Beck, Larry

From: Palmieri, Annemarie G (DEC) <annemarie.palmieri@alaska.gov>
Sent: Thursday, September 15, 2011 1:09 PM
To: Leibensberger, Debra; Beck, Larry
Cc: Wilcer, Bruce; Dykins, Stuart; Young, Elizabeth
Subject: RE: Final Kolmakof Workplan

Larry:
I have had the opportunity to review the final EE/CA work plan referenced below and conclude that the DEC's comments on the previously submitted draft work plan have been satisfactorily addressed. Therefore, this work plan, dated September 14, 2011, is approved in accordance with 18 Alaska Administrative Code (AAC) 75.335(b).
Please let me know if you have any questions.
Anne Marie.

From: Leibensberger, Debra [mailto:DLLEIBENSBERGER@mactec.com]
Sent: Wednesday, September 14, 2011 3:49 PM
To: Palmieri, Annemarie G (DEC); beckljxv@aol.com; Beck, Larry
Cc: Wilcer, Bruce; Dykins, Stuart; Young, Elizabeth
Subject: Final Kolmakof Workplan

Hi Anne Marie,
We have uploaded the final version of the workplan to the FTP site and will be shipping a signed hardcopy out to you tomorrow.
Please send your approval via e-mail on the electronic version so that we can have that before we go in the field. Your formal approval can follow receipt of your hardcopy if that works for you.
Please contact me with any questions or concerns

FTP Site:

ftp.mactec.com
login: externalclient
password: sen382
Outgoing folder
Kolmakof EECA WP for ADEC

Thanks!

Deb Leibensberger
AMEC
Environment & Infrastructure
Principle Environmental Scientist, REA

1465 N. McDowell Blvd, Suite 200
Petaluma, CA 94954
(707)496-3117

Please note new e-mail addess:
Debra.Leibensberger@amec.com

Final
Engineering Evaluation/Cost Analysis Workplan
Kolmakof Mine Site
Napaimute, Alaska

Prepared for

U.S. Department of the Interior
Bureau of Land Management
National Business Center
Denver Federal Center, Building 50
Denver, Colorado 80225-0047

AMEC Project No. 4038080005 01

Debra Leibensberger
Principal Environmental Scientist

Bruce L. Wilcer
Senior Principal Geologist

September 14, 2011

Environment & Infrastructure
1465 North McDowell Blvd., Suite 200
Petaluma, CA 94954 - (707) 793-3800

Final
Engineering Evaluation/Cost Analysis Workplan
Kolmakof Mine Site
Napaimute, Alaska

AMEC Project No. 4038080005 01

This document was prepared by AMEC Environment & Infrastructure (AMEC) for the Bureau of Land Management (BLM), for the sole use of the BLM, the only intended beneficiaries of this work. No other party should rely on the information contained herein without the prior written consent of the BLM. This report and the interpretations, conclusions, and recommendations contained within are based in part on information presented in other documents that are cited in the text and listed in the references. Therefore, this report is subject to the limitations and qualifications presented in the referenced documents.

CONTENTS

ACRYONYMS v

EXECUTIVE SUMMARY vii

1.0 INTRODUCTION 1-1

1.1 Site Description 1-1
1.2 Site History 1-2
1.3 Previous Investigations and Removal Actions 1-3
1.4 Sources, Nature and Extent of Contamination 1-6
1.4.1 Metals 1-6
1.4.2 Petroleum Hydrocarbons 1-8
1.4.3 Explosives 1-8
1.4.4 Asbestos and Lead Based Paint 1-8
1.5 Conceptual Site Model 1-9
1.6 Streamlined Risk Evaluation 1-10
1.6.1 Human Health Risk Evaluation 1-10
1.6.2 Ecological Risk Evaluation 1-11

2.0 REMOVAL ACTION OBJECTIVES 2-1

2.1 Scope and Purpose 2-1
2.2 Justification for the Proposed Action 2-1
2.3 Identification of ARAR's 2-1

3.0 REMOVAL ACTION TECHNOLOGIES/ALTERNATIVES 3-1

3.1 Technology Identification and Screening 3-1
3.2 Development of Alternatives 3-1

4.0 ANALYSIS OF ALTERNATIVES 4-1

4.1 Individual Analysis of Alternatives 4-1
4.1.1 Effectiveness 4-1
4.1.2 Implementability 4-1
4.1.3 Cost 4-2
4.2 Comparative Analysis of Alternatives 4-2

5.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE 5-1

6.0 REFERENCES 6-1

FIGURES

1 Site Location Map
2 Site Overview
3 Mill Area Site Plan
4 Camp Area and Retort Mound Site Plan
5 Human Health Conceptual Site Model

APPENDICES

A SUMMARY OF FINDINGS – 2008 FIELD WORK & SAMPLING AND ANALYSIS PLAN – 2011 FIELD WORK
B GEOPHYSICAL SURVEY REPORT - 2008
C ASBESTOS CONTAINING MATERIALS AND LEAD BASED PAINT SURVEY REPORT – 2008
D HAZARDOUS AND NON-HAZARDOUS WASTE REMOVAL REPORT – 2008

ACRYONYMS

ACM	asbestos-containing material
ADEC	Alaska Department of Environmental Conservation
AHERA	Asbestos Hazard Emergency Response Act
AOCs	areas of concern
AMEC	AMEC Environment & Infrastructure
ARARs	Applicable or Relevant and Appropriate Requirements
As	arsenic
BLM	Bureau of Land Management
BTEX	benzene, toluene, ethyl benzene, xylenes
CalEPA	California Environmental Protection Agency
Calista	Calista Corporation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COCs	contaminants of concern
Cr	chromium
CSM	conceptual site model
DGGS	Alaska Department of Natural Resources Division of Geological and Geophysical Survey
DRO	diesel range organic compounds
DU	decision unit
EE/CA	Engineering Evaluation/Cost Analysis
E&E	Ecology and Environment, Inc.
FS	feasibility study
GRO	gasoline range organic compounds
HEAST	Health Effects Assessment Summary Tables
Hg	mercury
HQ	non-carcinogenic risk
IRIS	Integrated Risk Integration System
KMS	Kolmakof Mine Site
LBP	lead-based paint
MACTEC	MACTEC Engineering and Consulting, Inc.
mg/kg	milligram per kilogram
NCP	National Contingency Plan
NESHAP	National Emission Standards for Hazardous Air Pollutants
Ni	nickel
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PA/SI	Preliminary Assessment/Site Investigation
PEL	probable effects level
PCBs	polychlorinated biphenyls
PPRTV	Provisional Peer-Reviewed Toxicity Values
PRSC	post-removal site control
R&H	R&H Mining Co.
RAGS	Risk Assessment Guidance for Superfund
RAPM	Risk Assessment Procedures Manual
RAOs	Removal Action Objectives
RRO	residual range organic compounds
RSI	Removal Site Inspection

SAP	Sampling and Analysis Plan
SI	Site Investigation
SQGs	Sediment Quality Guidelines
SQuiRTs	Screening Quick Reference Tables
TBC	to be considered
TEL	threshold effects level
TKC	The Kuskokwim Corporation
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
Workplan	EE/CA Workplan
XRF	x-ray fluorescence

EXECUTIVE SUMMARY

Effective June 3, 2011 MACTEC Engineering and Consulting, Inc. (MACTEC) was acquired by AMEC and began operation under a new legal entity, AMEC E&I, Inc. (AMEC) on July 5, 2011. References in this document to work performed prior to the acquisition are cited as "MACTEC", while future work proposed is cited as "AMEC".

The Bureau of Land Management (BLM) is exercising its delegated authority to act as lead agency for conduct of a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Engineering Evaluation/Cost Analysis (EE/CA) of the Kolmakof Mine Site (KMS) to address contaminants of concern (metals, petroleum hydrocarbons, explosives, polychlorinated biphenyls [PCBs], asbestos and lead-based paint) within four areas of concern (Camp Area, Mill Area, Pit Area, and Tailings Area). The Alaska Department of Environmental Conservation (ADEC) is being provided meaningful and substantial participation in the CERCLA process by providing oversight of the project to ensure the State of Alaska's interests are adequately protected.

The KMS is an abandoned cinnabar mine on the north bank of the Kuskokwim River near the village of Napaimute, Alaska which is scheduled to be conveyed to The Kuskokwim Corporation (TKC) (surface estate) and Calista Corporation (Calista) (subsurface estate) in accordance with the Alaska Native Claims Settlement Act. Previous work performed at the site includes a preliminary assessment/site investigation (PA/SI) conducted by the United States Environmental Protection Agency (USEPA) and two site inspections and removal actions conducted by the BLM in 2000 and 2006. A Removal Site Inspection (RSI) was performed by Ecology and Environment, Inc. (E&E) in 2007 and site investigation and removal activities were conducted by MACTEC in 2008. The purpose of the RSI was to identify facility features, collect soil, product, sediment, and water samples to identify possible contaminants and concentrations, and to inventory abandoned mine-related structures, equipment, debris and potentially hazardous materials to determine if environmental remediation of the site would be necessary prior to transfer of the land to the TKC and Calista. While mercury was considered the primary contaminant of concern, the RSI identified the need for further investigation to characterize the site for additional metals, petroleum hydrocarbons, and explosives as well as the need for removal of hazardous and non-hazardous materials.

MACTEC conducted investigative removal activities in 2008 including soils sampling to establish metals background concentrations, geophysical survey to identify a potential monofill location, residue sampling and analysis from the location of a former shed used to house explosives, mercury speciation analysis, and an asbestos and lead based paint survey from the remaining structures on site. Removal activities included removal and disposal of various hazardous and non-hazardous wastes from abandoned waste containers and equipment.

In support of the preparation of the EE/CA, AMEC presents this EE/CA workplan, which describes the site history and previous investigations, the conceptual site model (CSM), the process for a streamlined risk evaluation, and evaluation of removal action objectives, technologies and alternatives that will be evaluated as part of the EE/CA.

This EE/CA workplan serves as a combined document that presents the EE/CA workplan as the main document and appendices that present the results of the 2008 field activities performed by MACTEC, and the Sampling and Analysis Plan for the remaining site activities to be conducted to complete characterization of the site:

- Appendix A: Summary of Findings – 2008 Field Work and 2011 Sampling and Analysis Plan

- Appendix B: Geophysical Survey Report – 2008
- Appendix C: Lead and Asbestos Survey Report – 2008
- Appendix D: Hazardous and non-Hazardous Waste Removal Report - 2008

1.0 INTRODUCTION

The BLM has a requirement to complete a CERCLA EE/CA for KMS to address contaminants of concern (COCs) which include the metals mercury (Hg), arsenic (As), nickel (Ni), chromium (Cr) as well as petroleum hydrocarbons and associated volatile and semi-volatile components within four Areas of Concern (AOCs). Other issues to be addressed include characterization and disposal of abandoned site-related equipment, structures, and supplies. The RSI conducted by BLM in 2007 (*E&E, 2008*) determined that there were several AOCs at the KMS where Non-Time Critical Removal Actions were warranted under authority of the National Contingency Plan (NCP). Additionally, the BLM has determined that certain hazardous materials needed to be removed from the site and properly disposed.

The EE/CA will divide the KMS into separate decision units (DU) and establish removal action objectives for each DU. For each DU, the EE/CA will provide documentation for identified Applicable or Relevant and Appropriate Requirements (ARARs), analysis of cost-effective removal alternatives, and recommendations for preferred removal actions that best meet the removal objectives.

In support of the preparation of the EE/CA, AMEC Environment & Infrastructure (AMEC) has prepared this EE/CA Workplan (Workplan), which describes additional characterization work required to delineate the extent of remaining contamination at each of the AOCs. The tasks outlined in this Workplan are based upon findings of the 2007 RSI, work performed by MACTEC in 2008, and discussions with BLM, ADEC, and the USEPA. Previous work performed by MACTEC in 2008 and the proposed Sampling and Analysis Plan (SAP) are presented in Appendices A through D.

Within 90 days of receipt of the last data from the laboratory, the Respondents will submit a draft EE/CA to BLM, ADEC, affected Alaska Native Corporations, and the Native Village of Napaimute for their review and comment. The EE/CA will present the results of the investigations performed at the Site and the human and ecological risk evaluations and will document the development and screening of removal action alternatives to address any unacceptable risks to human health or the environment associated with the Site.

The EE/CA will present the removal action objectives (RAOs), the ARARs that will have to be met by the removal action, and will develop and evaluate alternatives to address any identified unacceptable risks at the Site. A range of removal alternatives will be developed in the EE/CA and these alternatives will be evaluated against the NCP criteria of effectiveness, implementability and cost for both short term and long term remedies. The EE/CA will provide a comparative analysis of the alternatives and will define the removal action alternative which best satisfies the NCP criteria.

BLM, ADEC, affected Alaska Native Corporations and the Native Village of Napaimute will have 20 days to submit comments on the draft EE/CA, and the Respondents will revise the document to address comments and submit the final EE/CA to BLM within 30 days of receipt of the comments.

1.1 Site Description

The KMS is an abandoned cinnabar mine on the north bank of the Kuskokwim River located within Section 6, Township 17 North, Range 53 West, Seward Meridian. The site, located at approximately 61 degrees 35’ 22.825” north latitude and 158 degrees 55’ 22.438” west longitude, is on public land administered by the BLM. The site is located approximately 19.5 miles east of Aniak, Alaska, and approximately 10 miles west of Napaimute, Alaska (Figure 1), the nearest known inhabited area. A

small, unnamed creek passes by portions of the site and flows into the Kuskokwim River. There are no roads to the site or landing strips nearby; access is by boat only.

In the vicinity of KMS, the north bank of the Kuskokwim River is made up chiefly of hard-rock bluffs 100 to 400 feet high. The bluffs consist principally of alternate beds of sandstones and shales that have been intruded by rhyolite dikes and sills. The bluff where the cinnabar mineralization occurs shows sandstone beds 2 feet to 20 feet in thickness and shale beds from a few inches to two or three feet thick (*E&E, 2008*).

1.2 Site History

Mining of cinnabar at the KMS dates to about 1881, although all of the structures found there are of a more modern age from about the 1940's and newer. The last mining is thought to have occurred in the early 1970's and the claims were determined by BLM to be abandoned and void in 1993. Since the mine closure, the KMS area has become overgrown with vegetation to the extent that roads are now footpaths. The site is located within lands selected for conveyance to an Alaska Native Corporation - The Kuskokwim Corporation (TKC), as part of the Napaimute Village Townsite selection under authority of the Alaska Native Claims Settlement Act (*E&E, 2008*). Calista, the regional Alaska Native Corporation, will be conveyed the subsurface estate at that time.

The cinnabar deposit within the bluff on the north side of the Kuskokwin River was the only known deposit in the immediate area. In 1969 to 1970, the Bureau of Mines conducted a trenching and augering exploration project in the area in an attempt to identify extensions of the known cinnabar deposit. The results did not confirm the existence of additional cinnabar ore; however, results were perhaps non-conclusive due to heavy overburden of loess and moss concealing the bedrock (*Merrill, 1975*). The trenching did result in scars and hummocky topography visible northeast of the Mill Area on Figure 2. Because this was an exploration that disturbed the topography but resulted in no production or mining of cinnabar, this area explored by trenching has been ruled out as an area of further concern.

The ore source area for the mining operations is located within the bluff that parallels the Kuskokwim River's north boundary. The bluff is approximately 230 feet high from the base at the river's edge to the top of the slope with a steep grade. From the top of the slope proceeding north for approximately three hundred feet is an area scoured by blasting and bulldozing over the years of operation. This area is identified as the Pit Area (Figure 2). A small blast shack, an ore cart, and an air compressor are all currently found in the Pit Area. A 1998 inspection of the site by the Alaska Department of Natural Resources Division of Geological and Geophysical Surveys (DGGS) noted that undisturbed cinnabar remains visible on the slope of the bluff and within the pit area *as* described in *DGGS Report of Investigation 98-12* (*Buntzen, et al, 1999*), indicating that at least some of the cinnabar at the base of the bluff is a result of natural erosion, and not a result of mining activities. Erosion of the exposed cinnabar is further documented in a previous report issued in 1947 by the U.S. Department of the Interior, Bureau of Mines "The more promising deposit described by the Geologic Survey in 1914 is not now in evidence and has probably been removed by the rapid erosion to which the bluff is subjected" (*Webber, et al, 1947*).

From the Pit Area, the blasted fragments with high concentrations of cinnabar were hand sorted and hauled by wooden sled approximately ¼ mile northeast to the Mill Area. The remaining blasted rock with fragments of cinnabar were pushed over the top of the bluff toward the river. This area along the bluff is identified as the Tailings Area, although this may be misleading as the blasted rock might be more accurately described as waste rock, not tailings (*E&E, 2008*). Waste rock is generally the non-mineralized or low-grade mineralized material removed from above or within the ore during mining activities, whereas tailings are produced during beneficiation activities and are typically fine-grained materials that may still contain low concentrations of the target mineral.

Cinnabar ore collected from the Pit Area was transported approximately ¼ mile northeast to the Mill Area (Figure 3). The mill consisted of an open wooden-framed structure built on a steep slope. The ore deposit area, or chute, was at the top of the slope with a ball mill at the bottom. The structure was protected by a canopy. The ball mill and structure are still standing with a collapsed cover. Southwest of the chute at the top of the mill, is the burnt remains of a small shed that was formerly used to house blasting supplies.

At the bottom of the mill, a washing system (also identified as a "floatation system" in the 2007 RSI) was likely used to separate the crushed cinnabar from waste rock. A small settling pond was created approximately 200 feet southwest of the ball mill (slightly down-gradient along the drainage ditch) that was used to collect and reuse water from the washing process. Also in the Mill Area, a large shed southeast of the mill was used to house a generator and miscellaneous tools or supplies. Twelve flasks were found in the large shed, some containing small amounts of liquid mercury. A smaller shed south of the large shed was likely used as a tool/work shed. An abandoned pickup truck was found northeast of the mill and shed. Figures 2 and 3 show the location of the Mill Area and the site details.

A road approximately a half-mile long leads southeast from the Mill Area to the Camp Area. The Camp Area (Figures 2 and 4) is located near the Kuskokwim River at a location where the bluff subsides and access is gained from the river. The Camp Area consisted of some outbuildings including bunkhouses, a cookhouse, a generator shed and a manager's house. Also found at the Camp Area is a mound of earth that may have been used by the mine operators as a retort facility.

The Tailings Area, Pit Area, Mine Area, and Camp Area have been identified as the four areas of concern requiring investigation/characterization work in support of the EE/CA.

1.3 Previous Investigations and Removal Actions

This section describes investigations and removal actions performed prior to work performed by MACTEC in 2008. A description of the 2008 investigation and discussion of results is presented in Appendix A.

