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

April 24, 2008

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

Re: March 2008 Kolmakof Mine, Napaimute, Alaska Removal Site Inspection Final Report

Dear Mr. Beck:

The Department of Environmental Conservation (ADEC), Contaminated Sites Program has reviewed the Kolmakof Site Inspection Final Report received by the ADEC on April 21, 2008. This report describes site characterization efforts conducted on behalf of the Bureau of Land Management (BLM) at an abandoned Mercury Mine located on the Kuskokwim River near Napaimute, Alaska. ADEC comments to the draft report have been satisfactorily addressed in the final version. This report is accepted as is. Thank you for the opportunity to contribute to the final document.

If you have any questions, please contact me at 451-2752, or by e-mail at Kim.DeRuyter@alaska.gov.

Sincerely,

Kim DeRuyter

Kim DeRuyter
Environmental Program Specialist

cc: Len Marcus

RECEIVED
APR 28 2008
Anchorage Field Office

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Anchorage District & Field Office
6881 Elmore Road
Anchorage, Alaska 99507-2591
http://www.blm.gov/ak

April 1, 2008

In Reply Refer To:
2064 (011) AA-082255
3808 (011) AA-082114

CERTIFIED MAIL
RETURN RECIEPT REQUESTED

Alaska Department of Environmental Conservation
Division of Spill Prevention and Response
Contaminated Sites Program
610 University Avenue
Fairbanks, Alaska 99709-3643

Dear Ms. DeRuyter:

Enclosed is a copy of our Removal Site Inspection Report for the Kolmakof Mine Site, dated March 2008. This report incorporates your and other stakeholder comments on the draft report. Subject to availability of funds, we plan to conduct removal of solid wastes from the Site and continue characterization of the tailings dump area to adequately define its impact on the Kuskokwim River. If you have any questions or comments concerning this report or other aspects of the project please contact me at 907-267-1226, or by email at Larry_Beck@ak.blm.gov.

Sincerely,

/s/
Lawrence J. Beck
Environmental Protection Specialist

Kolmakof Mine, Napaimute, Alaska
Removal Site Inspection Final Report

March 2008

Prepared for:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Prepared by:

ecology and environment, inc.
International Specialists in the Environment

001998_BU08_01

Kolmakof Mine, Napaimute, Alaska
Removal Site Inspection
Final Report

March 2008

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
840 K Street, Suite 100
Anchorage, AK 99501

©2008 Ecology and Environment, Inc.

TABLE OF CONTENTS

Section **Page**

Site Location 1
Purpose of the Removal Site Inspection 1
Persons Responding 2
Date of the Removal Site Inspection 2
Background 3
E & E Actions 4
General Observations 4
Removal Site Inspection Sampling Summary 7
Discussion of Analytical Results 7
Comparison to Published Cleanup, Health Risk, and Background Criteria 9
Conceptual Site Model 16
Summary and Conclusions 17
References 21

LIST OF TABLES

Tables **Page**

Table 1: Collected Samples Summary 22
Table 2: Soil Samples Analytical Results Summary 23
Table 3: Sediment Samples Analytical Results 25
Table 4: Water Samples Analytical Results 26
Table 5: Other Samples Analytical Results 27
Table 6: Regional Background Soil and Sediment Concentrations 28

LIST OF FIGURES

Figures **Page**

Figure 1: Site Location Map 29
Figure 2: 1978 and 2003 Aerial Photographs 30
Figure 3: Camp Area 31
Figure 4: Mill Area 32
Figure 5: Tailings Pile Photograph 33

TABLE OF CONTENTS, cont'd.

LIST OF ATTACHMENTS

ATTACHMENT A PHOTOGRAPHIC DOCUMENTATION
ATTACHMENT B FIELD LOG BOOK
ATTACHMENT C STRUCTURES, EQUIPMENT, AND SOLID WASTE SUMMARY
ATTACHMENT D LABORATORY ANALYTICAL DATA, SAMPLE CHAIN-OF-CUSTODY RECORDS, AND DATA QUALITY ASSURANCE REVIEW MEMORANDUM
ATTACHMENT E ADEC CONCEPTUAL SITE MODEL FORM

KOLMAKOF MINE REMOVAL SITE INSPECTION FINAL REPORT
MARCH 2008

Site Location

The abandoned Kolmakof Mine Site (KMS) is located within Section 6, Township 17 North, Range 53 West, Seward Meridian. The site, located at approximately 61° 35' 22.825" north latitude and 158° 55' 22.438" west longitude, is on federal land owned and managed by the U.S. Bureau of Land Management (BLM). The site is located along the Kuskokwim River approximately 19.5 miles east of Aniak, Alaska and approximately 10 miles west of Napaimute, Alaska. The nearest known inhabited area is Napaimute (seasonal use only). A small, unnamed creek passes by portions of the site and flows into the Kuskokwim River near the Camp Area portion of the site. There are no roads to the site or landing strips nearby; access is by boat only. See Figure 1 for a site location map.

Purpose of the Removal Site Inspection

In accordance with Contract No. NAC040271, Purchase Order Number LAQ070314, Ecology and Environment, Inc. (E & E) conducted a Removal Site Inspection (RSI) of the abandoned Kolmakof Mine Site. The primary objective was to identify and report any chemical or physical hazards associated with the mine to determine if environmental remediation of the site is warranted prior to conveyance of the site land to the Regional Native Corporation.

The RSI focused on investigating potential contamination or remaining hazardous materials at and around the mine's two main facilities: the Camp Area located along the Kuskokwim River and the up-gradient Mill Area. The RSI included performing a visual survey of these facilities for possible hazardous materials or contamination and collecting soil, product, sediment, and surface water samples from representative locations for laboratory analysis of possible contaminants. Mercury was considered the primary contaminant of concern although other hazardous materials and compounds were investigated as well. See Figure 2 for aerial photos showing the general site area and the location of the Camp and Mill Areas.

Persons Responding

Larry Beck, Project Manager
BLM Anchorage Field Office
6881 Abbott Loop Road
Anchorage, Alaska 99507
(907) 267-1226
Larry_Beck@ak.blm.gov

Len Marcus, Project Manager
Ecology and Environment, Inc.
840 K Street, Suite 100
Anchorage, Alaska 99501
(907) 257-5000 ext. 224
lmarcus@ene.com

Charles Lovely, Land Law Examiner
BLM Alaska State Office
222 W 7th Avenue, #13
Anchorage, Alaska 99513
(907) 271-5733
Charles_Lovely@ak.blm.gov

Andy Uhrig, Field Sampling Technician
Ecology and Environment, Inc.
333 SW Fifth Avenue, Suite 608
Portland, Oregon 97204
(503) 248-5600
auhrig@ene.com

Land Conveyance/Local Resource Contacts:

Mark Leary, Tribal Administrator
Native Village of Napaimute
P.O. Box 1301
Bethel, AK 99559
Napaimute Office Phone: (907) 467-6171
Bethel Office Phone: (907) 543-2887
napaimute@starband.net

Mitchell Dammeyer, Environmental Coordinator
Native Village of Napaimute
P.O. Box 1301
Bethel, AK 99559
Napaimute Office Phone: (907) 467-6171
Bethel Office Phone: (907) 543-2887
napaimute@starband.net

This Removal Site Inspection report includes the following Attachments:

- Attachment A – Photographic documentation;
- Attachment B – Field log book copy;
- Attachment C – Structures, equipment, and solid waste summary;
- Attachment D – Laboratory analytical data quality assurance review memorandum, analytical data result sheets, sampling chain-of-custody records, and State of Alaska Department of Environmental Conservation (ADEC) Laboratory Data Review Checklist; and
- Attachment E – ADEC Conceptual Site Model Form

Date of the Removal Site Inspection

July 31 and August 1, 2007

Background

The KMS is an abandoned cinnabar (mercury ore) mine located within the Napaimute Village Town site selection and is scheduled to be conveyed to the Kuskokwim Corporation in accordance with the Alaska Native Claims Settlement Act. Cinnabar is prevalent throughout the Yukon-Kuskokwim drainage of Western Alaska and other now-inactive mercury mines are located elsewhere along the Kuskokwim River. Mining at the KMS dates back to around 1881 but the majority of existing structures date from the 1940s or more recent, and the mining claim at KMS was abandoned in 1993. The mine's two developed areas, the Camp Area on the bank of the Kuskokwim River and the upland Mill Area, are approximately 0.75 miles apart (see Figure 2). The two areas were connected by a dirt road which parallels an unnamed creek that drains directly into the Kuskokwim River. Since the mine closure, the KMS area has become overgrown with vegetation and the roads are now foot paths (see Figure 2).

In 1999, the U.S. Environmental Protection Agency (EPA) notified the BLM that they were initiating a preliminary assessment/site investigation (PA/SI) at the site. EPA's on-site contractor indicated in subsequent correspondence that they had identified the potential for mercury and other toxic metals contamination from the tailings, mill and retorting operations. Per the EPA, a retort was located at the "upper camp" and over 250 flasks of mercury were recorded to have been produced during the mine's period of active production.

In 2000, the BLM was notified by the EPA that the SI phase had been canceled based on BLM indicating that they would conduct the investigation under the Department of the Interior's delegated CERCLA authority. During 2000, BLM conducted site inspections and a determination was made that removal of hazardous materials was warranted at the site. The last claim owner was contacted (R&H Mining Co., San Diego, CA). In coordination with R&H, the BLM removed several drums of chemicals and razed a shed containing "dynamite". The available documentation from the BLM removal in 2000 does not indicate that the areas identified by the EPA were addressed. During an August 2006 joint site inspection of the site with a representative of the Native Village of Napaimute, the BLM concluded that further investigation was warranted.

During the 2006 BLM site inspection, the Mill Area was found to contain a collapsing ball mill structure with water flowing under and through it. Two sheds were found nearby, one containing about a dozen metal bottles which appeared to be empty mercury flasks. EPA correspondence to BLM had mentioned a

retort operation at the "upper camp" so it was assumed that the flasks indicated that the shed may have housed a retort or that one was nearby. Numerous empty drums and fuel cans were found scattered around both inside and outside the sheds. The unnamed creek formed a small pond a few feet from the mill, and the source of the creek was reported to be water coming to the ground surface above and around the mill building from the steep hillside/berm immediately adjacent. An old pickup truck was found abandoned a short distance away. The former dynamite shed was represented by a pile of ash and burned metal debris. No evidence of spills, stains, odors or distressed vegetation beyond the ash at the former dynamite shed was noted by BLM. It also appeared that waste rock/tailings were dumped over the bluff into the Kuskokwim River from the mill building and the mining pit areas uphill and behind the river bluff.

The Camp Area structures were observed by the BLM to be deteriorating and contained a significant volume of discarded household debris. The remnants of a potential mercury retort, consisting of a metallic, apparent beer keg secured to rotting wood beams, was found near the Camp Area. A firebrick pit was found located adjacent to the keg.

E & E Actions

During the KMS RSI, E & E performed the following tasks:

- Viewed developed portions of the site to identify facility features and determine representative sampling locations;
- Collected soil, product, sediment, and water samples, and obtained off-site laboratory analysis of the samples to identify possible contaminants and concentrations (see Table 1 for a summary of collected laboratory samples and Table 2 for a summary of analytical results); and
- Inventoried abandoned mine-related structures, equipment, and debris, as well as potential hazardous materials (see Attachment C for equipment, structures, and solid waste inventory).

General Observations

Figure 2 contains aerial photographs of the site indicating the location of the Camp and Mill Areas. Figures 3 through 5 are diagrams showing the features of the investigated mine areas and RSI sample collection points. Table 1 is a summary listing of all laboratory samples collected under the RSI and Table 2 is a summary of the analytical results. Attachment A contains a photo documentation log for the RSI and Attachment B is a copy of the E&E RSI field log book. Attachment C is a table summarizing KMS structures and equipment inventoried during the RSI and corresponding solid waste volume estimations.

During the KMS RSI, BLM and E&E personnel found the site much as described in this report's Background section. The approximate 0.75 mile length road linking the Camp Area to the Mill Area was significantly overgrown and required brush cutting to become passable by foot. Mine-related structures and equipment were found at the Camp and Mill Areas as previously reported (also see inventory in Attachment C). The rustic structures ranged in condition from mostly intact to partially collapsing and most still contained discarded goods remaining from the mine's operational period (examples: appliances and old food containers in the cooking structure; cabinetry, clothing and personal items in the housing structures; and tools, hardware, and mechanical and electrical parts in the Mill sheds).

At the Camp Area, the RSI field team viewed the housing, cooking, shop, and generator structures there as well as the nearby retort facility (see Figure 3 for a map of the Camp Area and Attachment C for a listing of structures and equipment found there). The retort facility is referred to as the "retort mound" in this report, as the site consists of an earthen mound containing discarded, apparent ore refining or processing equipment (see Figure 3 for a diagram of the retort mound and Attachment C for a listing of items found there). A "beer keg" container modified with an iron pipe attachment found there was suspected as being a retort or furnace unit for separating pure mercury from crushed ore, while a sewer pipe found there was suspected of being a related object or possibly a condensing column for retrieving vaporized mercury (a bucket was noted to be suspended mid-way inside the sewer pipe). These two items, plus an open-topped, two-compartment container on the ground (had the appearance of a split-open, 55-gallon drum), were found to contain a brown and red, or occasionally white-colored, sandy-to-lumpy granular material. This granular material was sampled when found and is suspected to be processed or "roasted" cinnabar ore. Numerous empty drums were found around the Camp Area and retort mound (see Figure 3 and Attachment C). No ground discoloration ("staining"), indicative of oil or fuel spillage, was observed around those drums or at other potential fuel usage locations, such as the Camp Area's generator shed.

During the RSI, a total of three surface soil samples, one creek sediment sample, one creek surface water sample, and four samples suspected to be processed ore from various containers were collected for laboratory analysis from the Camp Area and retort mound (see Table 1 and Figure 3).
At the Mill Area, the multi-level, wood beam-framed Mill building was found to be partially collapsed with processing equipment (ore crushing equipment, conveyor systems, ore treatment units) strewn around the base of the mill. The Mill building appeared to be built into a possibly man-made,

approximately 30-foot tall earthen bank which featured a pathway leading from outlying ore mining areas to an ore loading chute at the top rear of the structure. The drainage ditch that runs underneath and past the Mill building, noted to contain flowing water during the 2006 BLM site visit, was dry at the time of the RSI. Two sheds (referred to as the Large Shed and Small Shed) near the Mill building were found largely intact and with discarded small parts and equipment inside. Large wood beams were found on the dirt floor of the Large Shed; the RSI team surmised that the beams may have been a support base for a previously-removed large piece of machinery such as an electrical generator or ore processing equipment. Twelve, approximate 1/2-gallon-sized metal flasks suspected to have been used for storing processed liquid mercury were found in this structure, and apparent small beads of elemental mercury were noted nearby on the ground. The Small Shed appeared to have been used as a fabrication or shop building and the wood floor was partially collapsed. The burned structure reported as the explosives shed was found near the Mill building. Burned structural debris was present and white, apparent ash on the ground covered an approximate 6-foot diameter area. Numerous empty drums were found around the Mill Area but no ground discoloration indicating spillage was observed around those drums or at other potential fuel usage locations, such as inside the larger building. See Figure 4 for a diagram of the Mill Area and Attachment C for a listing of structures and equipment found there.

A wood box containing a white lumpy solid was found at the base of the Mill building amongst the strewn ore processing equipment. This material visually appeared similar to the “ash” found at the remains of the nearby explosives shed and resembled lime or a similar chemical agent used in mercury processing. It was known that bags of quicklime were formerly at the site, brought there as part of removal activities in 2000.

During the RSI, a total of 12 surface soil samples, two wet creek sediment samples, two creek surface water samples, three dry drainage ditch sediment samples, two ash samples, and one sample of the unknown white solid material in the wood box were collected for laboratory analysis from the Mill Area (see Table 1 and Figure 4).

The field team also investigated a reported KMS-related tailings pile along the northern bank of the Kuskokwim River in the vicinity of the Mill Area. This portion of the northern bank of the Kuskokwim River features an approximately 150-foot high bluff that slopes sharply down to the river. The bluff face is vegetated in some areas and displays bare soil in others. The reported tailing pile is along a steep slope

approximately 0.75 miles downriver (west) of the Camp Area and is approximately 200-300 feet wide. The Mill Area lies approximately 1,500 feet behind the investigated tailings pile, and the aerial photos in Figure 2 show pathways connecting the two. This connection, and the field team's observation that soil at the reported tailings pile appeared to have been placed there, indicates that this slope likely contains either overburden (waste rock) or tailings generated from the mining operation. The field team also noted several outcrops of brown/red-colored soil appearing on the bluff slope both close to and further downriver (west) of the alleged tailings pile. The soil at these outcrops did not visually appear to have been displaced or transplanted but was only viewed from the water. Cinnabar (mercury ore) is characteristically brownish-red; therefore these colored soil areas noted on the bluff face may be cinnabar deposits. During the RSI, a total of three surface soil samples were collected for laboratory analysis from the tailings pile (see Table 1 and Figure 5).

Removal Site Inspection Sampling Summary

Collection of laboratory-analysis samples took place in accordance with the RSI Work Plan guidelines. One deviation from the Work Plan, performed under the approval of the BLM Project Manager, consisted of collecting a sample of the unknown white solid material found in a wood box at the Mill building and performing laboratory analyses to characterize that material as well as the similar-appearing explosives shed "ash" samples. Table 1 on page 22 is a summary listing of all samples collected for laboratory analysis under the RSI. Samples are grouped in Table 1 according to matrices and intended analyses.

Discussion of Analytical Results

RSI samples received laboratory analysis under the following analytical methods, as applicable:

- Metals (inorganic metals, total concentrations): EPA Method 6010B
- Methylmercury (organic mercury): EPA Method 1630
- Nitroaromatics (explosives): EPA Method 8330
- Petroleum hydrocarbons: ADEC Methods AK 101 (gasoline range organics - GRO), AK 102 (diesel range organics - DRO), and AK 103 (residual range organics- RRO) and EPA method 8260B for benzene, toluene, ethylbenzene, and total xylenes (BTEX)
- pH: EPA Method 9045C
- Anions: EPA Method 300

RSI sampling analytical results are summarized in Table 2 through Table 5 and are discussed in the four following subsections: Soil Samples, Sediment Samples, Surface Water Samples, and Other Samples. Each subsection begins with a summary of detected compounds followed by comparisons (where applicable) to regulatory health risk or cleanup criteria, to site-specific reference concentrations, and to regional background concentrations (comparison criteria is discussed beginning on the following page). Laboratory analytical result forms for RSI samples are contained in Attachment D. Per the RSI Work Plan, E & E performed a data quality assurance review of the analytical data, which is also provided in Attachment D. All analytical data were found to be acceptable for use subject to qualifications identified in the analysis-specific data quality assurance memorandum prepared by E & E.

As discussed in the RSI Work Plan, up to six samples revealing mercury under total (or inorganic) metals analysis (EPA Method 6010B) were to be submitted for mercury speciation analysis (EPA Method 1630) to identify whether organic mercury compounds, known to be biologically more harmful than other forms, were present in KMS samples. Following the receipt of total metals analytical results, the following six samples (representing a variety of the media sampled onsite as well as some of the higher total mercury concentrations) were selected for mercury speciation analysis: the ore fines sample from the loading chute; the sediment sample from the dry settling pond close to the Mill; the lumpy solid material found in the open-topped, two-compartment container at the retort mound; two of the three tailings pile soil samples, and one of the duplicate wet sediment samples collected from the flowing, unnamed creek down-gradient of the Mill. The mercury speciation results, reported as methylmercury detections, are addressed in the appropriate subsections below. Where a given sample underwent both inorganic and organic mercury analysis, no direct correlation in concentrations was noted between the results of the two analyses – a common situation, according to the laboratory. Within Attachment D, the mercury speciation results are on a single, unnumbered page 63 pages in, just prior to copies of the sample submittal chain-of-custody forms.

Comparison to Published Cleanup, Health Risk, and Background Criteria

1. Comparison to Published State and Federal Cleanup or Health Risk Criteria. RSI sampling results were compared to published criteria or guidance values from various agencies. These criteria are summarized below and are included as applicable in the RSI sample result tables beginning on page 22.

BLM risk management criteria were used for comparison to RSI soil, sediment, and surface water sample results (BLM 2004). Specifically, the sample results were compared to "camper" exposure category criteria provided in Table 2, Human Risk Management Criteria. As previously mentioned, there are no residents at the site, no work occurs there, and visitors are infrequent. The camper scenario is presently considered the most applicable of the exposure categories (the others are: resident, ATV driver, worker, surveyor, boater, and swimmer) and is also generally the second-most protective category after the "resident" category.

ADEC soil cleanup criteria were also used for comparison to RSI sample results (ADEC 2007). Specifically, cleanup levels under Method 2, Tables B1 and B2, in the "Under 40-inch Zone/Migration to Groundwater" category were applied. Groundwater characteristics at the site are not currently known, but migration to groundwater conditions are presumed for the purpose of evaluating site data.

In addition to BLM criteria, ADEC water quality criteria were also used for comparison to RSI surface water sample results (ADEC 2003). Specifically, the lower of the ADEC values found between Table 1 (Drinking Water Primary Maximum Contaminant Levels) and Table V (Human Health Criteria for Non-Carcinogens) were applied and are included in RSI Table 4 (Surface Water Samples Analytical Results).

In accordance with ADEC guidance, RSI sediment sampling results were compared to National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs)(ADEC 2001). The specific NOAA criteria used consisted of Threshold Effects Level (TEL) and Probable Effects Level (PEL) values for freshwater sediment (NOAA 1999).

Some detected soil contaminants not addressed under published BLM and ADEC criteria (specifically methylmercury and 1,3,5-trinotrobenzene) were compared to EPA Region 6 Human Health Medium Specific Screening Levels (HHMSSLs) under the "Industrial Outdoor Worker" category (EPA 2007).

2. Comparison to Site-Specific Reference Samples. Analytical results from samples collected around the site were also compared to site-specific reference surface soil, creek surface sediment, and creek surface water samples collected during the RSI. Referred to as background samples in the KMS RSI Work Plan, these site-specific reference samples were collected from presumed uncontaminated areas upgradient of the Mill Area that showed no visible signs of development or obvious impacts from mine-related activities.

3. Comparison to Regional Background Concentrations. Regional background concentrations for metals are available for soils and sediments in Alaska and the western United States (Gough et al. 1988; Bailey et al. 2002; Bailey and Gray 1995; BLM 2000) and were used for comparison to provide additional context for concentrations of metals detected in the RSI samples.

Soil Sample Results (results reported in Table 2)
The BLM criterion of 40 milligrams per kilogram (mg/kg) inorganic mercury in soil was exceeded in three samples: the apparent ore fines sample collected at the ore chute entrance (690 mg/kg) and two of the three tailings pile samples (74 mg/kg and 99 mg/kg). No other metals results were noted to exceed BLM criteria.

A comparison of ADEC metals criteria to soil sample results revealed exceedences of arsenic, total chromium, and inorganic mercury concentrations in multiple samples (ADEC arsenic and inorganic mercury criteria are lower than the corresponding BLM criteria). The arsenic concentrations in soil samples ranged from 4.5 mg/kg to 13 mg/kg, exceeding the ADEC criteria of 2 mg/kg. The ADEC total chromium criterion of 26 mg/kg was exceeded in four samples: the ore fines sample from the loading chute (39 mg/kg estimated), and the three tailings pile samples (33 mg/kg to 36 mg/kg estimated), and was equaled in the retort mound soil sample. The ADEC inorganic mercury criterion of 1.4 mg/kg was exceeded in eight soil samples: the ore fines sample from the loading chute (690 mg/kg), the three tailing pile samples (22 mg/kg to 99 mg/kg), the soil sample from the retort mound (3.8 mg/kg), the duplicate soil samples from inside the Mill Area's Large Shed (5.4 mg/kg and 9.1 mg/kg), and the soil sample from in between the two Mill Area Sheds (12 mg/kg).

Those metals noted to exceed BLM or ADEC criteria (arsenic, total chromium, and inorganic mercury) were compared to the site-specific reference sample collected during the site inspection. The arsenic

concentration exceeded the site-specific reference concentration of 9.0 mg/kg only in the ore fines sample collected at the top ore chute (13 mg/kg). The soil sample collected from the east side of the tailings pile and from between the two Mill Area Sheds met the arsenic reference concentration, and all other samples remained below it. Total chromium concentrations exceeded the site-specific reference concentration of 23 mg/kg in five samples: ore fines at the top ore chute (39 mg/kg estimated), soil at the retort mound (26 mg/kg estimated), and the east side (33 mg/kg estimated), west side (36 mg/kg estimated), and center (34 mg/kg estimated) of the tailings pile. Inorganic mercury concentrations exceeded the site-specific reference concentration of 1.4 mg/kg in eight samples: the ore fines sample from the loading chute (690 mg/kg), the three tailing pile samples (22 mg/kg to 99 mg/kg), the soil sample from the retort mound (3.8 mg/kg), the duplicate soil samples from inside the Mill Area's Large Shed (5.4 mg/kg and 9.1 mg/kg), and the soil sample from in between the two Mill Area Sheds (12 mg/kg).

Background metals concentrations for the State of Alaska and the western United States were compiled for further evaluation of arsenic, total chromium, and inorganic mercury in soil samples collected in the mine-impacted area of the site. The site-specific reference sample concentrations of arsenic, total chromium, and inorganic mercury generally fall within the reported range for background metals in Alaska (Table 6). As discussed below, arsenic and total chromium concentrations in mine-impacted soil appear to fall within the range of regional background concentrations while mercury levels appear to be elevated relative to regional background concentrations.

Arsenic concentrations found in KMS soil samples ranged from 4.5 to 13 mg/kg, with a mean site concentration of 8.0 mg/kg. These levels of arsenic are consistent with mean background values reported for Alaska, which range from less than 10 to 750 mg/kg, and with values reported for Western U.S. soils, which range from 2.8 to 10.9 mg/kg. Total chromium concentrations found in KMS soil samples ranged from 12 to 39 mg/kg, with a mean concentration of 24.2 mg/kg. The mean background total chromium concentration reported for Alaska is 64 mg/kg, with a range of 5 to 390 mg/kg, indicating that total chromium in KMS soil samples is present at levels consistent with natural background concentrations. In addition, the maximum chromium concentration in KMS soil samples falls well within the reported range of 19 to 90 mg/kg for Western U.S. soils. Inorganic mercury concentrations in KMS soil samples range widely from 0.59 to 690 mg/kg, but all samples were collected from within or near areas where cinnabar

ore enrichment or refining likely occurred. All values for inorganic mercury in KMS soil samples exceed reported regional background levels that range from 0.05 to 0.2 mg/kg[1].

A comparison of ADEC petroleum cleanup criteria to the four soil samples analyzed for petroleum fractions revealed only one exceedence: a DRO result of 16,000 mg/kg in the soil sample collected from the bare floor inside the Mill Area's Large Shed near the wood beams, compared to the DRO standard of 250 mg/kg. This same sample also yielded GRO, RRO, and xylene detections but at levels below cleanup criteria. No direct evidence of petroleum products use or storage within this building was noted, although it was surmised that a generator may have been present at one time, and empty drums were found outside the building. The site-specific reference soil sample was not analyzed for petroleum compounds.

Organic mercury analysis was performed on two tailings pile samples and the ore fines sample collected at the head of the Ball Mill's loading chute. Methylmercury was detected in the ore fines sample only, at an estimated concentration of 0.000015 mg/kg. BLM and ADEC do not have published cleanup or health risk criteria for organic mercury; therefore, EPA Region 6 2007 HHMSSL criteria was used for comparison. The EPA Region 6 screening levels for methylmercury are listed as 6.1 mg/kg for residential soil and as 68 mg/kg for an industrial outdoor worker. The methylmercury concentration detected in the soil sample is below the EPA Region 6 screening criteria.

The two surface soil samples collected near the burned explosive shed were analyzed for explosives residue. The only detected compound, 1,3,5-trinitrobenzene, was found in one sample only at an estimated concentration of 0.024 mg/kg (this compound was also detected at a similar concentration in one of the duplicate ash pile samples listed in Table 5). Trinitrobenzene is derived from trinitrotoluene (TNT) and is used as an explosive; therefore detection of this compound is not unexpected given the area of collection. BLM and ADEC do not have published cleanup or health risk criteria for explosives, but related criteria was found in EPA Region 6's 2007 HHMSSL. EPA Region 6 screening levels for 1,3,5-trinitrobenzene are listed as 1,800 mg/kg for residential soil and as 21,000 mg/kg for an industrial outdoor

[1] Three mean background concentrations were obtained for inorganic mercury (0.05 mg/kg, 168 mg/kg, 0.2 mg/kg); although one value (168 mg/kg) appears to be an outlier as it is inconsistent with other values reported for southwestern Alaska and values for total mercury in Western U.S. soils (0.02 to 0.11 mg/kg). Two additional regional background levels were obtained for "mercury" but were not considered in this comparison because it was assumed that the values represented total mercury rather than inorganic mercury only.

worker. The explosive residue concentrations detected in this sample is below these levels. The site-specific reference soil sample was not analyzed for explosives.

Sediment Sample Results (results reported in Table 3)
The BLM criterion of 46 mg/kg inorganic mercury in sediment was exceeded in two of the six sediment samples: the dry settling pond close to the Mill building (48 mg/kg) and one of the duplicate sediment samples collected from the flowing, unnamed creek slightly down-gradient of the Mill (89 mg/kg). No other metals concentrations exceeded BLM sediment criteria.
Five of the six sediment samples displayed inorganic mercury concentrations ranging from 1.0 mg/kg to 89 mg/kg, which exceeds the NOAA SQuiRT mercury TEL of 0.174 mg/kg and the mercury PEL of 0.486 mg/kg. Five of six sediment samples displayed arsenic concentrations between 8.3 mg/kg and 13 mg/kg, in excess of the NOAA SQuiRT arsenic TEL of 5.9 mg/kg but below the arsenic PEL of 17 mg/kg. One sediment sample, collected from the dry drainage ditch west of the Mill building, revealed a copper concentration of 40 mg/kg, in excess of the NOAA SQuiRT TEL of 35.7 mg/kg but below the copper PEL of 197 mg/kg. The six sediment samples displayed nickel concentrations ranging from 22 mg/kg to 48 mg/kg, all of which exceeded the NOAA SQuiRT nickel TEL of 18 mg/kg. The nickel PEL of 35.9 mg/kg was exceeded in three of those samples.

Those metals found to exceed BLM or NOAA criteria (arsenic, copper, inorganic mercury, nickel) in the six sediment samples were compared to the site-specific reference sample collected during the RSI. This comparison revealed that five samples exceeded the reference sample for arsenic, copper, and mercury, while four samples exceeded the reference sample for nickel.

Table 6 presents one source of regional background concentrations for metals in stream and lake sediments of Alaska. Based on this reference, arsenic, copper, and nickel concentrations in the KMS sediment samples appear to be consistent with regional background concentrations. Site-related arsenic concentrations ranged from 4.5 to 13 mg/kg with a mean of 9.5 mg/kg, all of which are below the regional mean background level of 17.3 mg/kg and are consistent with regional background levels for soil. Copper concentrations ranged from 14 to 40 mg/kg, with a mean of 28 mg/kg, which is generally consistent with the regional background range of 7 to 14,000 mg/kg and mean background concentration of 37 mg/kg. Similarly, nickel concentrations ranging from 22 to 48 mg/kg fall within the reported regional background range of 9 to 1,800 mg/kg. Again, the mean nickel concentration of 35 mg/kg is consistent with the

reported mean regional background concentration of 37 mg/kg. Regional background concentrations for inorganic mercury in sediment were not obtained.

Two sediment samples were analyzed for organic mercury: the sediment sample from the dry settling pond close to the Ball Mill and one of the duplicate wet sediment samples collected from the flowing, unnamed creek down-gradient of the Mill. The dry settling pond sample revealed an estimated methylmercury concentration of 0.004922 mg/kg, and methylmercury was not detected in the other sample. Published health risk or screening criteria exists for inorganic mercury in sediments (BLM criteria and NOAA SQuiRTs) and in soil (EPA Region 6 HHMSSL) but not for organic mercury in sediments; therefore, no comparison to existing criteria is provided.

Surface Water Sample Results (results reported in Table 4)
The four collected surface water samples were analyzed for metal concentrations only. All analyzed metals remained undetected in these samples (three from adjacent to or down-gradient of the site and one from the site-specific reference location); therefore there no criteria or reference sample comparisons are provided.

Other Sample Results (results reported in Table 5)
"Other" samples consist of the duplicate "ash" samples collected from the remains of the burned explosives shed, a sample of the unknown white solid material found in a wood box at the base of the Mill, and four samples of suspected processed or roasted ore collected from containers at the retort mound: the sewer pipe (duplicate samples), the beer keg retort unit, and the open-topped two-compartment container. Although not soil, these materials were either found on the ground (the ash) or in containers but collectively have the potential to (or may have already) migrate into surrounding soil and exposure pathways for this material would also be similar to that of soil. Therefore, soil health risk or screening criteria is used for comparison of the analytical results.