In 1999, the USEPA notified the BLM that they were initiating a PA/SI at the site. USEPA'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 retort operations. Per the USEPA, a retort was located at the "upper camp" (Mill Area) 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 USEPA that the site investigation (SI) phase has 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, California [R&H]). In coordination with R&H, the BLM removed several drums of chemicals and razed a shed containing explosives in the Mill Area. The available documentation from the BLM removal in 2000 does not indicate that the areas identified by the USEPA were addressed.

During an August 2006 joint site inspection of the Site with representatives of the Native Village of Napaimute, the BLM concluded that further investigation was warranted. Twelve metal bottles were found in the generator shed near the mill, which appeared to be empty mercury flasks (at least one flask was later found to contain a drop or two of liquid mercury). The earlier USEPA correspondence identified a retort at the "upper camp" – which may refer to the generator shed, suggesting that the

USEPA's inspectors may have hypothesized that the shed may have once housed a retort operation. Numerous empty drums were found stacked or scattered around the sheds. The nearby settling pond contained standing water. The former dynamite shed near the top of the mill was now a pile of ash and metal debris. There was no evidence of spills, stains, odors, or distressed vegetation.

Also during the 2006 inspection, what is now called the "retort mound" in the Camp Area was first identified as the remnants of a potential mercury retort. A firebrick pit and a beer keg secured to wood beams were identified within the mound. The building structures in the Camp Area (bunk houses, etc.) were described as deteriorating and containing a significant amount of household debris.

In 2007, E&E, a BLM contractor, conducted a RSI to identify facility features, collect soil, product, sediment, and water samples to identify possible contaminants and concentrations, and to inventory abandoned mine-related structures, equipment, debris, and potentially hazardous materials. The 2007 RSI focused on the Camp Area, Mill and Tailings Areas. A summary of the findings is presented below.

Camp Area: During the 2007 RSI, the structures at the Camp Area were inventoried for safety and hazardous materials. The buildings included a generator shed, bunk house/shop, bunkhouse, cookhouse, manager's house, and canvas wall tent (Figure 4). Structures ranged from partially collapsed to mostly intact and most still contained discarded goods such as appliances, food containers, clothing, and personal items.

The retort facility (referred to as "retort mound") in the Camp Area was defined as an earthen mound containing discarded ore refining or processing equipment in the RSI (Figure 4 inset). The retort mound consists of an earthen mound containing discarded ore refining equipment such as a beer keg modified with an iron pipe attachment which may have been used as a retort or furnace. A nearby sewer pipe approximately 10 feet long may have been used as a condensing pipe for retrieving vaporized mercury. An open two-compartment container was filled with a lumpy granular material (as was the sewer pipe and beer keg) suspected of being processed ore. A firebrick kiln and a concrete slab hearth were also identified.

Samples were collected for metals analysis from the suspected processed ore material in the open container, sewer pipe and beer keg. The results indicate levels of arsenic, chromium, and mercury above the ADEC Method 2 cleanup criteria of 3.9 milligrams per kilogram (mg/kg), 25 mg/kg, and 1.4 mg/kg, respectively. Of note, the sample from the open container contained mercury at 18,000 mg/kg while the sewer pipe and beer keg samples ranged from 32 mg/kg to 43 mg/kg. One surface soil sample was collected from the retort mound with similar results of arsenic and chromium, but with a much lower mercury result (3.8 mg/kg).

An additional soil sample was collected outside the generator shed amongst empty fuel drums. The sample was analyzed for volatile organic compounds (VOCs) and petroleum hydrocarbons. The only detected results were for diesel-range organics (DRO) and residual-range organics (RRO), which were below the ADEC cleanup criteria of 250 mg/kg and 10,000 mg/kg, respectively. Also in the Camp Area, a surface water sample and sediment sample were collected from within Unnamed Creek, which flows near the Mill Area and empties into the Kuskokwim River at the Camp Area. The sediment sample contained arsenic and nickel above the National Oceanographic and Atmospheric Administration (NOAA) probable effects level (PEL) criteria (5.9 mg/kg and 18 mg/kg, respectively), while there were no detected metals in the surface water sample. Detected arsenic concentrations in the collected samples were noted to be similar to the arsenic concentration for the site-specific reference sample and reported regional background levels for the southwestern Alaska (*E&E, 2008, page 17*).

Mill Area: During the 2007 RSI, 12 surface soil and five sediment samples were collected from the Mill Area (Figure 3). Six of these locations contained mercury at levels above the ADEC cleanup criteria of 1.4 mg/kg. The highest mercury result (690 mg/kg) was present in the sample adjacent to the chute at the top of the mill. The sediment samples at the settling pond (48 mg/kg, dry at the time of the RSI) and Unnamed Creek (21 mg/kg primary sample and 89 mg/kg for the field duplicate) were the areas with the next highest levels. Primary and duplicate surface samples were collected from the floor of the large shed near the 12 mercury flasks and mercury results of 5.4 mg/kg and 9.1 mg/kg (respectively) were detected. The sample collected from the ground between the large shed and the small shed contained mercury at a concentration of 12 mg/kg, and the sample collected from the ground underneath the ball mill at the bottom of the mill structure contained mercury at a concentration of 16 mg/kg.

Nearly all of the samples collected and analyzed for metals contained arsenic at levels above the ADEC Method 2 cleanup criteria of 3.9 mg/kg. The highest concentration of arsenic (13 mg/kg) came from the ore chute at the top of the mill and the sediment sample collected underneath the ball mill at the bottom of the mill structure.

In the large shed, a large wooden cradle was found that likely served as a mount for the generator (no longer present at the site). A sample was collected from the floor of the shed at that location for petroleum hydrocarbon analysis. The results indicated that DRO was present at a concentration of 16,000 mg/kg, above the ADEC cleanup criteria of 250 mg/kg. RRO was also detected at 3,100 mg/kg, which is below the ADEC cleanup criteria of 11,000 mg/kg.

Tailings Area: The 2007 RSI identified the reported tailings pile as being located along the bluff on the north side of the Kuskokwim River approximately ¾ miles downriver (west) of the Camp Area and was approximately 200 to 300 feet wide. The RSI field team observed that soil at the reported tailings pile appeared to have been placed there, indicating that the slope likely contained either overburden (waste rock) or tailings generated from the mining operation. Several outcrops of brown/ red colored soil were observed on the bluff slope close to and downriver of the alleged tailings pile. These outcrops did not visually appear to have been displaced or transplanted. Since cinnabar is brownish-red in color, the identified colored soil areas on the slope are believed to be natural exposures of the cinnabar deposits as described in *DGGS Report of Investigation 98-12* (*Buntzen, et al, 1999*).

There were three surface soil samples collected from the toe of the bluff at the reported tailing pile area (Figure 2). Mercury, chromium, and arsenic were detected at levels above ADEC Method 2 cleanup criteria. Mercury ranged from 22 mg/kg at the east sample location to 99 mg/kg at the center sample location. Chromium ranged from 33 mg/kg to 36 mg/kg and arsenic ranged from 4.5 mg/kg to 9.0 mg/kg.

Following the 2007 RSI, the BLM identified areas in need of further characterization in order to support the preparation of an EE/CA for the KMS. The Site was divided into the four AOCs and identified as the Camp Area, Mill Area, Pit Area, and Tailings Area. The following investigations were identified as steps needed to address data gaps in preparation of the EE/CA:

1. Conduct a background metals study in accordance with USEPA 540-R-01-003/OSWER 9285.7-41 “Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites”. Each AOC will be treated as a separate DU with statistically determined background concentrations.

2. Conduct an investigation to determine whether there are potential impacts of contamination in the Tailings Area on the Kuskokwim River.

3. Define the vertical and lateral extent of mercury impacted soils at the Mill Area, including in and around the large and small shed, around and under the mill structure, in the settling pond and ditch, and in the unnamed creek at the RSI sampling location.

4. Characterize the retort mound soil.

5. Identify on-site locations for potential construction of an ADEC-permitted refuse disposal monofill to be used as an option in the EE/CA.

In addition to these steps, the BLM listed additional tasks to be completed at the KMS:

- Asbestos and lead-based paint survey of selected structures,
- Disposal of mining wastes considered to be hazardous waste,
- Delineate DRO contamination in the large shed,
- Investigate soils under drum piles for petroleum contamination, and
- Determine whether explosives residue remain in soils at the burned explosives shed.

1.4 Sources, Nature and Extent of Contamination

This section discusses the sources, nature, and extent of contamination identified at the KMS based on investigations performed to date. In general, the COCs at the KMS include metals, petroleum hydrocarbons and associated volatile and semi-volatile components, explosives, and PCBs. Because limited sampling has been performed at the KMS to date, further characterization is necessary to fully evaluate the nature and extent of all COCs to support an evaluation of human health and ecological risks present at the site. Other potential contamination that will require further characterization to confirm their presence or absence include lead-based paint (LBP) and asbestos containing materials (ACM) related to the structures and debris remaining at the site. Appendix C describes the investigations implemented to date to characterize the LBP and ACM and includes recommendations for completion of the process. Removal of various hazardous wastes during the 2008 field program is described in Appendix D.

1.4.1 Metals

Camp Area

In the Camp Area, metals contamination was found to be associated with the Retort Mound and associated processing equipment and containers including a sewer pipe, split-open drum, 55-gallon drum, corrugated sheet metal, and a beer keg retort in the western portion of the Camp Area (*E&E, 2008*). The various containers were removed and disposed as part of the 2008 field program performed by MACTEC. A remaining area of concern for metals contamination in the Camp Area is the Retort Mound (Figure 4), where a sample collected during the 2007 RSI contained mercury and arsenic at concentrations exceeding the ADEC Method 2 Criteria and total chromium at an estimated value (J-qualified) equal to the ADEC Method 2 Criteria. The mound, which is approximately 35 feet by 20 feet and 3 feet high, requires further characterization to determine the lateral and vertical extent of arsenic, chromium, mercury and nickel contamination with particular interest given to areas more likely to contain metals contamination – e.g. near former locations of cinnabar containers that were removed during 2008 field activities.

Preliminary soil background comparison values from the Background Study in the Camp Area (Section A.2.1 in Appendix A) were: arsenic 10.74 mg/kg; chromium 29.26 mg/kg; mercury 0.522 mg/kg; and nickel 26.50 mg/kg.

Also in the Camp Area, a surface water sample and sediment sample were collected during the RSI from within Unnamed Creek, which flows near the Mill Area and empties into the Kuskokwim River at the Camp Area (Figure 4). The sediment sample contained arsenic and nickel above NOAA PEL criteria (13 mg/kg and 33 mg/kg, respectively), while there were no detected metals in the surface water sample. Detected arsenic concentration in the collected samples were noted to be similar to the arsenic concentration for the site-specific reference sample.

Mill Area

In the Mill Area, elevated concentrations of mercury, arsenic, or chromium in soil were detected in one or more areas. The concentrations seen in the area are related to various ore separation, milling, and refinement processes occurring in various locations. Mercury above the ADEC Method 2 Criteria of 1.4 mg/kg was detected at concentrations ranging from 5.4 to 690 mg/kg (Figure 3). Based on the limited sampling performed to date in these areas, further characterization is required to determine the lateral and vertical extent of mercury.

Preliminary soil background comparison values from the Background Study in the Mill Area (Section A.2.1 in Appendix A) were: arsenic 12.70 mg/kg; chromium 30.03 mg/kg; mercury 1.998 mg/kg; and nickel 53.97 mg/kg.

Mercury concentrations in sediment in the Mill Area above the BLM Criteria and/or the NOAA Criteria were detected during the RSI in samples from four areas (ditches under and west of the Ball Mill, settling pond, and creek near the Ball Mill) at concentrations ranging from 1.0 to 89 mg/kg (Figure 3). Based on the limited sampling performed to date in these areas, further characterization is required in these areas to determine the lateral and vertical extent of mercury in sediment.

Arsenic was detected in soil during the RSI in the Mill Area above ADEC Method 2 Criteria of 3.9 mg/kg at concentrations ranging from 6.0 to 9.0 mg/kg and is associated with areas near the Ball Mill (surrounding soil and the chute) and the flotation cell (Figure 3). These values are below the preliminary soil background comparison value of 12.70 mg/kg.

Total chromium exceeding the ADEC Method 2 Criteria of 25 mg/kg was detected during the RSI in one soil sample from the Ball Mill chute at a concentration of 39 mg/kg. No other soil or sediment sample results exceeded state or federal criteria. This area will be investigated further for total chromium and hexavalent chromium as described in Appendix A to further delineate the lateral and vertical extent of contamination. This value is above the preliminary soil background comparison value of 20.03 mg/kg.

Tailings Area

In the Tailings Area, elevated concentrations of mercury, arsenic, or chromium in surface soil were detected in the three samples collected at the base of the tailing (waste rock) slope during the 2007 RSI. Mercury above the ADEC Method 2 Criteria of 1.4 mg/kg was detected at concentrations ranging from 22 to 99 mg/kg. Arsenic above the ADEC Method 2 criteria of 3.9 mg/kg was detected at concentrations ranging from 4.5 to 9.0 mg/kg. Total chromium above the ADEC Method 2 criteria of 25 mg/kg was detected at concentrations ranging from 33 to 36 mg/kg. Based on the limited sampling performed to date in this area, further characterization is required to determine the lateral and vertical extent of mercury, arsenic and total chromium above the ADEC criteria.

Preliminary soil background comparison values from the Background Study in the Tailings Area (Section A.2.1 in Appendix A) were: arsenic 153.7 mg/kg; chromium 92.10 mg/kg; mercury 69.17 mg/kg; and nickel 155.80 mg/kg. Chromium and arsenic sample concentrations that exceed ADEC criteria are less than these soil background comparison values. Some mercury sample concentrations exceed both the ADEC criterion and background comparison values.

1.4.2 Petroleum Hydrocarbons

Previous investigations have identified seven areas within the KMS where contamination from petroleum hydrocarbons and associated volatile and semi-volatile components could exist:

1. Drum Area 1 near the Generator Shed (Camp Area)
2. Drum Area 2 near the Retort Mound (Camp Area)
3. Drum Area 3 northwest of the Camp Area (Figure 4)
4. Drum Area 4 near the Large Shed (Mill Area)
5. Abandoned Pickup Truck (Mill Area)
6. Floor area of the Large Shed (Mill Area)
7. Compressor near the Pit Area (Figure 3)

During the 2007 RSI, three of the above-mentioned areas were investigated for potential petroleum hydrocarbon contamination: 1) soil outside the generator shed in the Camp Area, 2) soil outside the large shed in the Mill Area near Drum Area 4, and 3) soil in the interior of the large shed in the Mill Area. Except for the soil sample collected within the large shed in the Mill Area with DRO detected at 16,000 mg/kg, benzene, toluene, ethyl benzene, xylenes (BTEX), gasoline range organic compounds (GRO), DRO, or RRO were either not detected or detected well below ADEC Method 2 Criteria. Additional soil sampling and analysis must be performed in all of these areas in order to determine the nature and extent of contamination. The proposed investigation of these areas is described in Appendix A.

1.4.3 Explosives

As described in the 2007 RSI, the sampled ash collected at the burned explosives shed was later suspected to contain quicklime or similar material that was spread on the ground or partially consumed in the fire, possibly leaving explosives residue in the footprint of the burned shed under the applied material. MACTEC conducted an investigation for explosives residue in this area during the 2008 field program as described in Appendix A. While no detections of nitroaromatic compounds were reported above the laboratory reporting limits, the analysis was performed one day outside of holding time. AMEC will collect confirmation samples for nitroaromatics and nitroglycerin as part of the 2011 field program as described in Appendix A.

1.4.4 Asbestos and Lead Based Paint

MACTEC conducted ACM and LBP surveys in the remaining buildings at the site during the 2008 field program as described in the BLM Statement of Work dated June 13, 2008. Samples were collected from a variety of materials contained in on-site buildings as part of the asbestos survey, which was conducted in general accordance with the Asbestos Hazard Emergency Response Act (AHERA), National Emission

Standards for Hazardous Air Pollutants (NESHAP), and Occupational Safety and Health Administration (OSHA) protocols as described in the ACM and LBP Survey Report provided as Appendix C of this report. Laboratory reports indicate that the presence of asbestos was not identified in the samples submitted for analyses; however, an insufficient number of samples to meet NESHAP criteria were collected from several of the materials. As a result, AMEC will collect additional samples from the materials identified in Appendix C during the 2011 field program as described in Appendix A.

Painted surfaces were screened for lead-based paint by MACTEC personnel during the 2008 field program using a Niton x-ray fluorescence (XRF) Spectrum Analyzer. Results of the field screening did not identify the presence of lead-based paint in the materials analyzed. The field survey performed is described in the ACM and LBP Survey report provided as Appendix C. AMEC will collect confirmation samples for laboratory analysis during the 2011 field program as described in Appendix A.

1.5 Conceptual Site Model

A completed ADEC Human Health CSM is presented as Figure 5. The model was completed on the ADEC website using the data collected from the 2007 RSI. In the RSI report, a CSM was presented based on the available data collected and understanding of the conditions in the area of the mine (*E&E, 2008*). When additional characterization proposed in the SAP (Appendix A of this document) is completed, the CSM will be updated as necessary to reflect information regarding the nature and extent of contamination, and present a description the site, surroundings, and the potential exposure scenarios in the KMS area.

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. However, 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)
- 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. Potential subsistence foods in the area will be identified during the visual survey to be conducted as part of the ecological risk evaluation described in Section 1.6.2. Because site re-occupation cannot be presently ruled out, future residents and commercial or industrial workers are also considered potential receptors.

1.6 Streamlined Risk Evaluation

A streamlined human health and ecological risk evaluation will be conducted to determine if there are any unacceptable risks to human health or the environment associated with the Site. These evaluations will be based on the current uses of the Site and the data on the source materials and potentially affected media collected as part of the previous Site investigations presented in Sections 1.3 and 1.4, and the proposed additional sampling and analysis presented in Appendix A.

1.6.1 Human Health Risk Evaluation

The human health risk evaluation will assess the potential risks to human health associated with the Site.

Health risks will be evaluated using a two-tier approach. Potential health risks will first be evaluated by comparing the concentration of constituents in environmental media at the Site to risk-based screening levels. If a constituent is found to be present at a concentration greater than the defined soil screening criteria, then the human health risk evaluation will assess if the observed concentration is likely to constitute a risk to human health given the nature and extent of the constituent in Site soils and other Site specific considerations.