The white solid material in the wood box was sampled to identify the material or its characteristics. This material appeared discolored and partially solidified due to years of exposure to the elements, and because the "ash" material found in the remains of the burned explosives shed appeared visually similar, the two ash samples (collected as a field duplicate) were subjected to the same laboratory analyses as the wood box material: metals concentrations, pH, anions, and explosives residue. The results appeared very

similar between the three samples – each displayed a pH of around 9.5, concentrations of calcium and magnesium averaging 120,000 mg/kg and 50,000 mg/kg respectively, and only very low levels of nitrate and sulfate under the anion analysis. Following the RSI sampling event, it was learned that quicklime or a similar material was brought to the site in or around 2000 as part of an earlier, planned cleanup effort, but it is not known whether the lime was actually used as intended. The bags of quicklime also may have been stored in the explosives shed when the fire occurred. Therefore, it is possible that the material observed both in the box and at the burned explosives shed is the quicklime material. The analytical results do not conclusively support this (for example, a higher pH value would be expected of quicklime), although the sampled material may have been quicklime that has become degraded or altered through prolonged exposure to the elements.

One of the ash samples revealed a detection of the compound 1,3,5-trinitrobenzene at an estimated concentration of 0.026 mg/kg (this compound was also detected at a similar concentration in one of the soil samples near the burned explosives shed); the other ash sample and the wood box material showed no explosives residue detections. Trinitrobenzene is derived from TNT and is used as an explosive; therefore detection of this compound is not unexpected given the area of collection. EPA Region 6 HHMSSL screening levels for 1,3,5-trinitrobenzene are listed as 1,800 mg/kg for residential soil and as 21,000 mg/kg for an industrial outdoor worker. The explosive residue concentration detected in this sample is below these levels.

The suspected processed ore samples revealed elevated arsenic, chromium and mercury concentrations relative to the comparison criteria. The ADEC criterion of 2 mg/kg arsenic in soil was exceeded the four processed ore samples and the two ash samples, with concentrations ranging from 7.1 mg/kg to 30 mg/kg. Two of those samples, the duplicate ash samples, exceeded the BLM criterion of 20 mg/kg of arsenic in soil with concentrations of 25 mg/kg and 30 mg/kg. The ADEC total chromium in soil criterion of 26 mg/kg was exceeded in all four of the processed ore samples (total chromium concentrations ranged from 41 to 81 mg/kg estimated) and total chromium was undetected in the ash samples. Inorganic mercury concentrations were highest in the retort mound's open-topped container material at 18,000 mg/kg, while the other samples showed lower concentrations of 32 and 43 mg/kg. Four of the inorganic mercury concentrations exceed the ADEC criterion of 1.4 mg/kg mercury in soil and two exceed the BLM criterion of 40 mg/kg mercury in soil.

The granular material found in the retort mound's open-topped container was also analyzed for organic mercury and revealed a methylmercury concentration of 0.012426 mg/kg. Both the inorganic and organic mercury concentrations in this sample were the highest of all the RSI samples. For comparison, the EPA Region 6 HHMSSL screening levels for methylmercury are listed as 6.1 mg/kg for residential soil and as 68 mg/kg for an industrial outdoor worker. The methylmercury concentration in the open-topped container sample is below the EPA Region 6 screening criteria.

Conceptual Site Model

Attachment E contains a completed ADEC Human Health Conceptual Site Model (CSM) based on the template on ADEC's Contaminated Sites Program website. The ADEC CSM follows a similar format and selection criteria to BLM guidance (BLM 2004). Information relating to the CSM evaluation for KMS is presented below. This CSM is based on preliminary information obtained through the RSI project and is subject to change as additional information becomes available.

The KMS site is in a remote portion of Alaska and has not been active or inhabited since at least 1993, when the mining claim reportedly was abandoned. The nearest residents reside on a seasonal (summertime) basis at Napaimute, approximately 10 miles up the Kuskokwim River. According to Native Village of Napaimute representatives, human activity around the KMS area has included visits by persons from the region on a regular basis to trap animals, pick berries, and hunt moose. However, since the road from the river to the Mill Area has become overgrown, visitation to the KMS area has reportedly decreased substantially to the point where little or no hunting or food gathering takes place. But it is also reported that people traveling on the Kuskokwim River still stop at the Camp Area, presumably to camp or rest. Therefore, site visitation for food collection or other purposes remains a current or future possibility. Residential or commercial use of the site occurred in a limited capacity when the mine was operational but is believed to have ended when the claim was abandoned in 1993. Although future site usage in a residential or commercial manner is currently not envisioned as likely, it is possible that the site could host residents or workers again. No information exists on groundwater depth or prior usage in the site area. Based on the detection of surface contamination, the potential exists that groundwater could be affected by surface contaminants through downward migration, and therefore ingestion of groundwater is counted as a possibility in the event that groundwater is utilized in the future.

The RSI sampling results revealed elevated levels of contaminants in surface soil and creek sediment media and in containers holding mining process waste. Additionally, the possibility exists that site-related contaminants have impacted the Kuskokwim River. When considering possible transport mechanisms affecting these media (such as migration, leaching, volatilization, erosion, sedimentation, and biological uptake), the following potential exposure media and pathways at KMS are identified: soil (through incidental soil ingestion and dermal absorption of contaminants); groundwater (through ingestion of groundwater); air (through inhalation of indoor air and inhalation of fugitive dust); surface water (through ingestion of surface water); sediment (through direct contact with sediment); and biota (through ingestion of wild foods).

Potential current or future human receptors are considered to be site visitors or recreational users, subsistence harvesters, or subsistence consumers. Because site re-occupation can not be presently ruled out, future residents and commercial or industrial workers are also considered potential receptors.

Summary and Conclusions

The RSI findings indicate that certain surface soil and sediment locations as well as containerized, suspected processed ore contain the metals arsenic, total chromium, copper, inorganic mercury, and nickel (either individually or combined), or DRO, in concentrations that exceed either State of Alaska ADEC or federal agency (BLM or NOAA) cleanup or health risk/screening criteria. The exceedences were found in samples collected from the Camp Area, the Mill Area, and the tailings pile.

A comparison of RSI sample results against available, regional background data indicate that concentrations of arsenic, total chromium, copper, and nickel in soil and/or sediment are consistent with naturally-occurring metals background levels for southwestern Alaska. Arsenic concentrations exceeding ADEC standards were found in most soil and refined ore samples, and arsenic concentrations in the two ash samples only exceeded BLM soil criteria. However, these arsenic concentrations were similar to the site-specific reference sample and reported regional background levels for southwestern Alaska and may therefore be indicative of naturally-occurring arsenic levels. Total chromium concentrations in several soil and refined/processed ore samples exceeded the ADEC cleanup criterion; although levels again were consistent with reported regional background concentrations. Like arsenic, chromium appears to be a prevalent, naturally occurring element. Nickel and copper concentrations exceeded health risk criteria in

most of the sediment samples but were consistent with regional background concentrations reported for Alaska streams and lakes.

Mercury is naturally occurring within cinnabar deposits in the area and was detected in all RSI samples, including the site-specific reference soil and sediment samples. The highest inorganic mercury concentrations detected under the RSI were found in the apparent refined or roasted ore material held in various mercury processing containers (retort unit, sewer pipe, open-topped container) at the retort mound. As these containers are not well secured and pose human contact or environmental release threats, removal is recommended in accordance with applicable federal or state regulations. Inorganic mercury concentrations exceeding health risk or cleanup criteria were also discovered in natural media around the site (soil, sediment), and visible, elemental mercury droplets were observed on the soil floor of the Mill Area's Large Shed. The values for inorganic mercury in KMS soil samples exceed the typical reported regional soil background levels (regional background values for mercury in sediment were not obtained). Regarding the mercury concentrations detected in soil and sediment areas, it is recommended that BLM evaluate the RSI findings against the presence of/impact of naturally-occurring, background mercury concentrations and consult with other agencies, as appropriate, to determine if further studies or remedial activities are required.

All three tailings pile soil samples displayed mercury, total chromium, and arsenic concentrations in excess of either BLM or ADEC contamination criteria. The detected arsenic and total chromium concentrations in the tailings pile samples are close to the site-specific reference sample and regional background levels, but the inorganic mercury concentrations exceed the site-specific reference level as well as the typical, regional background concentration. This is not unexpected given the suspected nature of the pile (tailings or waste-rock). These results should be evaluated to determine if further action regarding tailings pile soil is warranted. Sampling in the adjacent Kuskokwim River was not performed; therefore it is not known whether mercury is present in river sediments. If present, however, sources of any mercury may include local cinnabar deposits, past KMS practices, or even upriver mercury mining activities. Given the proximity of the tailing pile to the river and taking into account the potential for soil/contamination migration, an evaluation of whether KMS is a contributor to any possible mercury (or other compounds) contamination in the Kuskokwim River sediments may be warranted.

One surface soil sample, collected from the soil floor of the Large Shed in the Mill Area, displayed a DRO petroleum fraction concentration above the ADEC cleanup level. No ground discoloration indicating contamination was noted and the horizontal and vertical extent of this contamination was not investigated; therefore the potential extent of this contamination is not known. This result should be addressed with ADEC to determine if further action is warranted.

The lateral and horizontal extent of any detected in-situ (i.e., within soil or sediment environments) contamination was not ascertained during the RSI; therefore, contaminated area volume estimates are not available (however, preliminary estimates are made in Attachment C for soil at the retort mound, sediment in the settling pond at the Mill Area, and soil inside the Large Shed; the estimates are based on a three-foot depth of contamination assumption). If contamination removal is warranted, further delineation of affected areas is needed.

Structures at the KMS are in declining condition and pose a physical threat to curious or unprepared site visitors. Although very few persons currently visit the site, BLM may have to consider possible future land use conditions in determining whether the structures can remain as is or should be otherwise addressed (i.e., removed or improved). Drums inspected at the site appeared to be empty, but the site is known to contain several smaller known or possible hazardous materials such as batteries, grease, and used mercury flasks (see Attachment C). Apparent empty drums should be inspected further to verify a lack of contents, and the various known or suspected hazardous material items should be removed to prevent migration of contaminants into the environment or accidental public or wildlife exposures. Removal of empty drums and the smaller mechanical and electrical parts, empty containers, kitchen supplies, furniture, and other household items noted within or outside the various site structures is also recommended to reduce the potential for visitor injury due to misuse and to eliminate the potential for the dispersal or littering of these items into the environment. The table in Attachment C includes volume estimates for solid waste observed at the site, and the estimates are further subdivided into volumes of wood debris that could possibly be burned onsite and volumes of non-wood or hazardous debris that may require offsite removal for disposal.

Because it was learned after the RSI field event that the sampled “ash” at the burned explosives shed may have been quicklime or a similar material spread on the ground there or partially consumed in the fire, the

possibility exists that explosives residue may still remain in the footprint of the burned shed underneath that applied material.

References

Alaska Department of Environmental Conservation (ADEC). 2007. *18 AAC 75 Article 3, Section 341 – Soil Cleanup Levels. Register 180, January 2007.*

———, 2003. *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, As amended through May 15, 2003.*

———, 2001. *Sediment Quality Guidelines Technical Memorandum of March 2004* (Executive Summary for *"Sediment Quality Guideline Options for the State of Alaska, May 2001"*).

Bailey, E.A. and J.E. Gray. 1995. *Mercury in the terrestrial environment, Kuskokwim Mountains Region, Southwestern Alaska.* Published in Geologic Studies in Alaska by the U.S. Geological Survey, 1995.

Bailey, E.A, Gray, J.E., and Theodorakos, P.M. 2002. *Mercury in vegetation and soils at abandoned mercury mines in Southwestern Alaska..* Published in Geologic Studies in Alaska by the U.S. Geological Survey, 2002.

Gough, L.P., Sverson, R.C., and Shaklette, H.T. 1988. *Element concentrations in Soils and Other Surficial Materials of Alaska.* U.S. Geological Survey Professional Paper 1458.

National Oceanic and Atmospheric Administration (NOAA). 1999. *Screening Quick Reference Tables; Hazmat Report 99-1, Updated September 1999.*

U.S. Bureau of Land Management (BLM). 2004. *Risk Management Criteria for Metals at BLM Mining Sites, Technical Note 390 rev., October 2004.*

———, 2000, R*eview and analysis of site investigations and engineering evaluation for determination of a contaminated site cleanup option for the Red Devil Mercury Mine, Alaska.* Bureau of Land Management, Anchorage, AK. April 2000.

U.S. Environmental Protection Agency. 2007. *Region 6 Human Health Medium Specific Screening Levels 2007.*

Table 1: Collected Samples Summary

Sample No.	Matrix	Location/Description
SURFACE SOIL AND TAILINGS MATERIAL FOR METALS ANALYSIS		
07KMS03SS	soil/ore	Mill: apparent ore fines at ore loading chute entrance
07KMS04SS	surface soil	Mill: approx. 50 feet upslope of ore loading chute
07KMS09SS	**surface soil**	**Mill Area: bare floor inside Large Shed; near mercury flasks**
07KMS10SS	**surface soil**	**Field duplicate of above sample**
07KMS11SS	surface soil	Mill Area: ground area between the two Sheds
07KMS12SS	surface soil	Mill Area: down-gradient of the two Sheds
07KMS14SS	tailings/waste rock	Tailings pile along Kuskokwim River: east end
07KMS15SS	tailings/waste rock	Tailings pile along Kuskokwim River: west end
07KMS16SS	tailings/waste rock	Tailings pile along Kuskokwim River: central area, closer to shoreline
07KMS17SS	processed ore	Retort mound: brown/white lumpy solid in open-topped, split drum-like container
07KMS18SS	processed ore	Retort mound: red/brown granular solid from inside "beer keg" retort unit
07KMS19SS	surface soil	Retort mound: central area
07KMS20SS	**processed ore**	**Retort mound: red/brown granular solid from inside "sewer pipe"**
07KMS21SS	**processed ore**	**Field duplicate of above sample**
07KMS28SS	surface soil	Mill Area: east side of Mill support embankment
07KMS29SS	surface soil	Mill Area: west side of Mill support embankment
07KMS31SS	unk. white solid	Mill: wood box at Mill base containing unknown white solid
07KMS32SS	surface soil	Site-specific reference sample: west and up-gradient of site
CREEK SURFACE WATER FOR METALS ANALYSIS		
07KMS24SW	surface water	Unnamed creek: at confluence with Kuskokwim River; co-located with sediment sample 07KMS24SD
07KMS25SW	**surface water**	**Unnamed creek: close to and down-gradient of ball mill; co-located with sediment sample 07KMS25SD**
07KMS26SW	**surface water**	**Field duplicate of above sample**
07KMS33SW	surface water	Site-specific reference sample: east & up-gradient of site; co-located with sediment sample 07KMS33SD
CREEK SURFACE SEDIMENT FOR METALS ANALYSIS		
07KMS01SD	surface sediment	Mill: dry drainage ditch immediately underneath ball mill unit
07KMS02SD	surface sediment	Mill Area: dry settling pond approx. 100 feet east of Mill
07KMS24SD	surface sediment	Unnamed creek: at confluence with Kuskokwim River; co-located with sediment sample 07KMS24SW
07KMS25SD	**surface sediment**	**Unnamed creek: close to and down-gradient of Mill; co-located with sediment sample 07KMS25SW**
07KMS26SD	**surface sediment**	**Field duplicate of above sample**
07KMS30SD	surface sediment	Mill Area: dry drainage ditch approx. 100 feet west of Mill
07KMS33SD	surface sediment	Site-specific reference sample: east & up-gradient of site; co-located with sediment sample 07KMS33SW
ASH FOR EXPLOSIVES ANALYSIS		
07KMS05SS	**ash**	**Mill Area: burned explosives shed**
07KMS06SS	**ash**	**Field duplicate of above sample**
07KMS07SS	surface soil	Mill Area: approx. 15 feet north of burned explosives shed
07KMS08SS	surface soil	Mill Area: approx. 15 feet southeast of burned explosives shed
SOILS FOR PETROLEUM ANALYSIS		
07KMS13SS	surface soil	Mill Area: near empty drums outside of Large Shed
07KMS22SS	**surface soil**	**Camp Area: near empty drums outside generator shed**
07KMS23SS	**surface soil**	**Field duplicate of above sample**
07KMS27SS	surface soil	Mill Area: bare floor inside Large Shed; near wood beam floor platform
07KMS34SS	soil trip blank	Trip blank

Note – bolded, adjoining lines indicate duplicate sample pairs

Table 2: Surface Soil Samples Analytical Results

Contaminant	ADEC Method 2 [1] Criteria (mg/kg)	BLM Criteria [2] (mg/kg)	EPA Criteria [3] (mg/kg)	Sample ID: 07KMS32SS	07KMS03SS	07KMS04SS	07KMS07SS	07KMS08SS	07KMS09SS	07KMS10SS	07KMS11SS	07KMS12SS	07KMS13SS
				Site-Specific Surface Soil Reference Sample	soil/ore fines at entrance to ore chute at Ball Mill	soil upslope of Ball Mill near ore chute	soil near explosives shed (outside of ash pile)	soil near explosives shed (outside of ash pile)	soil inside Mill's Large Shed (FIELD DUPLICATES)	soil inside Mill's Large Shed (FIELD DUPLICATES)	soil between the two sheds at the Mill Area	soil near floatation cell at Mill Area	soil outside Mill's Large Shed, near drums
VOCs (SW 846 EPA Method 8260B) (mg/kg)													
Benzene	0.02	N/A	N/A	na	na	na	na	na	na	na	na	na	(0.005) U
Toluene	5.4	N/A	N/A	na	na	na	na	na	na	na	na	na	(0.025) U
Ethylbenzene	5.5	N/A	N/A	na	na	na	na	na	na	na	na	na	(0.025) U
Xylenes	78	N/A	N/A	na	na	na	na	na	na	na	na	na	(0.025) U
Petroleum Hydrocarbons (mg/kg)								na					
GRO (Method AK 101)	300	N/A	N/A	na	na	na	na	na	na	na	na	na	(2.5) U
DRO (Method AK 102)	250	N/A	N/A	na	na	na	na	na	na	na	na	na	(25) U
RRO (Method AK 103)	11,000	N/A	N/A	na	na	na	na	na	na	na	na	na	73 J
Metals (SW 846 EPA Method 6010/7471), mercury speciation - EPA Method 1630 (mg/kg)													
Arsenic	2	20	N/A	9.0	**13**	**6.0**	na	na	**8.8**	**7.3**	**9.0**	**8.9**	na
Antimony	3.6	50	N/A	(5.7) U	(2.9) U	(3.4) U	na	na	(3.4) U	(2.9) U	(3.4) U	(2.8) U	na
Beryllium	42	N/A	N/A	(0.48) U	0.58	0.47	na	na		0.6	0.60	0.53	na
Cadmium	5	70	N/A	(0.95) U	(0.48) U	(0.56) U	na	na	0.75	(0.49) U	(0.57) U	(0.47) U	na
Chromium (total)	26	NA	N/A	23 J	**39** J	21 J	na	na	21 J	15 J	21 J	18 J	na
Copper	N/A	5,000	N/A	17	55	25	na	na	45	37	47	35	na
Lead	400	1,000	N/A	8.4 J	13 J	9.9 J	na	na	59 J	20 J	15 J	23 J	na
Mercury (inorganic)	1.4	40	N/A	1.4	**690**	1.1	na	na	**5.4**	**9.1**	**12**	0.91	na
Methylmercury (organic)	N/A	N/A	68	na	0.000015 J	na	na	na	na	na	na	na	na
Nickel	87	2,700	N/A	17	46	25	na	na	46	43	42	39	na
Selenium	3.5	700	N/A	(9.5) UJ	(4.8) UJ	(5.6) UJ	na	na	(5.7) UJ	(4.9) UJ	(5.7) UJ	(4.7) UJ	na
Silver	21	700	N/A	(1.9) U	(0.96) U	(1.1) U	na	na	(1.1) U	(0.97) U	(1.1) U	(0.95) U	na
Thallium	N/A	N/A	N/A	(9.5) U	(4.8) U	(5.6) U	na	na	(5.7) U	(4.9) U	(5.7) U	(4.7) U	na
Zinc	9,100	40,000	N/A	52 J	110 J	61 J	na	na	170 J	110 J	100 J	83 J	na
Nitroaromatics (Explosives) EPA Method 8330 (mg/kg)													
1,3,5 - trinitrobenzene	N/A	N/A	21,000	na	na	na	(0.25) U	0.024 J	na	na	na	na	na

Note: bolded results represent an exceedance of one or more criteria.

[1] - From 18 AAC 75 Article 3, Section 341: Method 2 Soil Cleanup Levels Tables B1 and B2; Under 40-inch Zone; Migration to Groundwater category.

[2] - From "BLM Risk Management Criteria for Metals at BLM Mining Sites, BLM, 2004; Soils medium; Camper category.

[3] - From EPA Region 6 2007 Human Health Medium Specific Screening Levels, Soil Matrix, Industrial Outdoor Worker category.

Key:

ADEC = State of Alaska Department of Environmental Conservation
AK = Alaska
BLM = Bureau of Land Management
DRO = diesel range organics
EPA = U.S. Environmental Protection Agency
GRO = gasoline range organics
J = Estimated value
mg/kg= milligrams per kilogram
N/A = Not available
na = Not analyzed
RRO = residual range organics
SW = Solid Waste
U = Undetected or below Method Detection Limit (detection limit in parentheses)
UJ = Detection Limit is an estimated value
VOCs = Volatile organic compounds

Table 2, cont'd: Surface Soil Samples Analytical Results

Contaminant	ADEC Method 2 [1] Criteria (mg/kg)	BLM Criteria [2] (mg/kg)	EPA Criteria [3] (mg/kg)	Sample ID: 07KMS32SS Site-Specific Surface Soil Reference Sample	07KMS14SS tailings pile - east side	07KMS15SS tailings pile - west side	07KMS16SS tailings pile - center	07KMS19SS soil - Retort Mound	07KMS22SS soil outside Camp Area generator shed (FIELD DUPLICATES)	07KMS23SS soil outside Camp Area generator shed (FIELD DUPLICATES)	07KMS27SS soil inside Large Shed at Mill Area	07KMS28SS soil - East side of Ball Mill embankment	07KMS29SS soil - West side of Ball Mill embankment
VOCs (SW 846 EPA Method 8260B) (mg/kg)													
Benzene	0.02	N/A	N/A	na	na	na	na	na	(0.0047) U	(0.0049) U	(0.0043) U	na	na
Toluene	5.4	N/A	N/A	na	na	na	na	na	(0.023) U	(0.025) U	(0.022) U	na	na
Ethylbenzene	5.5	N/A	N/A	na	na	na	na	na	(0.023) U	(0.025) U	(0.022) U	na	na
Xylenes	78	N/A	N/A	na	na	na	na	na	(0.023) U	(0.025) U	0.046	na	na
Petroleum Hydrocarbons (mg/kg)													
GRO (Method AK 101)	300	N/A	N/A	na	na	na	na	na	(2.3) U	(2.5) U	4.0	na	na
DRO (Method AK 102)	250	N/A	N/A	na	na	na	na	na	65 J	75 J	**16,000** J	na	na
RRO (Method AK 103)	11,000	N/A	N/A	na	na	na	na	na	250 J	270 J	3,100 J	na	na
Metals (SW 846 EPA Method 6010/7471), mercury speciation - EPA Method 1630 (mg/kg)													
Arsenic	2	20	N/A	9.0	**9.0**	**4.5**	**7.6**	**7.9**	na	na	na	**6.1**	**7.7**
Antimony	3.6	50	N/A	(5.7) U	(3.5) U	(2.9) U	(3.2) U	(3.2) U	na	na	na	(3.7) U	(3.0) U
Beryllium	42	N/A	N/A	(0.48) U	0.71	0.52	0.65	0.60	na	na	na	0.83	0.63
Cadmium	5	70	N/A	(0.95) U	(0.58) U	(0.49) U	(0.54) U	(0.54) U	na	na	na	(0.61) U	(0.49) U
Chromium (total)	26	NA	N/A	23 J	**33** J	**36** J	**34** J	**26** J	na	na	na	15 J	12 J
Copper	N/A	5,000	N/A	17	39	26	35	31	na	na	na	39	40
Lead	400	1,000	N/A	8.4 J	11 J	8.2 J	10 J	14 J	na	na	na	11 J	11 J
Mercury (inorganic)	1.4	40	N/A	1.4	**22**	**74**	**99**	**3.8**	na	na	na	0.75	0.59
Methylmercury (organic)	N/A	N/A	68	na	na	0.000009 U	0.000009 U	na	na	na	na	na	na
Nickel	87	2,700	N/A	17	43	35	51	32	na	na	na	35	26
Selenium	3.5	700	N/A	(9.5) UJ	(5.8) UJ	(4.9) UJ	(5.4) UJ	(5.4) UJ	na	na	na	(6.1) UJ	(4.9) UJ
Silver	21	700	N/A	(1.9) U	(1.2) U	(0.97) U	(1.1) U	(1.1) U	na	na	na	(1.2) U	(0.99) U
Thallium	N/A	N/A	N/A	(9.5) U	(5.8) U	(4.9) U	(5.4) U	(5.4) U	na	na	na	(6.1) U	(4.9) U
Zinc	9,100	40,000	N/A	52 J	99 J	76 J	100 J	83 J	na	na	na	110 J	85 J
Nitroaromatics (Explosives) EPA Method 8330 (mg/kg)													
1,3,5 - trinitrobenzene	N/A	N/A	21,000	na	na	na	na	na	na	na	na	na	na

Note: bolded results represent an exceedance of one or more criteria.

[1] - From 18 AAC 75 Article 3, Section 341: Method 2 Soil Cleanup Levels Tables B1 and B2; Under 40-inch Zone; Migration to Groundwater category.

[2] - From "BLM Risk Management Criteria for Metals at BLM Mining Sites, BLM, 2004; Soils medium; Camper category.

[3] - From EPA Region 6 2007 Human Health Medium Specific Screening Levels, Soil Matrix, Industrial Outdoor Worker category.

Key:

ADEC = State of Alaska Department of Environmental Conservation
AK = Alaska
BLM = Bureau of Land Management
DRO = diesel range organics
EPA = U.S. Environmental Protection Agency
GRO = gasoline range organics
J = Estimated value
mg/kg= milligrams per kilogram
N/A = Not available
na = Not analyzed
RRO = residual range organics
SW = Solid Waste
U = Undetected or below Method Detection Limit (detection limit in parentheses)
UJ = Detection Limit is an estimated value
VOCs = Volatile organic compounds

Table 3: Sediment Samples Analytical Results

Contaminant	BLM Criteria [1] (mg/kg)	NOAA Criteria [2] (PEL/TEL) (mg/kg)	Sample ID: 07KMS33SD		07KMS01SD		07KMS02SD		07KMS24SD		07KMS25SD		07KMS26SD		07KMS30SD	
			Site-Specific Sediment Reference Sample		sediment - dry ditch under Ball Mill		sediment - dry settling pond near Ball Mill		sediment - flowing creek at confluence with Kuskokwim River		sediment - flowing creek near Ball Mill (FIELD DUPLICATES)		sediment - flowing creek near Ball Mill (FIELD DUPLICATES)		sediment - dry ditch west of Ball Mill	
Metals (SW 846 EPA Method 6010/7471), mercury speciation - EPA Method 1630 (mg/kg)																
Arsenic	46	5.9/17	7.0		**13**		**8.6**		**13**		4.5		**9.7**		**8.3**	
Antimony	62	N/A	(6.3)	U	3.9		(4.0)	U	(3.8)	U	(4.3)	U	(4.2)	U	(3.8)	U
Beryllium	N/A	N/A	(0.52)	U	0.61		0.41		0.46		(0.36)	U	0.59		0.67	
Cadmium	155	0.596/3.53	(1.0)	U	(0.47)	U	(0.66)	U	(0.63)	U	(0.72)	U	(0.69)	U	(0.63)	U
Chromium	NA	37.3/90	17	J	19	J	20	J	22	J	15	J	27	J	26	J
Copper	5,745	35.7/197	15		32		32		20		14		30		**40**	
Lead	1,000	35/91.3	5.5	J	12	J	8.7	J	7.5	J	5.0	J	9.6	J	13	J
Mercury (inorganic)	46	0.174/0.486	0.18		**16**		**48**		0.096		**21**		**89**		**1.0**	
Methylmercury (organic)	NA	N/A	na		na		0.004922	J	na		na		0.000015	U	na	
Nickel	3,094	18/35.9	25		**48**		**23**		**33**		**22**		**40**		**45**	
Selenium	774	N/A	(10.0)	UJ	(4.7)	UJ	(6.6)	UJ	(6.3)	UJ	(7.2)	UJ	(6.9)	UJ	(6.3)	UJ
Silver	774	N/A	(2.1)	U	(0.94)	U	(1.3)	U	(1.3)	U	(1.4)	U	(1.4)	U	(1.3)	U
Thallium	N/A	N/A	(10.0)	U	(4.7)	U	(6.6)	U	(6.3)	U	(7.2)	U	(6.9)	U	(6.3)	U
Zinc	46,455	123.1/315	62	J	89	J	62	J	69	J	57	J	95	J	97	J

Note: bolded results represent an exceedance of one or more criteria.

[1] - From "BLM Risk Management Criteria for Metals at BLM Mining Sites, BLM, 2004; Sediments medium; Camper category.

[2] - From NOAA Screening Quick Reference Table for Inorganics in Solids - Freshwater Sediment, HAZMAT REPORT 99-1, Updated Feb 2004.

Key:

BLM = Bureau of Land Management
EPA = U.S. Environmental Protection Agency
J = Estimated value
mg/kg= milligrams per kilogram
N/A = Not available
na = Not analyzed

NOAA = National Oceanin and Atmospheric Administration

PEL = Probable Effects Level

SW = Solid Waste

TEL = Threshold Effects Level

U = Undetected or below Method Detection Limit (detection limit in parentheses)

UJ = Detection Limit is an estimated value

Table 4: Surface Water Samples Analytical Results

Contaminant	BLM Criteria [1] (ug/L)	ADEC Criteria [2] (ug/L)	Sample ID: 07KMS33SW Site-Specific Surface Water Reference Sample		07KMS24SW surface water - unnamed creek at confluence with Kuskokwim River		07KMS25SW surface water - creek near Ball Mill (FIELD DUPLICATES)		07KMS26SW surface water - creek near Ball Mill (FIELD DUPLICATES)	
Metals (SW 846 EPA Method 6010/7471), mercury speciation - EPA Method 1630 (ug/L)										
Arsenic	93	50	(60)	U	(60)	U	(60)	U	(60)	U
Antimony	124	6	(60)	U	(60)	U	(60)	U	(60)	U
Beryllium	N/A	4	(5)	U	(5)	U	(5)	U	(5)	U
Cadmium	155	5	(10)	U	(10)	U	(10)	U	(10)	U
Chromium	N/A	100	(25)	U	(25)	U	(25)	U	(25)	U
Copper	11,490	1,300	(20)	U	(20)	U	(20)	U	(20)	U
Lead	50	N/A	(30)	U	(30)	U	(30)	U	(30)	U
Mercury (inorganic)	93	0.050	(0.2)	U	(0.2)	U	(0.2)	U	(0.2)	U
Methylmercury (organic)	N/A	N/A	na		na		na		na	
Nickel	6,194	100	(20)	U	(20)	U	(20)	U	(20)	U
Selenium	1,548	50	(100)	U	(100)	U	(100)	U	(100)	U
Silver	1,548	N/A	(20)	U	(20)	U	(20)	U	(20)	U
Thallium	N/A	1.7	(100)	U	(100)	U	(100)	U	(100)	U
Zinc	92,909	9,100	(40)	U	(40)	U	(40)	U	(40)	U

Note: bolded results represent an exceedance of one or more criteria.

[1] - From "BLM Risk Management Criteria for Metals at BLM Mining Sites, BLM, 2004; Camper category.

[2] - From ADEC "Alaska Water Quality Criteria Manual" as amended through May 15, 2003. The lower values between Tables I and V are listed.