The concentrations of inorganic or organic constituents determined to be present in tailings and Site soils will be compared to the ADEC's Cumulative Risk Guidance human health risk-based soil screening levels for sites located in climate zone below 40 (*ADEC, 2008*). These concentrations are associated with a non-carcinogenic risk (HQ) no greater than 1 and carcinogenic risk no greater than 1×10^{-5}. Therefore, for risk screening purposes, these levels will be adjusted to a concentration associated with an HQ no greater than 0.1 and carcinogenic risk no greater than 1×10^{-6} (*ADEC, 2010*). If constituents are detected for which ADEC human health risk-based soil screening levels have not been developed, then soil screening levels will be obtained from USEPA's Region 9 Regional Screening Levels Table and adjusted to the lower of the concentrations associated with a HQ of 0.1 and a carcinogenic risk level of 1×10^{-6} (*ADEC, 2010*). Screening levels are developed to be very conservative such that if the concentration of a constituent in an environmental media is below the screening level for that constituent, then the probability is very low that there would be any unacceptable risks associated with exposure to that environmental media.

For constituents that exceed the risk-based screening levels, excess lifetime cancer risks and non-cancer hazards will be calculated in accordance with ADEC's Risk Assessment Procedures Manual (RAPM) (*ADEC, 2010*) using risk assessment methodology described in ADEC's RAPM and USEPA's Risk Assessment Guidance for Superfund (RAGS), Human Health Evaluation Manual (Parts A, B, D, and E). (*USEPA, 2004*). Risks will be assessed for receptors that may contact soil at the Site under the existing conditions (e.g., recreational trespassers / passive recreational visitors). Exposure parameters used to

calculate constituent intakes will be obtained from USEPA guidance (e.g., Exposure Factors Handbook; RAGS Part E). Cancer slope factor and non-cancer reference dose values will be obtained from the USEPA Integrated Risk Information System (IRIS) (*USEPA, 2011)*. If values are not published in IRIS, values will be obtained from Provisional Peer-Reviewed Toxicity Values (PPRTVs), California Environmental Protection Agency (CalEPA), Agency for Toxic Substances and Disease Registry (ATSDR) and Health Effects Assessment Summary Tables (HEAST) (*ADEC, 2010*). Cancer and non-cancer risks will be calculated in accordance with the methodology described in RAPM and RAGS Part A. The cancer risks for each constituent included in the risk evaluation will be summed by medium to obtain cumulative excess lifetime cancer risk. The cumulative excess lifetime cancer risk value will be compared to the ADEC's target cancer risk of 1E-05 and USEPA's excess lifetime cancer risk range of 1E-06 to 1E-04. The non-cancer hazards for each constituent included in the risk evaluation will be summed by medium to obtain a cumulative hazard index value; separate hazard index values may be tabulated by target organ effect, if appropriate. The hazard index values will be compared to a threshold hazard index value of 1.

1.6.2 Ecological Risk Evaluation

The ecological risk evaluation will assess the potential risks to both aquatic and terrestrial receptors. As described in the ADEC guidance for completing ecological risk evaluations, USFWS, NOAA and AK Dept of Fish and Game databases will be reviewed to identify potential protected or special status species that are known to be present at the site. In addition, a field visual survey will be conducted by a qualified biologist as part of the 2011 field program to identify habitats and ecological receptors known from these habitats in the area of former site activities which will be evaluated as part of the EE/CA.

The potential risks to aquatic receptors will be evaluated by comparing the concentrations of constituents found in sediment at the Site to published screening levels or promulgated standards and the results of the visual survey. Sediments will be compared to the threshold effects level (TEL) and PEL Sediment Quality Guidelines (SQGs), as published in the NOAA Screening Quick Reference Tables (SQuiRTs). The sediment criteria and guidelines have been developed to be protective of all aquatic organisms in all settings and concentrations greater than these criteria or guidelines do not necessarily mean that there are unacceptable risks to the aquatic resources of the Site. If a constituent is found in sediment at a concentration greater than these criteria or guidelines, then the ecological evaluation will assess if the observed concentration is truly likely to be causing an unacceptable risk to the aquatic resources of the Site. This evaluation will consider the location of the concentrations greater than criteria or guidelines and other Site-specific factors.

The potential risks to terrestrial receptors will be evaluated using the data collected during the physical site survey and by comparing the concentrations of constituents found in soil at the Site to ADEC's Environmental Media-Specific Conservative Screening Values found in Appendix D of the Ecoscoping Guidance (*ADEC, 2009*).

The human health and ecological evaluations will be included in the EE/CA Report.

2.0 REMOVAL ACTION OBJECTIVES

This section will identify the scope, goals, and objectives for the non-time critical removal action for the site. The EE/CA will divide the site into separate DUs and establish removal action objectives for each DU. For each DU, the EE/CA will provide documentation for identified ARARs, analysis of cost-effective removal alternatives and applicable statutory limitations, and recommendations for preferred removal actions that best meet the removal objectives.

2.1 Scope and Purpose

This section will define the specific objectives of the removal action (e.g., site stabilization, surface cleanup of hazardous substances) based on the results of the previous and additional proposed investigations, and the results of the risk evaluations for the four DUs identified.

The EE/CA will be prepared in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan and USEPA "Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA" guidance (Office of Solid Waste and Emergency Response [OSWER] Directive 9360.0-32; *USEPA, 1993*). Under this guidance, an EE/CA is "similar to a focused feasibility study (FS), concentrating on the analysis of perhaps two or three appropriate alternatives and providing reference to existing information on the nature and extent of contamination and risks."

2.2 Justification for the Proposed Action

This section will present a summary of the relevant factors pertaining to the site that necessitate a removal action. This includes identifying that a threat or potential threat to the public or the environment exists. As described in Section 1.2, the Camp Area, Mine Area, Pit Area, and Tailings Area, have been identified as the four AOCs requiring additional investigation/characterization work in support of the EE/CA.

2.3 Identification of ARAR's

This section will include a compilation of a comprehensive list of site-specific ARARs pertaining to the scope of the removal action alternatives. The complete listing will be presented in tabular form in an appendix, and will include a brief discussion of the ARARs related to the action including anticipated waste streams, waste storage, treatment or disposal requirements, or any other particular requirements that may be of special consideration.

ARARs are typically divided into three groups: (1) chemical-specific; (2) location-specific; and (3) action-specific. Chemical-specific ARARs establish an acceptable amount or concentration that may remain in or be discharged to the ambient environment. Location-specific ARARs include restrictions placed on the conduct of activities solely because they occur in special locations such as wetlands, floodplains, historic properties, or critical habitat. Action-specific ARARs are usually technology or activity-based requirements or limitations on actions taken with respect to hazardous substances, or other particular circumstances at a site.

Based on the results of previous investigations that indicate soil contamination is present within the four AOCs at the site at concentrations above ADEC cleanup criteria, preliminary identification of ARARs includes the following State requirements under Alaska State Code 18 AAC 75.340 through 375, Title 18, Environmental Conservation, Chapter 75, pertaining to soil cleanup that may be potentially applicable:

Section
325. Site cleanup rules: purpose, applicability, and general provisions.
330. Interim removal actions.
340. Soil cleanup levels; general requirements.
341. Soil cleanup levels; tables.
355. Sampling and analysis.
360. Cleanup operation requirements.
365. Offsite or portable treatment facilities.
370. Soil storage and disposal.
375. Institutional controls.
380. Final reporting requirements and site closure.
396. Local control.

A detailed analysis of ARARs will be performed in the EE/CA by reviewing the State Code and additional Federal and local ARARs and To-Be-Considered (TBC) requirements, and considering any input or guidance from ADEC and USEPA. ARARs will be defined for each alternative that is developed in the EE/CA based on the results of the risk evaluations that will also consider results of the additional sampling proposed in Appendix A.

3.0 REMOVAL ACTION TECHNOLOGIES/ALTERNATIVES

3.1 Technology Identification and Screening

This section will identify the applicable technologies based on site-specific conditions and the contaminants of concern. If appropriate, an additional technology screening step will be conducted to limit the number of technologies on the basis of the effectiveness, implementability, and cost evaluation. However, the typical EE/CA technology screening process is focused and evaluates only those technologies that have been proven to be effective at similar sites.

The removal actions are anticipated to involve excavation of contaminated soils and dismantling/demolition of buildings and large equipment. This process may generate non-hazardous wood debris, which could be disposed of by burning or onsite disposal in a monofill. Non-wood debris and contaminated soil could be disposed of in an onsite monofill or transported offsite. If estimated quantities of soil contaminated with petroleum or explosive compounds are identified during the proposed investigation, onsite treatment may be considered.

3.2 Development of Alternatives

In this section, technologies identified through the process described in Section 3.1 will be combined (if applicable) to form alternatives to meet the Removal Action Objectives for the applicable AOCs. This section will present a detailed description of each alternative. The use of presumptive remedy guidance can, in many cases, provide an immediate focus for the selection of alternatives. In accordance with EE/CA guidance, a limited number of alternatives (two to four), including no action, should be developed for detailed analyses (*USEPA, 1993*).

The descriptions, at a minimum, will cover overall implementation of the alternative, technologies or processes to be used (including schematics or flow charts if applicable), wastes generated (site and process), waste disposal, and regulatory requirements. The description of the selected alternative (Section 5.0) will provide greater detail on the attributes of the selected alternative.

4.0 ANALYSIS OF ALTERNATIVES

This section will present detailed descriptions and analyses of each of the removal action alternatives. The EE/CA guidance specifies a limited scope of proven alternatives be identified for analysis that are appropriate for addressing the removal action objectives (*USEPA, 1993*). The removal action alternatives will be identified based on Site conditions, the nature and extent of contamination, and the results of the risk evaluations. Based on data from previous investigations identified in Section 1.0, it is anticipated the following response actions will be considered in the EE/CA for limited quantities of soils impacted with metals, and potentially soils impacted by petroleum hydrocarbons and associated volatile and semi-volatile components however, the final scope and development of alternatives will be refined based on (1) the results of additional sampling and analysis to be conducted as proposed in Appendix A, and (2) the results of the risk evaluations described in Section 1.5, that are intended to delineate the nature and extent of contamination requiring a removal action in the EE/CA:

- No Further Action
- Excavation and Consolidation in a Permitted Refuse Disposal Monofill with Land Use Controls and Long Term Monitoring and Maintenance
- Excavation and Offsite Disposal

4.1 Individual Analysis of Alternatives

This Section will discuss the effectiveness of each alternative to meet the objectives of the removal action. Each of the removal action alternatives will be evaluated based on the following criteria specified in the EE/CA guidance (*USEPA, 1993*), as described in further detail below:

- Effectiveness
- Implementability
- Cost

4.1.1 Effectiveness

Each of the removal action alternatives will be evaluated based on the following effectiveness criteria:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness

4.1.2 Implementability

Each of the removal action alternatives will be evaluated based on the following implementability criteria:

- Technical feasibility
- Administrative feasibility
  - Statutory limits
  - Permits and waivers
  - Availability of services and materials
  - Acceptance by the state or support agency
  - Acceptance by the community

4.1.3 Cost

Cost estimates will be prepared for each of the removal action alternatives based on the following types of costs for comparison purposes:

- Direct capital costs
- Indirect capital costs
- Annual post-removal site control (PRSC) costs

The cost estimates will be prepared based on the EE/CA guidance (*USEPA, 1993*).

4.2 Comparative Analysis of Alternatives

This section will present a comparative analysis of each of the removal action alternatives against the evaluation criteria presented in Section 4.1. The purpose of the comparative analysis is to identify the advantages and disadvantages of the alternatives relative to one another, and to aid in the selection of a recommended removal action alternative to be implemented.

5.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

This section will present the recommended removal action alternative for implementation at the Site based on the comparative analysis of alternatives in Section 4.2.

It is anticipated that if the results of the additional sampling and risk evaluations indicate the volume of impacted soils requiring a removal action is limited, excavation and offsite disposal and site closure would be the preferred alternative over onsite management of contaminated soil in a monofill, which would require long term monitoring, maintenance, and Land Use Controls.

6.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2008. *Cumulative Risk Guidance.* Division of Spill Prevention and Response. Contaminated Sites Program. June 9.

_____, 2009. *Ecoscoping Guidance*. Division of Spill Prevention and Response. Contaminated Sites Program. March.

_____, 2010. *Risk Assessment Procedures Manual*. Draft. Division of Spill Prevention and Response. Contaminated Sites Program. July 1.

Bundtzen, T.K., Harris, E.E., Miller, M.L., Layer, P.W., and Laird, G.M., 1999. Geology of the Sleetmute C-7, C-8, D-7, and D-8 quadrangles, Horn Mountains, southwestern Alaska: Alaska Division of Geological & Geophysical Surveys Report of Investigation 98-12, 38 p., 3 sheets, scale 1:63,360.

Ecology and Environment, Inc., 2008. *Kolmakof Mine, Napaimute, Alaska, Removal Site Inspection Report*. March.

Merrill, C.W., Jr. and R.P. Maloney, 1975. *Kolmakof Mercury Deposits.* U.S. Department of the Interior, Bureau of Mines, Open File Report 21-75.

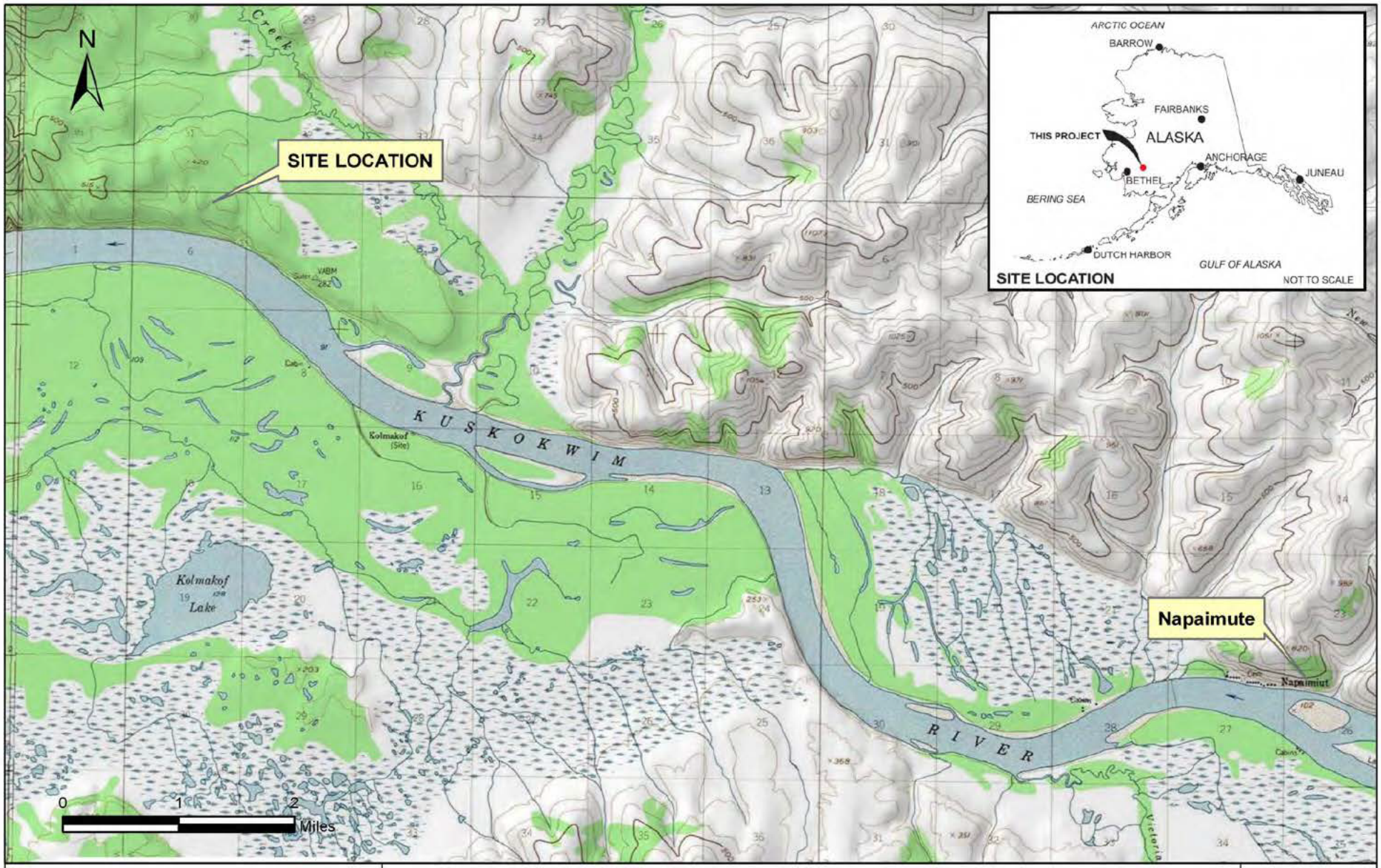
United States Environmental Protection Agency. (USEPA), 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, Publication 9360.0-32, Washington, D.C., August.

_____, 2004. *Risk Assessment Guideline for Superfund Volume 1: Human Health Evaluation Manual, Parts A, B, D, and E.*

_____, 2011. *Integrated Risk Information System (IRIS) www.epa.gov/iris/standal.html*

Webber, B.S., Bjorklund, S.C., Rutledge, F.A., Thomas, B.I., and Wright, W.S., 1947, Mercury deposits of southwestern Alaska: U.S. Bureau of Mines Report of Investigations 4065, 57 p.

FIGURES



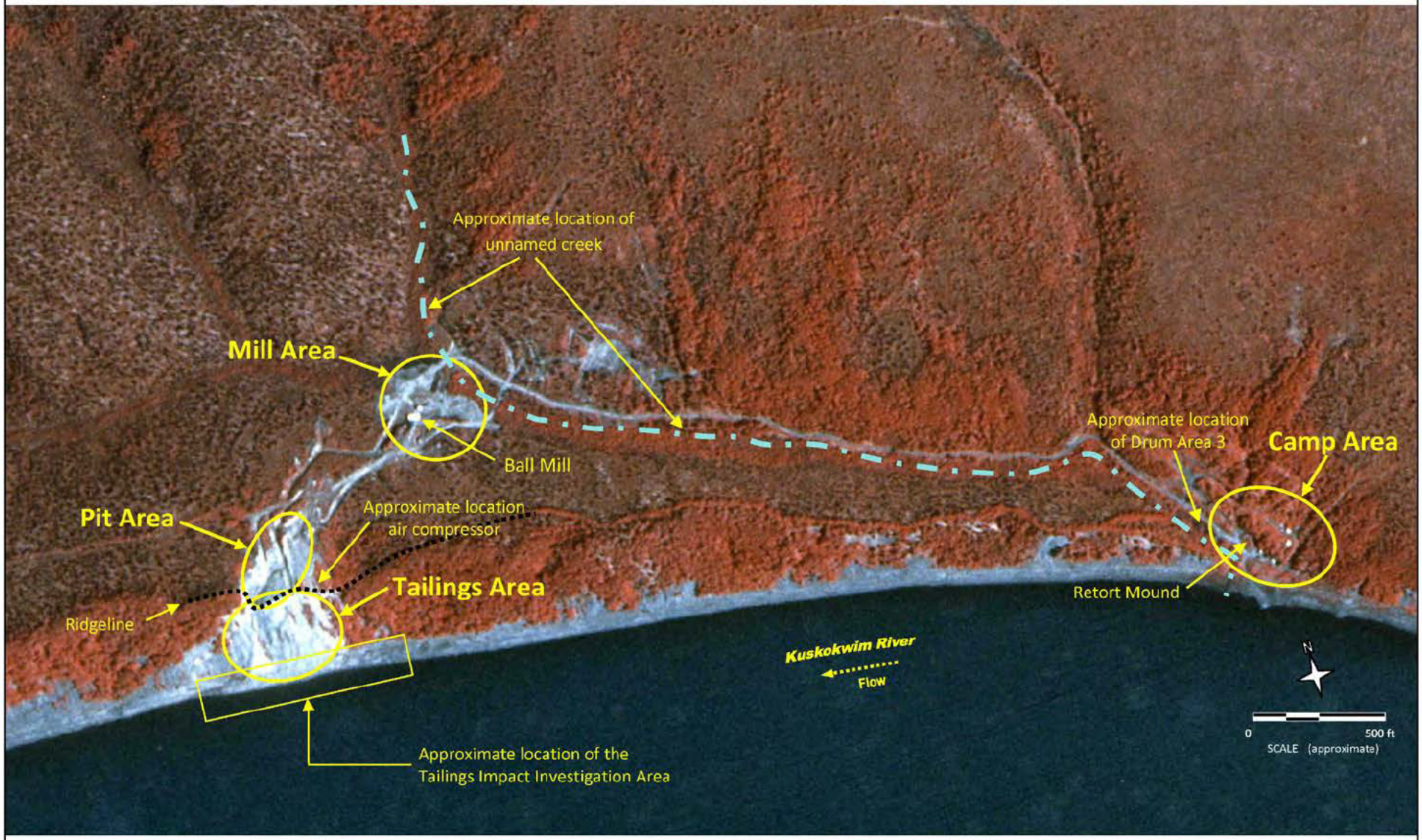
amec

Site Location and Vicinity Map
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE
1

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
TJH	4038080005 01		7/2011		

July 28, 2011 2:30:12 PM
P:\4038\080005__Kolmakof Mine\GIS\Projects\EECAWorkP(lan\Figure-1.mxd



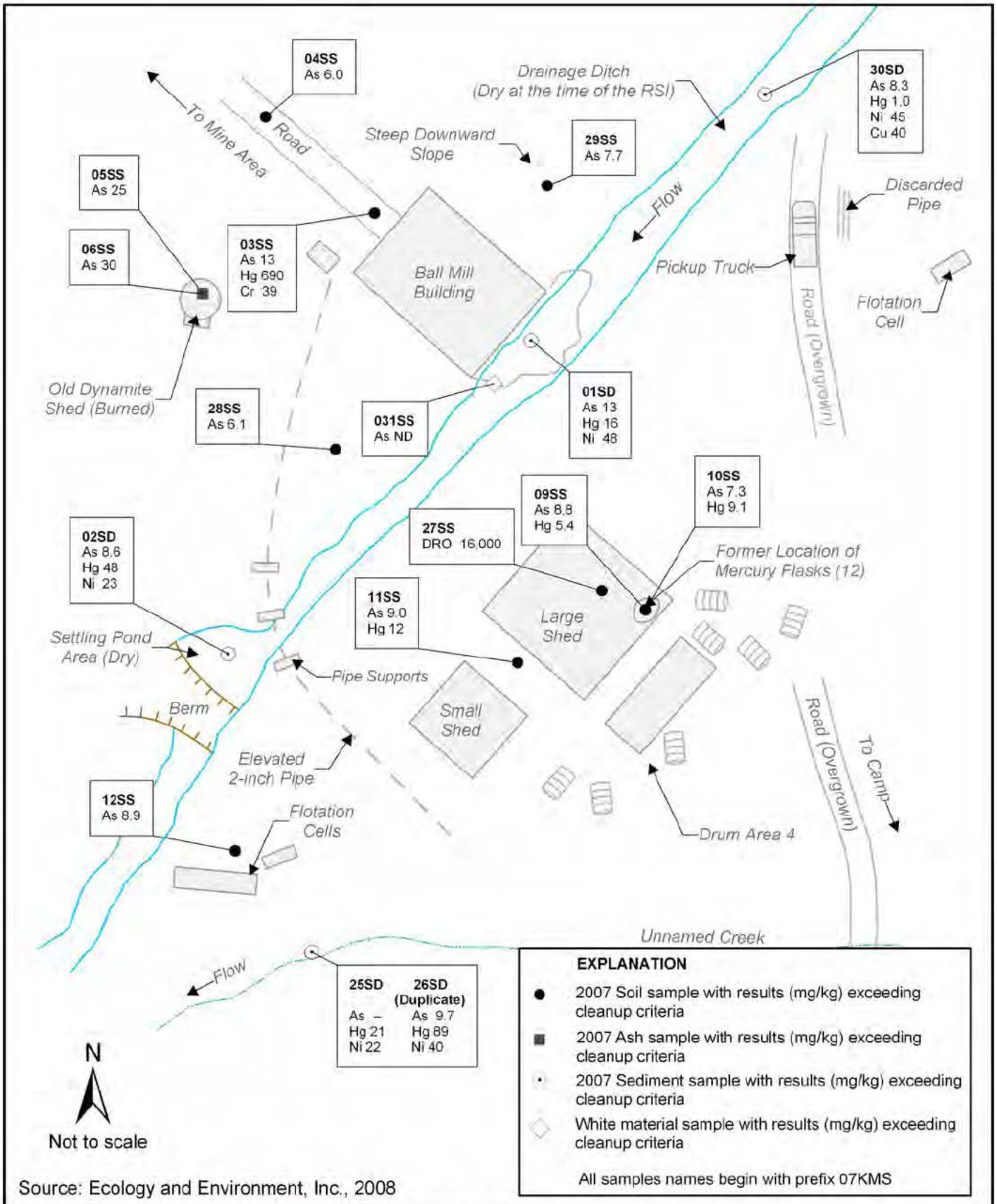
amec

Site Overview
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE
2

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
TJH	4038080005 01		7/2011		

July 6, 2011 12:14:50 PM
P:\4038\080005__Kolmakof Mine\GIS\Projects\Figure-2.mxd



Source: Ecology and Environment, Inc., 2008

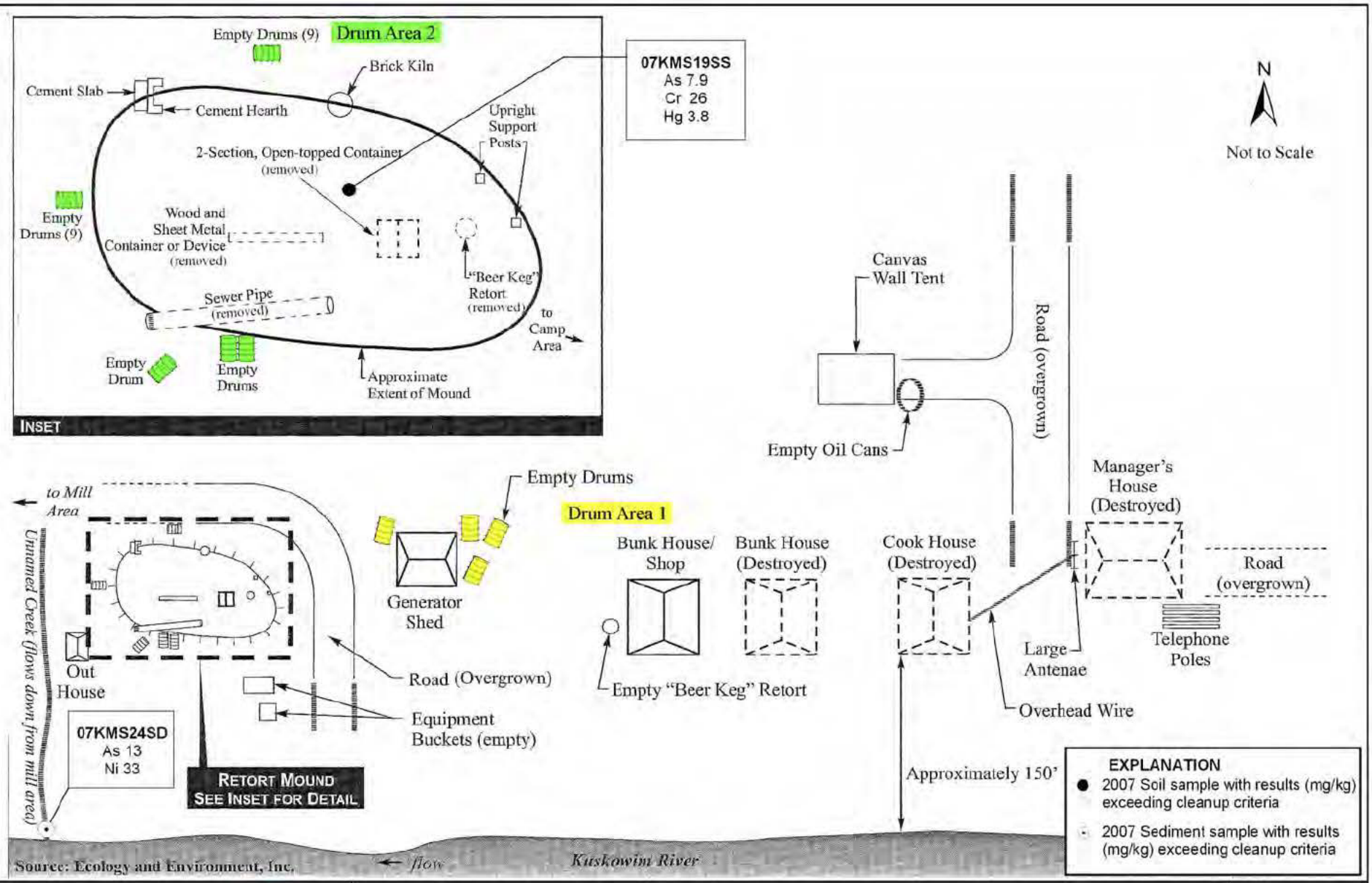
amec

Mill Area Site Plan
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE
3

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
TJH	4038080005 01		6/2011		

July 13, 2011 2:31:53 PM
P:\4038\080005__Kolmakof Mine\GIS\Projects\EECAWorkP(Ian\Figure-3.mxd



amec

Camp Area and Retort Mound Site Plan
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE
4

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
TJH	4038080005 01		7/2011		

July 13, 2011 2:38:48 PM
P:\4038\080005__Kolmakof Mine\GIS\Projects\EECAWorkP(lan\Figure-4.mxd

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Kolmakof Mine Site
West Napaimute, Alaska, North Bank of Kuskokwim River

Completed By: Bruce Wilcer, AMEC E&I, Inc.
Date Completed: July 12, 2011

***Instructions**: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/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. Check additional media under (1) if the media acts as a secondary source.*

Media	Transport Mechanisms	
☑ Surface Soil (0-2 ft bgs)	Direct release to surface soil	check soil
	✓ Migration to subsurface	check soil
	✓ Migration to groundwater	check groundwater
	✓ Volatilization	check air
	✓ Runoff or erosion	check surface water
	✓ Uptake by plants or animals	check biota
	Other (list):	
☐ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil	check soil
	Migration to groundwater	check groundwater
	Volatilization	check air
	Uptake by plants or animals	check biota
	Other (list):	
☐ Ground-water	Direct release to groundwater	check groundwater
	Volatilization	check air
	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):	

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	✓ Incidental Soil Ingestion							
	✓ Dermal Absorption of Contaminants from Soil	F	F	C/F		C/F	C/F	
	✓ Inhalation of Fugitive Dust	F	F	C/F		C/F	C/F	
☑ groundwater	✓ Ingestion of Groundwater	F	F	F		F	F	
	☐ Dermal Absorption of Contaminants in Groundwater							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ air	☐ Inhalation of Outdoor Air							
	✓ Inhalation of Indoor Air	F	F	C/F		C/F	C/F	
	✓ Inhalation of Fugitive Dust	F	F	C/F		C/F	C/F	
☐ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ sediment	✓ Direct Contact with Sediment	F	F	C/F		C/F	C/F	
☐ biota	✓ Ingestion of Wild or Farmed Foods	F	F	C/F		C/F	C/F	

Revised, 10/01/2010

amec

Human Health Conceptual Site Model
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE **5**

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
TJH	4038080005 01		7/2011		

July 13, 2011 2:41:56 PM
P:\4038\080005__Kolmakof Mine\GIS\Projects\EECA\WorkP(lan\Figure-5.mxd

Appendix A

Summary of Findings – 2008 Field Work & Sampling and Analysis Plan – 2011 Field Work
Kolmakof Mine Site
Napaimute, Alaska

Prepared for

U.S. Department of the Interior
Bureau of Land Management
National Business Center
Denver Federal Center, Building 50
Denver, Colorado 80225-0047

AMEC Project No. 4038080005 01

September 14, 2011

Environment & Infrastructure
1465 N. McDowell Blvd. Suite 200
Petaluma, CA 94954 - (707) 793-3800

APPENDIX A CONTENTS

ACRONYMS LIST iv

A1.0 INTRODUCTION A1-1

A2.0 2008 INVESTIGATION AND REMOVAL ACTIVITES A2-1

A2.1 Background Samples A2-1
A2.2 Geophysical Survey A2-2
A2.3 Explosives Residue Sampling A2-2
A2.4 Mercury Speciation Sampling A2-2
A2.5 Asbestos and Lead Based Paint Survey A2-3
A2.6 Hazardous and Non-Hazardous Materials Removal A2-4
A2.7 Data Review A2-4
A2.8 Conclusions and Recommendations A2-4

A3.0 SAMPLING AND ANALYSIS PLAN – 2011 FIELD WORK A3-1

A3.1 Introduction A3-1
A3.2 Proposed Investigation Activities A3-1
A3.2.1 Metals Investigation A3-2
A3.2.2 Petroleum Hydrocarbon Investigation A3-5
A3.2.3 Explosives Residue Additional Investigation A3-6
A3.2.4 PCB Investigation A3-7
A3.2.5 Asbestos and Lead Based Paint A3-7

A4.0 PROJECT AND DATA QUALITY OBJECTIVES A4-1

A4.1 Project Quality Objectives A4-1
A4.2 Data Quality Objectives A4-1
A4.3 Data Quality Indicators A4-2

A5.0 ANALYTICAL TEST METHODS AND QUALITY CONTROL A5-1

A5.1 Analytical Test Methods A5-1
A5.2 Quality Control A5-3
A5.2.1 Sample Identification A5-3
A5.2.2 Sample Collection A5-4
A5.2.3 Decontamination and Investigative Derived Waste A5-4
A5.2.4 Field Documentation A5-4
A5.2.5 Field QC Samples A5-5

A6.0 DATA VALIDATION AND EVALUATION A6-1

A7.0 REFERENCES A7-1

TABLES

A2-1 Background Samples, Camp Area
A2-2 Background Samples, Mill Area
A2-3 Background Samples, Pit Area
A2-4 Background Samples, Tailings Area
A2-5 Mercury Speciation Results

PHOTOGRAPHS

A1 Sample Locations: BGS37, BGS38, BGS39
A2 Sample Location: BGS37
A3 Rock Outcrop Near Sample Location BGS38

FIGURES

A1 BACKGROUND SAMPLE LOCATIONS

APPENDICES

A1 DATA VALIDATION AND LABORATORY REPORTS
A2 ADEC LABORATORY DATA REVIEW CHECKLIST

ACRONYMS LIST

AAC	Alaska Administrative Code
ACM	asbestos contained materials
ADEC	Alaska Department of Environmental Conservation
AHERA	Asbestos Hazard Emergency Response Act
AMEC	AMEC Environment & Infrastructure
AOC	areas of concern
As	arsenic
Bgs	below ground surface
BLM	Bureau of Land Management
BTEX	benzene, toluene, ethyl benzene, xylenes
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	contaminants of concern
Cr	chromium
Cu	copper
D/I	de-ionized
DQO	Data quality objectives
DRO	diesel range organic compounds
EE/CA	Engineering Evaluation/Cost Analysis
GPS	global positioning system
GRO	gasoline range organic compounds
Hg	mercury
HDPE	high density polyethylene
IAs	investigation areas
J	estimated
KMS	Kolmakof Mine Site
LBP	lead-based paint
LCS	Laboratory control samples
MACTEC	MACTEC Engineering & Consulting, Inc.
mg/kg	milligrams per kilograms
MOD	modified
MS/MSD	matrix spike/matrix spike duplicate
N/A	not applicable
NELAP	National Environmental Laboratory Accreditation Program
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazards Air Pollutants
Ng/g	nanogram per gram
Ni	Nickel
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyls
PEL	probable effects level
PID	photoionization detector
QC	quality control
R	rejected
RPD	relative percent difference

RRO	Residual Range Organics
RSI	Removal Site Inspection
SAP	Sampling and Analysis Plan
SOP	standard operating procedures
SPLP	Synthetic Precipitation Leaching Procedure
SSE	Selective Sequential Extraction
TEL	threshold effects level
TPH	total petroleum hydrocarbons
UJ	non-detected estimated
USEPA	United States Environmental Protection Agency
VOA	volatile organic analysis
VOC	volatile organic compounds
XRF	x-ray fluorescence

A1.0 INTRODUCTION

In support of the preparation of the Engineering Evaluation/Cost Analysis (EE/CA), MACTEC Engineering and Consulting, Inc. (MACTEC) conducted investigative and removal activities between September and October 2008 as required by the Bureau of Land Management (BLM) and as recommended in the 2007 Removal Site Inspection (RSI). Investigative activities conducted in 2008 included soil sampling and analysis to establish background metals concentrations, geophysical survey for a potential monofill location, residue sampling and analysis in the area of the former explosives shed, mercury speciation to differentiate naturally occurring cinnabar from processed inorganic mercury, and asbestos and lead based paint surveys in existing site structures. Removal activities included packaging and containerizing various hazardous wastes and fluids from abandoned equipment and coordination of off-site disposal at an authorized facility.