Key:
ADEC = State of Alaska Department of Environmental Conservation
BLM = Bureau of Land Management
EPA = U.S. Environmental Protection Agency
N/A = Not available
SW = Solid Waste
U = Undetected or below Method Detection Limit (detection limit in parentheses)
ug/l = micrograms per liter

Table 5: Other Samples Analytical Results

Contaminant	ADEC Method 2 [1] Criteria (mg/kg)	BLM Criteria [2] (mg/kg)	EPA Criteria [3] (mg/kg)	Sample ID: 07KMS05SS		07KMS06SS		07KMS17SS		07KMS18SS		07KMS20SS		07KMS21SS		07KMS31SS	
				ash at explosives shed remains		ash at explosives shed remains		processed ore - open-topped, split container at Retort Mound		processed ore - "beer keg" retort unit at Retort Mound		processed ore - sewer pipe at Retort Mound		processed ore - sewer pipe at Retort Mound		unknown white solid in wood box at base of Ball Mill	
				FIELD DUPLICATES								FIELD DUPLICATES					
Metals (SW 846 EPA Method 6010/7471), mercury speciation - EPA Method 1630 (mg/kg)																	
Arsenic	2	20	N/A	**25**		**30**		**8.7**		**7.6**		**7.1**		**7.6**		(2.8)	U
Antimony	3.6	50	N/A	(2.9)	U	(3.0)	U	(3.3)	U	(2.6)	U	(3.1)	U	(3.2)	U	(2.8)	U
Beryllium	42	N/A	N/A	(0.24)	U	(0.25)	U	(0.28)	U	0.52		0.65		0.69		(0.24)	U
Cadmium	5	70	N/A	(0.48)	U	(0.49)	U	(0.56)	U	0.49		(0.51)	U	0.54	U	(0.47)	U
Chromium	26	NA	N/A	3.4	J	4.6	J	**41**	**J**	**51**	**J**	**78**	J	**81**	J	3.4	J
Copper	N/A	5,000	N/A	3.9		3.1		23		33		26		35		(0.95)	U
Lead	400	1,000	N/A	8.6	J	4.1	J	16	J	7.5	J	5.2	J	6.6	J	(1.4)	UJ
Mercury (inorganic)	1.4	40	N/A	na		na		**18,000**		**32**		**43**		**32**		na	
Methylmercury (organic)	N/A	N/A	68	na		na		0.012426		na		na		na		na	
Nickel	87	2,700	N/A	2.3		3.1		26		33		39		43		1.5	
Selenium	3.5	700	N/A	(4.8)	UJ	(4.9)	UJ	(5.6)	UJ	(4.4)	UJ	(5.1)	UJ	(5.4)	UJ	(4.7)	UJ
Silver	21	700	N/A	(0.96)	U	(0.99)	U	(1.1)	U	(0.88)	U	(1.0)	U	(1.1)	U	(0.95)	U
Thallium	N/A	N/A	N/A	(4.8)	U	(4.9)	U	(5.6)	U	(4.4)	U	(5.1)	U	(5.4)	U	(4.7)	U
Zinc	9,100	40,000	N/A	370	J	540	J	97	J	410	J	76	J	87		8.8	J
Aluminum [4]	N/A	N/A	N/A	250		370		na		na		na		na		77	
Barium [4]	1,100	N/A	N/A	7.4		9.6		na		na		na		na		2.4	
Cobalt [4]	N/A	N/A	N/A	0.77		0.90		na		na		na		na		0.48	
Iron [4]	N/A	N/A	N/A	810		1,800		na		na		na		na		170	
Manganese [4]	N/A	19,000	N/A	160		180		na		na		na		na		140	
Strontium [4]	N/A	N/A	N/A	25		27		na		na		na		na		17	
Titanium4	N/A	N/A	N/A	12		16		na		na		na		na		3.1	
Vanadium [4]	3,400	N/A	N/A	3.0		3.5		na		na		na		na		2.7	
Calcium [4]	N/A	N/A	N/A	120,000		120,000		na		na		na		na		120,000	
Magnesium [4]	N/A	N/A	N/A	52,000		39,000		na		na		na		na		61,000	
Nitroaromatics (Explosives) EPA Method 8330 (mg/kg) [4]																	
1,3,5 - trinitrobenzene	N/A	N/A	21,000	(0.25)	U	0.026	J	na		na		na		na		(0.25)	U
pH (EPA Method 9045) [4]																	
	N/A	N/A	N/A	9.52		9.55		na		na		na		na		9.50	
Anions (EPA Method 300) (mg/kg) [4]																	
Sulfate - S	N/A	N/A	N/A	(3.0)	U	(2.8)	U	na		na		na		na		3.8	
Nitrate as N-S	N/A	N/A	N/A	0.84		0.83		na		na		na		na		2.6	

Note: bolded results represent an exceedance of one or more criteria.

[1] - From 18 AAC 75 Article 3, Section 341: Method 2 Soil Cleanup Levels Tables B1 and B2; Under 40-inch Zone; Migration to Groundwater category.

[2] - From "BLM Risk Management Criteria for Metals at BLM Mining Sites, BLM, 2004; Camper category.

[3] - From EPA Region 6 2007 Human Health Medium Specific Screening Levels, Soil Matrix, Industrial Outdoor Worker category.

[4] - Additional analyses performed on the ash samples and unknown white material only (sample No.'s 07KMS05SS, 06SS, and 31SS)

Key:
ADEC = State of Alaska Department of Environmental Conservation
EPA = U.S. Environmental Protection Agency
J = Estimated value
N/A = Not available
na = Not analyzed
SW = Solid Waste
U = Undetected or below Method Detection Limit (detection limit in parentheses)
UJ = Detection Limit is an estimated value

Table 6: Regional Background and Site-Specific Reference Soil and Sediment Metals Concentrations

Metal	BLM (2000)[1]	Bailey and Gray (1995)[2]	Bailey et al. (2002)[3]	Bailey et al. (2002)[4]	Bailey et al. (2002)[5]	Gough et al. (1988)[6]	Gough et al. (1988)[7]	Gough et al. (1988)[8]	Site-Specific Reference Sample
									07KMS32SS
Arsenic	NR	NR	NR	NR	NR	9.6	<10 - 750	2.8 - 10.9	9.0
Chromium (total)	NR	NR	NR	NR	NR	64	5 - 390	19 - 90	23 J
Mercury	5.6	0.34	0.05	168	0.2	NR	NR	0.02 - 0.11	1.4
Soil									07KMS33SD
Arsenic	NR	NR	NR	NR	NR	17.3	5 - 1796	NR	7.0
Copper	NR	NR	NR	NR	NR	37	7 - 14,000	NR	15
Sediment									
Mercury	5.6	NR	NR	NR	NR	NR	NR	NR	0.18
Nickel	NR	NR	NR	NR	NR	37	9 - 1,800	NR	25

Note: All concentrations are presented in units of mg/kg.

NR = Not reported

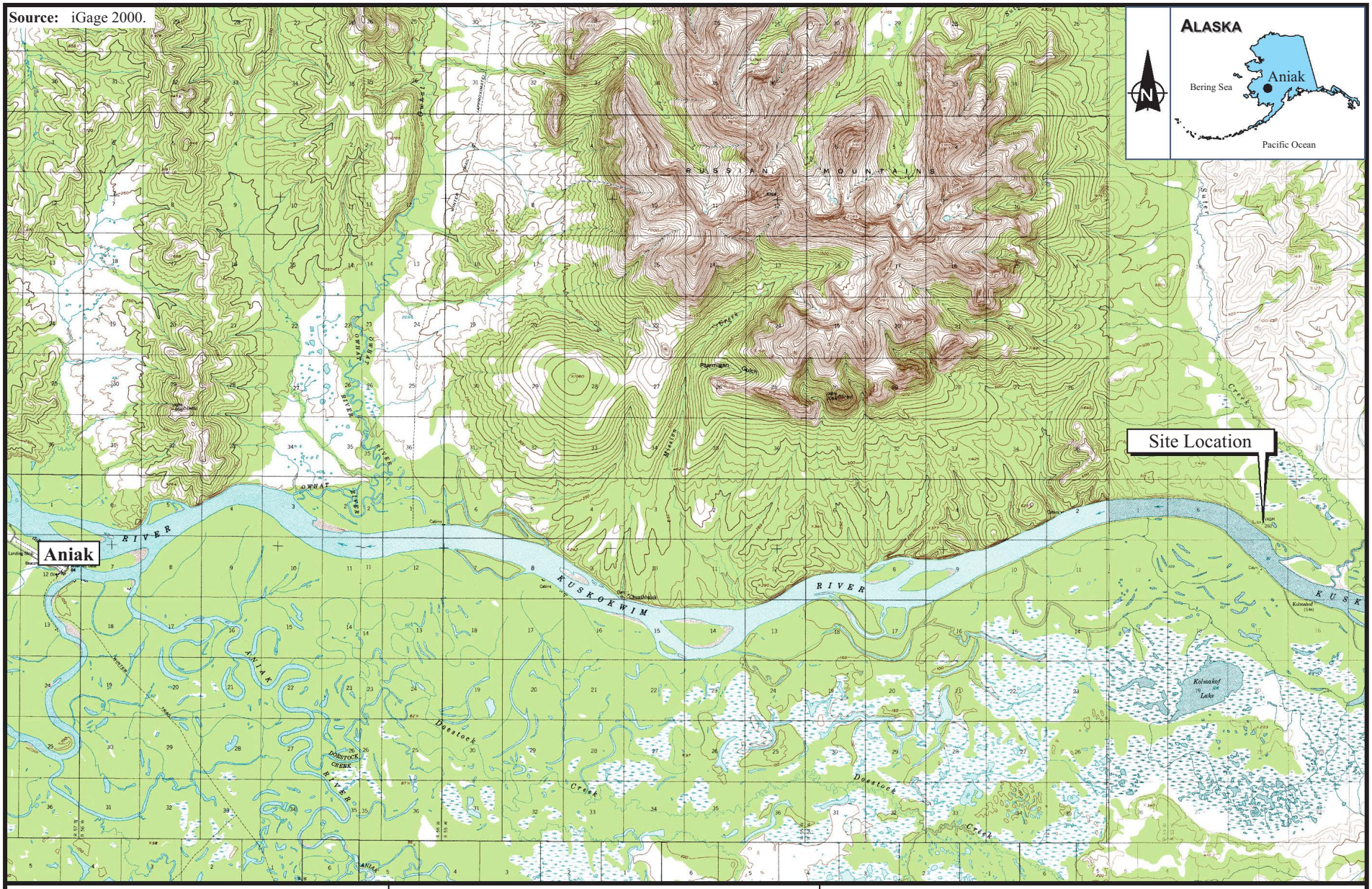
BLM 2000 - Reivew and analysis of site investigations and engineering evaluation for determination of a contaminated site cleanup option for the Red Devil Mercury Mine, Alaska. Bureau of Land Management, Anchorage, AK. April 2000.

Bailey, E.A. and J.E. Gray. 1995. Mercury in the terrestrial environment, Kuskokwim Mountains Region, Southwestern Alaska. Published in Geologic Studies in Alaska by the U.S. Geological Survey, 1995.

Bailey, E.A, Gray, J.E., and Theodorakos, P.M. 2002. Mercury in vegetation and soils at abandoned mercury mines in Southwestern Alaska. Published in Geologic Studies in Alaska by the U.S. Geological Survey, 2002.

Gough, L.P., Sverson, R.C., and Shaklette, H.T. 1988. Element concentrations in Soils and Other Surficial Materials of Alaska. U.S. Geological Survey Professional Paper 1458.

1. Value is mean of four values presented for mercury: 0.2, 6.4, 7.8, 8.0 mg/kg.
2. Value is mean of four values presented for total mercury: 0.18, 0.10, 0.16, 0.39 mg/kg as regional background levels for the Red Devil Mine and three values presented for total mercury: 1.2, 0.16, 0.18 mg/kg as regional background for the Cinnabar Creek Mine. Both mines are located in Southwestern Alaska, in the Kuskokwim Mountains.
3. Value is mean of three values presented for background concentrations of inorganic mercury for Red Devil Mine.
4. Value is mean of four values presented for background concentrations of inorganic mercury for Cinnabar Creek Mine.
5. Value is one measurement presented for background concentrations of inorganic mercury for Red Top Mine.
6. Values for soil and sediment are arithmetic mean values for soil from Alaska and sediment from stream and lake sediments in Alaska.
7. Range of mean values reported for the state of Alaska.
8. Range of mean values reported for Western United States.



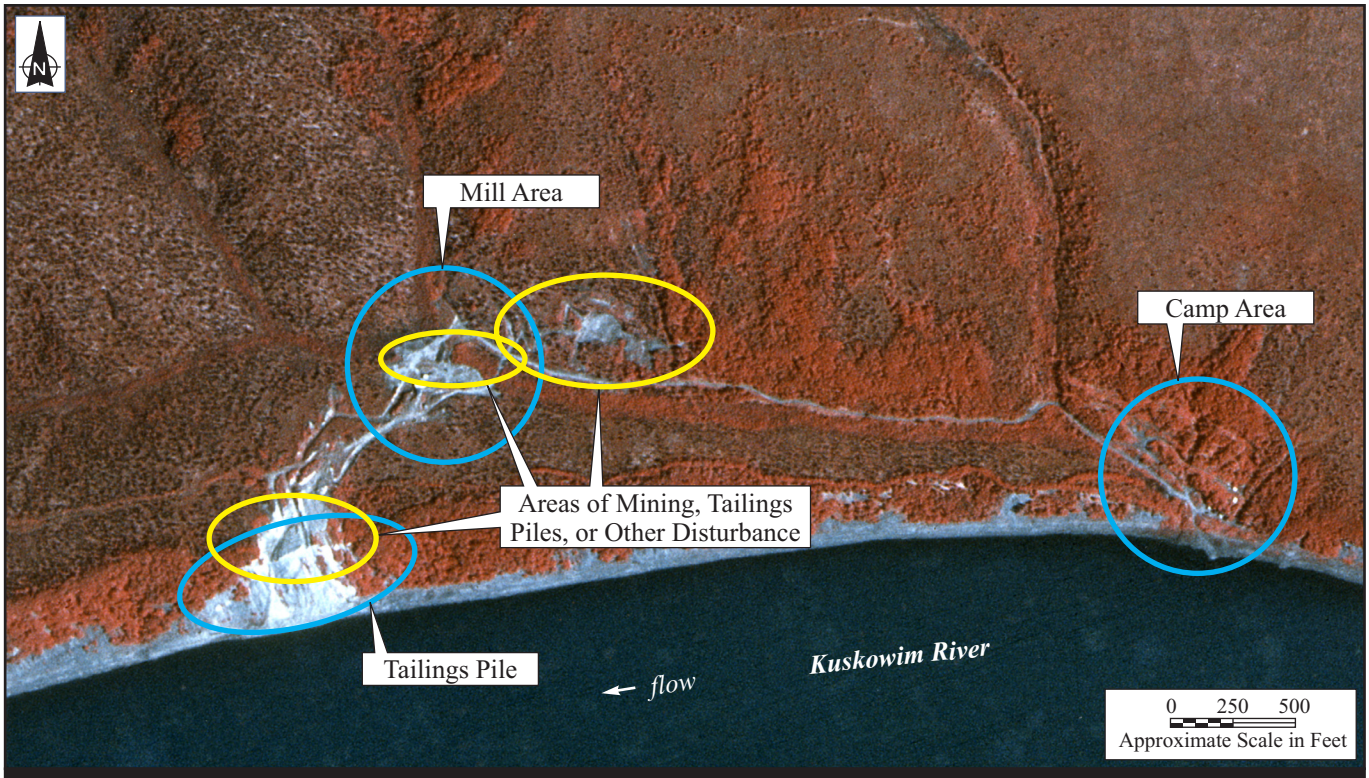
ecology and environment, inc.
International Specialists in the Environment
Anchorage, Alaska

KOLMAKOF MINE
REMOVAL SITE INSPECTION
Napaimute, Alaska

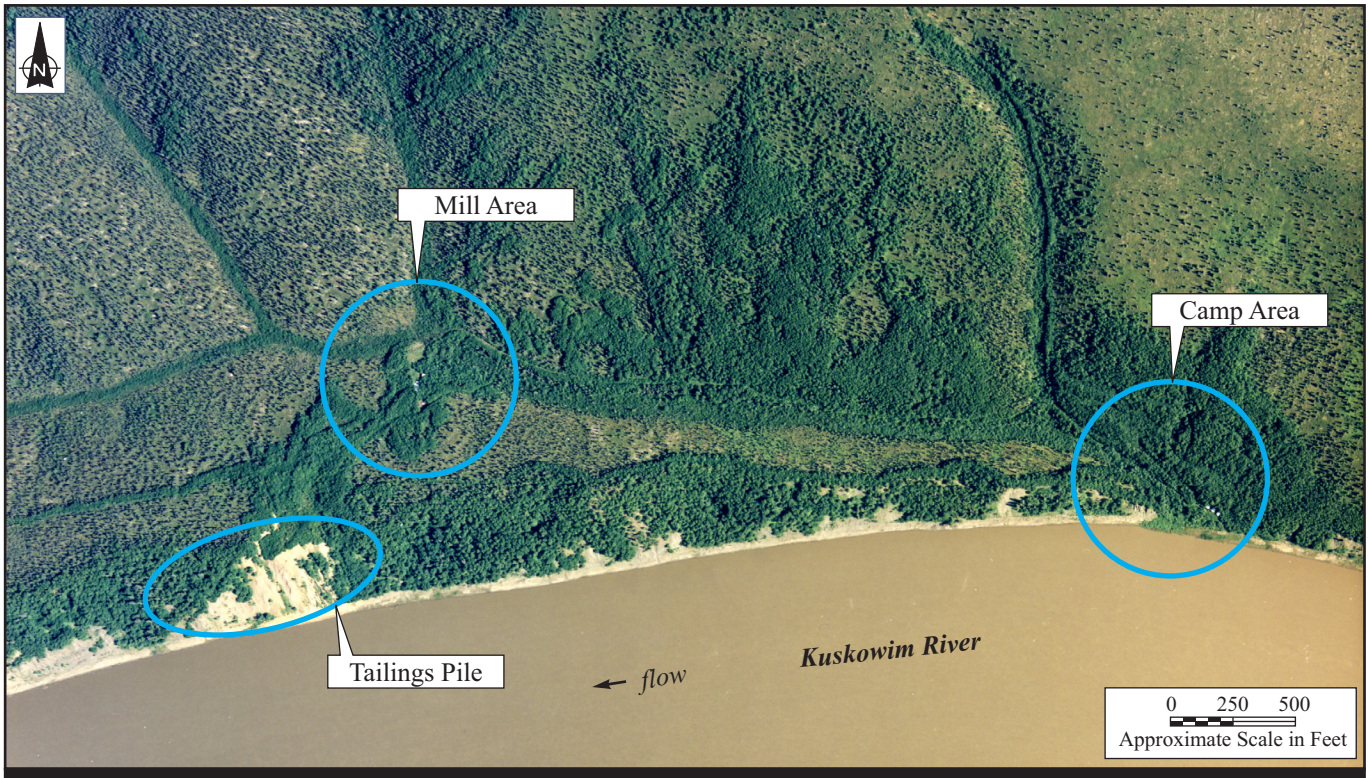
0 2 4
Approximate Scale in Miles

Figure 1
SITE LOCATION MAP

Date:	Drawn by:	
9/20/07	AES	10:001998BU0801\fig 1

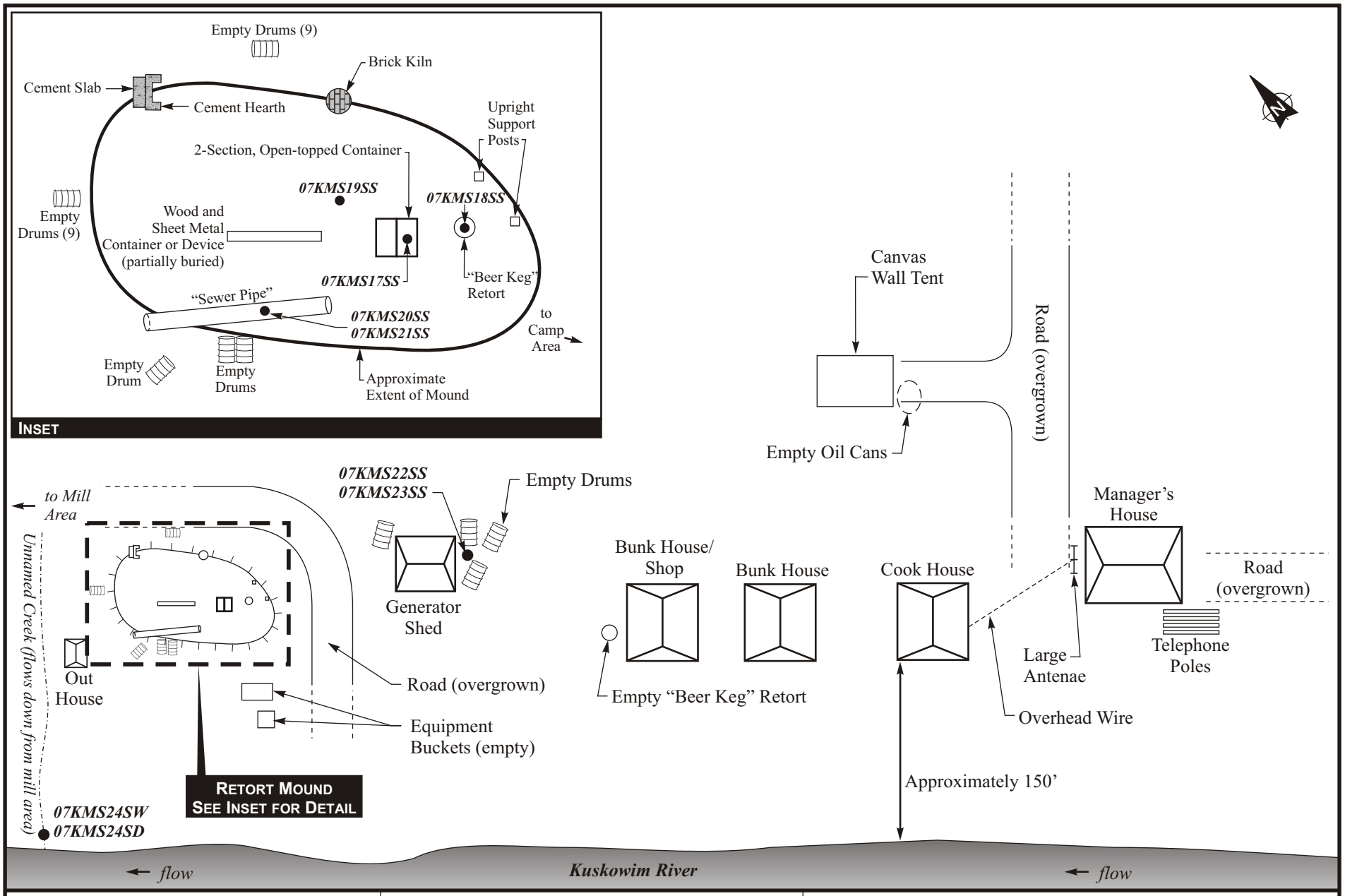


1978 Aerial Photograph

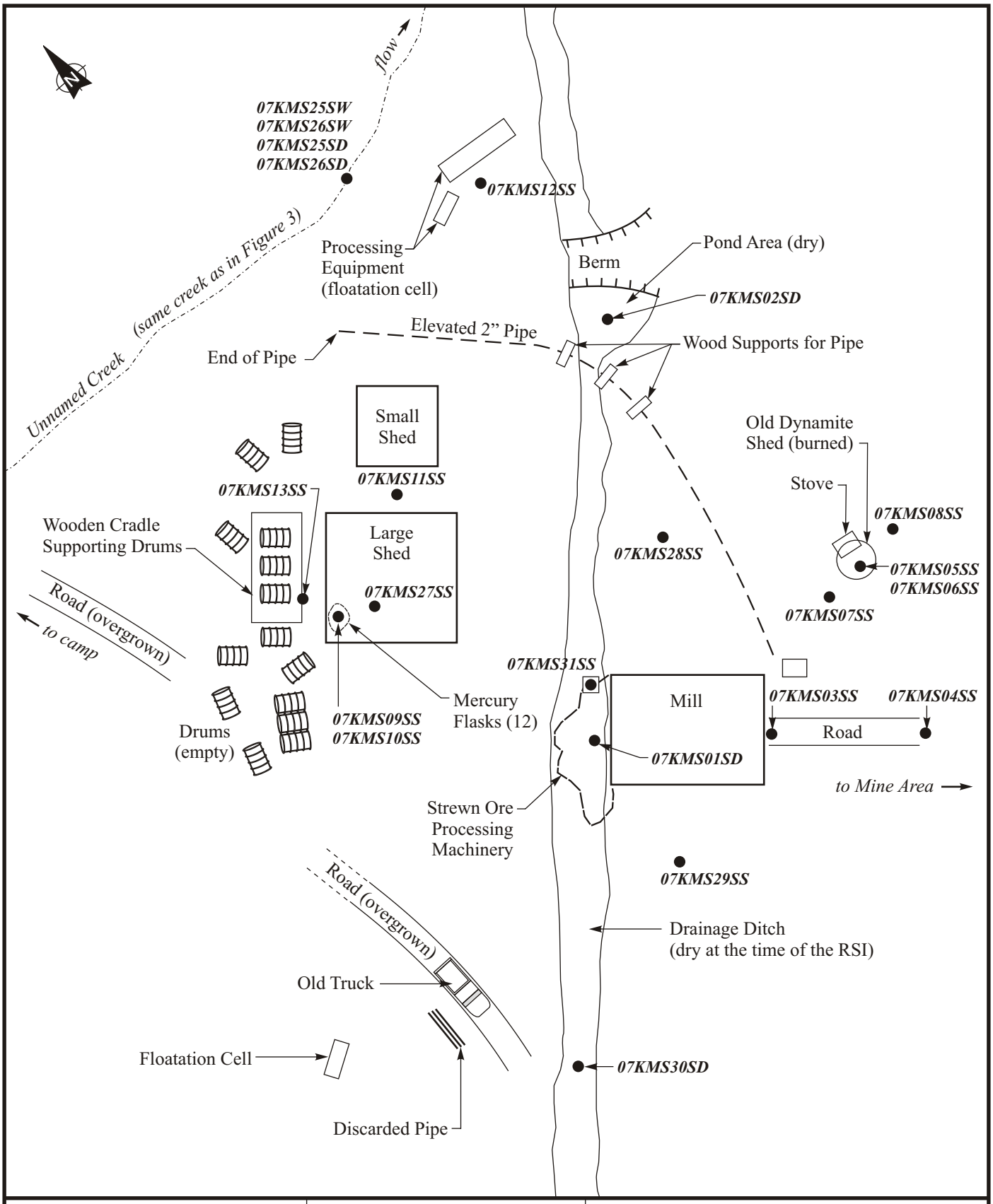


2003 Aerial Photograph

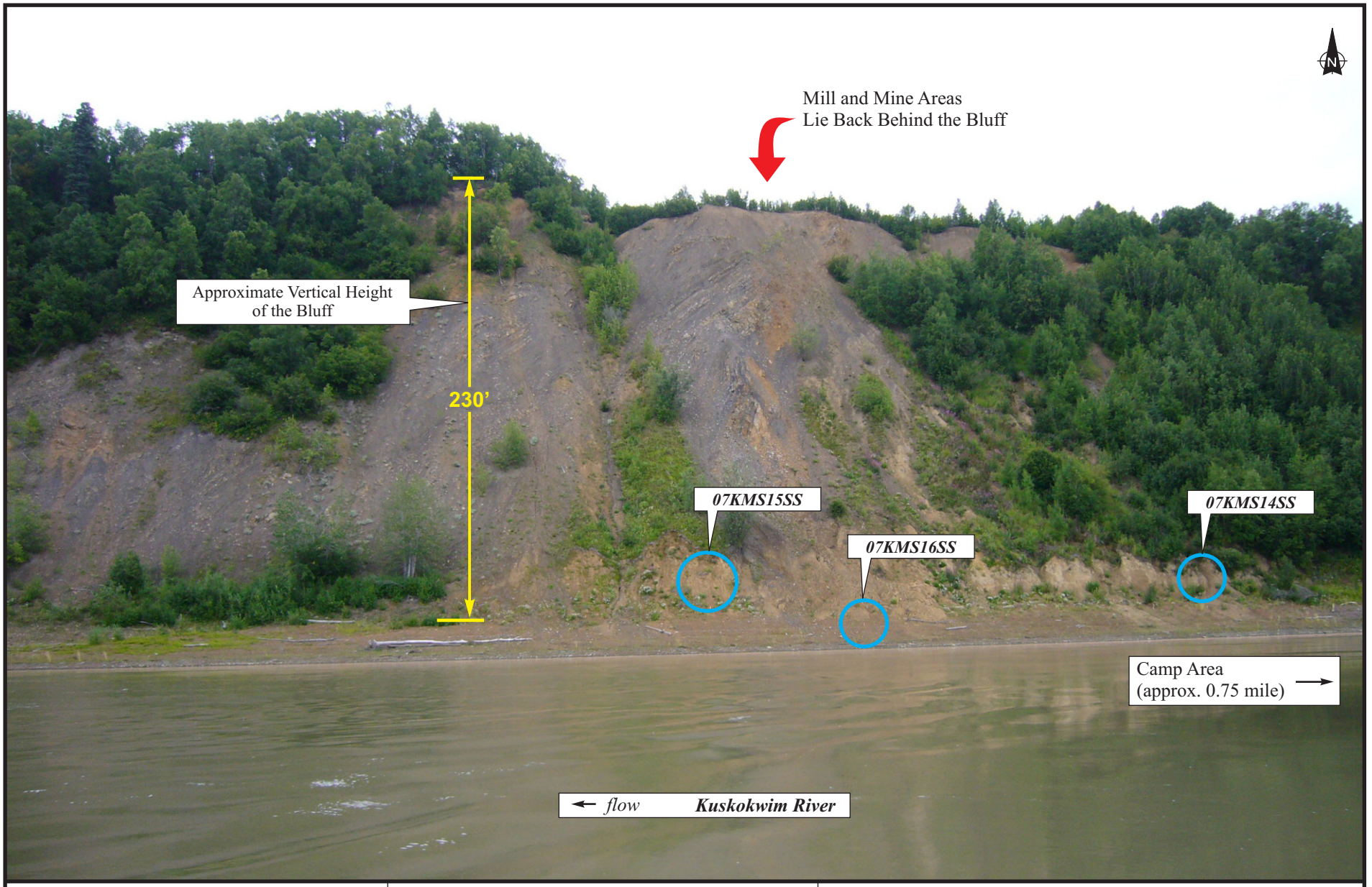
ecology and environment, inc. International Specialists in the Environment Anchorage, Alaska	KOLMAKOF MINE REMOVAL SITE INSPECTION Napaimute, Alaska	Figure 2 1978 AND 2003 AERIAL PHOTOGRAPHS		
	Source: Aero-Metric, Inc.	Date: 10-9-07	Drawn by: AES	10:001998BU0801\fig 2



ecology and environment, inc. International Specialists in the Environment Anchorage, Alaska	KOLMAKOF MINE REMOVAL SITE INSPECTION Napaimute, Alaska	Figure 3 CAMP AREA		
	Not to Scale	Date: 9/20/07	Drawn by: AES	10:001998BU0801\fig 3



ecology and environment, inc. International Specialists in the Environment Anchorage, Alaska	KOLMAKOF MINE REMOVAL SITE INSPECTION Napaimute, Alaska	Figure 4 MILL AREA		
	Not to Scale	Date: 2-22-08	Drawn by: AES	10:001998BU0801\fig 4



ecology and environment, inc.
International Specialists in the Environment
Anchorage, Alaska

KOLMAKOF MINE
REMOVAL SITE INSPECTION
Napaimute, Alaska

Figure 5
TAILINGS PILE PHOTOGRAPH

Date:	Drawn by:	
3/25/08	AES	10:001998BU0801\fig 5

ATTACHMENT A

PHOTOGRAPHIC DOCUMENTATION

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010094.JPG

Date: 7/31/07

Description: E&E sampler reaching underneath strewn mill equipment at the base of the Ball Mill to collect sediment sample # 07KMS01SD from the dry drainage ditch that runs past the Ball Mill.

Photograph: P1010095.JPG

Date: 7/31/07

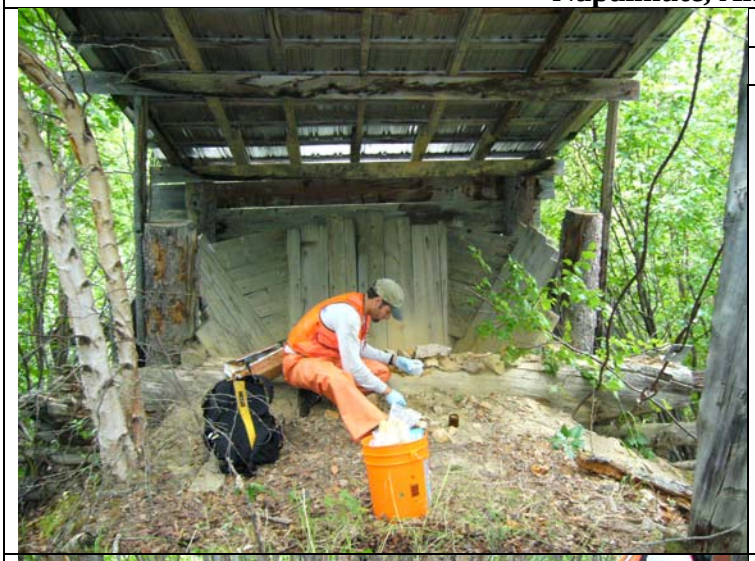
Description: Base of collapsing Ball Mill structure, showing ball mill unit and other ore processing equipment.

Photograph: P1010096.JPG

Date: 7/31/07

Description: Surface sediment sample # 07KMS02SD being collected from the dry settling pond slightly downgradient of the Ball Mill.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska



Photograph: P1010097.JPG

Date: 7/31/07

Description: Sample of suspected ore fines being collected from the ore loading chute entrance at the top of the Ball Mill structure (sample # 07KMS03SS).

Photograph: P1010099.JPG

Date: 7/31/07

Description: Surface soil sampling location on the earthen road or ramp leading up to the ore loading chute at the top rear of the Ball Mill structure (sample # 07KMS04SS; location is at red-topped stake).

Photograph: P1010100.JPG

Date: 7/31/07

Description: Duplicate samples being collected from ash pile at burned explosives shed location (sample #'s 07KMS05SS and 07KMS06SS).

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010101.JPG

Date: 7/31/07

Description: Surface oil sample location # 07KMS08SS, near the burned explosives shed (shed remains are visible in background).

Photograph: P1010102.JPG

Date: 7/31/07

Description: Surface soil sample location # 07KMS07SS, near the burned explosives shed (shed remains are visible in background).

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010103.JPG

Date: 7/31/07

Description: Duplicate surface soil sample #'s 07KMS09SS and 07KMS10SS being collected from the soil floor inside the Large Shed in the Mill Area. Sample is being collected near old mercury flasks seen in the picture.

Photograph: P1010104.JPG

Date: 7/31/07

Description: Surface soil sample # 07KMS11SS being collected from the area between the two Sheds in the Mill Area. The Small Shed is in the background.

Photograph: P1010105.JPG

Date: 7/31/07

Description: Surface soil sample # 07KMS12SS being collected near abandoned process equipment in the Mill Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010108.JPG

Date: 7/31/07

Description: Abandoned truck in the Mill Area.

Photograph: P1010110.JPG

Date: 7/31/07

Description: Discarded piping and wood piled near the abandoned truck in the Mill Area.

Photograph: P1010113.JPG

Date: 7/31/07

Description: The Large Shed in the Mill Area. Several old mercury flasks (yellow containers) are gathered inside near the doorway.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010115.JPG

Date: 7/31/07

Description: Portion of the interior of the Large Shed in the Mill Area, showing discarded parts and equipment. Several old mercury flasks (yellow containers) are in the foreground.

Photograph: P1010116.JPG

Date: 7/31/07

Description: Portion of the interior of the Large Shed in the Mill Area, showing discarded parts and equipment. Several old mercury flasks (yellow containers) are in the foreground. Red-topped stake at approximate center of photograph marks location of duplicate surface soil sample #'s 07KMS09SS and 07KMS10SS.

Photograph: P1010117.JPG

Date: 7/31/07

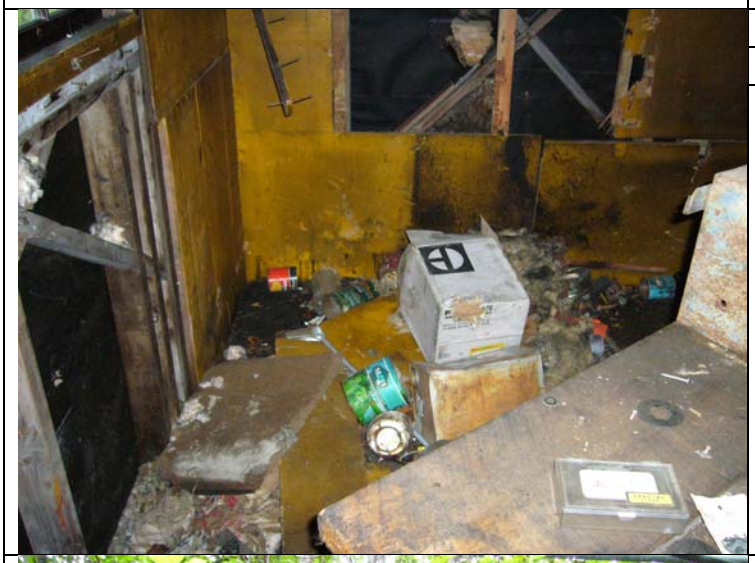
Description: Outside of the Large Shed in the Mill Area, showing empty drums and other debris. Surface soil sample # 07KMS13SS (red-topped stake near closest drum) was collected next to the empty drums.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010118.JPG

Date: 7/31/07

Description: Outside of the Large Shed in the Mill Area, showing empty drums and other debris. Doorway into and a portion of the Small Shed is in the background.



Photograph: P1010119.JPG

Date: 7/31/07

Description: Portion of the interior of the Small Shed in the Mill Area, showing discarded parts and equipment.

Photograph: P1010124.JPG

Date: 7/31/07

Description: Small Shed in the Mill Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010125.JPG

Date: 7/31/07

Description: Ore process equipment strewn at the base of the Ball Mill structure.

Photograph: P1010130.JPG

Date: 7/31/07

Description: Base of the Ball Mill structure. Actual ball mill crusher unit is cylindrical object towards the bottom.

Photograph: P1010131.JPG

Date: 7/31/07

Description: Base area of Ball Mill structure. Ball mill crusher unit is cylindrical object.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010132.JPG

Date: 7/31/07

Description: Side view of the Ball Mill structure.

Photograph: P1010133.JPG

Date: 7/31/07

Description: View inside the mid-portion of the Ball Mill structure.

Photograph: P1010135.JPG

Date: 7/31/07

Description: Discarded empty drums in the Mill Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010136.JPG

Date: 7/31/07

Description: Interior of kitchen cabin in the Camp Area.

Photograph: P1010137.JPG

Date: 7/31/07

Description: Interior of kitchen cabin in the Camp Area.

Photograph: P1010140.JPG

Date: 7/31/07

Description: Discarded food containers found inside the kitchen cabin in the Camp Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010142.JPG

Date: 7/31/07

Description: Possible hazardous material items (batteries and bottles of unknown liquids) found inside the kitchen cabin in the Camp Area.

Photograph: P1010144.JPG

Date: 7/31/07

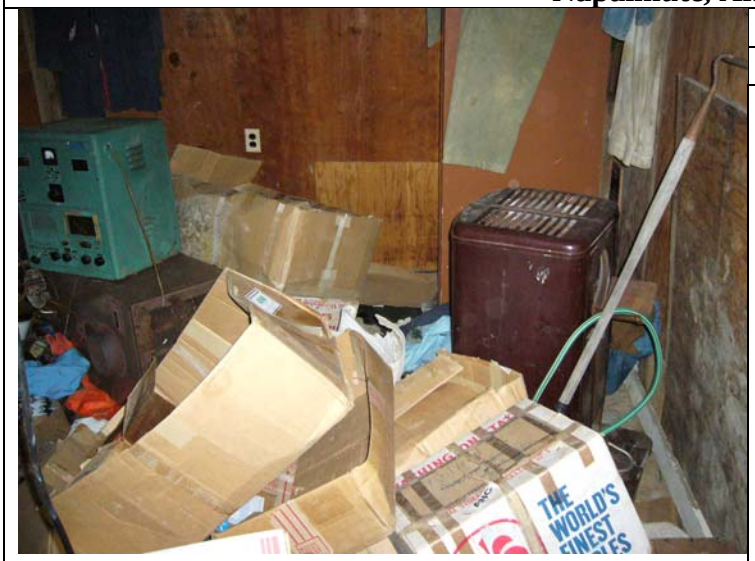
Description: Interior of the Manager's house in the Camp Area.

Photograph: P1010146.JPG

Date: 7/31/07

Description: Exterior of the Manager's house in the Camp Area.

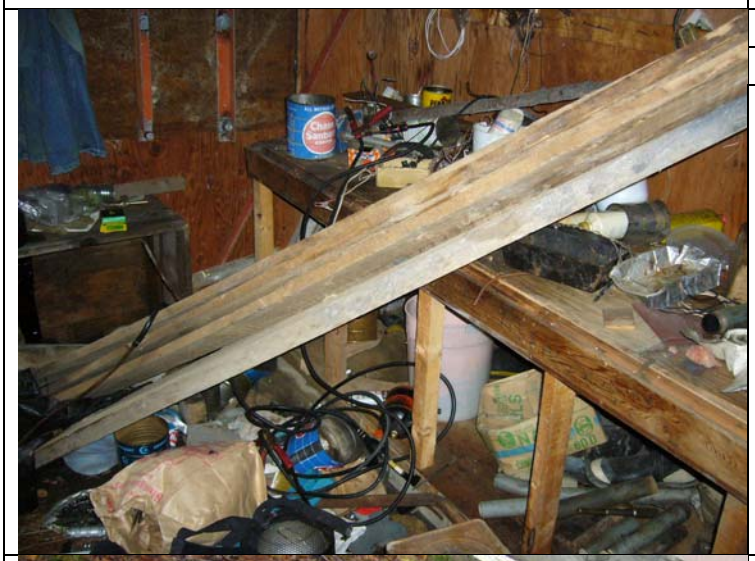
Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska



Photograph: P1010148.JPG

Date: 7/31/07

Description: Interior of the shop cabin in the Camp Area.



Photograph: P1010151.JPG

Date: 7/31/07

Description: Interior of the shop cabin in the Camp Area.

Photograph: P1010153.JPG

Date: 7/31/07

Description: Second apparent "beer keg" retort found at the site; this unit was found next to the cabins in the Camp Area. Unlike the "beer keg" found at the Retort Mound, this one did not appear to have been actually used as a retort or for ore processing.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010154.JPG

Date: 7/31/07

Description: Empty drums located next to the generator shed in the Camp Area. Duplicate surface soil sample #'s 07KMS 22SS and 07KMS23SS were collected from around the drums.

Photograph: P1010156.JPG

Date: 7/31/07

Description: Discarded parts and equipment found inside the generator shed in the Camp Area. A broken lead acid battery is at the center.

Photograph: P1010159.JPG

Date: 7/31/07

Description: Suspected kiln, made out of bricks, found at the Retort Mound. The "beer keg" retort unit that contained granular material is in the background.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010161.JPG

Date: 7/31/07

Description: Group of empty drums found next to the Retort Mound.

Photograph: P1010164.JPG

Date: 7/31/07

Description: "Sewer pipe" found at the Retort Mound; suspected refined or processed ore material found inside was collected as duplicate sample #'s 07KMS20SS and 07KMS21SS.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010165.JPG

Date: 7/31/07

Description: "Beer keg" retort unit found at the retort mound; suspected refined or roasted ore material inside was collected as sample # 07KMS18SS.

Photograph: P1010166.JPG

Date: 7/31/07

Description: One of several empty ore cart or similar-type containers found near the Camp Area.

Photograph: P1010168.JPG

Date: 7/31/07

Description: Outhouse structure in the Camp Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010169.JPG

Date: 7/31/07

Description: Wall Tent structure in the Camp Area.

Photograph: P1010170.JPG

Date: 7/31/07

Description: Interior of the Wall Tent structure, showing discarded equipment including a heater and cooking items.

Photograph: P1010172.JPG

Date: 7/31/07

Description: Interior of the Wall Tent structure, showing discarded equipment.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010175.JPG

Date: 8/1/07

Description: Cliffs along the north bank of the Kuskokwim River, within a mile or two downstream (west) of the Kolmakof Mine Site. Brown soil outcrops possibly indicating natural cinnabar deposits are periodically visible along the cliff face.

Photograph: P1010178.JPG

Date: 8/1/07

Description: Cliffs along the north bank of the Kuskokwim River, within a mile or two downstream (west) of the Kolmakof Mine Site. Brown soil outcrops possibly indicating natural cinnabar deposits are periodically visible along the cliff face.

Photograph: P1010180.JPG

Date: 8/1/07

Description: Surface soil sample # 07KMS14SS being collected from along the tailings pile.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010182.JPG

Date: 8/1/07

Description: Surface soil sample # 07KMS15SS location at the tailings pile marked with a red-topped stake (near lower center of photograph).

Photograph: P1010183.JPG

Date: 8/1/07

Description: Surface soil sample # 07KMS15SS location at the tailings pile marked with a red-topped stake (near left-center of photograph).

Photograph: P1010184.JPG

Date: 8/1/07

Description: Surface soil sample # 07KMS16SS location at the tailings pile marked with a red-topped stake (next to bucket).

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010185.JPG

Date: 8/1/07

Description: Surface soil sample # 07KMS16SS location at the tailings pile marked with a red-topped stake (next to bucket).

Photograph: P1010186.JPG

Date: 8/1/07

Description: Tailings pile from the Kolmakof Mine, viewed from the Kuskokwim River. All three tailings pile surface soil sampling locations fall within the photographed area.

Photograph: P1010189.JPG

Date: 8/1/07

Description: E&E sampler collecting sample # 07KMS18SS of suspected processed or refined ore from inside the "beer keg" retort unit at the Retort Mound.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010192.JPG

Date: 8/1/07

Description: Open-topped, two-compartment container at the Retort Mound. Container held a brown and white solid material that was collected as sample # 07KMS17SS.

Photograph: P1010193.JPG

Date: 8/1/07

Description: Open-topped, two-compartment container at the Retort Mound, where brown and white solid material found inside was collected as sample # 07KMS17SS. The "beer keg" retort unit, where granular material sample # 07KMS18SS was collected from, is in the background.

Photograph: P1010195.JPG

Date: 8/1/07

Description: Hearth-like structure found at the Retort Mound. Item is built from concrete and bricks.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010197.JPG

Date: 8/1/07

Description: Hearth-like structure found at the Retort Mound. Item is built from concrete and bricks. Concrete base dug up along one side of the hearth is visible.

Photograph: P1010198.JPG

Date: 8/1/07

Description: Retort Mound, showing location of surface soil sample # 07KMS19SS (red-topped stake at lower left-center), the open-topped two compartment container where sample # 07KMS17SS was collected from (right-center), and the "beer keg" retort unit (top right-center) where sample # 07KMS18SS was collected from.

Photograph: P1010201.JPG

Date: 8/1/07

Description: E&E sampler extracting granular material found inside a bucket within the "sewer pipe" at the Retort Mound. The material within the pipe was collected as duplicate sample #'s 07KMS20SS and 07KMS21SS.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010203.JPG

Date: 8/1/07

Description: E&E sampler extracting granular material found inside a bucket within the "sewer pipe" at the Retort Mound. The material within the pipe was collected as duplicate sample #'s 07KMS20SS and 07KMS21SS.

Photograph: P1010204.JPG

Date: 8/1/07

Description: The inside of the "sewer pipe" found at the Retort Mound. A bucket appeared to be suspended in the middle of the pipe, and a sample of the granular material within the bucket was collected as duplicate sample #'s 07KMS20SS and 07KMS21SS.

Photograph: P1010208.JPG

Date: 8/1/07

Description: Location of duplicate surface soil sample #'s 07KMS22SS and 07KMS23SS, collected from around the empty drums next to the Camp Area's generator shed. Red-topped stake at lower center marks sampling location.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010209.JPG

Date: 8/1/07

Description: E&E sampler collecting co-located surface water and sediment sample #'s 07KMS24SW and 07KMS24SD, respectively, from the unnamed creek just upstream of the creek's confluence with the Kuskokwim River.

Photograph: P1010211.JPG

Date: 8/1/07

Description: E&E sampler collecting sediment sample # 07KMS24SD from the unnamed creek just upstream of the creek's confluence with the Kuskokwim River. Co-located surface water sample # 07KMS24SW was collected at the same location prior to sediment sampling.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010213.JPG

Date: 8/1/07

Description: Red-topped stake adjacent to the location where duplicate, co-located surface water and sediment sample #'s 07KMS25SW and 07KMS25SD and 07KMS26SW and 07KMS26SD were collected from within the unnamed creek in the Mill Area portion of the site. Plastic trowel in the creek bed marks the sampling location.

Photograph: P1010215.JPG

Date: 8/1/07

Description: E&E sampler collecting surface soil sample # 07KMS27SS from around the wood beams on the ground inside the Large Shed in the Mill Area. Red-topped stakes mark other surface soil sampling locations (duplicate sample #'s 07KMS09SS and 07KMS10SS to the left and 07KMS11SS outside the background door).

Photograph: P1010216.JPG

Date: 8/1/07

Description: E&E sampler collecting surface soil sample # 07KMS28SS from along the earthen slope that the Ball Mill structure is built into.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010220.JPG

Date: 8/1/07

Description: Red-topped stake marking location of surface soil sample # 07KMS29SS along the earthen slope that the Ball Mill structure is built into. Ball Mill structure is in the background.

Photograph: P1010221.JPG

Date: 8/1/07

Description: Red-topped stake (upper right) marking location of surface soil sample # 07KMS29SS along the earthen slope that the Ball Mill structure is built into. View is from the base of the slope. Ball Mill structure is to the left.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010223.JPG

Date: 8/1/07

Description: Red-topped stake marking location of surface soil sample # 07KMS28SS along the earthen slope that the Ball Mill structure is built into. Ball Mill structure is out of view to the right.

Photograph: P1010225.JPG

Date: 8/1/07

Description: Wood box of unknown white solid material found amongst the strewn equipment at the base of the Ball Mill structure. Material was collected as sample # 07KMS31SS.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010226.JPG

Date: 8/1/07

Description: Wood box of unknown white solid material found amongst the strewn equipment at the base of the Ball Mill structure. The box is underneath the canvas cover at the lower-center and was covered up following collection of sample # 07KMS31SS.

Photograph: P1010227.JPG

Date: 8/1/07

Description: Discarded steel floatation cell or similar-type ore processing equipment found near the abandoned truck in the Mill Area.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010232.JPG

Date: 8/1/07

Description: Site-specific reference surface soil sample # 07KMS32SS being collected.

Photograph: P1010233.JPG

Date: 8/1/07

Description: Location of co-located site-specific reference surface water and sediment sample #'s 07KMS33SW and 07KMS33SD.

Photograph: P1010234.JPG

Date: 8/1/07

Description: Location of co-located site-specific reference surface water and sediment sample #'s 07KMS33SW and 07KMS33SD.

Photo Documentation for:
Kolmakof Mine Site Removal Site Inspection
Napaimute, Alaska

Photograph: P1010235.JPG

Date: 8/1/07

Description: Wood sled found next to the road (trail) between the Camp and Mill Areas; several similar sleds were found around the site.

Photographer: L. Marcus

Latitude: 61° 35’ 22.825” North	**Longitude: 158° 55’ 22.438” West**

Camera: Panasonic Lumix DMC-FX3 digital camera, S/N FD6SA12115R

ATTACHMENT B

FIELD LOG BOOK

BLM Alaska
E&E Contract

"Rite in the Rain"®
ALL-WEATHER
FIELD
No. 350NF

Kolmakof Mine Site
Removal Site Inspection
Napaimute, AK

[redacted]
001998.BU08.01

No. 350NF Field Num Fab
32281 35041
ISBN 1-932149-5[illegible]-1

CONTENTS

PAGE	REFERENCE	DATE
2	Main Logbook begins	
130	Sample Summary Tables begin	
136	GPS Coordinates	
140	Photo Log begins	

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

ALL-WEATHER FIELD BOOK

Name _____

Address _____

Phone _____

Project _____

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikoid Cover
Columnar	1/4" Grid	Item No. 350N	Item No. 350NF

Monday July 30 2007

0830 E&E Field Team Leader Len Marcus (FTL Marcus) picks up E&E field assistant Andy Uhrig (Sampler Uhrig) at hotel in Anchorage - Andy flew up from Portland last night
- both proceed to Anchorage International Airport, Anchorage Alaska
- meet with client representatives after checking in for flights
  - Larry Beck, BLM Anchorage Field Office rep; and
  - Charles Lovely, Land Examiner with BLM's State (AK) Office

1000 - Marcus, Uhrig, Beck + Lovely fly Anchorage - Aniak on Pen Air scheduled flight

1130 arrive Aniak, AK
- meet Mitchell Dammeyer of Native Village of Napaimute; he will be our escort + transportation source while in Aniak + Napaimute
- pick up field sampling gear in Aniak sent ahead by E&E as cargo
- proceed in boat to Napaimute - Marcus + Uhrig (E&E), and Beck and Lovely BLM. Boat is operated by Mitchell Dammeyer - E&E is paying for boat transportation the next few days to Native Village of Napaimute to travel between Aniak, Napaimute and the Kolmakof Mine Site
- Aniak is on the Kuskokwim River; Napaimute is on the Kuskokwim River approx 20 miles upriver of Aniak and the site (Kolmakof Mine site) lies between the two but closer to Napaimute (~10 miles away)

Len Marc

7-30-07

1530 all arrive Napaimute. Meet Mark Leary, Tribal Administrator, Native Village of Napaimute.
- BLM personnel (Beck + Lovely) + E&E personnel (Marcus + Uhrig) discuss Kolmakof Mine Site Removal Site Inspection Scope, schedule logistics. BLM + E&E personnel are shown lodging facilities in Napaimute
- unload field + personal gear from Mitchell Dammeyer's boat into lodging facility
- E&E is paying Native Village of Napaimute $200/day for lodging in Napaimute and boat use; gas for boat (cost) is incurred by E&E - to be a separate cost. $200/day lodging covers both E&E personnel.
- E&E + BLM personnel discuss possibly visiting the site this evening just as a reconnaissance visit, but there is a 2nd cargo

Len Marcus

shipment of E&E sampling arriving in Aniak this evening that needs to be picked up. Decide that based on time limitations (Napaimute - Aniak by boat = ~60 min) and the need for FTL Marcus to be in Aniak to receive that cargo, that a site recon will instead occur 1st thing tomorrow morning, upon arrival at the site

1900 FTL Marcus departs Napaimute with Mitchell Dammeyer in his boat (Native Village of Napaimute's boat) for Aniak

2000 arrive Aniak
- pick up remaining E&E field gear at Frontier Flying Service - gear just came in from Anchorage

2030 FTL Marcus + Mitchell Dammeyer depart Aniak for Napaimute by boat

2130 arrive back at Napaimute

Len Marcus

7-30-07

Stay at lodging in Napaimute made available by Native Village of Napaimute for $200/day w/boat use.

Len Marcus

Tuesday July 31 2007

0800 E&E personnel Marcus + Uhrig and BLM personnel Beck + Lovely Meet at lodge in Napaimute Pack + load equipment needed for R&T into Native Village of Napaimute boat

0830 Above personnel depart Napaimute with Mitchell Dammeyer and Mark Leary of Native Village of Napaimute in their boat for Kolmakof Mine Site

0900 all arrive at Kolmakof Mine Site (KMS)
- unpack field gear
- weather - overcast, approx 60°F no wind

0915 hold site safety meeting, held by L. Marcus, E&E
Attending: Andy Uhrig (E&E) Larry Beck + Charles Lovely

Len Marcus

7-31-07

(BLM) and Mitchell Demmerer and Mark Leary of Native Village of Napaimute.
Discuss:
- mercury concern
- other possible contaminants
- slip, trip, fall + cut hazards
- bear safety
- emergency evacuation procedures (meet at boat)

0930 take walking tour of KMS — tour camp area
3 pink (painted) cabins; "manager's house", wall tent structure, "retort" site, discarded drum area, ruined power shack (no generator present)

1100 - arrive at mill building upgradient from river have to follow a grown-over trail
- no water is flowing in the drainage that flows in front

Len Marcus

of the mill building - had planned to sample both water and sediments in this unnamed creek

1215 - Marcus + Chris return to Camp Area to obtain sampling supplies

1345 Marcus + Chris return to mill area to begin sampling
- meet with Larry Beck - BLM; discuss mining operations and appropriate sampling location

1400 collect sample #07KMS01SD, from sediment in dry drainage ditch immediately under ~~and~~ in ball mill machinery
- collect sample #07KMS02SD from apparent pond (settling pond?) approx 100 feet east of ball mill, located down the drainage ditch that flows away easterly + downgradient of the ball

Len Marcus

7-31-07

mill area contains a leaf layer on top but clay-like soil underneath.

1430 collect soil sample # 07KMS03SS; soil sample comprized of the powder/sand consistency material at the opening of apparant ore ~~shoot~~ introduction chute into ball mill - sampled material is suspected cinnibar ore

1440 collect soil sample # 07KMS04SS; surface soil sample from approx 50 feet ~~upth~~ upgradient of ore loading chute at ball mill; collected from apparant road/ramp leading to chute. Road/ramp believed to be man-made. Thin layer of roots + leaves here with brown soil underneath

1450 collect duplicat sample # 07KMS05SS + 07KMS06SS; white ash ~~mat~~ material within approx 6' diameter area

Len Marcus

7-31-07

reported to be the burned down explosives shed; sample will be analyzed for explosives residue (EPA 8330) These 2 samples are field duplicates

1500 collect sample # 07KMS07SS; a soil sample from approx. 15 feet north of/downgradient of the ash pile of the burned explosives shed; sample will be analyzed for EPA 8330.

1505 collect sample # 07KMS08SS, a soil sample from approx 15 feet southeast of the ash pile of the burned explosives building. Sample will be analyzed for EPA 8330.

- neither sample # ~~05~~ 07 SS or 08 SS displayed any white ash material associated with ~~the~~ the burned material itself (sampled as # 05 + 06SS)

Len Marcus

7-31-07

rain has been falling since approx 1430 hours

1520 collect sample #s 07KMS09SS. + 07KMS10SS; duplicate soil samples collected from within unnamed larger structure (an 2 structures here) just north of ball mill. Building has much debris/old equipment inside including large wood support for possible large piece of equipment no longer here. Also in this structure are approx 1-gallon metal containers reported to be mercury flasks. Larry Beck of BLM opened up a flask ~~earlier~~ earlier and noticed some residual mercury though the flasks feel/sound empty.

note - 12 flasks counted later

1540 Collect sample # 07KMS11SS. surface soil sample from in between the 2 sheds next

Len Marcus

7-31-07

to the ball mill. Only a little leaf matter on top. mostly sandy/rocky soil. Area represents foot path between 2 buildings or area where mercury might have been transported through.

1555 collect soil sample # 07KMS12SS. Surface soil sample from next to an approx 8' long piece of apparent mining or refining equipment. General location is approx 50 feet east of easternmost side of 2nd shed at mill area. Some roots/leaf matter on top. brown organic soil underneath

1615 collect soil sample # 07KMS13SS, collected from underneath the heads of horizontal drums lying outside of the larger ball mill building; building may

Len Marcus

7-31-07

have held a generator based on large wood stand inside building plus electrical wiring and component, and drums still present (empty) may have held fuel or leaked fuel — no obvious signs of fuel spillage noted though. This sample will be analyzed for GRO/BTEX and DRO/RRO analysis only; 50.3 grams soil put into GRO/BTEX jar followed by addition of methanol preservative provided by lab (Test America)

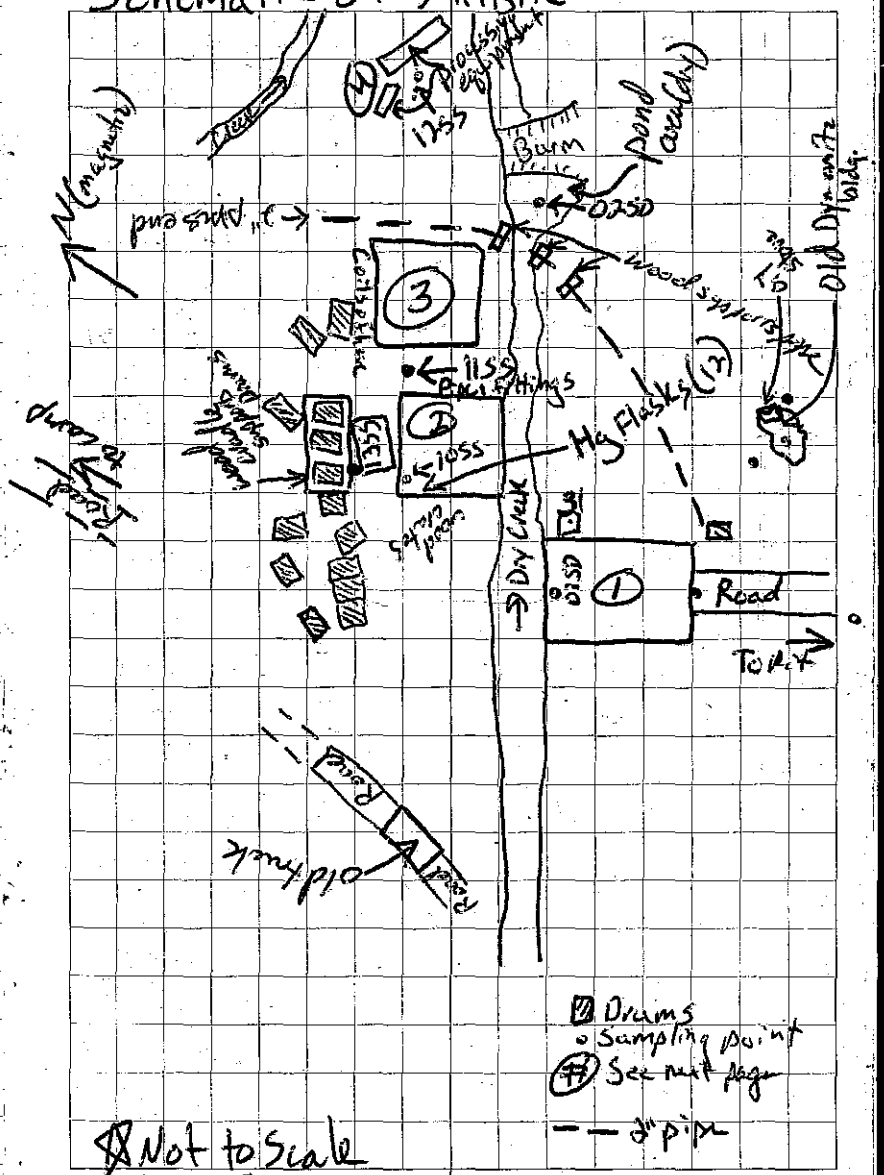
1630 Marcus & Chris notice small running creek approx 150 feet north of ball mill buildings — creek runs roughly east-west here but generally moves north (downgradient); good location to collect ball mill-area water + sediment sample

1700 Marcus and Chris map and inventory ball mill area (see following pages)

Ben Marcus

7-31-07

Schematic of Millsite



7-31-07

① Mill – lots of wood, heavy machinery, 2 drums, metal roofing
② Generator Bldg. – lots of wood debris, electrical parts and Mercury Flasks
③ ? Bldg. – This bldg. has a table with an ore processing machine, various small parts, coffee can, fuel cans.
④ Equipment – Floatation Machine, 2 pumps, Driveshaft, 2 gal pail

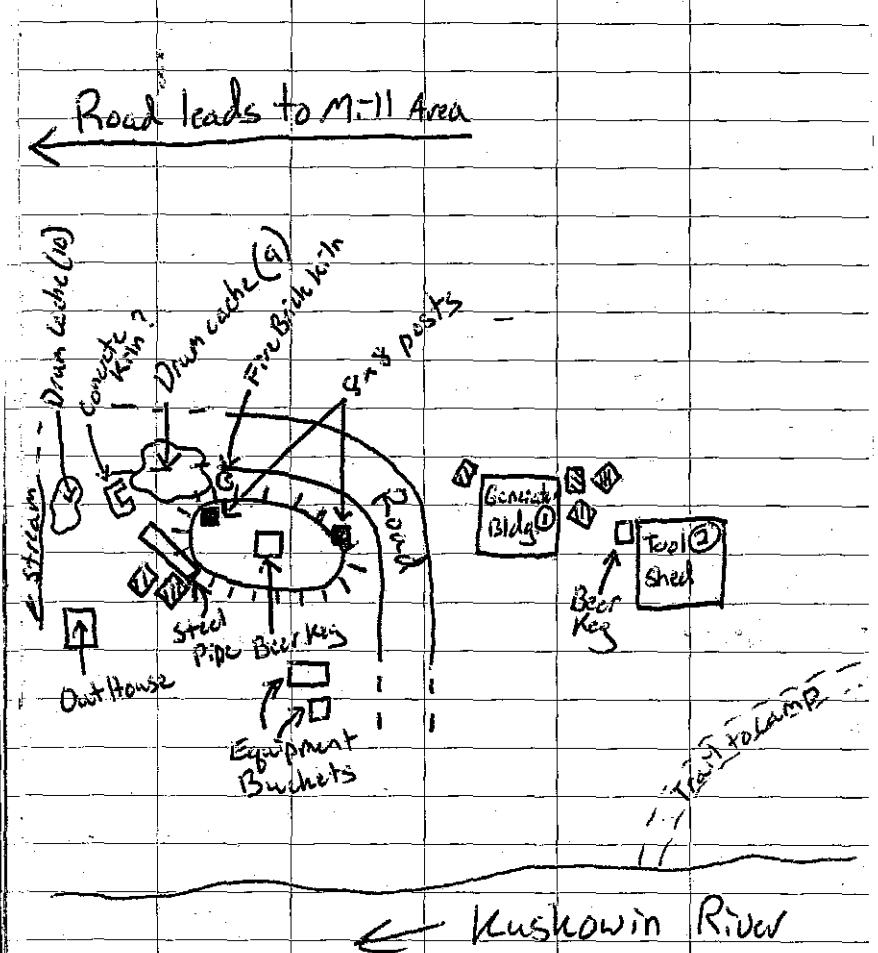
Other notes on Ball Mill area –
① building is approx 30' tall and 20' wide; built into hillside
② building – approx 13' wide; 19' long, 10' tall. Bare soil floor; large wood beams on floor. 12 approx 1-gallon empty mercury flasks inside. Maybe 10 yds³ of debris inside, or 15 yd³ high estimate
③ building measures approx. 8' wide, 12' long, 10' tall. Wood floor is collapsing. Has tools – maybe a shop? Maybe 10 yds³ of debris inside
– no soil 'staining' or signs of spillage noted.