The 2008 field activities represent the completion of the first half of a two part field investigation plan described in MACTEC proposal to BLM dated July 28, 2008. The proposed 2011 field activities address the remaining field tasks from the original BLM scope of work as well as additional investigation to be conducted in support of the EE/CA. The following sections of this appendix to the EE/CA workplan present the findings of the 2008 field activities and the proposed 2011 field investigation activities.

A2.0 2008 INVESTIGATION AND REMOVAL ACTIVITES

A2.1 Background Samples

Based on United States Environmental Protection Agency's (USEPA) "*Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites"* (*USEPA, 2002*), MACTEC collected background samples in 2008 for mercury (Hg), arsenic (As), chromium (Cr), and nickel (Ni) from each of the four areas of concern (AOC). A total of nine locations were sampled from each AOC. From each location, two soil samples were collected; one from approximately 0 to 6 inches below ground surface (bgs) and a second sample was collected from approximately 6 to 14 inches bgs. Locations for background samples were selected from areas that were not impacted by the mining operation but were representative of conditions at the AOC. The analytical results are presented on Tables A2-1 through A2-4.

The USEPA's Office of Research and Development's "ProUCL" program was used to determine suggested background levels for metals in each AOC. ProUCL was developed as a statistical tool kit that includes "statistical methods to address various environmental issues for both full data sets without nondetects and for data sets with non-detects (NDs) (also known as left-censored data sets)." (*ProUCL User's Guide, 2007*). In addition, it includes a number of statistical tests for comparison of data sets and other routines useful for comparison of samples to background *ProUCL Technical Guide (draft)* (*USEPA, 2010*). ProUCL also implements many of the parametric and nonparametric statistical techniques suggested in USEPA 2002 and the more recent USEPA's "Unified Guidance" (*USEPA, 2009*) to allow powerful, robust, and statistically-appropriate comparisons of individual samples to background and also compare an AOC to background concentration. Documentation from the ProUCL program used will be provided as an attachment to the EE/CA.

For individual sample comparisons, the ProUCL-suggested background comparison values for metals in each AOC are listed in the following table:

	Suggested Background Comparison Value (in milligrams per kilogram [mg/kg])			
Area of Concern	**Arsenic**	**Chromium**	**Mercury**	**Nickel**
Camp	10.74	29.26	0.522	26.5
Mill	12.7	30.03	1.998	53.97
Pit	28.02	25.37	1.595	24.35
Tailings	153.7	92.1	69.17	155.8

In the Tailings Area, all background samples were collected from the face of the bluff. Of the nine sample locations, three were established west (downstream) of the tailings area and three were established east (upstream) of the tailings area. These locations were within areas that appeared undisturbed by mining activities based on vegetation (including large trees) and the distance to the pit area. The remaining three sample locations were established from within the scarred area likely to represent the area used as a tailings or waste rock deposit. Samples were collected at outcrops of naturally occurring reddish-brown rock (Photos A1-A3). Samples were chosen to represent native material from the bluff and not overburden. These locations were selected to capture the naturally occurring background characteristics of the bluff within this area of concern.

While the suggested background comparison numbers vary considerably among the areas, the values for the Tailings Area are distinctly higher than the other three areas. This is likely due to the presence of naturally occurring ore minerals present at lower concentrations than in the actual mine pit, but still noticeable as the reddish-brown color of the exposed rocks.

Once AOC delineation and characterization samples are collected, individual samples will be compared to ProUCL-suggested background comparison values (*USEPA, 2010*) to assess delineation, then AOC-wide values will be compared using guidance from USEPA, 2002 and USEPA, 2009 (as implemented in USEPA, 2010) to support risk assessment activities.

A2.2 Geophysical Survey

In order to help identify potential on-site locations for construction of an Alaska Department of Environmental Conservation (ADEC)-permitted monofill to be considered as an option in the EE/CA, MACTEC conducted a geophysical survey in the Pit Area. In general, the geophysical survey identified a low velocity zone with favorable conditions for a disposal pit. The geophysical survey report is attached in Appendix B.

A2.3 Explosives Residue Sampling

Six soil samples were collected from the area inside of the burned explosives shed near the Ball Mill. Samples were collected from the grey to reddish brown silt material at a depth of 2 to 3.5 inches bgs. The soil samples were submitted for analysis of nitroaromatics; using USEPA Test Method 8330 to determine if any residual explosives remained after the shed was burned. The samples collected were analyzed by the laboratory one day past the USEPA recommended holding time of 14 days for nitroaromatics in soil. Although there were no reported detected results in the samples, AMEC will re-sample the area of the burned explosive shed during the 2011 field program as described in Section A3.2.3 to confirm the non-detect results reported from the 2008 field program.

A2.4 Mercury Speciation Sampling

Soil samples were also collected for speciation of mercury. Seven of the locations with the highest mercury results reported during the 2007 RSI were sampled (top of the mill at the chute, bottom of the mill structure underneath the ball mill, between the large and small sheds, settling pond, Unnamed Creek sediment, retort mound soil, and tailing area at the toe of the bluff). Samples were collected at approximately two inches bgs and submitted to Frontier Geosciences Inc. laboratory in Seattle, Washington for mercury speciation by Selective Sequential Extraction (SSE). The SSE method was developed to assess the environmental mobility and bioavailability of mercury in contaminated soils, especially those associated with mercury and gold mining.

The speciation is an operational one, based on the solubility of mercury contained in a soil sample to progressively more aggressive solvents. There are seven different fractions (F0 to F6) identified (see following table). These include: F0 – elemental mercury (Hg^0) measured in the headspace above the sample; F1 – plain water soluble mercury (generally inorganic mercury salts); F2 – dilute acid soluble mercury (mercury soluble in stomach acid of vertebrates or forming soluble organic acid complexes); F3 – weak, generally organically-complexed mercury ; F4 – strongly-complexed or adsorbed mercury (generally inorganic complexes or adsorption to crystal active sites); F5 – sulfide, selenide, or amalgam mercury (soluble in aqua regia a mixture of nitric and hydrochloric acid that can dissolve gold and platinum); and F6 – mineral-bound mercury (mercury cations actually incorporated into a mineral's crystal lattice).

Step	Extractant	Description	Typical Compounds
F0	headspace gas	vapor equilibrium	Free elemental Hg^0
F1	De-ionized water	water soluble mercury salts	$HgCl_2$, $HgSO_4$
F2	pH 2 HCl/Acetic acid	"stomach acid" extractable	HgO
F3	1N KOH	organo-complexed	Hg-humics, Hg_2Cl_2
F4	12N HNO_3	strong-complexed	Hg adsorbed to mineral lattice, Hg_2Cl_2, Hg^0
F5	aqua regia (HCl and HNO_3)	Sulfides, selenides, amalgams	HgS, m-HgS, HgSe, HgAu
F6	HNO_3/HCl/HF	mineral-bound	Hg incorporated into crystal lattice

Mobility and bioavailability are high for fractions F0 to F3 while F4 to F6 mercury fractions have low to very low mobility, solubility, or bioavailability. The common mercury ore minerals cinnabar and meta-cinnabar are found almost exclusively in the F5, non-mobile fraction.

The results of the mercury speciation analysis indicated that the majority of the mercury detected in the collected samples was in the form of cinnabar (F5). Analytical results are presented in Table 3-2.

A2.5 Asbestos and Lead Based Paint Survey

Thirty bulk samples of potential asbestos-containing materials (ACM) found within the buildings at the Kolmakof Mine Site (KMS) were collected during the 2008 field program and submitted for laboratory analysis for asbestos. These materials included rolled roofing, fiberboard, tar paper, and mastic. Prior to the 2008 field activities, three of the buildings in the Camp Area (a bunk house, the cook house, and manager's house) had been burned down and therefore not screened for asbestos or lead-based paint. The analytical results for the samples collected indicate that none of these materials contained asbestos. The survey was conducted in general accordance with USEPA Standards 40 CFR 763, Subpart E, Asbestos Hazard Emergency Response Act (AHERA), 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP), and Occupational Safety & Health Administration (OSHA) Standard 29 1926.1101 sampling protocol. However, insufficient samples (a minimum of three samples of each suspect material is required) to meet NESHAP criteria were collected for several of the materials tested. Additional samples from materials remaining on site will be collected as part of the 2011 field program as described in Section A3.0 to complete the survey in compliance with the NESHAP requirements. The proposed sampling plan is presented in Section A3.2.6.

Painted surfaces at the KMS were surveyed for lead-based paint using a Niton X-ray fluorescence (XRF) Spectrum Analyzer supplied by BLM. Results from the field screening indicate that the surfaces tested were non-detect for lead. As part of the 2011 field program as presented in Section A3.2.6, approximately five samples will be collected from the previously tests surfaces and submitted to the laboratory for lead analyses to confirm the 2008 field survey results. Appendix C presents the ACM and Lead Based Paint (LBP) Report from the 2008 field survey.

A2.6 Hazardous and Non-Hazardous Materials Removal

In addition to the investigation work, MACTEC personnel inventoried, prepared, and coordinated the removal of hazardous and non-hazardous waste from the project site. The Hazardous Materials Removal report is presented as Appendix D.

In addition to the processed cinnabar and containers that were packaged from the retort mound in the Camp Area, other surfaces were screened for mercury using an XRF spectrum analyzer. The firebricks, concrete hearth/slab, and other devices were all screened with negative results for elevated mercury or other metals.

Surfaces at the Mill Area (wooden and metal beams within the Ball Mill itself, walls of the large and small shed) were also screened using the XRF analyzer all with negative results.

A2.7 Data Review

MACTEC performed the equivalent of USEPA Level II data review on 100% of the analytical results reported by Test America, Inc. and Frontier GeoSciences from the 2008 field event for the following test Methods:

- Metals by USEPA 6010C
- Mercury by USEPA 7471
- Nitroaromatics (explosive compounds) by USEPA 8330
- Diesel Range Organics (DRO) by ADEC AK102
- Gasoline Range Organics (GRO) by ADEC AK101
- Residual Range Organics (RRO) by ADEC AK103
- Volatile Organic Compounds (VOCs) by USEPA 8260B
- Mercury Speciation by USEPA 1631 (MOD)

With the exception of non-detect samples for nitroaromatics by USEPA Test Method 8330 which were analyzed past holding time, the results reported from the laboratories are considered useable as qualified. The non-detect results for nitroaromatics run outside of holding time are not considered useable to support the EE/CA and will be re-sampled as part of the 2011 field effort. The Data Review Summary Report and laboratory reports are presented in Appendix A1.

A2.8 Conclusions and Recommendations

As part of the field work performed from September to October 2008, background levels for metals in the four AOCs were established, various hazardous materials and non-hazardous fluids from abandoned vehicles were packaged and shipped to an off-site facility for disposal, and an initial asbestos and lead-based paint survey were completed. As a result of the findings of the 2008 field work, the following additional investigations are recommended to be completed during the 2011 field program:

- Testing for explosives residue in area of the Explosives Shed: Sampling and analysis was conducted for explosives residue in the area of the Explosives shed, however samples were analyzed outside of holding time. Although no detections were reported, confirmation samples should be collected.

- Asbestos and LBP: Samples from the initial surveys indicate that the materials tested were non-detect for asbestos and LBP, additional samples are needed for ACM for compliance with the NESHAP. Confirmation samples should also be collected for LBP to confirm non-detect results reported from the XRF survey.

- The off-site treatment facility that received soils removed from the area of the large shed reported that the soils tested positive for polychlorinated biphenyls (PCBs). Confirmation samples for PCBs should be collected from the former location of the generator in the large shed.

Additional field work described in the BLM work scope dated June 13, 2008 also should be completed during the 2011 field program and include:

- Complete metals investigation to determine lateral and vertical extent in several investigation areas (IAs)

- Conduct petroleum hydrocarbon investigation in the identified IAs within the Camp and Mill areas

- Complete investigation to determine the impacts of the Tailings area on the sediment of the Kuskokwim river

Proposed field activities to complete these remaining investigations are described in the following Sampling and Analysis Plan (SAP), Section A3.0.

A3.0 SAMPLING AND ANALYSIS PLAN – 2011 FIELD WORK

A3.1 Introduction

In response to the additional investigative activities identified as a result of the 2008 field program and additional investigations to be conducted from the original BLM scope of work dated June 13, 2008, AMEC presents the following proposed field investigation activities to be conducted during the 2011 field program. Field work will be performed by qualified personnel as defined in 18 Alaska Administrative Code (AAC) 75.990(100).

A3.2 Proposed Investigation Activities

The following 18 IAs have been identified for further investigation and characterization during the 2011 field program:

- IA-1 Retort Mound: As, Cr, Copper (Cu), Hg, and Ni (Metals), plus hexavalent chromium
- IA-2 Ball Mill Building Chute: Metals, plus hexavalent chromium
- IA-3 Settling Pond: Metals
- IA-4 Ditch North of Ball Mill: Metals
- IA-5 Between Mill Area Sheds: Metals
- IA-6 Ditch Under Ball Mill: Metals
- IA-7 Tailings Area: Metals plus methyl mercury
- IA-8 Large Shed in Mill Area: Metals, DRO/RRO/GRO/benzene, toluene, ethyl benzene, xylenes (BTEX) and PCBs
- IA-9 Unnamed Creek: Metals
- IA-10 Drum Area 1 in Camp Area: DRO/RRO/GRO/BTEX
- IA-11 Drum Area 2 in Camp Area: DRO/RRO/GRO/BTEX
- IA-12 Drum Area 3: DRO/RRO/GRO/BTEX
- IA-13 Drum Area 4 in Mill Area: DRO/RRO/GRO/BTEX
- IA-14 Pick up Truck Area in Mill Area: DRO/RRO/GRO/BTEX
- IA-15 Compressor Area: DRO/RRO/GRO/BTEX
- IA-16 Former Explosives Shed: nitroaromatics and nitroglycerin

- IA-17 Tailings Area, Upstream: Metals plus methyl mercury
- IA-18 Tailings Area, Downstream: Metals plus methyl mercury

A variety of investigation methods will be used in these areas, including field screening and laboratory confirmation, and sediment, soil, and surfaced water sampling, which are described in the following sections.

A3.2.1 Metals Investigation

Eleven IAs have been identified within the AOCs for further characterization of metals to include As, Cr, Cu, Hg, Ni for all IAs and the addition of methyl mercury in the tailings area. Samples will be screened in the field using XRF technology and sampled for laboratory confirmation as described below.

Random Origin Grid Sampling

In eight of the IAs, a random-origin grid as described in 40CFR 761.308 (sample selection by random number generation on any two dimensional grid) will be set up to collect field screening samples that will be used to statistically characterize the IA. Actual number of samples to be screened in the field will be based on the size and shape of each IA, however an average of approximately 10 samples per IA is expected. Collected samples will be prepared for XRF analysis by sieving using a #10 sieve prior to being analyzed by the Niton Portable XRF Spectrometer. The XRF will indicate levels of gross contamination – metals at concentrations generally greater than cleanup levels.

Up to six grab soil samples for laboratory-analysis will be collected from each IA (up to 48 samples). Samples will be collected from locations with the highest screening results as well as at least two locations with an absence or low-levels of the metals of concern to confirm XRF readings. Samples collected for laboratory analyses will be fresh aliquots of sample from the location where field screening was performed, but will not be subject to sample processing procedures used for XRF. The field XRF readings will be correlated with the corresponding laboratory results as part of the EE/CA.

Samples for laboratory analysis will be collected at 0 to 6 inches bgs, 6 to 12 inches bgs and 12 to 18 inches bgs. Samples from the 0 to 6 inches bgs sample will be analyzed by the laboratory first, and the others placed on hold. If the surface sample is non-detect or below ADEC cleanup levels, no additional analyses will be performed. If a surface sample has detections above ADEC cleanup level, the 6 to 12 inches bgs sample will be analyzed, followed by the 12 to 18 inches bgs sample if needed to complete delineation.

In order to evaluate whether there is a potential exposure pathway for metals to groundwater through leaching of the soil under normal weathering conditions, additional sample volume will be collected from samples with the three highest readings for Hg from the field screening XRF analyses and will be submitted to the laboratory for Synthetic Precipitation Leaching Procedure (SPLP) and analyzed for the five metals of concern.

The following IAs will be investigated using the XRF and random origin grid sampling:

- IA-1 Retort Mound (Camp Area) Metals plus hexavalent chromium

  In addition to the random origin grid sampling, this IA may have up to 18 additional samples taken from targeted areas more likely to contain metals contamination, to include the areas of former cinnabar containers, sewage pipe and "beer keg" retort that were removed during 2008 field activities. Samples will be collected within the retort mound in these three areas at depths of 0 to 6 inches, 6 to 12 inches and 12 to 18 inches below the surface of the retort mound. Historical observation indicates that the retort mound is comprised of native soils and not created from site generated waste; as a result, samples will not be collected from underneath the retort mound.

  In addition to sampling for total chromium, AMEC will submit the sample with the highest XRF detection for total chromium in IA-1 to the laboratory for analysis of hexavalent chromium to speciate the chromium detected at the site.

- IA-2 Ball Mill Building Chute (Mill Area) Metals plus hexavalent chromium

  The area immediately northeast and southwest of the ball mill structure will be investigated, as well as the area surrounding the chute at the top of the slope near the 2007 sample 07KMS03SS, which had reported detections of As, Cr, and Hg above ADEC Method 2 Criteria at 13 mg/kg, 39 mg/kg, and 690 mg/kg, respectively. Areas underneath the structure will only be sampled if it can be done safely.

  In addition to sampling for total chromium, AMEC will submit the sample with the highest XRF detection for total chromium in IA-2 to the laboratory for analysis of hexavalent chromium to speciate the chromium detected at the site.

- IA-3 Settling Pond Metals

  The sediment in the often-dry pond area southwest of the mill structure will be investigated, surrounding 2007 sample 07KMS02SD which had reported detections above the National Oceanic and Atmospheric Administration (NOAA) probable effects level (PEL) criteria for As, Hg, and Ni at 8.6 mg/kg, 48 mg/kg , and 23 mg/kg, respectively. The settling pond was constructed to collect the water used to help separate cinnabar from the waste ore or gangue after being ground by the ball mill. Surface water, if present will also be collected for total and dissolved metals laboratory analysis.

- IA-4 Ditch north of ball mill (Mill Area) Metals

  The area north of the ball mill (along the drainage ditch) at the bottom of the slope will be investigated – near the 2007 sample 07KMS30SD which had reported detections above the NOAA PEL criteria for As, Hg, and Ni. This "ditch" no longer holds standing water, however it is suggested that it once drained the pit area. This area will be investigated in conjunction with IA-6.

- IA-5 Between Sheds (Mill Area) Metals

  The area between the Large Shed and the Small Shed will be investigated – near 2007 sample 07KMS11SS which had reported concentrations above the ADEC Method 2 criteria for As and Hg.