Len Marcus

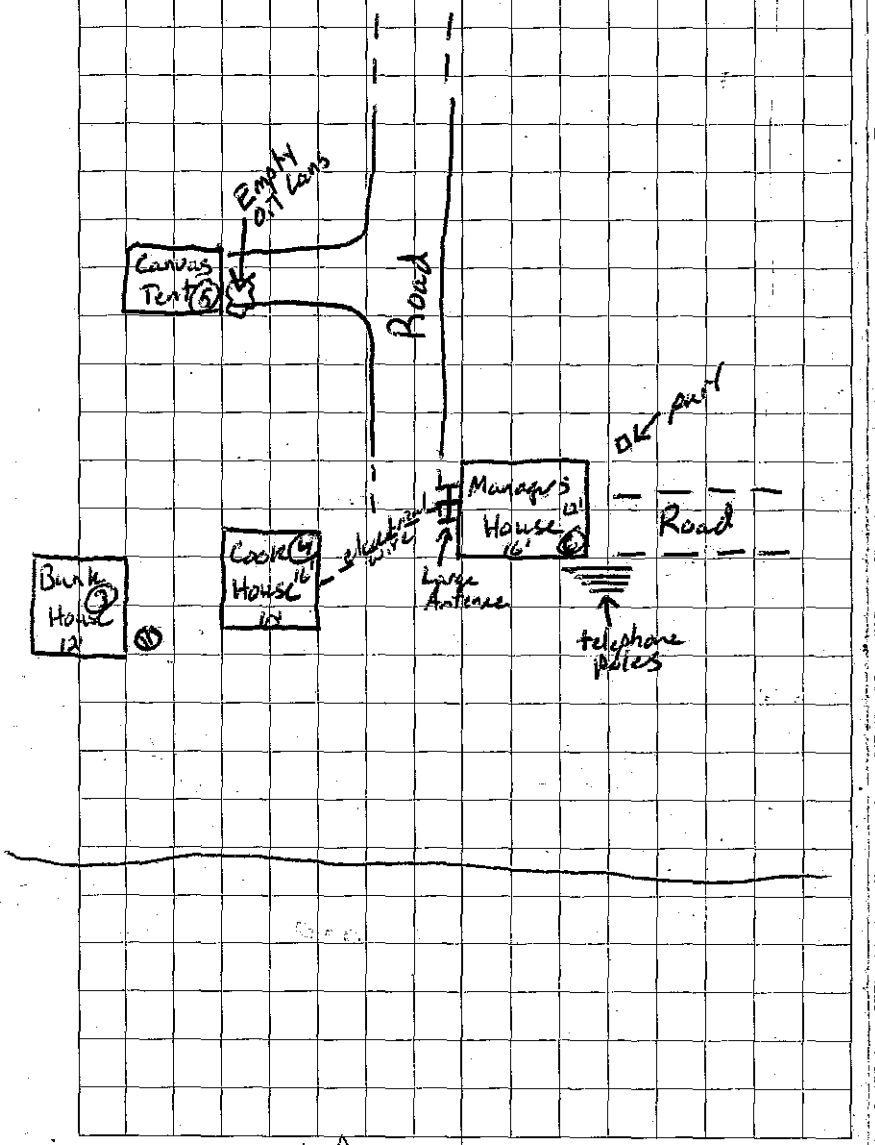
1800 Marcus + Uhrig depart mill site on foot for Camp Area
1820 Marcus + Uhrig meet with Larry Beck + Charles Lovely of BLM and Mitchell Dammeyer of Native Village of Napaimute in Camp Area. Provide brief status report to Larry Beck of E&E activities
– weather – overcast all day, periodic rain, little-to-no wind, approx. 60°F
1830 – Marcus and Uhrig proceed to map and inventory Camp Area. Samples collected by E&E so far remain in an ice chest with frozen gel packs; left with other E&E equipment temporarily stored on-site – See map and comments on following pages.

Len Marcus

7-31-07


Road leads to M-11 Area
Drum cache (10)
Concrete Kiln ?
Drum cache (9)
Fire Brick Kiln
8x8 posts
Stream
Road
Garage Bldg (1)
Tool (2) Shed
Beer Keg
Steel Pipe
Beer Keg
Out House
Equipment Buckets
Trail to Camp
Kuskowin River

7-31-07


Empty Oil Cans
Canvas Tent (5)
Road
Well
Manager's House (6)
Road
Bunk House (3)
Cook (4) House
Large Antenna
telephone poles

7-31-07

① Generator Bldg - Oil Burner motor, electrical panel with wires, small gas generator, Broken lead-acid battery, Belts, and plastic jugs (empty) (measures ~ 10' x 8')

② Tool Shed - 5gal buckets oil (empty), Engine parts, outboard motor, paint cans, motor oil cans, gas cans, hoses, stove, kitn brshs, cardboard, pad's, hardware, clothing, and various ape.

③ Bunk House - old clothing, oil stove, bunks

④ Cook House - Various household waste - some hazardous

⑤ Canvas Tent - Oil lamp, Engine and parts, pumps, oil stove, stainless cooker?

⑥ Managers House - Wood and paper debris

Andrew Lily

1930 - Marcus & Uhrig complete Camp Area inventory.
- Pack all collected samples to go back to Napaimute with personnel. Secure other field gear at site for ~~night~~ night
1945 E&E personnel Marcus + Uhrig, BLM Personnel Beck and Lovely are taken back to Napaimute by Mitchell Dammeyer of Native Village of Napaimute in his boat. E&E personnel have all collected samples with them on ice
2015 all arrive back at Napaimute. E&E personnel secure collected samples for the night on ice in ice coolers
- discuss project further - Marcus, A. Uhrig, and Larry Beck. Larry may be interested in having the ash sample from the burned explosives.

Len Marcus

shed (already collected - sample #s 07KMS0555 + 07KMS0655) as well as a white powdery-chunky solid noticed in a wood box at the base of the ball mill ruins possibly analyzed for hazardous constituents/properties. If so, will constitute a change order in Scope of Work for this project.

- general sampling notes:
  - unless otherwise noted, all soil, ash, tailings and sediment samples are collected using dedicated, new stainless steel spoons. Samplers don a new, dedicated pair of unused nitrile gloves for each sample.
- Unless otherwise noted, all soil, ash, tailings, sediment and water samples will be analyzed for Priority Pollutant metals (method EPA 6010B); solids are collected in a 4-ounce

Len Marcus

amber glass jar (no preservative) and waters in a 1 L poly bottle pre-preserved with nitric acid

- all samples are also having a separate fraction collected for possible mercury speciation under EPA Method 1630. Decision to analyze speciation fraction will be made once Priority Pollutant samples are analyzed and reviewed; but all samples are collected for both analyses at the time of collection. Container used for speciation is an 8-ounce plastic (HDPE) jar for solids and a 250 ml FLPE plastic bottle for waters, pre-preserved with HCl.

Len Marcus

Also - all soil/sediment samples are being collected from 0-6 inches below ground surface

WEDNESDAY ~~Tuesday~~ August 1 2007

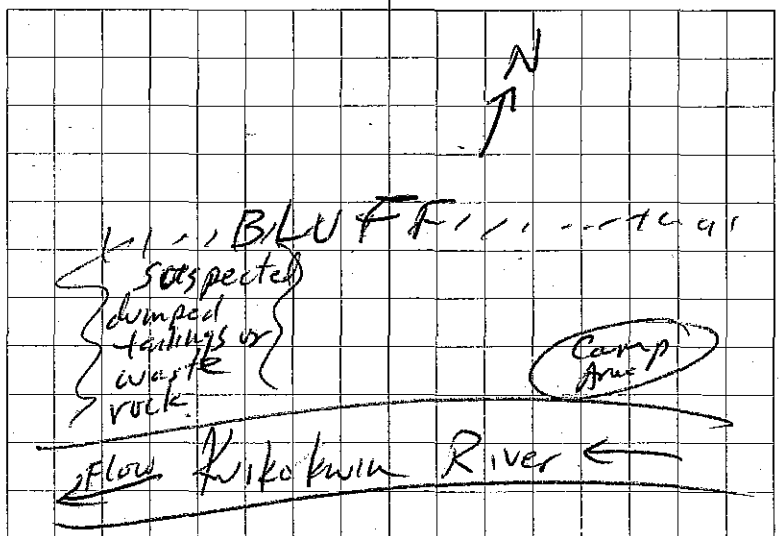
0815 E&E personnel Marcus + Uhrig and BLM rep Larry Beck depart Napaimute in boat driven by Mitchell Dannemyer for Kolmakof Mine Site (KMS)

0845 arrive at Camp Area at KMS. Pick up sampling supplies

0900 proceed approx 3/4 mile downstream the Kuskokwim River from the Camp Area. Note the known tailings pile/waste rock pile sloping down from the bluff to the banks of the Kuskokwim. From the boat, observe the reported tailings pile, where soil there does appear to have moved/transplanted/dumped there. Also view northern bank of Kuskokwim River up to another mile or so west of (downriver of) the tailings pile;

Len Marcus

8-1-07



some portions of the slope are bare soil and show different soil colors that appear to be natural outcroppings/different soil types vs. the more obvious transplanted appearance of the soil at the reported tailings pile. Some of these outcroppings are brownish-red against the lighter prevalent soil color; cinnibar (mercury-bearing ore) is red colored.

Len Marcus

8-1-07

0910 land boat at main suspected tailings/waste rock pile
Safety meeting - held by Len Marcus - Attending - Andy Uhrig (E&E), Larry Beck (BLM), Mitchell Dannenger, Native Village of Napaimute
Discussed -
mercury concern/avoidance; bear safety; buddy system, watch footing; always work with partner and inform others where you are going. Watch for tree branches/limbs hitting eyes/face when walking through vegetation
- group views suspected tailings/waste rock pile from the river bank, - discuss sampling option
0930 collect soil sample # 07KM51455 from suspected tailings/waste rock pile; collected from eastern end of apparent pile approx 1/4 way upslope from the Kuskokwim River.

Len Marcus

8-1-07

this sample is collected from a dry hardened mud flow spot, where the material obviously was wetter at some point and flowed downslope, then stopped and hardened. There are several of these hardened mud flows across the estimated 200 foot wide face of this tailings or waste rock pile
0955 collect sample # 07KM51555 waste rock/tailings material along main pile west of the Cabin Area. Sample is collected from another "mud flow" about 1/5 of the way upslope from the Kuskokwim River. Material here is sandy light brown soil (like sample # 1455) but also contains small rocks mixed in.

Len Marcus

8-1-07

1000 Collect sample # 07KMS1655, tailings/waste rock material from low angle "bench" of possible tailings/waste rock formed between the natural riverbank below and the dumped tailings/waste rock above. Collected near the middle of the width of the waste rock dump, and about 50 feet upgradient of the Kuskokwim River. Material here is mix of fines, small rocks, and larger rocks

– looking up + downriver, Kuskokwim River bank looks like it has "2 tiers" – natural beach, and then a steeper hillside leading up to adjacent bluffs

Len Marcus

8-1-07

1030 all return to Cabin Area
attempt to open up retort unit by breaking off fittings - are heavily rusted into place

1115 collect sample # 07KMS1755
container has appearance of open, split drum
suspected tailings material in a metal process container next to where the retort unit and brick kiln are. Material is brown, sandy, with white chunky material mixed in (a flux?)

1125 Collect sample # 07KMS1855 - suspected cooked (retorted) cinnibar refined ore taken out of interior chamber of retort unit found in Camp Area. Material is a fine granular red-brown solid, dry
- Uhrig + Beck explore other features + equipment around mound where retort is located - brick kiln also present. Brick kiln extends ~4' deep into side of mound; 15' downgradient

Len Marcus

is the cement + brick control point/passageway - somehow possibly used for mercury production. Large sewer pipe lying nearby may have connected the two. No soil or tailings seen inside kiln to sample; area around concrete hearth looks clean with natural vegetation overgrowth.

1200 collect soil sample #'s LM
07KMS1955 + ~~07KMS2055~~
duplicate soil sample collected from the lower end of the retort mound, middle area - location is within approx. 10-15 feet of other retort mound stems
note: did not collect duplicate # 07KMS1955 only
retort, kiln, concrete hearth, Sewer pipe. Sewer pipe has a reduced iron fitting welded onto one end; looks like it might fit onto the pipe elbow

Len Marcus

8-1-07

and fittings found installed now removed to collect a sample) on the retort "beer keg"

- Soil sample here is brown, sandy; some rock.
- A thing examine approx 12' long approx 14" diameter iron sewer pipe at retort mound. One ~~of~~ end is wide open; viewing it inside shows some sort of container inside - maybe a 5-gallon bucket - blocking the mid-area of the pipe. Extending a clean sampling spoon into the pipe reveals red-brown granular material - could be refined cinnibar ore, or tailings. Decide to sample this material - possibly high mercury levels. Also decide that this material would also be a more appropriate duplicate sample than the soil location previously sampled

Len Marcus

#'s ~~for~~ 07KMS19SS + 07KMS20SS.
Return duplicate sample #07KMS20SS to original sampling location, revise sampling info pages 130 + 131

1240 collect duplicate sample #'s 07KMS20SS + 07KMS21SS from ~~of~~ concentrated ore or tailings material found inside the sewer pipe at the retort mound. Use a new sampling spoon fastened to the end of a tree branch to extend sampling spoon approx 5 feet into the pipe to collect the sample.

- sewer pipe now suspected to be a condenser pipe for mercury production
- lunch break

1350 collect duplicate sample #'s 07KMS22SS + 07KMS23SS; surface soil samples collected on east side of generator shed

Len Marcus

8-1-07

in camp area. This is where several empty drums are located, this sample will be for GRO/BTEX and DRO/RRO analysis only, and the 2 samples are field duplicates. Soil volume in GRO/BTEX containers:

#2255 = 49.1 grams
#2355 = 50.2 grams

1400 E&E - BLM look again at modified apparent burner container found at Walled Tent yesterday; Conclude it is not a mercury retort or similar - possibly just a hot water heater

- steady rain now falling

1420 collect surface water sample # 07KMS24SW, collected from unnamed creek close to where it flows into the Kuskokwim River - Creek has a steady, clear flow and is approx. 2 feet wide here. Sample collected

Len Marcy

8-1-07

from approx. 20 feet up creek from where it meets the Kuskokwim

1425 collect co-located sediment sample # 07KMS24SD at location where water sample # 07KMS24SW was just collected from

- return to Camp Area - Pack supplies for additional

1445 - begin walking up to Mill Area

1505 arrive mill area
- walk to creek flowing to the north of the Ball Mill; creek is approx 500' to the north. This is believed to be the unnamed creek that flows downgradient and drains into the Kuskokwim River next to the Camp Area; the same creek (presumably) that water & sediment sample # 07KMS24 was

Len Marcy

8-1-07

- select a location somewhat between the easternmost mill building and the abandoned flocculation unit, but further north of both, in this creek to sample. Creek flows west to east here.

1525 – collect co-located surface water and sediment sample #'s 07KMS255W and 07KMS255D, and duplicate samples # 07KMS265W and 07KMS275D all from the same location. For each sample, collect an 8-ounce jar of sediment for total metals analysis, an 8-ounce poly jar of sediment for mercury speciation analysis (if later selected), a 1-liter poly bottle with ~~HC~~ nitric preservative for total metals analysis and an 8-ounce poly bottle with HCl preservative for mercury speciation analysis, if selected.

Len Marcus

8-1-07

– also collect sample #s 07KMS26SW and 07KMS26SD as an intended MS/MSD sample, so 2 bottles are filled for Priority Pollutant analysis instead of the ~~usual~~ usual one. no additional volume needed for sediment MS/MSD analysis

1540 collect soil sample ~~# 07KMS~~ 07KMS275S from ground floor (bare soil floor) inside larger of the 2 ball mill buildings; bldg suspected as a generator or retort building though no equipment left. Sample collected from inside large timber frame stand still on the ground here. Sample will be for GRO/BTEX and DRO/RRO analysis only. 50.5 grams soil collected for GRO/BTEX analysis

Len Marcus

8-1-07

1605 collect soil # 07KMS28SS, soil sample from apparent man-made embankment/rise that the ball mill is built into; collected from about 2/3 up the embankment (estimated overall 30' fall) and approx. 40' east of the ball mill itself. Soil is sandy brown, loose (unconsolidated)

1615 collect soil sample # 07KMS29SS soil sample from apparent man-made embankment/rise that the ball mill is built into; sample is collected from the north-facing (downgradient) slope which is the direction the mill faces + operator in. Sample is collected from about 1/2 way up the embankment (maybe a 30-40' rise in total) and approx 20' west of the ball mill building. Area here has trees and bush vegetation; soil sample is dirt with some root/leaf material.

Ken Marcus

8-1-07

1630 collect sediment sample # 07KMS30SD, a sediment sample in the dry drainage ditch (now dry; sometimes wet) that runs across the ball mill site from west to east. this sample is approximately 100 feet west and slightly upgradient of the ball mill; will indicate if any contaminants are entering the ball mill area from this direction

- 5-gallon bucket of military grease noted inside ball mill housing
- A Uhing checks possible type of white powder/solid seen in a box at ball mill, which also looks like "ash" at burned explosives shed. Exposes these materials to hydrochloric acid available as a preservative for RSI-collected water samples. Material al

Ken Marcus

8-1-07

both places effervesces, as if it was a high pH material - appears like a caustic soda or soda-ash-like material
- based on this material possibly being a hazardous material that BLM might have to address further or remove, BLM rep. Larry Beck requests E&E to add on additional analyses, currently not in the Scope of Work or E&E's proposal or Work Plan for the Kolmakof Mine Site RSI, and to sample this material,
- Concur with the above:

Analytical method or technique to identify these materials will be determined upon consultation with the lab (Test America) once E&E + the

Len Marcus

samples are back in Anchorage; Larry Beck requests to obtain effective identification of actual material itself and not just a class or pH determination

1700 collect sample # 07KMS31SS white powder from a wooden box lying in abandoned/ruined debris at the base of the ball mill. The other white, possible caustic soda material to be identified is the "ash" at the burned explosives shed; this material has already been sampled as sample #s #07KMS05SS and 07KMS06SS on 7-31-07; original intended analysis for nitramines will still be applied, but additional analyses will be added to further identify this material. NO additional sample material of the "ash"

Len Marcus

8-1-07

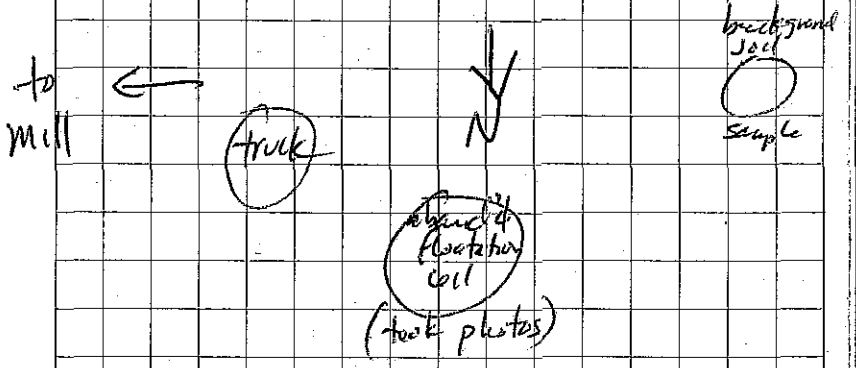
needs to be collected
- Marcus, Uhrig, Beck and Dammeyer hike west of the ball mill approx 1/4 mile in an open, tundra area - appears up gradient of the mill area and undisturbed from mining-related activities or influence. No signs of mining debris or land disturbance here

1735 collect soil sample #07KMS325S a background soil sample. Remove approx. 8" of tundra and moss vegetation coverage first to sample soil underneath. Permafrost found at about 2' below tundra surface; sample collected below tundra root level at permafrost interface - about 2' below ground surface all together. Background soil sample to be analyzed for metals only.

Len Marcus

8-1-07

inspect an abandoned floatation cell near the abandoned truck on way back to mill Area



1800 Marcus, Uhrig Beck + Dammeyer complete sampling at Mill Area.
- proceed back down the road/trail back to the Cabin Area
- about 300-400 feet down the road/trail, turn off the road to the north, away from the ball mill + mine, to collect a background surface water and sediment sample

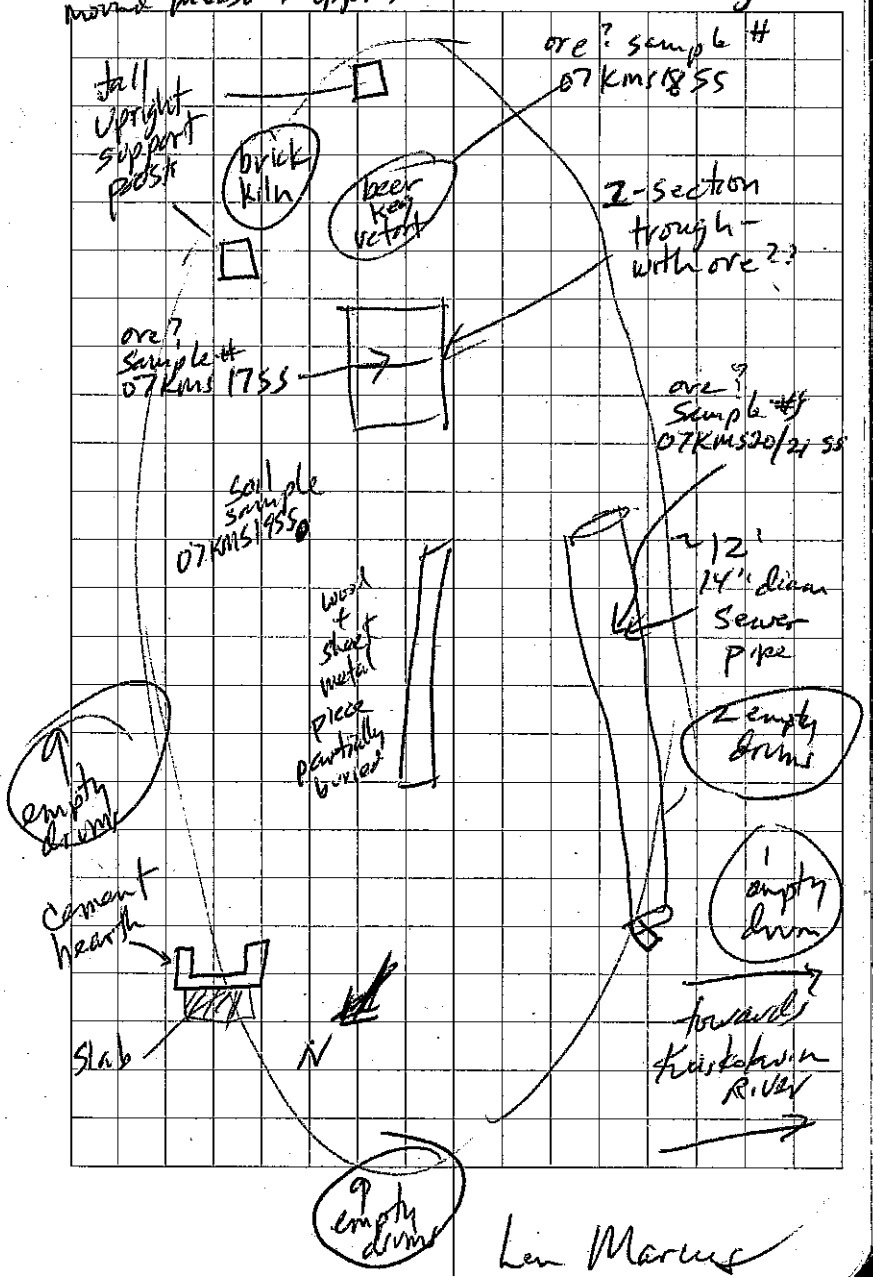
Len Marcus

8-1-07

- follow the creek north that crosses under the road/trail about 125 feet; creek continually fingers out into multiple channels in this boggy/tundra area; some fingers have flowing water, others are stagnant. Creek source disappears altogether after about 150 feet north of the road. This creek is believed to be the one that runs past the ball mill area (north of but downgradient of) where water and sediment sample #'s 07KMS25 and 26 were collected from. Current location appears undisturbed and away from the ball mill + mine in general, so collect co-located surface water and sediment sample #'s 07KMS33SW and 07KMS33SD here, about 100 feet north of the road/trail. Collect samples at 1815 hours.
- all sampling under RSI project now complete.

Len Marcus

8-1-07
Field sketch - "Retort Hill/Mound"
mound measures approx 20' wide + 35' long



Len Marcus

8-1-07

~~1845~~ 1830 Marcus, Uhrig, Beck and Mitchell depart Mill Area for Camp Area

1845 – arrive Camp Area. Pack up all field supplies for demobilization

– Marcus maps out the hill on mound where the retort and other objects were found – see previous page

1905 Marcus, Uhrig and Beck depart Site in boat operated by Mitchell Dammeyer for Napaimute

– rain stopped earlier this afternoon; still overcast, approx. 65° F, no wind.

– all samples collected today are with E & E personnel in the boat; Samples are in coolers on ice

1930 all arrive at Napaimute Unload all work supplies. Organize for demobilization tomorrow. Secure collected samples on ice (Marcus + Uhrig perform this)

2030 complete above tasks

Len Marcus

2200 Marcus + Uhrig complete sample chain-of custody preparation + sample packaging by icing samples in 3 coolers and packing them for transport to Anchorage. Prepare chain-of-custody form for each cooler. Secure coolers (after loading) with chain of custody seals. Leave these on lodge porch overnight on ice

0000 complete this task.

Len Marcus

Thursday August 2 2007

0700 E&E personnel Marcus and Uhrig complete packing all E&E field + lodging supplies (had to bring all food + bedding) for demobilization. Load all E&E supplies onto Native Village of Napaimute boat

0830 Marcus and Uhrig and Larry Beck and Charles Lovely of BLM depart Napaimute in boat driven by Mitchell Dammeyer for Aniak for demobilization back to Anchorage

- E&E Marcus pays Native Village of Napaimute/Napaimute Enterprises (before departing Napaimute for cumulative lodging expenses for E&E as well as all boat usage + boat gas incurred for the project over 7/30/07 - 8/2/07; total cost - $1,528.65.

1000 all arrive in Aniak

- Uhrig, Beck + Lovely check in

Len Marcus

for PenAir flight back to Anchorage

- Marcus turns in all E&E field supplies and all collected samples to Frontier Flying Service at Aniak Airport for transport back to Anchorage. Frontier indicates that all gear will almost certainly get to Anchorage today (3 flights going there). PenAir indicated the opposite poor chance.
- Marcus checks in for PenAir flight.
- Samples (3 coolers) turned in to Frontier Flying Service have frozen ice packs put in earlier this morning, and are taped shut with chain-of-custody seals over each coolers' lid + side.

1200 Marcus + Uhrig + Beck + Lovely, fly PenAir from

Len Marcus

8-2-07

Aniak to Anchorage

1330 all arrive in Anchorage. Chris proceeds to check in for his flights to return him to Portland.

- Marcus checks with Frontier Flying Service to see if field gear + samples have arrived in Anchorage - not yet

1430 Marcus arrives at E&E Anchorage office

- provide project update to E&E Project Manager Mike Jones

1700 receive call from Frontier Flying Service - E&E field supplies and samples available for pickup in Anchorage

- Marcus travels to Anchorage Airport. Picks up E&E field gear at Frontier Flying Service cargo facility

- Analytical (lab) that will accept the samples and forward them to their Tacoma, WA

in Anchorage

Len Marcus

8-2-07

facility for analysis, TestAmerica, is closed for the night

- Marcus takes all field gear and samples to E&E warehouse facility in Anchorage. All collected samples will remain here at locked warehouse overnight until lab submittal tomorrow

— LATE ENTRY —

E&E Marcus assigned a sample number to the trip blank that had been carried with the field team on-site throughout the project. Trip blank is for GRO/BTEX analysis only and consists of plain methanol - was prepared by/provided by the analytical lab TestAmerica in Anchorage. Trip blank was assigned sample # and labeled just prior to demobilization from site on 8-1-07, assigned sample # 07KMS345S

Len Marcus

Friday August 3 2007

1500 E:E Marcus re-ices the 3 coolers holding all project samples at the E:E warehouse in Anchorage. Samples remained on ice, locked here, overnight

- take coolers to Test America lab in Anchorage. They will forward also samples to their lab facility in Tacoma, WA for analysis
- sign over chain-of-custody to Anchorage Test America lab representative; lab takes the 3 coolers of samples
- in speaking to both E:E chemists and Test America lab rep Terri Torres earlier today, decide that appropriate initial analyses to identify nature of/identity of the unknown white solid material collected in sample #s 07KMS05, 06 + 31 SS

Len Marc

are:

pH	EPA Method 9045
Cations	EPA Method 6010
anions	EPA Method 300

these analyses may help indicate if material is a caustic soda, as suspected

- these analyses were added to the appropriate chain-of-custody form earlier today, prior to submittal to the lab.
- if necessary or appropriate, other analyses can be conducted later if the 1st 3 (top of page) are inconclusive.