- IA-6 Ditch under ball mill (Mill Area) Metals

  The area underneath and surrounding the ball mill at the bottom of the slope will be investigated near the 2007 sample 07KMS01SD which had reported detections above the NOAA PEL criteria for As, Hg and Ni at 13 mg/kg, 16 mg/kg, and 48 mg/kg, respectively. Areas underneath structures will only be sampled if determined to be safe. This area will be investigated in conjunction with IA-4.

- IA-8 Large Shed (Mill Area) Metals (Also DRO/RRO, and PCBs discussed under hydrocarbon investigation section)

  The floor of the Large Shed, which was used at one time to house the generator that powered the mining activities, will be further investigated. In 2007, the shed was cleaned out and the top 1 to 4 inches of soil were removed from the floor.

Unnamed Creek and Tailings Area

- IA-9 Unnamed Creek (near Mill Area) Metals

  The unnamed creek located north of the mining facilities (Figure 3) will be investigated as follows:

  Up to six sediment samples will be collected along the unnamed creek, one at the location of the 2007 sample 07KMS25SD which had reported detections above NOAA PEL criteria for Hg and Ni at 21 mg/kg and 22 mg/kg, respectively. Two sediment samples will be collected downstream of the 2007 sample, up to a few hundred yards away. Three to four samples will be collected upstream of the 2007 sample, one between the culvert under the road and the 2007 sample location, and two upstream of the culvert. A stainless steel spoon will be used to collect fine-grain sediment from beneath surface water in the creek. Each collected sample will be immediately containerized.

  Surface water, if present, will also be collected from the areas of sediments collected as described above. Surface water samples will be analyzed for total and dissolved metals. Samples submitted for analysis of dissolved metals will be field filtered.

- IA-7, IA-17, and IA-18 Tailings Area (Beach/river interface below Pit Area, Figure 2) Metals and Methyl Mercury

  Sediment samples will be collected from four locations: at the base of the waste pile (IA-7), upstream from the base of the waste pile, adjacent to the base of the waste pile (IA-17), and at two locations downstream from the base of the waste pile (IA-18) (Figure 2). These samples will be analyzed for metals and methyl mercury.

Sample collection will begin at the upstream (unaffected) location, then proceed to the furthest downstream location, and then proceeding upstream (ending adjacent to the pile), so that disturbances associated with sampling activities do not affect subsequent samples and so that samples are taken from the unaffected to potentially most affected locations.

The first set of three co-located samples will be collected at the point 50 yards beyond the farthest upstream extent of the base of the waste pile. Sediment samples will be collected at the water/bank interface, approximately five feet from shore, and approximately 10 feet from the shore.

A second set of three co-located sediment samples will be collected in a similar manner at a point along the river that is 100 yards downstream of the base of the waste pile. A third set of three co-located water/sediment samples will be collected in a similar manner at the point along the river that is 50 yards downstream of the base of the waste pile.

A3.2.2 Petroleum Hydrocarbon Investigation

Seven petroleum hydrocarbon IAs have been identified for further characterization of specific petroleum hydrocarbons and associated volatile and semi-volatile components. The IAs selected for petroleum hydrocarbon investigation are based on the findings of the 2007 RSI, however AMEC will conduct an additional visual inspection for evidence of petroleum spills in the areas within the sheds where potential stoves and fuel lines may have existed. Since polynuclear aromatic hydrocarbons may be associated with total petroleum hydrocarbons (TPH) and heating fuels, samples that test positive for TPH from laboratory testing will also be analyzed for PAH. Identified IAs, specific contaminants, and proposed sampling method are described below. IAs located in the Mill Area and Camp Areas are presented in Figure 3 and 4, respectively.

Investigation Area	Contaminant(s)
IA-8 Large Shed (Mill Area)	DRO/RRO, PCBs
IA-10 Drum Area 1 (Camp Area)	DRO/RRO, GRO/BTEX
IA-11 Drum Area 2 (Camp Area)	DRO/RRO, GRO/BTEX
IA-12 Drum Area 3 (Figure 2)	DRO/RRO, GRO/BTEX
IA-13 Drum Area 4 (Mill Area)	DRO/RRO, GRO/BTEX
IA-14 Pickup Truck (Mill Area)	DRO/RRO and GRO/BTEX
IA-15 Compressor (Figure 2)	DRO/RRO and GRO/BTEX

DRO = Diesel Range Organics, RRO = Residual Range Organics, GRO = Gasoline Range Organics, BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes (volatile organic compounds), PCBs = Polychlorinated Biphenyl.

Except for in the area of the Large Shed (IA-8), where field screening for TPH will be performed in tandem with the metals investigation in that area as described in A3.2.1, the petroleum hydrocarbon investigations will be performed by initially collecting surface and sub-surface soil samples. Samples

will be collected in areas most likely to be contaminated based on field observations such as surface soil stains, odors or near drums with evidence of ruptures or leakage. Samples will be collected at 0 to 6 inches, 6 to 12 inches, and 12 to 18 inches bgs and screened in the field using a photoionization detector (PID) for GRO and BTEX compounds and Oil Screen Soil™ hydrocarbon test kits for DRO/RRO compounds. Surface and shallow sub-surface sampling will be performed using a combination of hand tools including trowels, shovels, and hand auger equipment. Screening samples will be collected as follow:

- Drum Areas 1-4: Two to three sample locations will be selected in areas where multiple drums were stored, and one to two sample locations will be selected from areas where single drums were stored.

- Pickup Truck and Compressor: One to two sample locations will be selected from under the engine of the pickup truck and one to two sample locations will be selected from the area under the former compressor.

- Large Shed: Sample locations will be determined using the random-origin grid process described in A3.2.1. Samples collected for laboratory metals analysis at these locations will also be sent to the laboratory for PCB analysis, and will be screened in the field for petroleum hydrocarbons. Additional samples will be screened for petroleum hydrocarbons in any areas of staining or odor irrespective of metals screening results.

In sampling locations where all three depth interval samples are ND, a sample from the 0 to 6 inch bgs interval will be submitted for laboratory analysis for GRO/DRO/RRO to confirm the non-detect results. Where one or more of the screening depth intervals tests positive for petroleum hydrocarbons, additional shallow samples will be collected and screened to determine the lateral extent of the contamination. Once the lateral extent of shallow contamination has been defined in a given area, the vertical extent of the contamination will be determined through a series of borings, drilled with a 2 inch auger mounted on a tracked vehicle (or similar). Borings will be drilled to a maximum depth of 10 feet bgs or until bedrock or refusal is encountered. Samples will be collected and field screened from shallowest to deepest at 2 feet, 4 feet, 6 feet, 8 feet and 10 feet bgs until ND. Samples from surface to the deepest detected sample and ND below it will be submitted to the laboratory for analysis of GRO/BTEX/DRO/ and RRO. The number and location of the borings will be determined in the field based on the results of the field screening. The deeper samples will be held by the laboratory pending the results of the shallower samples. Deeper samples will not be analyzed where the shallower samples are ND for petroleum hydrocarbons. Sample quantities, laboratory analysis, and required quality control are summarized in Tables A5.1 and A5.2.

A3.2.3 Explosives Residue Additional Investigation

One explosives-related IA (IA-16) has been identified for further characterization and delineation of specific compounds associated with explosives and degradation products as determined by SW-846 method 8330 for nitroaromatics andnitroglycerine. Nitroglycerine has been added to the analyte list associated with explosive compounds due to the prevalent use of nitroglycerine in dynamite for blasting and the prior use of quick lime, which is a common nitroglycerine desensitizer.

The soil at the former dynamite shed near the top of the mill (now a pile of ash and metal debris) will be investigated with a series of up to six grab samples collected for laboratory analysis. These samples will

be taken from the top of any "white granular material" previously tentatively identified as "quick lime" as well as from the top 2 to 3 inches of the underlying soil.

A3.2.4 PCB Investigation

Routine analytical testing prior to disposal of mercury waste soil during the 2008 removal program identified the presence of PCBs in soil excavated from the Large Shed. No PCBs had been previously identified anywhere at the KMS site. PCBs have been added as contaminants of concern (COC) at the Large Shed and will be included in for analysis with the samples collected for metals and hydrocarbons during the 2011 field activities.

A3.2.5 Asbestos and Lead Based Paint

This section describes additional sampling of materials and surfaces that potentially contain lead-based paint or asbestos containing materials.

Asbestos Containing Materials Survey

As discussed in Section A2.5, at several locations, insufficient samples for asbestos analysis were collected to meet NESHAP criteria (a minimum of three samples of each suspect material is required). Additional samples from structures and materials remaining on site will be collected as part of the 2011 field program to complete the survey in compliance with the NESHAP requirements.

The asbestos survey will be completed in general accordance with USEPA Standards 40 CFR 763, Subpart E, AHERA, 40 CFR 61, Subpart M, NESHAP, and OSHA Standard 29 1926.1101 sampling protocol. The following additional samples will be collected at the locations noted to provide the appropriate sample quantities to complete the survey:

- Red rolled asphalt roofing on the large shed (one additional sample)
- Black tar like sealant on the large shed (one additional sample)
- Black tar/paint on fiber board on the small shed (two additional samples)
- Green rolled asphalt roofing on the small shed (one additional sample)
- Red rolled asphalt roofing on the pit shed (one additional sample)
- Gray rolled asphalt roofing on the generator shed (one additional sample)
- Tar like sealant roofing on the generator shed (two additional samples)
- Black tar paper/felt on the generator shed (two additional samples)
- Black tar like sealant on the pink building (one additional sample)

Lead Based Paint Survey

During the 2008 investigation, painted surfaces at the KMS were surveyed for lead-based paint using a Niton XRF Spectrum Analyzer supplied by BLM. Results from the field screening indicate that the surfaces tested were non-detect for lead. Because the accuracy of the XRF analyzer is suitable for screening but not directly comparable to laboratory-based results, it is appropriate to sample and perform laboratory analysis on a portion of the surfaces screened in the past. As part of the 2011 field program, five samples will be collected from the previously tested surfaces and screened in the field using XRF and also submitted to the laboratory for lead analyses to confirm the 2008 field survey results. Samples will be collected from selected surfaces which may include:

- Painted window sills
- Painted plywood and wallboard
- Shelf supports
- Painted door frames
- Various painted interior and perimeter walls

Where XRF screening test positive on building materials, soil samples adjacent to the positive detections also be field screened using the XRF. Soil samples will be collected to confirm ND and positive results.

A4.0 PROJECT AND DATA QUALITY OBJECTIVES

A4.1 Project Quality Objectives

The following project quality objectives have been developed using the systematic planning process, which is designed to support defensible project decision through a series of specific environmental questions that define the type, quantity and quality of the data that will be needed to achieve the project goals. The project quality objectives for this investigation are defined by the following:

Who will use the data?

The data will be used by BLM, their consultant, and the lead regulatory agency, ADEC.

What will the data be used for?

The data collected as part of the investigation will be used for the following:

- Characterization of areas containing elevated levels of mercury waste for disposal
- Characterization of areas containing elevated mercury waste for evaluation of remedial options
- Characterization of areas containing elevated petroleum hydrocarbon and PCBs for evaluation of remedial options
- Characterization of effects to sediments along the Kuskokwim river due to mining activities, primarily associated with tailings/waste rock that may have been pushed over the bluff
- Provide data to support the preparation of an EE/CA

How "good" does the data need to be to support project decisions?

The data collected as part of the field investigation need to be of a known quality based on the data quality indicators presented in Section A4.2 in order to support the preparation of an EE/CA for the project site. The data will be evaluated based on the use of standard sample collection methods and review of field logs, laboratory quality control (QC) acceptance criteria, and published analytical methods. One hundred percent of the data will be subject to the equivalent of USEPA Level II data review, which is described in Section A.6.0. Additionally, 10% of the data collected will be subject to the equivalent of an USEPA Level III data review, which is also described in Section A.6.0.

A4.2 Data Quality Objectives

Data quality objectives (DQOs) are discussed in context of the DQO process as defined in the USEPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process* (*USEPA, 2006*). This process was developed by USEPA to ensure the type, quantity, and quality of data used in decision-making is appropriate for the intended application. The DQO process includes seven steps, each of which has specific outputs. DQOs are qualitative and quantitative statements that:

1. *State the Problem*

   The project area is the site of an abandoned cinnabar (mercury) mine. Past mining activities may have resulted in elevated mercury in surface soil, subsurface soil, sediment and/or surface water.

2. *Identify the Goals of the Study*

   The purpose of this investigation is to identify whether mining activity has resulted in elevated concentrations of contaminants (e.g., mercury, PCBs, petroleum hydrocarbons) in surface soil, subsurface soil or sediment.

3. *Identify Information Inputs*

   Information inputs will include visual observation, field screening methods and laboratory results from samples collected during the field program.

4. *Define the Boundaries of the Study*

   The study boundaries have been defined as the Decision Units (as previously described). Sampling procedures and target analytes are presented in Section A5.0 of this document.

5. *Develop an Analytic Approach*

   Analytical results from environmental samples will be compared to ADEC Method 2 Cleanup Levels for soil samples and NOAA PELs/Threshold Effects Levels (TELs) for sediment samples as well as to background concentrations in accordance with ADEC guidance.

6. *Specify Performance or Acceptance Criteria*

   The sampling program is designed to confirm that the target analytes are not present at concentrations that exceed cleanup criteria in the media. The Field Sampling and analytical program presented in Section A5.0 of this document specifies the quality assurance protocols that will be used to ensure that meaningful and accurate measurements are obtained to support project decisions.

7. *Develop the Plan for Obtaining Data*

   The data collection program as presented in this SAP has been based on ADEC and BLM sampling guidance. Any further modifications to the data collection program will need to be determined by the stakeholders (i.e., ADEC, BLM, etc.).

A4.3 Data Quality Indicators

Sample measurement errors may be introduced during the sampling, analysis, and reporting processes. To evaluate if the analytical data quality is sufficient to support the preparation of an EE/CA, five data quality indicators will be assessed. These data quality indicators include precision, accuracy, representativeness, completeness, and comparability (PARCC) and are discussed below.

<u>Precision</u>

Precision is the measure of variability between separate sample measurements of the same property under the same prescribed conditions. The relative percent difference (RPD) of field duplicate samples and matrix spike/matrix spike duplicate (MS/MSD) samples are calculated to assess field and laboratory precision, respectively.

Field duplicate samples and MS/MSD samples will be collected as described in Section A5.0 and evaluated as described in Section A6.0. Field duplicate samples are defined as samples collected simultaneously from the same sample source under identical conditions. These samples are collected in the field and are expected to contain similar contaminant concentrations. Therefore, variability in the reported analyses can be attributed to variability introduced by sampling, handling, or analytical procedures. MS/MSD sample analyses are used to evaluate the effect of the sample matrix on the precision of the laboratory method. The MS/MSD samples are taken through the entire analytical procedure and the recoveries and RPDs of the constituents are calculated.

Accuracy

Accuracy is reported as the percent recovery of a known quantity of an analyte reported by an analytical procedure. Accuracy measurements provide an assessment of potential bias in a measurement system. Accuracy will be measured by evaluating the percent recoveries of the MS/MSD, Laboratory control samples (LCS), and surrogates, and potential sample contamination will be measured by evaluating the laboratory method blanks, and field trip and equipment blanks.

MS/MSD analyses percent recoveries are used to evaluate the effect of the sample matrix on the accuracy of the laboratory method while LCS analyses are used to validate the preparation method in the absence of matrix effects and to monitor instrument accuracy.

Surrogate recoveries are used to monitor laboratory extraction and analysis efficiency.

Method blanks consist of analyte-free sand, are analyzed at a rate of one per 20 samples or batch, and are used to monitor potential laboratory contamination. Potential field sampling contamination is evaluated through the use of trip and equipment blanks. Trip blanks are used to monitor volatile sample contamination that may be introduced during sample collection, storage, and transport. Equipment blanks are used to validate the cleanliness of the equipment used for sample collection. Method, field and equipment blanks will be collected and analyzed at the frequency specified in Section A5.0.

Representativeness

Representativeness is assessed by evaluating sample field and laboratory documentation. Chain-of-custody documentation including labeling of samples, collection dates and times, and sample condition upon receipt at the laboratory will be evaluated as part of the data review process. Laboratory documentation of holding times, instrument calibration, and adherence to analytical methods, quantitation limits, and data package completeness will also be examined. The review of field and laboratory documentation and the evaluation of the accuracy, precision, and completeness are performed to determine whether the designed sampling program and laboratory sample analyses resulted in the collection of representative samples and the data collected appropriately reflects the environmental conditions being studied.

Completeness

Completeness is defined as the percentage of valid analytical results (useable results) out of the total number of analytical results planned for samples submitted to the laboratory for analysis. The validity of sample results is determined through the data validation process. Sample results that are rejected (R), results qualified due to holding time violations, and any missing constituents are considered incomplete and not useable. Data that are qualified as estimated (J) or non-detected estimated (UJ) are considered valid and usable as qualified.

Comparability

Comparability of the data is a qualitative parameter that expresses the confidence with which one data set can be compared with another. Comparability of the data will be achieved by the use of standardized methods of analysis, quantitation limits, and data validation procedures.

A5.0 ANALYTICAL TEST METHODS AND QUALITY CONTROL

As described in Section A3.0 of this SAP, additional field work is proposed for 2011 to complete the site investigative tasks required to support the EE/CA. The following sections provide the analytical methods and quality control procedures that will be used during the 2011 Field program. Field sample screening and collection will be performed in accordance with AMEC standard operating procedures (SOPs) and documented using field logs, sampling forms and chain of custody. Field equipment will be calibrated and operated per manufacturer's instructions and documented in the field logs. Data review will be performed as described in Section A6.0, using the laboratory's performance based acceptance limit.