Len Marcus

"07KMSØ1SS"
Format

SOIL, TAILINGS - FOR METALS

Sample #	Date	Time	Matrix	Sampler	Location, gps waypoint, description, etc...
07KMS03SS	7-31-07	1430	soil/ore	A Uhrig	sandy/powdery ore(?) at ore chute entrance
07KMS04SS		1440	soil	A. Uhrig	soil approx. 50' upslope from ore loading chute
07KMS09SS		1520	soil	A Uhrig	soil from inside large shed next to ball mill, near
07KMS10SS		1520	soil	A Uhrig	duplicate of Above (field duplicate)
07KMS11SS		1540	soil	A Uhrig	soil from between 2 sheds near ball mill
07KMS12SS		1555	soil	A Uhrig	soil downgradient of 2 sheds at Ball Mill, near
07KMS14SS	8-1-07	0930	tailings-waste rock	A Uhrig	tailings/waste rock - main pile west of site, east end
07KMS15SS		0955	tailings-waste rock	A Uhrig	tailings/waste rock - main pile west of site, west end
07KMS16SS		1000	tailings-waste rock	A Uhrig	intermediate bench area of tailings/waste rock, always
07KMS17SS		1115	tailings	L. Marcus	brown + white material in open split drum
07KMS18SS		1125	tailings	A. Uhrig	red-brown granular solid from inside retort unit
07KMS19SS		1200	soil	A Uhrig	soil surface at "retort mound"
~~07KMS20SS~~	See pg 32+33 L Marcus	~~1200~~	~~soil~~	~~A. Uhrig~~	~~DUPLICATE OF ABOVE (field duplicate)~~
07KMS20SS		1240	ore/tailings	A Uhrig	concentrated ore or tailings from inside sewer pipe
07KMS21SS		1240	ore/tailings	A Uhrig	DUPLICATE OF ABOVE (field duplicate)
07KMS28SS		1605	soil	A Uhrig	from man made ball mill embankment - east side
07KMS29SS		1615	soil	A Uhrig	from man-made ball mill embankment - west side
07KMS31SS		1700	white solid	A Uhrig	unknow white powder in box at ball mill - possible soda
07KMS32SS		1735	soil	A Uhrig	BACKGROUND SOIL SAMPLE
07KMS34SS		1900	methanol	L. Marcus	TRIP BLANK (plain methanol) from lab

END

Len Marcus

END

Len Marcus

Format: 07KMSØ1SS - surface soil; ash; or tailings
SD - sediment
SW - surface water

Sample #	Date	Time	Matrix	Sampler	Location, gps waypoint, description, etc...
CREEK WATER					CREEK WATER
07KMS24SW	8-1-07	1420	water	A. Uhrig	slightly upcreek in unnamed creek from Kusko confluence
07KMS25SW		1525	water	A Uhrig	Unnamed creek downgradient of ball mill
07KMS26SW		1525	water	A Uhrig	DUPLICATE OF ABOVE (also MS/MSD)
07KMS335W		1815	water	A Uhrig	BACKGROUND SURFACE WATER
CREEK SEDIMENT					CREEK SEDIMENT
07KMS01SD	7-31-07	1400	sed.	A. Uhrig	dry drainage ditch immediately under ball mill
07KMS02SD	7-31-07	1415	sed	A Uhrig	dry settling pond (?) approx. 100' east of ball mill
07KMS24SD	8-1-07	1425	sed	A Uhrig	co-located with water #07KMS24SW
07KMS25SD		1525	sed	A Uhrig	unnamed creek downgradient of ball mill
07KMS26SD		1525	sed	A Uhrig	DUPLICATE OF ABOVE (field duplicate)
07KMS30SD		1615	sed	A Uhrig	from drainage ditch in front of ball mill - west side
07KMS335D		1815	sed	A Uhrig	BACKGROUND SEDIMENT
ASH - FOR EXPLOSIVES					ASH - FOR EXPLOSIVES
07KMS05SS	7-31-07	1450	ash	A. Uhrig	ash from burned explosives shed
07KMS06SS		1450	ash	A. Uhrig	duplicate of above - field duplicate
07KMS07SS		1500	soil	A Uhrig	Approx. 15' North of ash pile
07KMS08SS		1505	soil	A. Uhrig	Approx. 15' Southeast of ash pile

Len Marcus

Len Marcus

"07KMS01SS"

POL SOILS

Sample #	Date	Time	Matrix	Sampler	Location, gps waypoint, description, etc.
07KMS1255	7-31-07	1615	soil	A. Uhrig	underneath empty drum outside (N of) ball mill bldg
07KMS2255	8-1-07	1350	soil	L. Marcus	Soil near empty drums on E side of gen shed
07KMS2355	↓	1350	soil	L. Marcus	DUPLICATE OF #2255 - field duplicate
07KMS2755	↓	1540	soil	A Uhrig	Inside large ball mill bldg around timbers

END

Len Marcus

POL SOILS

END

Len Marcus

GPS Coordinates

Location	°N Lattitude	°W Longitude
Ball Mill	61.59727	158.95712
Bluff-East	61.59597	158.95941
Bluff-Middle	61.59598	158.96034
Bluff-West	61.59597	158.96141
Boat Landing	61.59307	158.94150
Cabin 1 (from left to right from river)	61.59332	158.94066
Cabin 2 (from left to right from river)	61.59330	158.94055
Cabin 3 (from left to right from river)	61.59323	158.94044
Camp retort	61.59335	158.94092
Camp Gen. shed	61.59338	158.94089
Compressor	61.59600	158.96077
Explosives shed	61.59700	158.95714
Foot east	61.59524	158.96001
Foot west	61.59530	158.96228
Sample 02SD	61.59721	158.95665
sample 03SS	61.59722	158.95706
sample 04SS	61.59710	158.95735
samples 05-08	61.59700	158.95712
sample 12SS	61.59735	158.95650
sample 14SS	61.59524	158.96065
sample 15SS	61.59528	158.96169

Len Marcus

Location	°N Lattitude	°W Longitude
sample 16SS	61.59520	158.96147
samples 17-21	61.59355	158.94089
samples 22-23	61.59338	158.94087
Sample 24	61.59332	158.94164
samples 25-26	61.59747	158.95650
sample 28SS	61.59723	158.95702
sample 29SS	61.59713	158.95731
sample 30SD	61.59727	158.95740
Sample 32SS	61.59757	158.95810
sample 33	61.59781	158.95686
Manager's House	61.59310	158.94023
Mill gen shed	61.59736	158.95705
Mill Area	61.59732	158.95709
Napaimute	61.59036	158.67488
ore sled	61.59612	158.96072
orange floatation unit	61.59748	158.95753
outhouse	61.59353	158.94122
pickup truck	61.59737	158.95766
possible dump 1 (W)	61.59520	158.97049
possible dump 2 (E)	61.59518	158.96878
other ore/tailings areas further downstream		
wall tent	61.59343	158.93993

Len Marcus

PHOTO LOG

Photo #	Date	Time	Photographer	Direction Facing	← DESCRIPTION →
1 092	7-31-07	1000	L. Marcus	E	"Retort" in camp area being examined
2 093		(001)		down	Split-drum Vessel next to retort in camp area
3 094		1402		W	Sample # 07KMS015D being collected under ball mill
4 095		1405		S	Same as # 3
5 096		1415		E	Sample # 07KMS025D being collected
6 097		1430		NW	Sample # 07KMS035S being collected
7 098		1431		down	Same as # 6
8 099		1443		NE	Sample location ~~#~~ 07KMS045S; ~~one looking down into bkgrnd~~ LM
9 100		1453		S	Sample #'s 07KMS055S/065S (dupes) collected from ash pile
10 101		1507		W	Sample # 07KMS085S with ash pile in bkgrnd
11 102		1509		S	Sample # 07KM075S with ash pile in bkgrnd
12		1525		W	Sample #'s 07KMS095S/0105S (dupes) being collected
13		1541		E	Sample # 07KMS115S being collected
14		1558		~~SW~~ NE	Sample # 07KMS125S being collected
15 106		1619		N	Sample 07KMS135S location
16 107		1619		E	Sample # 07KMS135S location
17		1634		N	Abandoned truck west of ball mill
18		1636		S	Same as # 18
19 110		1636		SW	Abandoned wood + piping next to truck
20 111		1638		N	Same as # 19, different view
21		1638		down	Abandoned piping (~20' long sections) by abandoned truck
22		1719		NE	Front door to main ball mill building larger of the 2 bldgs
23 114		1719		E	Interior view main ball mill building

Len Marcus

Len Marcus

Photo #	Date	Time	Photo-grapher	Direction Facing	← DESCRIPTION →
24 115	7-31-07	1719	L. Marcus	NE	Interior main ball mill building
25		1719		W	Interior main ball mill building
26		1720		NE	Exterior of main ball mill building - rear
27		1720		N	~~Interior of~~ ~~smaller ball mill building~~ same as # 26
28		1722		NE	Interior of Smaller ball mill building
29 120		1722		S	Interior of Smaller ball mill building
30		1725		SE	8' long piece of machinery east of ball mill bldgs
31		1729		N	piping + wood beam rock between Ball Mill bldgs
32		1730		W	Same as # 31
33		1730		E	same as #31
34 125		1730		S	Front of ball mill showing abandoned process equip
35		1731		S	Front of ball mill showing abandoned process equip
36		1732		SE	Front of ball mill
37		1732		SE	Ruins of ball mill
38		1732		S	Ruins of ball mill
39 130		1732		S	Ruins of ball mill
40		1732		S	Ball mill process equipment
41		1736		NE	Ball mill structure - side view general
42		1736		N	Ball mill structure side view detail
43		1740		W	Empty drums in Mill Area woods
44 135		1741		NW	Empty drums in Mill Area woods
45		1838		NE	Interior of kitchen cabin in Camp Area
46		1838		N	Interior of kitchen cabin in Camp Area

Len Marcus

Len Marcus

Photo #	Date	Time	Photo-grapher	Direction Facing	← DESCRIPTION →
47 138	7-31-07	1838	L. Marcus	SW	Interior of kitchen cabin at Camp Area
48		1840		N	Bottles of Unknown materials in kitchen cabin
49 140		1840		NW	Food cont- ainers abandoned in kitchen cabin
50		1841		N	Food cont ainers abandoned in kitchen cabin
51 142		1842		NW	Same as #48
52		1846		N/A	Mistake photograph
53		1846		W	Interior of Managers House - Camp Area
54 145		1847		N	Interior of Managers House - Camp Area
55		1850		N	Exterior of Managers House - Camp Area
56		1851		NW	Telephone poles piled up next to Managers House
57		1854		NE	Interior of Tool shed/maintenance shed - Camp Area
58		1854		N	Same as #57: fuel/oil cans + containers are empty
59 150		1856		SW	Same as #57; paint containers are empty
60		1856		W	Same as #57
61		1858		SW	Same as #57; kiln bricks are stacked by door
62		1903		down	Empty beer key outside Tool/maintenance shed. Rig processing? refitted for
63		1904		NW	Empty drums next to Generator Shed - Camp Area
64 155		1906		NE	Debris inside generator Shed in Camp Area
65		1906		down	Broken lead-acid battery inside generator shed - Camp Area
66		1906		N	Interior of generator shed - Camp Area
67		1908		NW	Empty hazmat containers in generator shed - Camp Area
68		1909		SW	Retort mound - brick kiln (foreground), "beerkeg" retort (bkgrnd)
69 160		1909		down	Circular brick kiln in Camp Area near beer keg retort

Lan Marcus

Lan Marcus

Photo #	Date	Time	Photographer	Direction Facing	← DESCRIPTION →
70 161	7-31-07	1907	L. Marcus	N	Empty drums at Retort Mound
71		1910		NW	Same as # 70 - different group though
72 163		1911		NW	Cement "hearth" at Retort Mound
73		1912		NW	"Sewer" pipe" at Retort Mound
74 165		1912		E	"Beer keg" retort unit in camp Area
75		1914		E	Suspected ore/concentrate transfer bucket - Camp Area
76		1914		N	Apparant front end loader bucket - Camp Area
77		1915		W	Outhouse at Camp Area
78		1919		NW	Wall tent above Managers House, Camp Area
79 170		1921		NW	Interior of wall tent
80		1921		W	Interior of wall tent
81		1923		NW	Reaction/ retort vessel (suspected) inside wall tent (center)
82		1923		NW	Same as #81; close-up
83		1926		W	Side of Wall Tent Structure
84 175	8-1-07	0843		N	Site area from up the Kuskokwim
85		0843		N	Site area from up the Kuskokwim
86		0905		N	Cliff face further downstream of main tailings pile
87		0906		N	Same as #86
88		0907		N	Cliff face possibly displaying cinnabar; not apparant mineral
89 180		0934		N	Sample # 07KMS1455S being collected
90		[illegible]		down	Close-up of Sample # 07KMS1455S being collected
91		1016		N	Sample location 07KMS1555S
92 183		1017		N	Sample location 07KMS1555S

Len Marcus

Len Marcus

Photo #	Date	Time	Photo-grapher	Direction Facing	CODE	SCRIPTION
93 184	8-1-07	1017	L. Marcus	NW	Sample #	07KMS1655 location
94 185		1027		N	Sample #	07KMS1655 location
95		1026		N	View of washed	rock/tailings dump from off-shore
96		1026		NE	Same as 95	
97		1028		NE	Same as	#95
98		1120		down	Collecting	sample # 07KMS1855
99 190		1125		down	Same as	#99
100		1135		down	"Beer keg"	retort - sample # 07KMS1855 collected inside
101		1136		down	Open trough	where sample # 07KMS1955 collected from
102		1136		SE	Open contame-	(sample # 1755) - foreground; retort (#1855) background
103		1140		down	brick kiln?	where retort unit was heated?
104 195		1141		N	Concrete	brick passage near retort mound
105		1150		NE	Concrete	wall/hearth/vent system at retort mound
106		1150		down	Same as	#105
107		1210		SE	Sample #	07KMS1955 ~~(07KMS2055 (depos)~~ location - "retort mound"
108		1211		down	Same as	#107
109 200		1211		W	examining	sewer pipe at retort mound
110		1212		down	tailings-like	material scooped out of sewer pipe - retort mound
111		1230		down	Duplicate	sample #s 07KMS2055 + 07KMS2155 being collected
112		1232		down	Same as	above
113		1257		NW	Inside	open end of sewer pipe at retort site
114 205		1258		NW	Same as	#113
115		1258		NW	Same as	#113

Len Marcus

Len Marcus

Photo #	Date	Time	Photographer	Direction Facing	← DESCRIPTION →	
116 207	8-1-07	1402	L. Marcus	N	Soil sample	location # 07KMS22/23SS (dupes) next to greenshed
117		1403		NW	Same as	#117, stake marks sample loc. (drums are empty)
118		1421		N	Co-located	Surface wtr/sediment samples collected from
119 216		1422		down	Same as above	unnamed creek just up from Kuskokwim confluence
120		1425		down	Same as #	118 - sample #'s 07KMS 24SW/SD
121 212		1532		down	co-located	Surface water + sediment duplicate sample
122 213		1532		down	Same as #121	location in unnamed creek near Mill Area
123		1540		down	~~Same as~~	~~#122~~ sample #; 07KMS25SW/SD + 26SW/SD
124 215		1540		NE	#123 +	124 - duplicate soil #'s 07KMS 22 + 23SS being collected inside larger Ball Mill Bldg.
125		1605		SW	Soil sample	#07KMS28SS collected - east side of Ball Mill slope
126		1612		N	Mid-portion	of Ball Mill structure; view from east side
127		1615		down	Soil sample	#07KMS29SS collected - west side of Ball Mill slope
128		1622		N	Soil sample	location #07KMS29SS in relation to Ball Mill
129 220		1623		N	Same as	above, wider view
130		1625		SE	Soil sample	location #07KMS29SS from base of slope, Ball Mill to the left
131		1631		down	Sediment	sample #07KMS30SD being collected - dry ditch W/of Ball Mill
132		1642		SE	Soil sample	location #07KMS28SS from base of slope; Ball Mill is to right
133		1702		down	Wood box of	unknown white solid at base of Ball Mill, sampled as 07KMS31SS
134 225		1703		down	Same as	above
135		1705		SW	Canvas cover	placed over wood box where #07KMS31SS collected
136		1723		E	Flotation	cell type device found near abandoned truck
137		1723		N	Same as	#136
138		1724		down	Product	name plate on flotation cell (?) in 2 previous photos

Len Marcus

Len Marcus

Photo #	Date	Time	Photo-grapher	Direction Facing	← DESCRIPTION →
139 230	8-1-07	1725	L Marcy	E	Misc. debris around orange floatation cell (?) near abandoned truck
140	↓	1737	↓	W	Background surface soil sample #07KMS325S being collected
141		1738		W	Same as #140
142		1815		down	Location of background colocated surf wtr/sed samples #335W/SD
143		1816		N	Same as #142
144 235		1823		down	abandoned wood sled on road between Camp + Mill areas

END OF PHOTOGRAPHS

Lee Marcy

Lee Marcy

Camera info for all photos in photodocumentation log:

Panasonic Lumix DMC-FX3
S/N FD6SA12115R

ATTACHMENT C

STRUCTURES, EQUIPMENT, AND SOLID WASTE SUMMARY

Item	Description	Photo. No. in Attach. A	Estimated Solid Waste Volume (assumes buildings or other large objects are dismantled/demolished); Other Comments	Non-Hazardous Wood Debris Volume - Eligible for Burning/ Disposal Onsite	Non-Wood or Hazardous Debris Volume - Possibly Requiring Offsite Removal
CAMP AREA					
Bunk Houses	Two bunk houses present. Wood construction. Debris inside: sleeping bunks; oil stove; clothing. Approximate dimensions: 12' wide, 12' long, 10' tall.		50 cubic yards each (100 total)	90 cubic yards	10 cubic yards
Tool Shed	Wood construction. Debris inside: empty oil containers; engine parts; electrical equipment, empty paint cans; outboard motor; oil stove; kiln bricks; clothing; life vests; misc. hardware. Approximate dimensions: 18' wide, 10' long, 10' tall.	148, 151	50 cubic yards	45 cubic yards	5 cubic yards
Cook House	Wood construction. Debris inside: stoves, cabinetry, food items, cooking utensils. Observed hazardous materials: several batteries. Several unlabeled bottles contain unknown liquids. Approximate dimensions: 10' wide, 16' long, 10' tall.	136, 137, 140, 142	50 cubic yards	45 cubic yards	5 cubic yards
Generator Shed	Wood construction. Debris inside: generator motor; electrical panels and wiring; damaged lead-acid battery; empty oil containers. Outside: unused "beer keg" retort. Approximate dimensions: 10' wide, 8' long, 10' tall.	153, 154, 156, 208	50 cubic yards. Soil sample No. 07KMS22SS and 23SS (duplicates) collected outside next to empty drums.	45 cubic yards	5 cubic yards
Managers House	Wood construction. Discarded personal belongings inside. Metal antenna attached to outside. Approximate dimensions: 12' wide, 16' long, 12' tall.	144, 146	50 cubic yards	45 cubic yards	5 cubic yards
Wall Tent	Wood and canvas construction. Debris inside: oil lamp; electric pumps; engines and parts; oil stove; cooking items. Approximate dimensions: 8' wide, 10' long, 8' tall.	169, 170, 172	30 cubic yards	25 cubic yards	5 cubic yards
Telephone Poles	Stack of several telephone poles on the ground in front of the Managers House.		10 cubic yards	10 cubic yards	
Outhouse	Small wood outhouse structure. Approximate dimensions: 5' wide, 5' long, 8' tall.	168	15 cubic yards	15 cubic yards	
Ore carts	Two metal ore cart or machinery-type bucket containers discarded near the retort mound	166	2 cubic yards		2 cubic yards
Empty 55-Gallon Drums	Approximately 8 empty 55-gallon drums located outside of various Camp Area structures.	154, 208	8 cubic yards		8 cubic yards
RETORT MOUND					
Retort Unit	Round metal "beer keg" with detached iron pipe elbow. Full of presumed processed ore.	165, 189, 193	1 cubic yard. Material inside collected as sample No. 07KMS18SS.		1 cubic yard
"Sewer Pipe"	Approximate 12' long by 14"-diameter sewer pipe on the ground. Contains presumed processed ore in interior bucket.	164, 201, 203, 204	2 cubic yards. Material inside collected as duplicate sample No.'s 07KMS120SS & 21SS.		2 cubic yards
"Hearth"	Cement and brick structure, approximately 3' wide and 2' tall.	195, 197	2 cubic yards		2 cubic yards
"Brick Kiln"	Approximate 4-foot diameter, 4-foot deep brick kiln set into the retort mound. Constructed of fire brick.	159	1 cubic yard		1 cubic yard
Open-topped Container	Open-topped, split drum-looking container full of white/brown sandy material.	192, 193, 198	2 cubic yards. Material inside collected as sample No. 07KMS17SS.		2 cubic yards
Empty 55-Gallon Drums	Approximately 21 empty 55-gallon drums located around the retort mound	161	21 cubic yards		21 cubic yards
Support Posts	Several approximate 8" square, upright timbers set into the retort mound; presumed equipment or cable support beams.		5 cubic yards	5 cubic yards	

Item	Description	Photo. No. in Attach. A	Estimated Solid Waste Volume (assumes buildings or other large objects are dismantled/demolished); Other Comments	Non-Hazardous Wood Debris Volume - Eligible for Burning/ Disposal Onsite	Non-Wood or Hazardous Debris Volume - Possibly Requiring Offsite Removal
Soil at Retort Mound	Approximate measurements of the retort mound: 35 feet long, 20 feet wide, 3 feet above grade. Assume any necessary soil removal occurs to three foot depth.	193, 198, 201	78 cubic yards (soil). Location of sample No's. 07KMS19SS.		78 cubic yards
Structure: Mill Building	Large, 3-story wooden structure built into suspected man-made hillside. Metal roofing panels. Extensive wood beam bracing and wall components. Approximate overall dimensions: 30' wide, 30 long', 40' tall.	94, 97, 130, 132, 133, 220	350 cubic yards	300 cubic yards	50 cubic yards
Misc. Ore Processing Debris at Base of Mill	Various processing and holding devices: ball mill (large round metal processing unit with attached drive mechanism); floatation cell; crushing machinery, conveyor systems and troughs, motors; 5-gallon bucket of military grease, box of white powder (poss. quicklime)	95, 125, 131, 225, 226	30 cubic yards		30 cubic yards
Structure: Large Shed	Wood construction. Bare dirt floor. Debris inside: various equipment and electrical parts, 12 approx. 1-gallon sized mercury flasks; wood beam equipment support base on floor. Approximate dimensions: 13' wide, 19' long, 10' tall.	103, 113, 115, 116, 117, 118, 215	40 cubic yards. Soil samples collected from floor: No.'s 07KMS09SS and 07KMS10SS (duplicates), and 07KMS27SS	35 cubic yards	5 cubic yards
Soil Floor of Large Shed	Bare soil floor; revealed elevated arsenic, mercury, and DRO concentrations. Floor dimensions = 13' wide, 19' long. Assume any necessary soil removal occurs to three foot depth.	103, 115, 116, 215	27 cubic yards (soil). Location of sample No's. 07KMS09SS, 10SS, & 27SS.		27 cubic yards
Structure: Small Shed	Wood construction. Collapsing wood floor. Debris inside: various electrical parts, tools, workbench. Approximate dimensions: 8' wide, 12' long, 10' tall.	104, 119, 124	50 cubic yards	45 cubic yards	5 cubic yards
Empty 55-Gallon Drums	Approximately 18 empty 55-gallon drums located around the Ball Mill buildings.	135	18 cubic yards		18 cubic yards
Abandoned Truck	Derelict, dual-cab pickup truck. Piles of abandoned piping and wood lie nearby. Unknown if battery, fuel, or other possible hazardous materials/fluids remain.	108, 110	15 cubic yards		15 cubic yards
Floatation Cells	Heavy steel units; three found: at base of Mill building; east of the Mill Area's Small Shed; and near derelict truck. Approximate dimensions: 8' long, 4' wide' 5' tall.	105, 227	5 cubic yards each; 15 cubic yards total		15 cubic yards
Piping	Approximate 2"-diameter, suspended steel pipe traverses the Mill Area for approximately 75 feet.		3 cubic yards		3 cubic yards
Explosives Shed	Approximate 6-foot diameter ash pile, with metal roof panels, oil furnace, and other metal structural debris mixed in. Material reported as and sampled as "ash" might be quicklime or similar material.	100, 101, 102	5 cubic yards. Ash (possible quicklime) collected as duplicate sample No.'s 07KMS05SS and 06SS.		5 cubic yards
Ore or Equipment Sleds	Several wood and metal sleds noted along roads (one along main site road; one noted along road in mining area).	235	2 cubic yards each; 8 cubic yards total		8 cubic yards
Sediment in settling pond near Ball Mill	Approximate measurements: 15 feet long, 10 feet wide; assumed sediment depth is 3 feet. Assume any necessary sediment removal occurs to three foot depth.	96	17 cubic yards (sediment). Location of sample No. 07KMS02SD.		17 cubic yards
	Solid Waste Volume Totals:		**1,055 cubic yards**	**705 cubic yards**	**350 cubic yards**

ATTACHMENT D

LABORATORY ANALYTICAL DATA, SAMPLE CHAIN-OF-CUSTODY RECORDS, AND DATA QUALITY ASSURANCE REVIEW MEMORANDUM

Note:

Analytical results for all Kolmakof RSI samples are contained in a 131-page report from the main analytical laboratory, a 20-page report from a branch laboratory, and a 10-page report from the laboratory subcontracted to perform organic mercury analyses. Each report contains pages of analytical methods narrative, internal sample identification and receipt information, and laboratory-performed quality control results in addition to pages of actual sample results. In the case of the 131-page report, only 52 pages contain actual sample results, with the rest of the report devoted to supporting information. These lab reports are retained in full by BLM, but for the purpose of this RSI report, only the actual sample results pages and accompanying E&E data validation memos (which summarize and take into account the lab's quality control measures) are presented. As a result, there may be gaps noted in the laboratory's page numbering system on the analytical result sheets in Attachment D. The omitted pages contain supporting analytical information that is either not critical to or has already been incorporated into this report's description of the actual sample results.

ecology and environment, inc.
International Specialists in the Environment
720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

TECHNICAL MEMORANDUM

DATE: September 25, 2007

TO: Len Marcus, E & E, Anchorage, Alaska

FROM: David Ikeda, E & E, Seattle, Washington

SUBJ: Kolmakof Mine BLM Site

RE: Soil and Water Data Review – Test America Analytical, Inc.

CC: 001998.BU08.01 Site File

A data usability review of 34 soil and 4 water sample results has been completed. Test America Analytical Services, Inc., (TA) of Tacoma, Washington, performed the analysis. E & E received one data package from TA: 580-6781-1. Soil samples were analyzed for Gasoline-range organics (GROs, Method AK101), Diesel-range organics (DROs, Method AK102), and Residual-range organics (RROs, Method AK103) by Alaska Department of Environmental Conservation (ADEC) methods, volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260B, metals by EPA Methods 6000 and 7000 series, anions by EPA Method 300, mercury speciation by modified EPA Method 1630, and nitroaromatics by EPA Method 8330. The groundwater samples were analyzed for metals.

The following summarizes the findings of the data review for the data package.

Sample Identifications:

07KMS03SS	07KMS19SS	07KMS10SS	07KMS28SS
07KMS27SS	07KMS30SD	07KMS15SS	07KMS25SW (Water)
07KMS13SS	07KMS14SS	07KMS16SS	07KMS25SD
07KMS22SS	07KMS02SD	07KMS20SS	07KMS24SW (Water)
07KMS23SS	07KMS26SD	07KMS18SS	07KMS24SD
07KMS05SS	07KMS11SS	07KMS29SS	07KMS26SW (Water)
07KMS06SS	07KMS32SS	07KMS17SS	07KMS33SW (Water)
07KMS07SS	07KMS01SD	07KMS09SS	07KMS33SD
07KMS08SS	07KMS12SS	07KMS04SS	07KMS34SS
07KMS31SS	07KMS21SS		

All samples were collected on July 31, 2007 and August 1, 2007, and received by TA on August 4, 2007. The samples were maintained and received within the QC limits of 4°C ± 2. No problems were identified that would affect data usability.

recycled paper

GROs:

- All GROs samples were analyzed within the holding time of fourteen days for soil.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil laboratory control sample (LCS) and LCS duplicate (LCSD) were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within required method control limits.
- A soil matrix spike (MS) sample and matrix spike duplicate (MSD) sample were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within required method control limits.
- Surrogate spike percent recovery values could not be calculated. The laboratory was not provided the surrogate concentration spiked into the sample. No action was taken for surrogate percent recovery.
- At the time of this review, the calibration data were not received.

DROs:

- All DROs samples were analyzed within the holding time of fourteen days for soil.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil LCS and LCSD were prepared and analyzed per batch of samples. The percent recovery values were outside method control limits. Positive results in the associated samples were flagged as estimated (J).
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The soil percent recovery values and the relative percent difference values were outside required method control limits. No action was taken for the outliers due to the high sample results and/or the large sample dilution.
- Surrogate spike percent recovery values were within the method control limits, except for the MS and MSD sample. No action was taken for the surrogate outlier.
- At the time of this review, the calibration data were not received.

RROs:

- All RROs samples were analyzed within the holding time of fourteen days for soil.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil LCS and LCSD were prepared and analyzed per batch of samples. The soil percent recovery values were outside required method control limits. Positive results in the associated samples were flagged as estimated (J).
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The soil percent recovery values and the relative percent difference values were outside required method control limits. No action was taken for the outliers due to the high sample results and/or the large sample dilution.
- Surrogate spike percent recovery values were within the method control limits, except for the MS and MSD sample. No action was taken for the surrogate outlier.
- At the time of this review, the calibration data were not received.

VOCs:

- All VOC samples were analyzed within the holding time of fourteen days for soil.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.

- A soil LCS and LCSD were prepared and analyzed per batch of samples. Percent recovery values and relative percent difference values were within required method control limits.
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within method control limits.
- Surrogate spike percent recovery values could not be calculated. The laboratory was not provided the surrogate concentration spiked into the sample. No action was taken for surrogate percent recovery.
- At the time of this review, the instrument tuning, internal standards or calibration data were not received.

Nitroaromatics:

- All nitroaromatic samples were analyzed within the holding time of fourteen days for soil.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil LCS and LCSD were prepared and analyzed per batch of samples. Percent recovery values and relative percent difference values were within required method control limits.
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within method control limits, except for tetryl. The both percent recovery values and relative percent difference were outside QC limit. No action was taken since the LCS and LCSD percent recovery values and the relative percent difference values were within method control limits.
- Surrogate spike percent recovery values were within the method control limits.
- At the time of this review, the calibration data were not received.

Metals:

- All soil and water samples met holding time criteria of less than 180 days between collection and analysis (28 days for mercury).
- A soil and water method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil and water LCS was prepared and analyzed per batch of samples. Percent recovery values were within required method control limits.
- A soil and water MS sample and MSD sample were prepared and analyzed per batch of samples.
  - The water percent recovery values and the relative percent difference values were within required method control limits.
  - The soil percent recovery values and the relative percent difference values were within required method control limits, except for chromium, lead, mercury, selenium, and zinc. No action was taken for the mercury outlier, since the original result was greater than four times the spike amount. Associated sample results for chromium, lead, selenium, and zinc were flagged as estimated (UJ or J).
- A duplicate sample was prepared and analyzed per batch of samples.
  - The water percent recovery values and the relative percent difference values were within required method control limits.

- The soil percent recovery values and the relative percent difference values were within required method control limits, except for lead. Positive results in the associated samples were flagged as estimated.
- At the time of this review, the calibration data were not received.

Mercury Speciation:

- All soil samples met holding time criteria of less than 180 days between collection and analysis.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil LCS was prepared and analyzed per batch of samples. Percent recovery values were within required method control limits.
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within required method control limits.
- A duplicate sample was prepared and analyzed per batch of samples. The soil percent recovery values and the relative percent difference values were within required method control limits, except for sample 07KMS03SS. The positive results in sample 07KMS03SS was flagged as estimated (J).
- The calibration data were received by the Laboratory.
- Sample result for 07KMS02SD was flagged as estimated "J" since the numerical value was between the Laboratory MDL and PQL.

Anions:

- All soil samples met the water holding time criteria of less than 28 days between collection and analysis, except for nitrate and nitrite (water holding time of less than 48 hours). No action was taken for the missed holding times since there is no official holding time for these analytes in soil samples.
- A soil method blank was prepared and analyzed per batch of samples. No analytes were detected in the method blanks.
- A soil LCS was prepared and analyzed per batch of samples. Percent recovery values were within required method control limits.
- A soil MS sample and MSD sample were prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within required method control limits.
- A duplicate sample was prepared and analyzed per batch of samples. The percent recovery values and the relative percent difference values were within required method control limits.
- At the time of this review, the calibration data were not received. All calibrations were within Laboratory QC limits, except for the initial calibration and final calibration for phosphate. The phosphate results in the associated samples were qualified as estimated (UJ or J).

Conclusion and Recommendation:

The overall usefulness of the data is based on the criteria outlined in the analytical methods and the July 2002 EPA Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (EPA 540-R-01-008). Based upon the information provided, the data are acceptable for use.

Data Qualifiers and Definitions

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the sample detection limits but greater than the instrument detection limits or because quality control criteria limits were not met.

U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

UJ - The associated detection limit is an estimated quantity because quality control criteria limits were not met.