A5.1 Analytical Test Methods

Field investigative samples will be collected as described in Section A3.2.1 through A3.2.6 and will be submitted under chain of custody to an analytical laboratory certified under the National Environmental Laboratory Accreditation Program (NELAP) and the State of Alaska (where applicable) for analysis. Laboratory analyses will be performed in accordance with the analytical test methods and approved laboratory SOPs. The following table presents the analytical test methods, target analytes, and reporting limits for the compounds of interest during the 2011 field sampling program as well as the applicable ADEC, BLM, USEPA or NOAA cleanup criteria:

TABLE A5.1: Planned Analysis Table

Analytical Method	**Analyte**	**Laboratory Reporting Limit (mg/kg)**	**Clean up Criteria**			
			Soils			**Sediment**
			ADEC[1] (mg/kg)	**BLM[2] (mg/kg)**	**USEPA[3] (mg/kg)**	**NOAA[4] (mg/kg) PEL/TEL**
USEPA 6010C	Arsenic	2.5	3.9	20	1.6	5.9/17
	Chromium	0.500	25	N/A	5.6	37.3/90
	Copper	0.5	460	5,000	41,000	35.7/197
	Nickel	1.5	86	2,700	20,000	18/35.9
USEPA 7471	Mercury	0.05	1.4	40	43	0.174/0.486
USEPA 1630M	Methyl mercury	0.025 ng/g	0.012426[5]	N/A	100	N/A
SPLP USEPA 1312	Cr, Ni, As, Hg		N/A	N/A		N/A
ADEC Method AK101	Gasoline Range Organics	20	300	N/A	N/A	N/A
ADEC Method AK102/103	Diesel/Residual Range Organics	20/100	250/10,000	N/A	N/A	N/A

Analytical Method	Analyte	Laboratory Reporting Limit (mg/kg)	Clean up Criteria			
			Soils			Sediment
			ADEC[1] (mg/kg)	BLM[2] (mg/kg)	USEPA[3] (mg/kg)	NOAA[4] (mg/kg) PEL/TEL
ADEC Method AK101/USEPA 8260B	Benzene	0.005	0.025	N/A	5.4	N/A
	Toluene	0.005	6.5	N/A	45,000	N/A
	Ethyl benzene	0.005	6.9	N/A	27	N/A
	Xylenes	0.005	63	N/A	2,700	N/A
USEPA 8330	1,3,5-Trinitrobenzene	0.25	19	N/A	27,000	N/A
	2,4-Dinitrotoluene	0.25	0.0093	N/A	5.5	N/A
	1,3-Dinitrobenzene	0.25	0.02	N/A	62	N/A
	2,6-Dinitrotoluene	0.25	0.0094	N/A	620	N/A
	2,4,6-Trinitrotoluene	0.25	0.49	N/A	79	N/A
	2,Amino-4,6-dinitrotoluene	0.25	0.029	N/A	2,000	N/A
	2-Nitrotoluene	0.25	0.025	N/A	13	N/A
	4-Amino-2,6-dinitrotoluene	0.25	0.029	N/A	1,900	N/A
	4-Nitrotoluene	0.25	0.34	N/A	110	N/A
	3-Nitrotoluene	0.25	4.9	N/A	62	N/A
	HMX	0.25	49	N/A	49,000	N/A
	Nitrobenzene	0.25	0.094	N/A	24	N/A
	RDX	0.25	0.40	N/A	24	N/A
	Tetryl	0.25	4.5	N/A	2,500	N/A
USEPA 8332	Nitroglycerine	2.0	0.22	N/A	62	N/A
USEPA 8082	Aroclor 1016	1.0[6]	0.30	N/A	21	N/A
	Aroclor 1221	1.0[6]	0.30	N/A	0.54	N/A
	Aroclor 1232	1.0[6]	0.30	N/A	.054	N/A
	Aroclor 1242	1.0[6]	0.30	N/A	.074	N/A
	Aroclor 1248	1.0[6]	0.30	N/A	0.74	N/A
	Aroclor 1254	1.0[6]	0.30	N/A	0.74	N/A
	Aroclor 1260	1.0[6]	0.30	N/A	0.74	N/A

Analytical Method	Analyte	Laboratory Reporting Limit (mg/kg)	Clean up Criteria			
			Soils			Sediment
			ADEC[1] (mg/kg)	BLM[2] (mg/kg)	USEPA[3] (mg/kg)	NOAA[4] (mg/kg) PEL/TEL
USEPA 6010C	Lead (paint chips)	2.0	400	1,000	800	N/A
USEPA 600/R-93/166	Bulk Asbestos	> 1%	N/A	N/A	N/A	N/A

mg/kg = milligram per kilogram
N/A = not applicable
ng/g = nanogram per gram
SPLP – Synthetic Precipitation Leaching Procedure

[1] ADEC Method 2 Criteria (from 18AAC 75, revised October 9, 2008: Article 3, Section 341 Method 2 Soil Cleanup Levels Tables B1 and B2; Migration to groundwater)

[2] BLM Criteria (from BLM Risk Management Criteria for metals at BLM Mining Sites, BLM 2004; Soils Medium; Camper)

[3] USEPA Criteria (from USEPA Region 6 2007 Human Health Medium Specific Screening Levels, Soil Matrix, Industrial Outdoor Worker)

[4] NOAA Criteria (PEL/TEL) – listed for planned sediment samples in metals only (from NOAA Quick Reference Table for Inorganics in Solids – Freshwater Sediment. HAZMAT Report 99-1, updated February 2004)

[5] ADEC cleanup level for methyl mercury was calculated using the ADEC online method 3 calculator.

[6] ADEC PCB cleanup level is 1.0 mg/kg for total summed PCBs.

A5.2 Quality Control

Field sample screening and collection will be performed in accordance with AMEC SOPs and documented using field logs, sampling forms and chain of custody. Field equipment will be calibrated and operated per manufacturer's instructions and documented in the field logs.

A5.2.1 Sample Identification

Each sample collected will be assigned a unique sample identification number as follows: XXKMSYYZZ where XX is the year, KMS is the Kolmakof Mine Site, YY is the sequential sample number, and ZZ is the sample type. Field quality control samples will be numbered and labeled in the same manner as the field investigative samples. Sample types will be designated as "SS" for soil samples and "SD" for sediment samples.

A5.2.2 Sample Collection

Samples will be collected in accordance with AMEC SOPs and as described in this SAP. Field personnel will use a new pair of nitrile gloves for each sample collected. Each samples collected for laboratory analysis will be immediately containerized in laboratory supplied sample containers and placed in coolers maintained at 0 to 6°C. A temperature blank will travel with each cooler daily to monitor sample temperature. Cooler temperature will be recorded on the sampling form as each sample is collected. Sample quantities, containers and holding times are presented in Table A5-2 below.

TABLE A5-2: Sample Containers, Volumes, Preservation and Holding Times

TEST METHOD	SAMPLE VOLUME/CONTAINERS	PRESERVATION/HOLDING TIME
USEPA 6010C	100 ml Widemouth HDPE jar	None. 6 Months
USEPA 7471	100 ml Widemouth HDPE jar	0-6°C during shipment. 28 days
USEPA 1630M	4 oz HDPE wide mouth jar	0-6°C during shipment. 1 year
ADEC AK101	4 oz amber glass	Methanol preservative. 28 days
ADEC AK102/103	4 oz amber glass	0-6°C, 14 days
USEPA 8330/8332	4 oz amber glass	0-6°C, 14 days
USEPA 8082	4 oz amber glass	0-6°C, 14 days
USEPA 600/R-93/166	4 oz amber glass	None

HDPE = High Density Polyethylene
ml = milliliter

A5.2.3 Decontamination and Investigative Derived Waste

Sampling equipment will be decontaminated prior to sample collection of each sample and at the end of each field day using an Alconox® solution and double rinsed with deionized water.

Field personnel will also be required to be decontaminated each day before leaving the site in order to eliminate the tracking of site contaminants and/or invasive, non-native plant, and noxious weeds off of BLM-managed lands. The decontamination area will be set up near the boat access at the Kuskokwim River. In addition, pressure washing equipment will be used on each piece of equipment prior to their leaving the site to comply with National Environmental Policy Act (NEPA) policy EO 13112 by preventing and controlling invasive non-native plant and noxious weed introduction or spreading.

With the exception of soils removed from borings during the TPH investigation, which will be back filled into the borings following sample collection, investigative derived waste (IDW) will be stored in small drums and transported to Anchorage for disposal at a licensed facility.

A5.2.4 Field Documentation

The following types of field documentation will be required.

- Field logs

- Sample record log
- Photograph log
- Global positioning system (GPS) Log
- Chain of Custody
- Sample Labels

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

A5.2.5 Field QC Samples

The following field quality control samples will be collected as part of the 2011 field program.

5.2.5.1 Field Duplicate Samples

Field duplicate samples will be collected at a rate of one duplicate sample per 10 field samples collected. The field sample will consist of one sample collected at the designated location and split in the field into two “duplicate” samples. The field duplicate samples will be labeled with separate sample IDs and submitted to the laboratory “blind” for analyses. The field duplicate samples will provide a measure of the precision of the field and analytical protocols.

5.2.5.1 Field Blanks

Field blanks will consist of equipment and trip blanks. Equipment blanks will be collected at a frequency of once per sampling day, and will provide a measure of the adequacy of the equipment decontamination procedures. Clean de-ionized (D/I) water will be poured over freshly decontaminated equipment and collected in appropriate containers for the same analyses as the last sample collected. Trip blank samples will consist of laboratory supplied VOC-free water in 40 ml volatile organic analysis (VOA) containers. Trip blank samples will be shipped with each cooler of samples for VOC analyses.

A6.0 DATA VALIDATION AND EVALUATION

One hundred percent of the data generated as part of the 2011 field sampling event will be subjected to the parameters described in ADEC Laboratory Data Review Checklist (Appendix A2) and the equivalent of USEPA Level II data review, which includes a review of the following parameters, where applicable:

- Holding Times
- Method Blank contamination
- Surrogate compound recoveries
- MS/MSD recoveries and relative percent differences
- Laboratory Duplicate relative percent differences
- LCS recoveries
- Trip and Equipment Blank contamination
- Field Duplicate relative percent differences
- Target compound detection limits

In addition to the Level II data review, Level III data review will be performed on approximately 10% of the chemical data collected during the monitoring event. In addition to the checks performed for the Level II review, the following parameters will be evaluated in the Level III data review, where applicable:

- Initial and Continuing calibrations
- Internal standard areas

Following Level II and Level III reviews, the overall chemical data quality will be evaluated using the following data quality indicators:

- Accuracy: defined as the bias in a measurement system. Accuracy will be assessed by reviewing percent recoveries of LCS, MS/MSD, and surrogate recoveries and through evaluation of potential contamination in laboratory method blanks, and field trip and equipment blanks.
- Precision: defined as a quantitative measure of the variability of a group of measurements in comparison to the average value. Precision will be assessed by reviewing the RPD of field duplicates, laboratory duplicates, and MS/MSDs.
- Completeness: defined as the percentage of measurements that are considered valid. Completeness will be assessed by comparing the number of usable results to the total number of results collected.
- Representativeness: defined as the degree to which the measured results accurately reflect the environmental conditions and the medium being sampled. Representativeness will be assessed qualitatively by reviewing the overall accuracy, precision, and completeness of the data, and sample/sampling integrity.

- Comparability: defined as the confidence with which one set of data can be compared to another set. Comparability will be assessed by comparing current results to previous results.

An evaluation of data quality indicators will be provided as part of the investigative report. Data qualifiers may be applied to the reported sample results as a result of the findings of the data review. The following data qualifiers may be applied to the data by the laboratory or by data validation personnel.

Data Qualifier	Definition
U	Compound was analyzed, but not detected above the listed sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. For the inorganic methods, a "+" or "–" may be added to indicate high or low bias.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated value represents an approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is an estimate.
R	The result is rejected due to a serious deficiency in the analysis or associated quality control analysis.
D	The sample or sample extract was diluted prior to analysis due to high levels of target analytes or matrix interferences.
B	The analyte was detected in an associated blank sample.

An ADEC Laboratory Data Review Checklist will be completed for each laboratory report and will be included with a comprehensive Data Review Summary Report for the 2011 field effort.

A7.0 REFERENCES

US Environmental Protection Agency (USEPA), 2002. *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites, EPA 540-R-01-003.* September 2002.

_____, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4.* February.

_____, 2007. *ProUCL Version 4.00.02 User Guide*, Anita Singh, Robert Maichle, Ashok K. Singh, Sanghee E. Lee, Narain Armbya. U.S. Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Environmental Sciences Division, Technology Support Center, Characterization and Monitoring Branch. EPA/600/R-07/038. April.

_____, 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance*, EPA/530/R-09/007). March.

_____, 2010. *ProUCL Version 4.1.00 Technical Guide (draft)* EPA/600/R-07/041. May 2010.

APPENDIX A TABLES

Table A2-1
Background Sample Results
Camp Area, Kolmokoff Mine Site, BLM

			Sample Number	08KMS01SL	08KMS02SL	08KMS03SL	08KMS04SL	08KMS05SL	08KMS06SL	08KMS07SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS01	BGS01	BGS02	BGS02	BGS02	BGS03	BGS03
			Depth (inches, bgs)	7	14	8	8	13	6	13
			Sample Type	PR	PR	PR	QC	PR	PR	PR
			Associated QC				08KMS03SL			
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	7.83	12	6.87	8.68	10.6	8.06	6.28
Chromium	EPA 6010C	mg/kg	25	17.6	20.8	23.3	24.3	26.8	25.2	24.4
Mercury	EPA 7471A	mg/kg	1	0.144	0.0799	0.0939	0.146	0.101	0.367	0.208
Nickel	EPA 6010C	mg/kg	86	14.1	22.5	15.7	18.5	21.6	17.5	16.3

			Sample Number	08KMS08SL	08KMS09SL	08KMS10SL	08KMS11SL	08KMS12SL	08KMS13SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS04	BGS04	BGS05	BGS05	BGS06	BGS06
			Depth (inches, bgs)	*	13	*	12	*	13
			Sample Type	PR	PR	PR	PR	PR	PR
			Associated QC						
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**						
Arsenic	EPA 6010C	mg/kg	3.6	5.78	7.06	5.48	7.1	5.84	11.4
Chromium	EPA 6010C	mg/kg	25	25.3	25.8	26.9	29.3	25.3	28.4
Mercury	EPA 7471A	mg/kg	1	0.0941	0.0925	0.107	0.104	0.108	0.129
Nickel	EPA 6010C	mg/kg	86	14.8	16	16.2	19.5	15.5	19.6

			Sample Number	08KMS14SL	08KMS15SL	08KMS16SL	08KMS17SL	08KMS18SL	08KMS19SL	08KMS20SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS07	BGS07	BGS08	BGS08	BGS08	BGS09	BGS09
			Depth (inches, bgs)	*	14	*	*	12	*	13
			Sample Type	PR	PR	PR	QC	PR	PR	PR
			Associated QC				08KMS16SL			
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	6.94	7.15	ND (5.62)	ND (6.02)	ND (3.69)	ND (4.07)	7.33
Chromium	EPA 6010C	mg/kg	25	24.7	27.8	11.6	12.5	15.4	9.17	24.1
Mercury	EPA 7471A	mg/kg	1	0.104	0.0893	0.53	0.05	0.114	0.233	0.0657
Nickel	EPA 6010C	mg/kg	86	16.4	21.6	13.9	3.61	13.8	7.48	30.4

bgs	Below ground surface	ND	Not detected at or above the reporting limit in parentheses
EPA	U.S. Environmental Protection Agency	PR	Project sample
mg/kg	Milligrams per kilogram	QC	Quality control sample

a. Cleanup levels are from Alaska Department of Environmental Conservation, Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75), Method Two, Table B1, under 40-inch zone, migration to groundwater pathway for all parameters.
* = sample depth not recorded

Checked by: DLL
Approved: BLW

Table A2-2
Background Sample Results
Mill Area, Kolmokoff Mine Site, BLM

			Sample Number	08KMS21SL	08KMS22SL	08KMS23SL	08KMS24SL	08KMS25SL	08KMS26SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS10	BGS10	BGS11	BGS11	BGS12	BGS12
			Depth (inches, bgs)	*	14	*	12	*	13
			Sample Type	PR	PR	PR	PR	PR	PR
			Associated QC						
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**						
Arsenic	EPA 6010C	mg/kg	3.6	8.05	7.65	7.39	8.38	7 99	8.23
Chromium	EPA 6010C	mg/kg	25	18.7	22.6	17.1	22 3	20.2	25.7
Mercury	EPA 7471A	mg/kg	1	1.43	2.49	1.6	2.08	0.188	0.58
Nickel	EPA 6010C	mg/kg	86	12.4	12.5	9.57	16.1	14.7	23.1

			Sample Number	08KMS27SL	08KMS28SL	08KMS29SL	08KMS30SL	08KMS31SL	08KMS32SL	08KMS33SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS13	BGS13	BGS14	BGS14	BGS14	BGS15	BGS15
			Depth (inches, bgs)	*	12.5	*	*	15	*	13
			Sample Type	PR	PR	PR	QC	PR	PR	PR
			Associated QC				08KMS29SL			
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	10.7	7 93	ND (9.54)	ND (9.77)	ND (5.85)	ND (5.42)	7.36
Chromium	EPA 6010C	m‿/k‿	25	23.2	22	3.87	16.78	8 24	12.9	14.9
Mercury	EPA 7471A	mg/kg	1	0.23	0 22	0.277	0.273	0.153	0.321	0.119
Nickel	EPA 6010C	mg/kg	86	18.1	18.1	ND (5.73)	ND (5.73)	4 51	3.83	27.2

			Sample Number	08KMS34SL	08KMS35SL	08KMS36SL	08KMS37SL	08KMS38SL	08KMS39SL	08KMS40SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS16	BGS16	BGS17	BGS17	BGS17	BGS18	BGS18
			Depth (inches, bgs)	*	12	5	11	11	5	10
			Sample Type	PR	PR	PR	PR	QC	PR	PR
			Associated QC					08KMS37SL		
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	12.9	16.7	ND (7.00)	ND (5 29)	5.6	ND (4.73)	5.88
Chromium	EPA 6010C	mg/kg	25	28.5	23.7	3.51	4.74	11.1	5.21	18.9
Mercury	EPA 7471A	mg/kg	1	0.376	0.368	0.174	0.112	0.0693	0.103	0.25
Nickel	EPA 6010C	mg/kg	86	44.9	44.1	ND (4.20)	3.29	9.2	2.24	15

bgs	Below ground surface	ND	Not detected at or above the reporting limit in parentheses
EPA	U.S. Environmental Protection Agency	PR	Project sample
mg/kg	Milligrams per kilogram	QC	Quality control sample

a. Cleanup levels are from Alaska Department of Environmental Conservation, Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75), Method Two,

Table B1, under 40-inch zone, migration to groundwater pathway for all parameters.
* = Sample dep h not recorded

Checked by: DLL
Approved: BLW

Table A2-3
Background Sample Results
Pit Area, Kolmokoff Mine Site, BLM

			Sample Number	08KMS41SL	08KMS42SL	08KMS43SL	08KMS44SL	08KMS45SL	08KMS46SL	08KMS47SL
			Sample Date	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008	9/26/2008
			Location	BGS19	BGS19	BGS19	BGS20	BGS20	BGS21	BGS21
			Depth (inches, bgs)	4	4	10	6	12	6	12
			Sample Type	PR	QC	PR	PR	PR	PR	PR
			Associated QC		08KMS41SL					
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	ND (4.44)	5.69	9.61	12.9	11.2	ND (6.63)	4.97
Chromium	EPA 6010C	mg/kg	25	4.07	18	25.4	20.1	24.6	5.94	23.8
Mercury	EPA 7471A	mg/kg	1	0.125	0.517	0.2	0.179	0.251	0.515	0.268
Nickel	EPA 6010C	mg/kg	86	ND (2.66)	12.5	22.2	16.1	21.9	6.45	19.2

			Sample Number	08KMS48SL	08KMS49SL	08KMS50SL	08KMS51SL	08KMS52SL	08KMS53SL	08KMS54SL
			Sample Date	9/26/2008	9/26/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008
			Location	BGS22	BGS22	BGS23	BGS23	BGS24	BGS24	BGS24
			Depth (inches, bgs)	5	13	6	12	6	13	13
			Sample Type	PR	PR	PR	PR	PR	PR	QC
			Associated QC							08KMS53SL
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	ND (8.47)	ND (4.56)	ND (6.30)	10.4	ND (5.94)	51.8	ND (4.03)
Chromium	EPA 6010C	mg/kg	25	4.72	3.53	11.2	24.8	6.88	22.8	22.1
Mercury	EPA 7471A	mg/kg	1	1.65	0.555	0.474	0.268	0.277	0.185	0.176
Nickel	EPA 6010C	mg/kg	86	8.33	3.78	6.55	20	5.82	14.4	17.2

			Sample Number	08KMS55SL	08KMS56SL	08KMS57SL	08KMS58SL	08KMS59SL	08KMS60SL
			Sample Date	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008
			Location	BGS25	BGS25	BGS26	BGS26	BGS27	BGS27
			Depth (inches, bgs)	5	11	6	12	5	13
			Sample Type	PR	PR	PR	PR	PR	PR
			Associated QC						
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**						
Arsenic	EPA 6010C	mg/kg	3.6	20.2	ND (3.92)	6.72	5.97	ND (5.21)	7.37
Chromium	EPA 6010C	mg/kg	25	17.3	22	21.5	21	13.3	21
Mercury	EPA 7471A	mg/kg	1	0.203	0.179	0.196	0.171	0.165	0.13
Nickel	EPA 6010C	mg/kg	86	11.8	18.8	16.4	14.5	6.12	17.3

bgs	Below ground surface	ND	Not detected at or above the reporting limit in parentheses
EPA	U.S. Environmental Protection Agency	PR	Project sample
mg/kg	Milligrams per kilogram	QC	Quality control sample

Checked by: DLL
Approved: BLW

a. Cleanup levels are from Alaska Department of Environmental Conservation, Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75), Method Two, Table B1, under 40-inch zone, migration to groundwater pathway for all parameters.