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS27SS

Lab Sample ID:	580-6781-2			Date Sampled:	08/01/2007 1540
Client Matrix:	Soil	% Moisture:	9.1	Date Received:	08/04/2007 1515

8260B Volatile Organic Compounds by GC/MS

Method:	8260B	Analysis Batch: 580-21761		Instrument ID:	SEA043
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	VB0008335.D
Dilution:	1.0			Initial Weight/Volume:	50.966 g
Date Analyzed:	08/14/2007 0246			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	RL
Benzene		ND		4.3 u
Toluene		ND		22 u
Ethylbenzene		ND		22 u
m-Xylene & p-Xylene		46		22
o-Xylene		ND		22 u

Surrogate	%Rec	Acceptance Limits
Fluorobenzene (Surr)	97	75 - 125
Toluene-d8 (Surr)	91	85 - 115
Ethylbenzene-d10	82	75 - 125
4-Bromofluorobenzene (Surr)	93	85 - 120

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS13SS

Lab Sample ID:	580-6781-3			Date Sampled:	07/31/2007 1615
Client Matrix:	Soil	% Moisture:	22.3	Date Received:	08/04/2007 1515

8260B Volatile Organic Compounds by GC/MS

Method:	8260B	Analysis Batch: 580-21761		Instrument ID:	SEA043
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	VB0008330.D
Dilution:	1.0			Initial Weight/Volume:	51.654 g
Date Analyzed:	08/14/2007 0055			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	RL	
Benzene		ND		5.0	u
Toluene		ND		25	u
Ethylbenzene		ND		25	u
m-Xylene & p-Xylene		ND		25	u
o-Xylene		ND		25	u

Surrogate	%Rec	Acceptance Limits
Fluorobenzene (Surr)	93	75 - 125
Toluene-d8 (Surr)	97	85 - 115
Ethylbenzene-d10	91	75 - 125
4-Bromofluorobenzene (Surr)	94	85 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS22SS

Lab Sample ID: 580-6781-4
Client Matrix: Soil
% Moisture: 15.5
Date Sampled: 08/01/2007 1350
Date Received: 08/04/2007 1515

8260B Volatile Organic Compounds by GC/MS

Method: 8260B
Preparation: 5035-Medium
Dilution: 1.0
Date Analyzed: 08/14/2007 0202
Date Prepared: 08/07/2007 1639

Analysis Batch: 580-21761
Prep Batch: 580-21486

Instrument ID: SEA043
Lab File ID: VB0008333.D
Initial Weight/Volume: 50.394 g
Final Weight/Volume: 1000 mL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	RL
Benzene		ND		4.7 u
Toluene		ND		23 u
Ethylbenzene		ND		23 u
m-Xylene & p-Xylene		ND		23 u
o-Xylene		ND		23 u

Surrogate	%Rec	Acceptance Limits
Fluorobenzene (Surr)	91	75 - 125
Toluene-d8 (Surr)	97	85 - 115
Ethylbenzene-d10	94	75 - 125
4-Bromofluorobenzene (Surr)	94	85 - 120

8/20/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS23SS

Lab Sample ID:	580-6781-5			Date Sampled:	08/01/2007 1350
Client Matrix:	Soil	% Moisture:	17.0	Date Received:	08/04/2007 1515

8260B Volatile Organic Compounds by GC/MS

Method:	8260B	Analysis Batch: 580-21761		Instrument ID:	SEA043
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	VB0008334.D
Dilution:	1.0			Initial Weight/Volume:	48.76 g
Date Analyzed:	08/14/2007 0224			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	RL	
Benzene		ND		4.9	u
Toluene		ND		25	u
Ethylbenzene		ND		25	u
m-Xylene & p-Xylene		ND		25	u
o-Xylene		ND		25	u

Surrogate	%Rec	Acceptance Limits
Fluorobenzene (Surr)	93	75 - 125
Toluene-d8 (Surr)	98	85 - 115
Ethylbenzene-d10	93	75 - 125
4-Bromofluorobenzene (Surr)	93	85 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS34SS

Lab Sample ID: 580-6781-38
Client Matrix: Solid

Date Sampled: 08/01/2007 1900
Date Received: 08/04/2007 1515

8260B Volatile Organic Compounds by GC/MS

Method: 8260B
Preparation: 5035-Medium
Dilution: 1.0
Date Analyzed: 08/14/2007 0032
Date Prepared: 08/07/2007 1639

Analysis Batch: 580-21761
Prep Batch: 580-21486

Instrument ID: SEA043
Lab File ID: VB0008329.D
Initial Weight/Volume: 25 g
Final Weight/Volume: 1000 mL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL	
Benzene		ND		8.0	u
Toluene		ND		40	u
Ethylbenzene		ND		40	u
m-Xylene & p-Xylene		ND		40	u
o-Xylene		ND		40	u

Surrogate	%Rec	Acceptance Limits
Fluorobenzene (Surr)	94	75 - 125
Toluene-d8 (Surr)	95	85 - 115
Ethylbenzene-d10	90	75 - 125
4-Bromofluorobenzene (Surr)	90	85 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: **07KMS27SS**

Lab Sample ID:	580-6781-2			Date Sampled:	08/01/2007 1540
Client Matrix:	Soil	% Moisture:	9.1	Date Received:	08/04/2007 1515

AK101 Gasoline Range Organics

Method:	AK101	Analysis Batch: 580-21906		Instrument ID:	SEA003
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	CS171699.D
Dilution:	1.0			Initial Weight/Volume:	50.966 g
Date Analyzed:	08/16/2007 0419			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Gasoline Range Organics (GRO)-C6-C10		4.0		2.2

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	102	60 - 120
Ethylbenzene-d10	118	60 - 120
Fluorobenzene (Surr)	105	60 - 120
Toluene-d8 (Surr)	117	60 - 120

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS13SS

Lab Sample ID:	580-6781-3			Date Sampled:	07/31/2007 1615
Client Matrix:	Soil	% Moisture:	22.3	Date Received:	08/04/2007 1515

AK101 Gasoline Range Organics

Method:	AK101	Analysis Batch: 580-21842		Instrument ID:	SEA003
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	CS171626.D
Dilution:	1.0			Initial Weight/Volume:	51.654 g
Date Analyzed:	08/14/2007 1914			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Gasoline Range Organics (GRO)-C6-C10		ND		2.5 u

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	97	60 - 120
Ethylbenzene-d10	118	60 - 120
Fluorobenzene (Surr)	106	60 - 120
Toluene-d8 (Surr)	117	60 - 120

8/28/07

Analytical Data

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS22SS

Lab Sample ID:	580-6781-4			Date Sampled:	08/01/2007 1350
Client Matrix:	Soil	% Moisture:	15.5	Date Received:	08/04/2007 1515

AK101 Gasoline Range Organics

Method:	AK101	Analysis Batch: 580-21842		Instrument ID:	SEA003
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	CS171629.D
Dilution:	1.0			Initial Weight/Volume:	50.394 g
Date Analyzed:	08/14/2007 2019			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Gasoline Range Organics (GRO)-C6-C10		ND		2.3 u

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	97	60 - 120
Ethylbenzene-d10	119	60 - 120
Fluorobenzene (Surr)	106	60 - 120
Toluene-d8 (Surr)	118	60 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS23SS

Lab Sample ID:	580-6781-5			Date Sampled:	08/01/2007 1350
Client Matrix:	Soil	% Moisture:	17.0	Date Received:	08/04/2007 1515

AK101 Gasoline Range Organics

Method:	AK101	Analysis Batch: 580-21842		Instrument ID:	SEA003
Preparation:	5035-Medium	Prep Batch: 580-21486		Lab File ID:	CS171630.D
Dilution:	1.0			Initial Weight/Volume:	48.76 g
Date Analyzed:	08/14/2007 2040			Final Weight/Volume:	1000 mL
Date Prepared:	08/07/2007 1639			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Gasoline Range Organics (GRO)-C6-C10		ND		2.5 u

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	97	60 - 120
Ethylbenzene-d10	119	60 - 120
Fluorobenzene (Surr)	107	60 - 120
Toluene-d8 (Surr)	118	60 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: **07KMS34SS**

Lab Sample ID: 580-6781-38
Client Matrix: Solid

Date Sampled: 08/01/2007 1900
Date Received: 08/04/2007 1515

AK101 Gasoline Range Organics

Method: AK101
Preparation: 5035-Medium
Dilution: 1.0
Date Analyzed: 08/14/2007 1853
Date Prepared: 08/07/2007 1639

Analysis Batch: 580-21842
Prep Batch: 580-21486

Instrument ID: SEA003
Lab File ID: CS171625.D
Initial Weight/Volume: 25 g
Final Weight/Volume: 1000 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Gasoline Range Organics (GRO)-C6-C10		ND		4.0 u

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	96	60 - 120
Ethylbenzene-d10	118	60 - 120
Fluorobenzene (Surr)	106	60 - 120
Toluene-d8 (Surr)	117	60 - 120

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS27SS

Lab Sample ID:	580-6781-2			Date Sampled:	08/01/2007 1540
Client Matrix:	Soil	% Moisture:	9.1	Date Received:	08/04/2007 1515

AK102 & 103 Nonhalogenated Organics by FID (Diesel Range Organics & Residual Range Organics

Method:	AK102 & 103	Analysis Batch: 580-21742		Instrument ID:	SEA015
Preparation:	3550B	Prep Batch: 580-21679		Lab File ID:	PL17110.D
Dilution:	1.0			Initial Weight/Volume:	10.6303 g
Date Analyzed:	08/13/2007 0951			Final Weight/Volume:	10 mL
Date Prepared:	08/10/2007 1418			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
RRO (nC25-nC36)		3100	* J	52

Surrogate	%Rec	Acceptance Limits
o-Terphenyl	75	60 - 120
n-Triacontane-d62	95	60 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: **07KMS27SS**

Lab Sample ID:	580-6781-2			Date Sampled:	08/01/2007 1540
Client Matrix:	Soil	% Moisture:	9.1	Date Received:	08/04/2007 1515

AK102 & 103 Nonhalogenated Organics by FID (Diesel Range Organics & Residual Range Organics

Method:	AK102 & 103	Analysis Batch: 580-21793		Instrument ID:	SEA016
Preparation:	3550B	Prep Batch: 580-21679		Lab File ID:	EP22218.D
Dilution:	10			Initial Weight/Volume:	10.6303 g
Date Analyzed:	08/14/2007 1029			Final Weight/Volume:	10 mL
Date Prepared:	08/10/2007 1418			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
DRO (nC10-<nC25)		16000	* J	210

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: **07KMS13SS**

Lab Sample ID:	580-6781-3			Date Sampled:	07/31/2007 1615
Client Matrix:	Soil	% Moisture:	22.3	Date Received:	08/04/2007 1515

AK102 & 103 Nonhalogenated Organics by FID (Diesel Range Organics & Residual Range Organics

Method:	AK102 & 103	Analysis Batch: 580-21742		Instrument ID:	SEA015
Preparation:	3550B	Prep Batch: 580-21679		Lab File ID:	PL17113.D
Dilution:	1.0			Initial Weight/Volume:	10.4174 g
Date Analyzed:	08/13/2007 1102			Final Weight/Volume:	10 mL
Date Prepared:	08/10/2007 1418			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
DRO (nC10-<nC25)		ND		25 u
RRO (nC25-nC36)		73	* J	62

Surrogate	%Rec	Acceptance Limits
o-Terphenyl	103	60 - 120
n-Triacontane-d62	95	60 - 120

8/20/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS22SS

Lab Sample ID:	580-6781-4			Date Sampled:	08/01/2007 1350
Client Matrix:	Soil	% Moisture:	15.5	Date Received:	08/04/2007 1515

AK102 & 103 Nonhalogenated Organics by FID (Diesel Range Organics & Residual Range Organics

Method:	AK102 & 103	Analysis Batch: 580-21742		Instrument ID:	SEA015
Preparation:	3550B	Prep Batch: 580-21679		Lab File ID:	PL17114.D
Dilution:	1.0			Initial Weight/Volume:	10.1259 g
Date Analyzed:	08/13/2007 1122			Final Weight/Volume:	10 mL
Date Prepared:	08/10/2007 1418			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
DRO (nC10-<nC25)		65		23
RRO (nC25-nC36)		250	*	58

Surrogate	%Rec	Acceptance Limits
o-Terphenyl	106	60 - 120
n-Triacontane-d62	106	60 - 120

8/08/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: **07KMS23SS**

Lab Sample ID: 580-6781-5
Client Matrix: Soil
% Moisture: 17.0
Date Sampled: 08/01/2007 1350
Date Received: 08/04/2007 1515

AK102 & 103 Nonhalogenated Organics by FID (Diesel Range Organics & Residual Range Organics

Method: AK102 & 103
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 08/13/2007 1143
Date Prepared: 08/10/2007 1418

Analysis Batch: 580-21742
Prep Batch: 580-21679

Instrument ID: SEA015
Lab File ID: PL17115.D
Initial Weight/Volume: 10.0902 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
DRO (nC10-<nC25)		75		24
RRO (nC25-nC36)		270	*	60

Surrogate	%Rec	Acceptance Limits
o-Terphenyl	103	60 - 120
n-Triacontane-d62	110	60 - 120

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS03SS

Lab Sample ID:	580-6781-1	Date Sampled:	07/31/2007 1430
Client Matrix:	Soil	% Moisture: 2.7	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0659 g
Date Analyzed:	08/14/2007 1507			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Arsenic		13		2.9
Antimony		ND		2.9 u
Beryllium		0.58		0.24
Cadmium		ND		0.48 u
Chromium		39	J	1.3
Copper		55		0.96
Lead		13	J	1.4
Nickel		46		0.96
Selenium		ND		4.8 u J
Silver		ND		0.96 u
Thallium		ND		4.8 u
Zinc		110	J	2.4

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	2000			Initial Weight/Volume:	0.5818 g
Date Analyzed:	08/14/2007 1830			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		690		35

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS05SS

Lab Sample ID: 580-6781-6 Date Sampled: 07/31/2007 1450
Client Matrix: Solid Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0390 g
Date Analyzed:	08/14/2007 1511			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Arsenic		25		2.9
Aluminum		250		29
Antimony		ND		2.9 u
Barium		7.4		0.48
Beryllium		ND		0.24 u
Boron		ND		24 u
Cadmium		ND		0.48 u
Chromium		3.4	J	1.3
Cobalt		0.77		0.48
Copper		3.9		0.96
Iron		810		9.6
Lead		8.6	J	1.4
Manganese		160		0.96 ~~u~~ 8/28/07
Molybdenum		ND		0.48 u
Nickel		2.3		0.96 ~~u~~ 8/28/07
Potassium		ND		160 u
Selenium		ND		4.8 u J
Silver		ND		0.96 u
Sodium		ND		96 u
Strontium		25		4.8
Thallium		ND		4.8 u
Tin		ND		4.8 u
Titanium		12		0.48
Vanadium		3.0		0.48
Zinc		370	J	2.4

Method:	6010B	Analysis Batch: 580-21819		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0390 g
Date Analyzed:	08/14/2007 2326			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Calcium		120000		53
Magnesium		52000		53

8/28/07

Analytical Data

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS05SS

Lab Sample ID:	580-6781-6	Date Sampled:	07/31/2007 1450
Client Matrix:	Solid	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21820		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0390 g
Date Analyzed:	08/15/2007 0022			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL	
Phosphorus		ND		290	u

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS06SS

Lab Sample ID: 580-6781-7 Date Sampled: 07/31/2007 1450
Client Matrix: Solid Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B Analysis Batch: 580-21818 Instrument ID: SEA027
Preparation: 3050B Prep Batch: 580-21751 Lab File ID: N/A
Dilution: 1.0 Initial Weight/Volume: 1.0106 g
Date Analyzed: 08/14/2007 1515 Final Weight/Volume: 50 mL
Date Prepared: 08/13/2007 1640

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Arsenic		30		3.0
Aluminum		370		30
Antimony		ND		3.0 U
Barium		9.6		0.49
Beryllium		ND		0.25 U
Boron		ND		25 U
Cadmium		ND		0.49 U
Chromium		4.6	J	1.3
Cobalt		0.90		0.49
Copper		3.1		0.99
Iron		1800		9.9
Lead		4.1	J	1.5
Manganese		180		0.99
Molybdenum		ND		0.49 U
Nickel		3.1		0.99
Potassium		ND		160 U
Selenium		ND		4.9 UJ
Silver		ND		0.99 U
Sodium		ND		99 U
Strontium		27		4.9
Thallium		ND		4.9 U
Tin		ND		4.9 U
Titanium		16		0.49
Vanadium		3.5		0.49
Zinc		540	J	2.5

Method: 6010B Analysis Batch: 580-21819 Instrument ID: SEA027
Preparation: 3050B Prep Batch: 580-21751 Lab File ID: N/A
Dilution: 1.0 Initial Weight/Volume: 1.0106 g
Date Analyzed: 08/14/2007 2329 Final Weight/Volume: 50 mL
Date Prepared: 08/13/2007 1640

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Calcium		120000		54
Magnesium		39000		54

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS06SS

Lab Sample ID: 580-6781-7
Client Matrix: Solid

Date Sampled: 07/31/2007 1450
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21820		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0106 g
Date Analyzed:	08/15/2007 0023			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Phosphorus		ND		300 u

8/20/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS31SS

Lab Sample ID: 580-6781-10
Client Matrix: Solid

Date Sampled: 08/01/2007 1700
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 08/14/2007 1519
Date Prepared: 08/13/2007 1640

Analysis Batch: 580-21818
Prep Batch: 580-21751

Instrument ID: SEA027
Lab File ID: N/A
Initial Weight/Volume: 1.0548 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL	
Arsenic		ND		2.8	u
Aluminum		77		28	
Antimony		ND		2.8	u
Barium		2.4		0.47	
Beryllium		ND		0.24	u
Boron		ND		24	u
Cadmium		ND		0.47	u
Chromium		3.4	J	1.2	
Cobalt		0.48		0.47	
Copper		ND		0.95	u
Iron		170		9.5	
Lead		ND		1.4	uJ
Manganese		140		0.95	
Molybdenum		ND		0.47	u
Nickel		1.5		0.95	
Potassium		ND		160	u
Selenium		ND		4.7	uJ
Silver		ND		0.95	u
Sodium		ND		95	u
Strontium		17		4.7	
Thallium		ND		4.7	u
Tin		ND		4.7	u
Titanium		3.1		0.47	
Vanadium		2.7		0.47	
Zinc		8.8	J	2.4	

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 08/14/2007 2332
Date Prepared: 08/13/2007 1640

Analysis Batch: 580-21819
Prep Batch: 580-21751

Instrument ID: SEA027
Lab File ID: N/A
Initial Weight/Volume: 1.0548 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Calcium		120000		52
Magnesium		61000		52

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS31SS

Lab Sample ID:	580-6781-10	Date Sampled:	08/01/2007 1700
Client Matrix:	Solid	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21820		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0548 g
Date Analyzed:	08/15/2007 0025			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL	
Phosphorus		ND		280	u

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS19SS

Lab Sample ID:	580-6781-11		Date Sampled:	08/01/2007 1200
Client Matrix:	Solid	% Moisture: 14.2	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0872 g
Date Analyzed:	08/14/2007 1523		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.9		3.2	
Antimony		ND		3.2	u
Beryllium		0.60		0.27	
Cadmium		ND		0.54	u
Chromium		26	J	1.4	
Copper		31		1.1	
Lead		14	J	1.6	
Nickel		32		1.1	
Selenium		ND		5.4	uJ
Silver		ND		1.1	u
Thallium		ND		5.4	u
Zinc		83	J	2.7	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	20		Initial Weight/Volume:	0.6007 g
Date Analyzed:	08/14/2007 1615		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		3.8		0.39

6/26/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS30SD

Lab Sample ID:	580-6781-12		Date Sampled:	08/01/2007 1615
Client Matrix:	Sediment	% Moisture: 28.1	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.1036 g
Date Analyzed:	08/14/2007 1527		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		8.3		3.8	
Antimony		ND		3.8	u
Beryllium		0.67		0.31	
Cadmium		ND		0.63	u
Chromium		26	J	1.6	
Copper		40		1.3	
Lead		13	J	1.9	
Nickel		45		1.3	
Selenium		ND		6.3	UJ
Silver		ND		1.3	u
Thallium		ND		6.3	u
Zinc		97	J	3.1	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	10		Initial Weight/Volume:	0.7368 g
Date Analyzed:	08/14/2007 1619		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		1.0		0.19

8/29/08

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS14SS

Lab Sample ID:	580-6781-13		Date Sampled:	08/01/2007 0930
Client Matrix:	Solid	% Moisture: 14.0	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0086 g
Date Analyzed:	08/14/2007 1531		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		9.0		3.5	
Antimony		ND		3.5	U
Beryllium		0.71		0.29	
Cadmium		ND		0.58	U
Chromium		33	J	1.5	
Copper		39		1.2	
Lead		11	J	1.7	
Nickel		43		1.2	
Selenium		ND		5.8	UJ
Silver		ND		1.2	U
Thallium		ND		5.8	U
Zinc		99	J	2.9	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	50		Initial Weight/Volume:	0.5089 g
Date Analyzed:	08/14/2007 1624		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		22		1.1

08/29/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS02SD

Lab Sample ID:	580-6781-14		Date Sampled:	07/31/2007 1415
Client Matrix:	Sediment	% Moisture: 28.3	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0552 g
Date Analyzed:	08/14/2007 1605		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		8.6		4.0	
Antimony		ND		4.0	u
Beryllium		0.41		0.33	
Cadmium		ND		0.66	u
Chromium		20	J	1.7	
Copper		32		1.3	
Lead		8.7	J	2.0	
Nickel		23		1.3	
Selenium		ND		6.6	uJ
Silver		ND		1.3	u
Thallium		ND		6.6	u
Zinc		62	J	3.3	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	100		Initial Weight/Volume:	0.5860 g
Date Analyzed:	08/14/2007 1629		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		48		2.4

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS26SD

Lab Sample ID:	580-6781-15	Date Sampled:	08/01/2007 1525
Client Matrix:	Sediment	% Moisture: 37.6	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.1539 g
Date Analyzed:	08/14/2007 1414			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		9.7		4.2	
Antimony		ND		4.2	u
Beryllium		0.59		0.35	
Cadmium		ND		0.69	u
Chromium		27	J	1.8	
Copper		30		1.4	
Lead		9.6	J	2.1	
Nickel		40		1.4	
Selenium		ND		6.9	uJ
Silver		ND		1.4	u
Thallium		ND		6.9	u
Zinc		95	J	3.5	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	200			Initial Weight/Volume:	0.5305 g
Date Analyzed:	08/14/2007 1654			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		89		6.0

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS11SS

Lab Sample ID:	580-6781-16		Date Sampled:	07/31/2007 1540
Client Matrix:	Solid	% Moisture: 17.9	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0669 g
Date Analyzed:	08/14/2007 1609		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Arsenic		9.0		3.4
Antimony		ND		3.4 u
Beryllium		0.60		0.29
Cadmium		ND		0.57 u
Chromium		21	~~J~~ J ⊙ 8/28/07	1.5
Copper		47		1.1
Lead		15	J	1.7
Nickel		42		1.1
Selenium		ND		5.7 uJ
Silver		ND		1.1 u
Thallium		ND		5.7 u
Zinc		100	J	2.9

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	50		Initial Weight/Volume:	0.5202 g
Date Analyzed:	08/14/2007 1718		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		12		1.2

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS32SS

Lab Sample ID:	580-6781-17	Date Sampled:	08/01/2007 1735
Client Matrix:	Solid % Moisture: 52.1	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0949 g
Date Analyzed:	08/14/2007 1612			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		9.0		5.7	
Antimony		ND		5.7	U
Beryllium		ND		0.48	U
Cadmium		ND		0.95	U
Chromium		23	J	2.5	
Copper		17		1.9	
Lead		8.4	J	2.9	
Nickel		17		1.9	
Selenium		ND		9.5	UJ
Silver		ND		1.9	U
Thallium		ND		9.5	U
Zinc		52	J	4.8	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	0.5278 g
Date Analyzed:	08/14/2007 1723			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		1.4		0.40

1 8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS01SD

Lab Sample ID:	580-6781-18			Date Sampled:	07/31/2007 1400
Client Matrix:	Sediment	% Moisture:	17.1	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.2843 g
Date Analyzed:	08/14/2007 1616			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		13		2.8	
Antimony		3.9		2.8	
Beryllium		0.61		0.23	
Cadmium		ND		0.47	U
Chromium		19	J	1.2	
Copper		32		0.94	
Lead		12	J	1.4	
Nickel		48		0.94	
Selenium		ND		4.7	UJ
Silver		ND		0.94	U
Thallium		ND		4.7	U
Zinc		89	J	2.3	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	50			Initial Weight/Volume:	0.5167 g
Date Analyzed:	08/14/2007 1728			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		16		1.2

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS12SS

Lab Sample ID:	580-6781-19		Date Sampled:	07/31/2007 1555
Client Matrix:	Solid	% Moisture: 15.5	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.2466 g
Date Analyzed:	08/14/2007 1619		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		8.9		2.8	
Antimony		ND		2.8	u
Beryllium		0.53		0.24	
Cadmium		ND		0.47	u
Chromium		18	J	1.2	
Copper		35		0.95	
Lead		23	J	1.4	
Nickel		39		0.95	
Selenium		ND		4.7	uJ
Silver		ND		0.95	u
Thallium		ND		4.7	u
Zinc		83	J	2.4	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	10		Initial Weight/Volume:	0.5554 g
Date Analyzed:	08/14/2007 1733		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		0.91		0.21

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS21SS

Lab Sample ID:	580-6781-20			Date Sampled:	08/01/2007 1240
Client Matrix:	Solid	% Moisture:	16.4	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.1079 g
Date Analyzed:	08/14/2007 1622			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.6		3.2	
Antimony		ND		3.2	u
Beryllium		0.69		0.27	
Cadmium		0.54		0.54	
Chromium		81	J	1.4	
Copper		35		1.1	
Lead		6.6	J	1.6	
Nickel		43		1.1	
Selenium		ND		5.4	uJ
Silver		ND		1.1	u
Thallium		ND		5.4	u
Zinc		87		2.7	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	100			Initial Weight/Volume:	0.5169 g
Date Analyzed:	08/14/2007 1752			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		32		2.3

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS10SS

Lab Sample ID:	580-6781-21	Date Sampled:	07/31/2007 1520
Client Matrix:	Solid	% Moisture: 14.2	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.2005 g
Date Analyzed:	08/14/2007 1625			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Arsenic		7.3		2.9
Antimony		ND		2.9 u
Beryllium		0.60		0.24
Cadmium		ND		0.49 u
Chromium		15	J	1.3
Copper		37		0.97
Lead		20	J	1.5
Nickel		43		0.97
Selenium		ND		4.9 uJ
Silver		ND		0.97 u
Thallium		ND		4.9 u
Zinc		110	J	2.4

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	50			Initial Weight/Volume:	0.5558 g
Date Analyzed:	08/14/2007 1757			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		9.1		1.0

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS15SS

Lab Sample ID:	580-6781-22			Date Sampled:	08/01/2007 0955
Client Matrix:	Solid	% Moisture:	11.2	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.1590 g
Date Analyzed:	08/14/2007 1628			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		4.5		2.9	
Antimony		ND		2.9	U
Beryllium		0.52		0.24	
Cadmium		ND		0.49	
Chromium		36	J	1.3	
Copper		26		0.97	
Lead		8.2	J	1.5	
Nickel		35		0.97	
Selenium		ND		4.9	UJ
Silver		ND		0.97	U
Thallium		ND		4.9	U
Zinc		76	J	2.4	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	500			Initial Weight/Volume:	0.5465 g
Date Analyzed:	08/14/2007 1802			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		74		10

1 8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

Client Sample ID: 07KMS16SS

Lab Sample ID:	580-6781-23		Date Sampled:	08/01/2007 1000
Client Matrix:	Solid	% Moisture: 10.8	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0443 g
Date Analyzed:	08/14/2007 1631		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.6		3.2	
Antimony		ND		3.2	U
Beryllium		0.65		0.27	
Cadmium		ND		0.54	U
Chromium		34	J	1.4	
Copper		35		1.1	
Lead		10	J	1.6	
Nickel		51		1.1	
Selenium		ND		5.4	UJ
Silver		ND		1.1	U
Thallium		ND		5.4	U
Zinc		100	J	2.7	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	500		Initial Weight/Volume:	0.5908 g
Date Analyzed:	08/14/2007 1807		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		99		9.5

1 8/20/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS20SS

Lab Sample ID:	580-6781-24			Date Sampled:	08/01/2007 1240
Client Matrix:	Solid	% Moisture:	16.5	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.1771 g
Date Analyzed:	08/14/2007 1642			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.1		3.1	
Antimony		ND		3.1	U
Beryllium		0.65		0.25	
Cadmium		ND		0.51	U
Chromium		78	J	1.3	
Copper		26		1.0	
Lead		5.2	J	1.5	
Nickel		39		1.0	
Selenium		ND		5.1	UJ
Silver		ND		1.0	U
Thallium		ND		5.1	U
Zinc		76	J	2.5	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	100			Initial Weight/Volume:	0.5162 g
Date Analyzed:	08/14/2007 1811			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		43		2.3

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS18SS

Lab Sample ID:	580-6781-25			Date Sampled:	08/01/2007 1125
Client Matrix:	Solid	% Moisture:	16.1	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.3606 g
Date Analyzed:	08/14/2007 1645			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.6		2.6	
Antimony		ND		2.6	u
Beryllium		0.52		0.22	
Cadmium		0.49		0.44	
Chromium		51	J	1.1	
Copper		33		0.88	
Lead		7.5	J	1.3	
Nickel		33		0.88	
Selenium		ND		4.4	uJ
Silver		ND		0.88	u
Thallium		ND		4.4	u
Zinc		410	J	2.2	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723		Lab File ID:	N/A
Dilution:	100			Initial Weight/Volume:	0.5356 g
Date Analyzed:	08/14/2007 1816			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		32		2.2

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS29SS

Lab Sample ID:	580-6781-26		Date Sampled:	08/01/2007 1615
Client Matrix:	Solid	% Moisture: 15.8	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21818	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21751	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.2039 g
Date Analyzed:	08/14/2007 1648		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1640			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.7		3.0	
Antimony		ND		3.0	u
Beryllium		0.63		0.25	
Cadmium		ND		0.49	u
Chromium		12	J	1.3	
Copper		40		0.99	
Lead		11	J	1.5	
Nickel		26		0.99	
Selenium		ND		4.9	uJ
Silver		ND		0.99	u
Thallium		ND		4.9	u
Zinc		85	J	2.5	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	10		Initial Weight/Volume:	0.5826 g
Date Analyzed:	08/14/2007 1821		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		0.59		0.20

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS17SS

Lab Sample ID:	580-6781-27		Date Sampled:	08/01/2007 1115
Client Matrix:	Solid	% Moisture: 14.6	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21817	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21778	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0523 g
Date Analyzed:	08/14/2007 2101		Final Weight/Volume:	50 mL
Date Prepared:	08/14/2007 1051			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		8.7		3.3	
Antimony		ND		3.3	u
Beryllium		ND		0.28	u
Cadmium		ND		0.56	u
Chromium		41	J	1.4	
Copper		23		1.1	
Lead		16	J	1.7	
Nickel		26		1.1	
Selenium		ND		5.6	uJ
Silver		ND		1.1	u
Thallium		ND		5.6	u
Zinc		97	J	2.8	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21723	Lab File ID:	N/A
Dilution:	40000		Initial Weight/Volume:	0.5097 g
Date Analyzed:	08/14/2007 1826		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1209			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		18000		920

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS09SS

Lab Sample ID:	580-6781-28	Date Sampled:	07/31/2007 1520
Client Matrix:	Solid	% Moisture: 14.2	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0250 g
Date Analyzed:	08/14/2007 1116			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		8.8		3.4	
Antimony		ND		3.4	U
Beryllium		0.61		0.28	
Cadmium		0.75		0.57	
Chromium		21	J	1.5	
Copper		45		1.1	
Lead		59	J	1.7	
Nickel		46		1.1	
Selenium		ND		5.7	UJ
Silver		ND		1.1	U
Thallium		ND		5.7	U
Zinc		170	J	2.8	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724		Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	0.5291 g
Date Analyzed:	08/14/2007 1849			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		5.4		0.22

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS04SS

Lab Sample ID:	580-6781-29	Date Sampled:	07/31/2007 1440
Client Matrix:	Solid	% Moisture: 14.4	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0412 g
Date Analyzed:	08/14/2007 1148			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		6.0		3.4	
Antimony		ND		3.4	U
Beryllium		0.47		0.28	
Cadmium		ND		0.56	U
Chromium		21	J	1.5	
Copper		25		1.1	
Lead		9.9	J	1.7	
Nickel		25		1.1	
Selenium		ND		5.6	UJ
Silver		ND		1.1	U
Thallium		ND		5.6	U
Zinc		61	J	2.8	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724		Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	0.5118 g
Date Analyzed:	08/14/2007 1913			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		1.1		0.23

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS28SS

Lab Sample ID:	580-6781-30	Date Sampled:	08/01/2007 1605
Client Matrix:	Solid	% Moisture: 20.4	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0236 g
Date Analyzed:	08/14/2007 1151		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		6.1		3.7	
Antimony		ND		3.7	U
Beryllium		0.83		0.31	
Cadmium		ND		0.61	U
Chromium		15	J	1.6	
Copper		39		1.2	
Lead		11	J	1.8	
Nickel		35		1.2	
Selenium		ND		6.1	UJ
Silver		ND		1.2	U
Thallium		ND		6.1	U
Zinc		110	J	3.1	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724	Lab File ID:	N/A
Dilution:	2.0		Initial Weight/Volume:	0.5266 g
Date Analyzed:	08/14/2007 1918		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		0.75		0.048

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS25SW

Lab Sample ID: 580-6781-31
Client Matrix: Water

Date Sampled: 08/01/2007 1525
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry-Total Recoverable

Method: 6010B
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/14/2007 1845
Date Prepared: 08/14/2007 1002

Analysis Batch: 580-21816
Prep Batch: 580-21773

Instrument ID: SEA027
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Antimony	ND		0.060	u
Arsenic	ND		0.060	u
Beryllium	ND		0.0050	u
Copper	ND		0.020	u
Nickel	ND		0.020	u
Zinc	ND		0.040	u
Chromium	ND		0.025	u
Silver	ND		0.020	u
Cadmium	ND		0.010	u
Lead	ND		0.030	u
Selenium	ND		0.10	u
Thallium	ND		0.10	u

7470A Mercury

Method: 7470A
Preparation: 7470A
Dilution: 1.0
Date Analyzed: 08/08/2007 1321
Date Prepared: 08/08/2007 0945

Analysis Batch: 580-21545
Prep Batch: 580-21509

Instrument ID: SEA029
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Mercury	ND		0.00020	u

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS25SD

Lab Sample ID:	580-6781-32	Date Sampled:	08/01/2007 1525
Client Matrix:	Solid	% Moisture: 34.5	Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799		Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.0584 g
Date Analyzed:	08/14/2007 1154			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		4.5		4.3	
Antimony		ND		4.3	U
Beryllium		ND		0.36	U
Cadmium		ND		0.72	U
Chromium		15	J	1.9	
Copper		14		1.4	
Lead		5.0	J	2.2	
Nickel		22		1.4	
Selenium		ND		7.2	UJ
Silver		ND		1.4	U
Thallium		ND		7.2	U
Zinc		57	J	3.6	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826		Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724		Lab File ID:	N/A
Dilution:	100			Initial Weight/Volume:	0.5583 g
Date Analyzed:	08/14/2007 1923			Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		21		2.7

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS24SW

Lab Sample ID: 580-6781-33
Client Matrix: Water

Date Sampled: 08/01/2007 1420
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry-Total Recoverable

Method:	6010B	Analysis Batch: 580-21816		Instrument ID:	SEA027
Preparation:	3005A	Prep Batch: 580-21773		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/14/2007 1851			Final Weight/Volume:	50 mL
Date Prepared:	08/14/2007 1002				

Analyte	Result (mg/L)	Qualifier	RL	
Antimony	ND		0.060	u
Arsenic	ND		0.060	u
Beryllium	ND		0.0050	u
Copper	ND		0.020	u
Nickel	ND		0.020	u
Zinc	ND		0.040	u
Chromium	ND		0.025	u
Silver	ND		0.020	u
Cadmium	ND		0.010	u
Lead	ND		0.030	u
Selenium	ND		0.10	u
Thallium	ND		0.10	u

7470A Mercury

Method:	7470A	Analysis Batch: 580-21545		Instrument ID:	SEA029
Preparation:	7470A	Prep Batch: 580-21509		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/08/2007 1326			Final Weight/Volume:	50 mL
Date Prepared:	08/08/2007 0945				

Analyte	Result (mg/L)	Qualifier	RL	
Mercury	ND		0.00020	u

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS24SD

Lab Sample ID:	580-6781-34		Date Sampled:	08/01/2007 1425
Client Matrix:	Sediment	% Moisture: 22.6	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0252 g
Date Analyzed:	08/14/2007 1158		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		13		3.8	
Antimony		ND		3.8	U
Beryllium		0.46		0.32	
Cadmium		ND		0.63	U
Chromium		22	J	1.6	
Copper		20		1.3	
Lead		7.5	J	1.9	
Nickel		33		1.3	
Selenium		ND		6.3	UJ
Silver		ND		1.3	U
Thallium		ND		6.3	U
Zinc		69	J	3.2	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	0.5224 g
Date Analyzed:	08/14/2007 1928		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		0.096		0.025

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS26SW

Lab Sample ID: 580-6781-35
Client Matrix: Water

Date Sampled: 08/01/2007 1525
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry-Total Recoverable

Method: 6010B
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/14/2007 1753
Date Prepared: 08/14/2007 1002

Analysis Batch: 580-21816
Prep Batch: 580-21773

Instrument ID: SEA027
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Antimony	ND		0.060	u
Arsenic	ND		0.060	u
Beryllium	ND		0.0050	u
Copper	ND		0.020	u
Nickel	ND		0.020	u
Zinc	ND		0.040	u
Chromium	ND		0.025	u
Silver	ND		0.020	u
Cadmium	ND		0.010	u
Lead	ND		0.030	u
Selenium	ND		0.10	u
Thallium	ND		0.10	u

7470A Mercury

Method: 7470A
Preparation: 7470A
Dilution: 1.0
Date Analyzed: 08/08/2007 1331
Date Prepared: 08/08/2007 0945

Analysis Batch: 580-21545
Prep Batch: 580-21509

Instrument ID: SEA029
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Mercury	ND		0.00020	u

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS33SW

Lab Sample ID: 580-6781-36
Client Matrix: Water

Date Sampled: 08/01/2007 1815
Date Received: 08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry-Total Recoverable

Method: 6010B
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/14/2007 1857
Date Prepared: 08/14/2007 1002

Analysis Batch: 580-21816
Prep Batch: 580-21773

Instrument ID: SEA027
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Antimony	ND		0.060	u
Arsenic	ND		0.060	u
Beryllium	ND		0.0050	u
Copper	ND		0.020	u
Nickel	ND		0.020	u
Zinc	ND		0.040	u
Chromium	ND		0.025	u
Silver	ND		0.020	u
Cadmium	ND		0.010	u
Lead	ND		0.030	u
Selenium	ND		0.10	u
Thallium	ND		0.10	u

7470A Mercury

Method: 7470A
Preparation: 7470A
Dilution: 1.0
Date Analyzed: 08/08/2007 1350
Date Prepared: 08/08/2007 0945

Analysis Batch: 580-21545
Prep Batch: 580-21509

Instrument ID: SEA029
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (mg/L)	Qualifier	RL	
Mercury	ND		0.00020	u

8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

Client Sample ID: 07KMS33SD

Lab Sample ID:	580-6781-37		Date Sampled:	08/01/2007 1815
Client Matrix:	Sediment	% Moisture: 53.1	Date Received:	08/04/2007 1515

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method:	6010B	Analysis Batch: 580-21799	Instrument ID:	SEA027
Preparation:	3050B	Prep Batch: 580-21743	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	1.0160 g
Date Analyzed:	08/14/2007 1201		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1521			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL	
Arsenic		7.0		6.3	
Antimony		ND		6.3	u
Beryllium		ND		0.52	u
Cadmium		ND		1.0	u
Chromium		17	J	2.7	
Copper		15		2.1	
Lead		5.5	J	3.1	
Nickel		25		2.1	
Selenium		ND		10	uJ
Silver		ND		2.1	u
Thallium		ND		10	u
Zinc		62	J	5.2	

7471A Mercury

Method:	7471A	Analysis Batch: 580-21826	Instrument ID:	SEA029
Preparation:	7471A	Prep Batch: 580-21724	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	0.5308 g
Date Analyzed:	08/14/2007 1932		Final Weight/Volume:	50 mL
Date Prepared:	08/13/2007 1322			

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	RL
Mercury		0.18		0.040

1
8/28/07

Client: Ecology and Environment, Inc.

Job Number: 580-6781-1

General Chemistry

Client Sample ID: **07KMS05SS**

Lab Sample ID: 580-6781-6
Client Matrix: Solid

Date Sampled: 07/31/2007 1450
Date Received: 08/04/2007 1515

Analyte	Result	Qual	Units	RL		Dil	Method
Fluoride-S	ND		mg/Kg	0.59	U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Chloride-S	ND		mg/Kg	3.3	U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Bromide-S	ND		mg/Kg	1.3	U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Sulfate-S	ND		mg/Kg	3.0	U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Nitrite as N-S	ND		mg/Kg	0.40	U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Nitrate as N-S	0.84		mg/Kg	0.42		1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	
Orthophosphate-S	ND	^ *	mg/Kg	1.6	UJ	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2225			DryWt Corrected: N	

Analyte	Result	Qual	Units	Dil	Method
pH	9.52		SU	1.0	9045C
	Anly Batch: 580-21571	Date Analyzed	08/08/2007 1720	DryWt Corrected: N	

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

General Chemistry

Client Sample ID: 07KMS06SS

Lab Sample ID: 580-6781-7 Date Sampled: 07/31/2007 1450
Client Matrix: Solid Date Received: 08/04/2007 1515

Analyte	Result	Qual	Units	RL	Dil	Method
Fluoride-S	ND		mg/Kg	0.57 U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Chloride-S	ND		mg/Kg	3.1 U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Bromide-S	ND		mg/Kg	1.2 U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Sulfate-S	ND		mg/Kg	2.8 U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Nitrite as N-S	ND		mg/Kg	0.38 U	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Nitrate as N-S	0.83		mg/Kg	0.40	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	
Orthophosphate-S	ND	^ *	mg/Kg	1.5 UJ	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2243		DryWt Corrected: N	

Analyte	Result	Qual	Units	Dil	Method
pH	9.55		SU	1.0	9045C
	Anly Batch: 580-21571	Date Analyzed	08/08/2007 1720	DryWt Corrected: N	

8/28/07

Client: Ecology and Environment, Inc. Job Number: 580-6781-1

General Chemistry

Client Sample ID: 07KMS31SS

Lab Sample ID: 580-6781-10 Date Sampled: 08/01/2007 1700
Client Matrix: Solid Date Received: 08/04/2007 1515

Analyte	Result	Qual	Units	RL	Dil	Method
Fluoride-S	ND		mg/Kg	0.59 u	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Chloride-S	ND		mg/Kg	3.2 u	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Bromide-S	ND		mg/Kg	1.3 u	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Sulfate-S	3.8		mg/Kg	2.9	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Nitrite as N-S	ND		mg/Kg	0.39 uJ	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Nitrate as N-S	2.6		mg/Kg	0.41	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	
Orthophosphate-S	ND	^ *	mg/Kg	1.6 uJ	1.0	300.0
	Anly Batch: 580-21993	Date Analyzed	08/16/2007 2337		DryWt Corrected: N	

Analyte	Result	Qual	Units	Dil	Method
pH	9.50		SU	1.0	9045C
	Anly Batch: 580-21571	Date Analyzed	08/08/2007 1720	DryWt Corrected: N	

8/20/07

TestAmerica Tacoma (fka STL Seattle)

Client Sample ID: 07KMS05SS(580-6781-6)

HPLC

Lot-Sample #...: G7H070340-001 **Work Order #...:** J4DH91AA **Matrix.....:** SOLID
Date Sampled...: 07/31/07 **Date Received..:** 08/07/07
Prep Date.....: 08/10/07 **Analysis Date..:** 08/16/07
Prep Batch #...: 7222274
Dilution Factor: 1 **Method.....:** SW846 8330

PARAMETER	RESULT	REPORTING LIMIT		UNITS
2-Amino-4,6-dinitrotoluene	ND	0.25	u	mg/kg
4-Amino-2,6-dinitrotoluene	ND	0.25	u	mg/kg
1,3-Dinitrobenzene	ND	0.25	u	mg/kg
2,4-Dinitrotoluene	ND	0.25	u	mg/kg
2,6-Dinitrotoluene	ND	0.25	u	mg/kg
HMX	ND	0.25	u	mg/kg
Nitrobenzene	ND	0.25	u	mg/kg
2-Nitrotoluene	ND	0.25	u	mg/kg
3-Nitrotoluene	ND	0.25	u	mg/kg
4-Nitrotoluene	ND	0.25	u	mg/kg
RDX	ND	0.25	u	mg/kg
Tetryl	ND	0.25	u	mg/kg
1,3,5-Trinitrobenzene	ND	0.25	u	mg/kg
2,4,6-Trinitrotoluene	ND	0.25	u	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	100	(84 - 114)

8/28/07

TestAmerica Tacoma (fka STL Seattle)

Client Sample ID: 07KMS06SS(580-6781-7)

HPLC

Lot-Sample #...: G7H070340-002 **Work Order #...:** J4DJE1AA **Matrix.....:** SOLID
Date Sampled...: 07/31/07 **Date Received..:** 08/07/07
Prep Date.....: 08/10/07 **Analysis Date..:** 08/17/07
Prep Batch #...: 7222274
Dilution Factor: 1 **Method.....:** SW846 8330

PARAMETER	RESULT	REPORTING LIMIT	UNITS
2-Amino-4,6-dinitrotoluene	ND	0.25 u	mg/kg
4-Amino-2,6-dinitrotoluene	ND	0.25 u	mg/kg
1,3-Dinitrobenzene	ND	0.25 u	mg/kg
2,4-Dinitrotoluene	ND	0.25 u	mg/kg
2,6-Dinitrotoluene	ND	0.25 u	mg/kg
HMX	ND	0.25 u	mg/kg
Nitrobenzene	ND	0.25 u	mg/kg
2-Nitrotoluene	ND	0.25 u	mg/kg
3-Nitrotoluene	ND	0.25 u	mg/kg
4-Nitrotoluene	ND	0.25 u	mg/kg
RDX	ND	0.25 u	mg/kg
Tetryl	ND	0.25 u	mg/kg
1,3,5-Trinitrobenzene	**0.026 J**	**0.25**	**mg/kg**
2,4,6-Trinitrotoluene	ND	0.25 u	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	103	(84 - 114)

NOTE(S):

J Estimated result. Result is less than RL.

8/20/07

TestAmerica Tacoma (fka STL Seattle)

Client Sample ID: 07KMS07SS(580-6781-8)

HPLC

Lot-Sample #...: G7H070340-003 **Work Order #...:** J4DJH1AA **Matrix.....:** SOLID
Date Sampled...: 07/31/07 **Date Received..:** 08/07/07
Prep Date.....: 08/10/07 **Analysis Date..:** 08/17/07
Prep Batch #...: 7222274
Dilution Factor: 0.99 **Method.....:** SW846 8330

PARAMETER	RESULT	REPORTING LIMIT	UNITS
2-Amino-4,6-dinitrotoluene	ND	0.25 u	mg/kg
4-Amino-2,6-dinitrotoluene	ND	0.25 u	mg/kg
1,3-Dinitrobenzene	ND	0.25 u	mg/kg
2,4-Dinitrotoluene	ND	0.25 u	mg/kg
2,6-Dinitrotoluene	ND	0.25 u	mg/kg
HMX	ND	0.25 u	mg/kg
Nitrobenzene	ND	0.25 u	mg/kg
2-Nitrotoluene	ND	0.25 u	mg/kg
3-Nitrotoluene	ND	0.25 u	mg/kg
4-Nitrotoluene	ND	0.25 u	mg/kg
RDX	ND	0.25 u	mg/kg
Tetryl	ND	0.25 u	mg/kg
1,3,5-Trinitrobenzene	ND	0.25 u	mg/kg
2,4,6-Trinitrotoluene	ND	0.25 u	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	104	(84 - 114)

8/20/07

TestAmerica Tacoma (fka STL Seattle)

Client Sample ID: 07KMS08SS(580-6781-9)

HPLC

Lot-Sample #...:	G7H070340-004	**Work Order #...:**	J4DJJ1AA	**Matrix.....:**	SOLID
Date Sampled...:	07/31/07	**Date Received..:**	08/07/07		
Prep Date.....:	08/10/07	**Analysis Date..:**	08/17/07		
Prep Batch #...:	7222274				
Dilution Factor:	0.98	**Method.....:**	SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
2-Amino-4,6-dinitrotoluene	ND	0.24 u	mg/kg
4-Amino-2,6-dinitrotoluene	ND	0.24 u	mg/kg
1,3-Dinitrobenzene	ND	0.24 u	mg/kg
2,4-Dinitrotoluene	ND	0.24 u	mg/kg
2,6-Dinitrotoluene	ND	0.24 u	mg/kg
HMX	ND	0.24 u	mg/kg
Nitrobenzene	ND	0.24 u	mg/kg
2-Nitrotoluene	ND	0.24 u	mg/kg
3-Nitrotoluene	ND	0.24 u	mg/kg
4-Nitrotoluene	ND	0.24 u	mg/kg
RDX	ND	0.24 u	mg/kg
Tetryl	ND	0.24 u	mg/kg
1,3,5-Trinitrobenzene	**0.024 J**	**0.24**	**mg/kg**
2,4,6-Trinitrotoluene	ND	0.24 u	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	103	(84 - 114)

NOTE(S):

J Estimated result. Result is less than RL.

8/20/07

TestAmerica Tacoma (fka STL Seattle)

Client Sample ID: 07KMS31SS(580-6781-10)

HPLC

Lot-Sample #...:	G7H070340-005	**Work Order #...:**	J4DJN1AA	**Matrix.....:**	SOLID
Date Sampled...:	08/01/07	**Date Received..:**	08/07/07		
Prep Date.....:	08/10/07	**Analysis Date..:**	08/17/07		
Prep Batch #...:	7222274				
Dilution Factor:	0.99	**Method.....:**	SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
2-Amino-4,6-dinitrotoluene	ND	0.25 u	mg/kg
4-Amino-2,6-dinitrotoluene	ND	0.25 u	mg/kg
1,3-Dinitrobenzene	ND	0.25 u	mg/kg
2,4-Dinitrotoluene	ND	0.25 u	mg/kg
2,6-Dinitrotoluene	ND	0.25 u	mg/kg
HMX	ND	0.25 u	mg/kg
Nitrobenzene	ND	0.25 u	mg/kg
2-Nitrotoluene	ND	0.25 u	mg/kg
3-Nitrotoluene	ND	0.25 u	mg/kg
4-Nitrotoluene	ND	0.25 u	mg/kg
RDX	ND	0.25 u	mg/kg
Tetryl	ND	0.25 u	mg/kg
1,3,5-Trinitrobenzene	ND	0.25 u	mg/kg
2,4,6-Trinitrotoluene	ND	0.25 u	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	101	(84 - 114)

8/22/07

Reported by

Brooks Rand LLC

Contact: Amanda Fawley

3958 6th Avenue NW
Seattle, WA 98107
Tel: 206-632-6206 Fax: 206-632-6017

Summary of Results for

Test America

Contact: Terri Torres

5755 8th Street E
Tacoma WA 98424
Tel: 253-922-2310

Lab Project # STL051
Lab Tracking # 07BR1248

Client Project Reference Ecology & Environment

Hg(Monomethyl)

Sample Identification	BRL Number	Total or Dissolved	Preparation date	Analysis date	Batch #	Result	Units	Qualifier (Q)
07KMS03SS (580-6781-1)	07BR1248 - 01	T	9/6/2007	9/7/2007	07-0954	0.015	ng/g (dry)	~~B~~ J
07KMS02SD (580-6781-14)	07BR1248 - 02	T	9/6/2007	9/7/2007	07-0954	4.922	ng/g (dry)	~~M~~ J
07KMS26SD (580-6781-15)	07BR1248 - 03	T	9/6/2007	9/7/2007	07-0954	0.015	ng/g (dry)	U
07KMS15SS (580-6781-22)	07BR1248 - 04	T	9/6/2007	9/7/2007	07-0954	0.009	ng/g (dry)	U
07KMS16SS (580-6781-23)	07BR1248 - 05	T	9/6/2007	9/7/2007	07-0954	0.009	ng/g (dry)	U
07KMS17SS (580-6781-27)	07BR1248 - 06	T	9/6/2007	9/7/2007	07-0954	12.426	ng/g (dry)	

9/25/07

Friday, September 14, 2007

Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

08/04/07 -1

CHAIN OF CUSTODY REPORT

Work Order #: 6781 (1)

CLIENT: Ecology and Environment

REPORT TO: Ecology and Environment Attn: Len Marcus
ADDRESS: 840 K St. #100
Anchorage AK 99501
PHONE: 907/257-5000 FAX:

INVOICE TO: Same

P.O. NUMBER:

PROJECT NAME: KMS-BLM
PROJECT NUMBER: 001998.B008.01
SAMPLED BY: Len Marcus/Andy Uhrig

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: MeOH

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	EPA 6010 PP Metals	EPA 1630 Hg Speci	AK101/8021 GRO/BTEX	AK102/103 DRO/RRO	EPA 9045 pH	EPA 6010 cations	EPA 300 Anions	EPA 8330 Nitramines	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	TA WO ID
1	07KMS03SS	7/31/07 1430	✓								Soil	2	Possible high metals (Hg) conc.	
2	07KMS27SS	8/1/07 1540			✓	✓					Soil	2	MS/MSD	
3	07KMS13SS	7/31/07 1615			✓	✓					Soil	2		
4	07KMS22SS	8/1/07 1350			✓	✓					Soil	2		
5	07KMS23SS	8/1/07 1350			✓	✓					Soil	2		
6	07KMS05SS	7/31/07 1450					✓	✓	✓	✓	Ash/product	1	MS/MSD - nitramines only	
7	07KMS06SS	7/31/07 1450					✓	✓	✓	✓	Ash/product	1		
8	07KMS07SS	7/31/07 1500				NO	~~✓~~	~~✓~~	~~✓~~	✓	Soil	1		
9	07KMS08SS	7/31/07 1505				NO	~~✓~~	~~✓~~	~~✓~~	✓	Soil	1		
10	07KMS31SS	8/1/07 1700					✓	✓	✓	✓	product	1		

RELEASED BY: Len Marcus	DATE: 8-3-07	RECEIVED BY: [illegible]	DATE: 3 Aug 07
PRINT NAME: Len Marcus FIRM: E&E	TIME: 1520	PRINT NAME: Race Brinton FIRM: TA	TIME: 15:21
RELEASED BY: [illegible]	DATE: 3 August 2007	RECEIVED BY: Ivy Bolm	DATE: 8/4/07
PRINT NAME: Race Brinton FIRM: TA	TIME: 1603	PRINT NAME: Ivy Bolm FIRM: TestAmerica	TIME: 8:15 am

ADDITIONAL REMARKS: SHIP TO TACOMA LAB. CONTACT = Terri Torres. Speciation testing to occur only after PP Metals results available and upon client authorization

TEMP: 2.4 C

COC REV 05/2006 PAGE 1 OF 2

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

TB =

TestAmerica
ANALYTICAL TESTING CORPORATION

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 6781

CLIENT: Ecology and Environment

REPORT TO: Ecology and Environment
ADDRESS: 840 K St. #100 Attn: Len Marcus
Anchorage AK 99501
PHONE: 907 257-5000 FAX:

INVOICE TO: Same

P.O. NUMBER:

PROJECT NAME: KMS-BLM
PROJECT NUMBER: 001998.BU08.01
SAMPLED BY: Len Marcus/Andy Uhrig

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: Waters only: nitric HCl; MeOH

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	EPA 6010 PP Metals	EPA 1630 Hg Spec.		AK101/802 GRO/BTEX								MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	TA WO ID
31	07KMS25SW	8/1/07 1525	✓											water	2		
32	07KMS25SD	8/1/07 1525	✓											Sed.	2		
33	07KMS24SW	8/1/07 1420	✓											Water	2		
34	07KMS24SD	8/1/07 1425	✓											Sed.	2		
35	07KMS26SW	8/1/07 1525	✓											water	3	MS/MSD	
36	07KMS33SW	8/1/07 1815	✓											water	2		
37	07KMS33SD	8/1/07 1815	✓											Sed	2		
38	07KMS34SS	8/1/07 1900				✓								water	1		
9																	
10																	

Len Marcus 8/2/07

RELEASED BY: Len Marcus DATE: 8-3-07 RECEIVED BY: [illegible] DATE: 3 Aug 07
PRINT NAME: Len Marcus FIRM: E&E TIME: 1520 PRINT NAME: Race Brunton FIRM: TA TIME: 15:21
RELEASED BY: [illegible] DATE: 3 August 2007 RECEIVED BY: [illegible] FW BLM DATE: 8/4/07
PRINT NAME: Race Brunton FIRM: TA TIME: 16:03 PRINT NAME: TEST AMERICA FIRM: TIME: 3:15 pm

ADDITIONAL REMARKS: SHIP TO TACOMA LAB. CONTACT = Terri Torres. Speciation testing to occur only after PP Metals results available and upon client authorization
TEMP: 2.6 C
PAGE 2 OF 2

COC REV 05/2006

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project.
Payment for services is due within 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

TestAmerica
ANALYTICAL TESTING CORPORATION

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

08/04/07-2

CHAIN OF CUSTODY REPORT

Work Order #: 8781 (2)

CLIENT: Ecology and Environment

REPORT TO: Ecology and Environment
ADDRESS: 840 K St #100 Attn: Len Marcus
Anchorage AK 99501
PHONE: 907 257-5000 FAX:

INVOICE TO: Same

P.O. NUMBER:

PROJECT NAME: KMS-BLM
PROJECT NUMBER: 001998.BU08.01
SAMPLED BY: Len Marcus/Andy Uhrig

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	EPA 6010-PP Metals	EPA 1631 Hg Spec.	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	TA WO ID
1	07KMS19SS	8/1/07 1200	✓		Soil	2		
2	07KMS30SD	8/1/07 1615	✓		Sed.	2		
3	07KMS14SS	8/1/07 0930	✓		Soil	2		
4	07KMS02SD	7/31/07 1415	✓		Sed	2	Possible high metals (Hg) conc	
5	07KMS26SD	8/1/07 1525	✓		Sed	2	MS/MSD	
6	07KMS11SS	7/31/07 1540	✓		Soil	2		
7	07KMS32SS	8/1/07 1735	✓		Soil	2		
8	07KMS01SD	7/31/07 1400	✓		Sed.	2	possible high metals (Hg) conc.	
9	07KMS12SS	7/31/07 1555	✓		Soil	2	Possible high metals (Hg) conc	
10	07KMS21SS	8/1/07 1240	✓		Soil	2	Possible high metals (Hg) conc	

RELEASED BY: Len Marcus DATE: 8-3-07
PRINT NAME: Len Marcus FIRM: E&E TIME: 1520
RECEIVED BY: [illegible] DATE: 3 Aug 07
PRINT NAME: Race Benton FIRM: TA TIME: 15:21

RELEASED BY: [illegible] DATE: 3 August 2007
PRINT NAME: Race Benton FIRM: TA TIME: 15:35
RECEIVED BY: Ivy Bohm DATE: 8/4/07
PRINT NAME: Ivy Bohm FIRM: TestAmerica TIME: 3:15PM

ADDITIONAL REMARKS: SHIP TO TACOMA LAB. CONTACT = Terri Torres. Speciation testing to occur only after PP Metals results available and upon client authorization.
TEMP: 4.7 C
TB 2.4°C

COC REV 05/2006 PAGE 1 OF 1

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project.
Payment for services is due within 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

TestAmerica
ANALYTICAL TESTING CORPORATION

2

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

08/04/07-3
Work Order #: 6781 (3)

CHAIN OF CUSTODY REPORT

CLIENT: Ecology and Environment

REPORT TO: Ecology and Environment
ADDRESS: 540 K St. #100
Anchorage AK 99501
Attn: Len Marcus
PHONE: 907 257-5000 FAX:

INVOICE TO: Same

P.O. NUMBER:

PROJECT NAME: KMS-BLM
PROJECT NUMBER: 001998.BU05.01
SAMPLED BY: Len Marcus/Andy Uhrig

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	EPA 6010 PP Metals	EPA 1630 Hg Spec.	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	TA WO ID
21	07KMS1[illegible]SS	7/31/07 1520	✓		Soil	2	possible high Metals(Hg) Conc.	
22	07KMS15SS	8/1/07 0955	✓		Soil	2		
23	07KMS16SS	8/1/07 1000	✓		Soil	2		
24	07KMS20SS	8/1/07 1240	✓		Soil	2	Possible high Metals(Hg) Conc.	
25	07KMS18SS	8/1/07 1125	✓		Soil	2	Possible high metals(Hg) Conc.	
26	07KMS29SS	8/1/07 1615	✓		Soil	2		
27	07KMS17SS	8/1/07 1115	✓		Soil	2	Possible high metals(Hg) Conc.	
28	07KMS09SS	7/31/07 1520	✓		Soil	2	Possible high Metals(Hg) Conc.	
29	07KMS04SS	7/31/07 1440	✓		Soil	2		
30	07KMS28SS	8/1/07 1605	✓					

Also: MS/MSD

RELEASED BY: Len Marcus		DATE: 8-3-07	RECEIVED BY: [illegible]			DATE: 3 August 07	
PRINT NAME: Len Marcus	FIRM: E&E	TIME: 1520	PRINT NAME: Race Brinton		FIRM: TA	TIME: 15:21	
RELEASED BY: [illegible]		DATE: 3 August 2007	RECEIVED BY: Ivy Balm			DATE: 8/4/07	
PRINT NAME: Race Brinton	FIRM: TA	TIME: 15:35	PRINT NAME: Ivy Balm		FIRM: TEST AMERICA	TIME: 3:15 pm	

ADDITIONAL REMARKS: SHIP TO TACOMA LAB. CONTACT = Terri Torres. Speciation testing to occur only after PP Metals results available and upon client authorization. H2O

TEMP: 4.2 C

PAGE 1 OF 1

COC REV 08/2006

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project.
Payment for services is due within 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

TB = 2.3°C

Laboratory Data Review Checklist

Completed by: David Ikeda

Title: Chemist

Date: October 30, 2007

CS Report Name: Kolmakof Mine

Report Date:

Consultant Firm: Ecology & Environment, Inc.

Laboratory Name: Test America Analytical, Inc - Tacoma

Laboratory Report Number: 580-6781

ADEC File Number:

ADEC RecKey Number:

1. Laboratory

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

      ☒ Yes ☐ No Comments:

   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 Comments:

2. Chain of Custody (COC)

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

      ☒ Yes ☐ No Comments:

b. Correct analyses requested?

☒ Yes ☐ No Comments:

3. Laboratory Sample Receipt Documentation

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

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

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 Comments:

Not applicable

e. Data quality or usability affected? Explain.

Comments:

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

Yes, the case narative identified all the QC outliers.

c. Were all corrective actions documented?

☒ Yes ☐ No Comments:

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

Comments:

According to the case narative, all QC outliers were due to matrix effect and no further corrective action was required.

5. Samples Results

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

☒ Yes ☐ No Comments:

b. All applicable holding times met?

☒ Yes ☐ No Comments:

c. All soils reported on a dry weight basis?

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

e. Data quality or usability affected? Explain.

Comments:

6. QC Samples

a. Method Blank

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

☐ Yes ☐ No Comments:

ii. All method blank results less than PQL?

☐ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

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

☐ Yes ☐ No Comments:

v. Data quality or usability affected? Explain.

Comments:

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples?

☐ Yes ☐ No Comments:

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

☐ Yes ☐ No Comments:

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 Comments:

The LCS/LCSD percent recovery value for diesel-range organics (DROs) and residual-range organics (RROs) were outside QC limits.

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

☒ Yes ☐ No Comments:

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

Comments:

Yes, the positive results in the associated DRO and RRO samples were qualified as estimated (J).

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

☒ Yes ☐ No Comments:

vii. Data quality or usability affected? Explain.

Comments:

The associated samples positive results were flagged as estimated, to signify that associated QC criteria were not met.

c. Surrogates – Organics Only

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

☐ Yes ☒ No Comments:

Reported for QC and lab samples; field surrogates were not sumbitted.

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 Comments:

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

☒ Yes ☐ No Comments:

iv. Data quality or usability affected? Explain.

Comments:

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

i. One trip blank reported per matrix, analysis and cooler?

☒ Yes ☐ No Comments:

ii. All results less than PQL?

☒ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

iv. Data quality or usability affected? Explain.

Comments:

e. Field Duplicate

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

☒ Yes ☐ No Comments:

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

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

RPD (%) = 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 Comments:

Field Duplicate samples IDs were not provided to the data reviewer, therefore the field duplicates data could not be assessed.

iv. Data quality or usability affected? Explain.

Comments:

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☐ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? Explain.

Comments:

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

a. Defined and appropriate?

☒ Yes ☐ No Comments:

MS/MSD results for DRO, RRO, nitroaromatics, and metals were outside QC limits. No action was taken for DRO and RRO due to high sample results. No action was taken for the nitroaromatic outlier, since the LCS and LCSD were within QC limits. Several metals were qualified as estimated (UJ or J) due to the MS/MSD outliers.

ATTACHMENT E

ADEC CONCEPTUAL SITE MODEL FORM

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: Kolmakof Mine Site
West of Napaimute, Alaska , north bank of Kuskokwim River

Completed By: Len Marcus, Ecology and Environment, Inc.
Date Completed: March 27, 2008

Follow the directions below. Do not consider engineering or land use controls when describing pathways.

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Briefly list other mechanisms or reference the report for details.*

(3) *Check exposure media identified in (2).*

(4) *Check exposure pathways that are complete or need further evaluation. The pathways identified must agree with Sections 2 and 3 of the CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathways	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
✓ Surface Soil (0-2 ft bgs)	✓ Direct release to surface soil — check soil	✓ soil	✓ Incidental Soil Ingestion							
	✓ Migration or leaching to subsurface — check soil		✓ Dermal Absorption of Contaminants from Soil	F	F	C/F		C/F	C/F	
	✓ Migration or leaching to groundwater — check groundwater	✓ groundwater	✓ Ingestion of Groundwater	F	F	F		F	F	
	✓ Volatilization — check air		☐ Dermal Absorption of Contaminants in Groundwater							
	✓ Runoff or erosion — check surface water		☐ Inhalation of Volatile Compounds in Tap Water							
	✓ Uptake by plants or animals — check biota	✓ air	☐ Inhalation of Outdoor Air							
	☐ Other (list):		✓ Inhalation of Indoor Air	F	F	C/F		C/F	C/F	
☐ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil		✓ Inhalation of Fugitive Dust	F	F	C/F		C/F	C/F	
	☐ Migration to groundwater — check groundwater	✓ surface water	✓ Ingestion of Surface Water	F	F	C/F		C/F	C/F	
	☐ Volatilization — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Other (list):		☐ Inhalation of Volatile Compounds in Tap Water							
☐ Ground-water	☐ Direct release to groundwater — check groundwater	✓ sediment	✓ Direct Contact with Sediment	F	F	C/F		C/F	C/F	
	☐ Volatilization — check air	✓ biota	✓ Ingestion of Wild Foods	F	F	C/F		C/F	C/F	
	☐ Flow to surface water body — check surface water									
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
✓ Surface Water	✓ Direct release to surface water — check surface water									
	☐ Volatilization — check air									
	✓ Sedimentation — check sediment									
	✓ Uptake by plants or animals — check biota									
	☐ Other (list):									
✓ Sediment	✓ Direct release to sediment — check sediment									
	✓ Resuspension, runoff, or erosion — check surface water									
	✓ Uptake by plants or animals — check biota									
	☐ Other (list):									

Revised 3/21/06