Table A2-4
Background Sample Results
Tailings Area, Kolmokoff Mine Site, BLM

			Sample Number	08KMS61SL	08KMS62SL	08KMS63SL	08KMS66SL	08KMS67SL	08KMS70SL	08KMS71SL
			Sample Date	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008
			Location	BGS28	BGS28	BGS28	BGS30	BGS30	BGS32	BGS32
			Depth (inches, bgs)	4	4	8	3	7	3	8
			Sample Type	PR	QC	PR	PR	PR	PR	PR
			Associated QC		08KMS61SL					
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	8.71	6.44	10.1	9 26	6.42	7 58	7 05
Chromium	EPA 6010C	mg/kg	25	19.7	22	24 9	30.7	26.6	27.8	26
Mercury	EPA 7471A	mg/kg	1	1.2	1.41	0.736	42.9	20.6	7.14	1 58
Nickel	EPA 6010C	mg/kg	86	37.3	34.1	17.4	44.5	46.7	50.5	44

			Sample Number	08KMS72SL	08KMS73SL	08KMS74SL	08KMS75SL	08KMS76SL	08KMS79SL	08KMS80SL
			Sample Date	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008
			Location	BGS33	BGS33	BGS34	BGS34	BGS34	BGS36	BGS36
			Depth (inches, bgs)	4	9	3	3	9	4	12
			Sample Type	PR	PR	PR	QC	PR	PR	PR
			Associated QC				08KMS74SL			
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**							
Arsenic	EPA 6010C	mg/kg	3.6	15.1	19 8	10	8.76	7 26	12.3	8.77
Chromium	EPA 6010C	mg/kg	25	15.3	12.1	15.4	17.5	17.5	16.7	14
Mercury	EPA 7471A	mg/kg	1	0.824	1.09	0.509	0.487	0.563	0.304	0.182
Nickel	EPA 6010C	m⎵/k⎵	86	48.1	51 9	49	47.9	53.3	46.7	38.5

			Sample Number	08KMS81SL	08KMS82SL	08KMS83SL	08KMS84SL	08KMS85SL	08KMS86SL
			Sample Date	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008	9/27/2008
			Location	BGS37	BGS37	BGS38	BGS38	BGS39	BGS39
			Depth (inches, bgs)	4	10	4	9	4	8
			Sample Type	PR	PR	PR	PR	PR	PR
			Associated QC						
Analyte	**Method**	**Units**	**Cleanup Criteria[a]**						
Arsenic	EPA 6010C	mg/kg	3.6	19	28 5	24.7	11.8	158	71.9
Chromium	EPA 6010C	mg/kg	25	18.6	22 9	62 6	93	74.9	66.9
Mercury	EPA 7471A	mg/kg	1	1 85	2.03	68 5	69.2	30.2	20.9
Nickel	EPA 6010C	mg/kg	86	49.2	69 9	156	136	152	124

bgs	Below ground surface	ND	Not detected at or above the reporting limit in parentheses
EPA	U.S. Environmental Protection Agency	PR	Project sample
mg/kg	Milligrams per kilogram	QC	Quality control sample

a. Cleanup levels are from Alaska Department of Environmental Conservation, Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75), Method Two, Table B1, under 40-inch zone, migration to groundwater pathway for all parameters.

Checked by: DLL
Approved: BLW

Table A2-5
Mercury Speciation Results
Kolmokoff Mine Site, BLM

		Sample Number	08KMS93SL	08KMS94SL	08KMS95SL	08KMS96SL	08KMS97SL	08KMS98SL	08KMS99SL	08KMS102SL
		Sample Date	9/29/2008	9/29/2008	9/29/2008	9/29/2008	9/29/2008	9/29/2008	9/29/2008	9/30/2008
		Location	Top of Mill	Bottom of Mill	Between Sheds	Settling Pond	Unnamed Creek	Retort Mound	Toe of Bluff	West of Pit
		Depth (inches, bgs)	2	2	2	2	2	2	2	4
		Sample Type	PR	PR	PR	PR	PR	PR	PR	PR
Analyte	**Method**	**Units**								
Total Mercury	SSE by FGS-069	ng/kg	24200	349000	1340	156000	311000	5830	40100	31800
Mercury (F0)	SSE by FGS-069	ng/kg	30	ND	ND	508	ND	ND	172	263
Mercury (F1)	SSE by FGS-069	ng/kg	ND	ND	ND	ND	ND	ND	ND	ND
Mercury (F2)	SSE by FGS-069	ng/kg	ND	ND	ND	55.2	ND	19.1	502	408
Mercury (F3)	SSE by FGS-069	ng/kg	1560	249	309	560	1580	5290	560	1330
Mercury (F4)	SSE by FGS-069	ng/kg	220	811	49.4	3740	395	ND	1840	2440
Mercury (F5)	SSE by FGS-069	ng/kg	21900	344000	787	150000	306000	488	35800	26200
Mercury (F6)	SSE by FGS-069	ng/kg	475	3720	193	1830	2360	30.3	1220	1200

ND Not detected at or above the reporting limit in parentheses
PR Project sample
ng/kg Nanograms per kilogram
SSE Selective Sequential Extraction

NOTE:
SSE extraction steps and their anticipated biogeochemical meaning:
Fraction F(0): Qualitative headspace analysis by vapor pressure equilibration
Fraction F(1): Water soluble mercury, extracted with DI water (ie. $HgCl_2$, $HgSO_4$)
Fraction F(2): Weak acid extractable mercury, pH2 HCl/HO Ac
Fraction F(3): Organo complexed mercury, extracted with 1N KOH
Fraction F(4): Strong complexed mercury, extracted with 12N HNO_3
Fraction F(5): Aqua Regia (cinnabar, HgSe, HgAu)
Fraction F(6): HNO_3/HCl/HF(mineral-bound; Hg in crystal lattice)
Fraction FS: Calculated Sum of all fractions

Checked by: DLL
Approved: BLW

APPENDIX A PHOTOGRAPHS

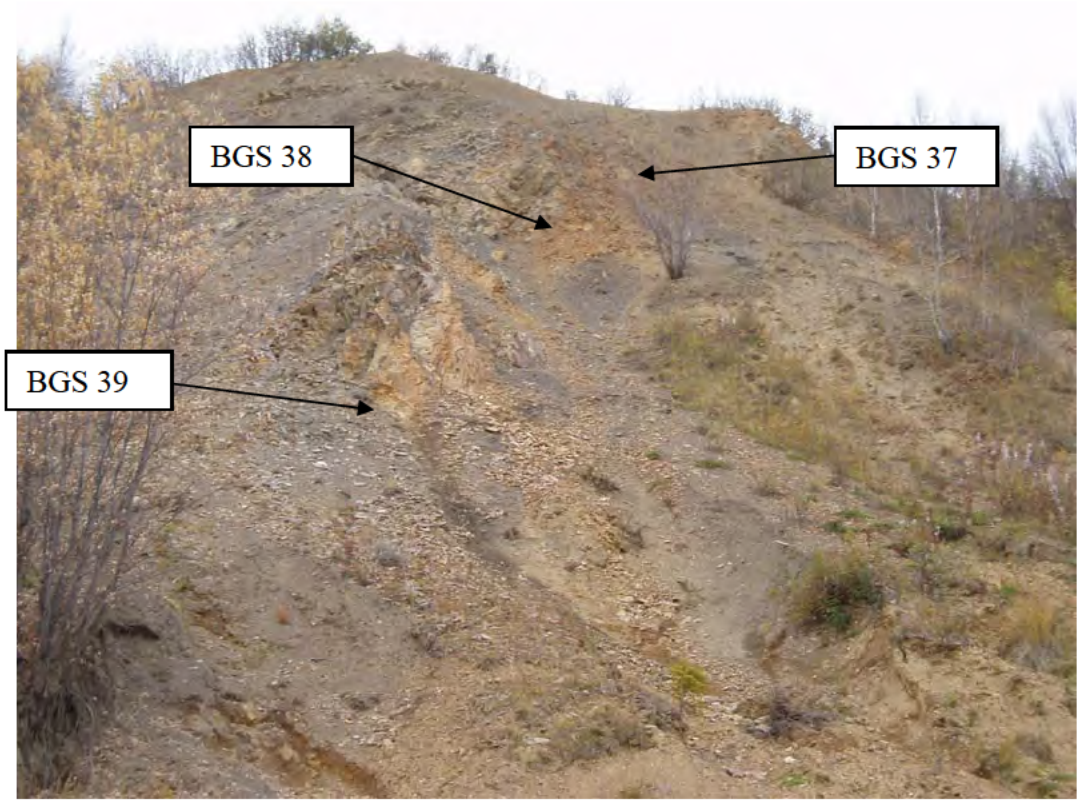
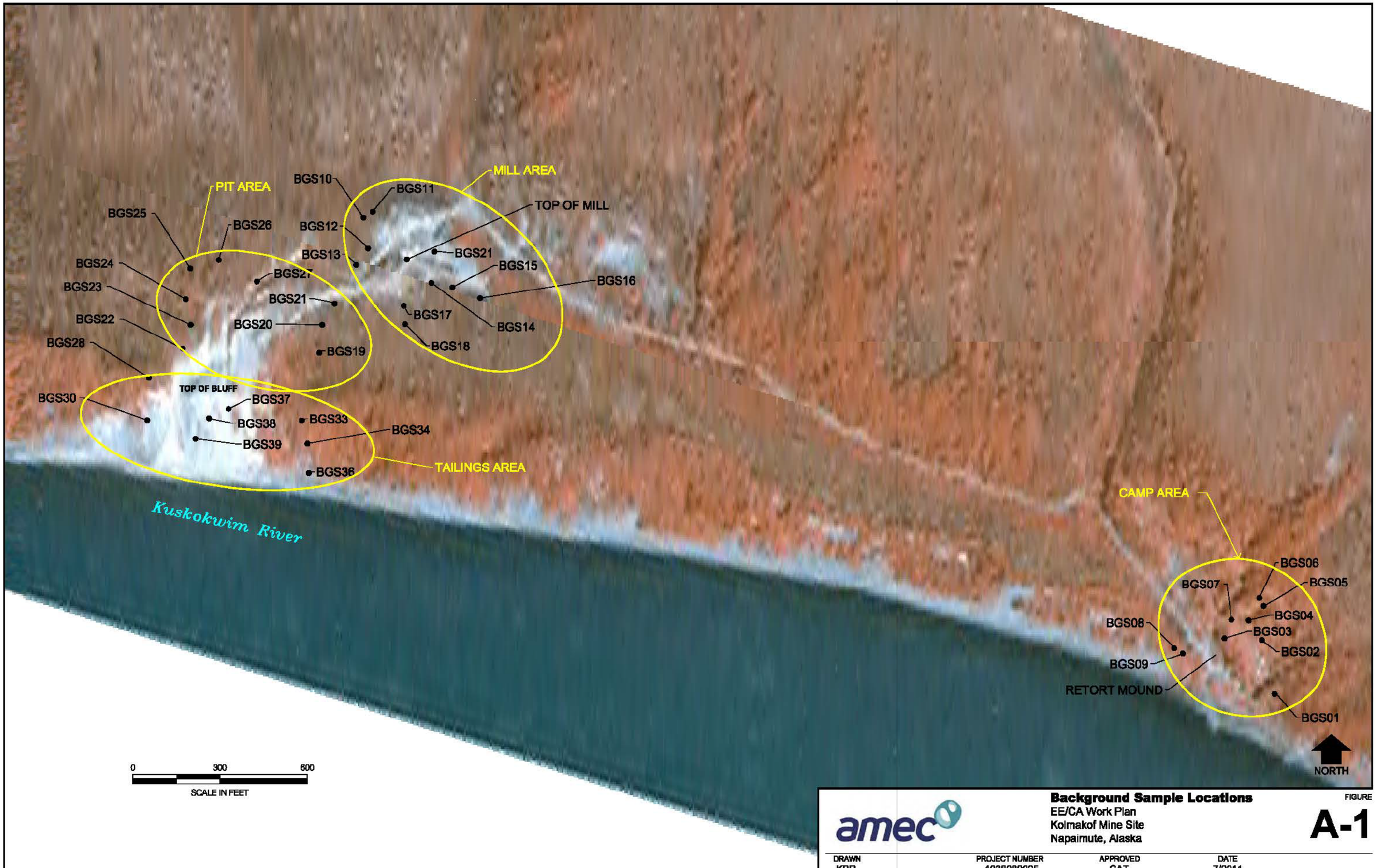


Photo A1. Background sample locations BGS37, BGS38, and BGS39.

Photo A2. BGS37 Sample location

Photo A3. Reddish-brown rock outcrop near BGS38

APPENDIX A FIGURES



amec

Background Sample Locations
EE/CA Work Plan
Kolmakof Mine Site
Napaimute, Alaska

FIGURE
A-1

DRAWN	PROJECT NUMBER	APPROVED	DATE
KBR	4038080005	CAT	7/2011

P:\Group\BLM 2001_DELIVERY ORDERS\T020_KOLMAKOF MINE SITE EE-CA\KMS GPS\KOLMAKOF MINE SITES AERIAL PHOTO.dwg, 1=1, 3/12/10 at 15:05 by KBR
LAYOUT: LAYOUT1

APPENDIX A1

DATA VALIDATION AND LABORATORY REPORTS

DATE: May 19, 2011
REVIEWED BY: Zachary Carroll
SUBJECT: AMEC Project # 4038080005

DATA REVIEW SUMMARY REPORT FOR KOLMAKOF MINE SITE

LABORATORIES: Test America, Inc., Anchorage, AK and Frontier GeoSciences, Inc., Seattle, WA

SAMPLING DATES: 9/26/08 – 10/3/08

AMEC Environment and Infrastructure (AMEC) performed the equivalent of United States Environmental Protection Agency (USEPA) Level II data review on analytical results reported by Test America, Inc. Anchorage, Alaska and Frontier GeoSciences, Inc., Seattle, Washington for soil samples collected September 26, 2008 through October 7, 2008 from Kolmakof Mine Site/Ketchikan. The attached Table 1 presents a list of the samples collected and analytical test methods performed for each sample. Level II cursory data review was performed on 100% of the samples collected, which includes a review of holding times and sample preservation, surrogate recoveries, blanks, laboratory control and laboratory control sample duplicates (LCS/LCSD), matrix spike and matrix spike duplicate (MS/MSD) samples, laboratory and matrix duplicate samples, field duplicate samples, and surrogate recoveries, as applicable. The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

Data review and validation was performed according to the principles presented in the *USEPA National Functional Guidelines for Laboratory Data Review, Inorganics* (EPA, 2004), and the principles presented in the USEPA *National Functional Guidelines for Superfund Organic Methods Data Review* (EPA, 2008).

The following paragraphs highlight the essential findings of the data review:

I. <u>Arsenic, Chromium, and Nickel by EPA Test Method 6010C and Mercury by EPA Test Method 7471</u>

Eighty-six samples were collected and analyzed for arsenic, chromium, nickel and mercury. Overall, the data are usable as reported, with any added qualifiers. Qualifications were required for the reasons noted in sections D and E.

A. <u>Holding Times</u>

The 6-month technical holding time criteria for metals by 6010C and the 28 day technical holding time criteria for mercury were met for the project samples. Samples were received properly preserved.

B. <u>Blanks</u>

Target analytes were not observed above the reporting limits in laboratory method blanks associated with the project samples.

C. Laboratory Control Samples

Laboratory acceptance criteria were met for the LCS samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate

Laboratory acceptance criteria were met for the MS/MSD samples associated with the project samples with the following exceptions:

1. The MS/MSD recoveries for mercury in spiked samples 08KMS21SL (ARJ0018-21) and 08KMS84SL (ARJ0019-28) were not useful for assessing accuracy, as the concentration of mercury in the parent samples each exceeded the spike concentrations by a factor of greater than four. The associated sample results were accepted based on LCS recoveries and qualification was not necessary.

2. The following MS/MSDs were outside of the laboratory acceptance limits of 75-125% or above the 20% relative percent difference (RPD) limit as indicated:

Laboratory Batch	MS/MSD Source	Analyte	MS	MSD	RPD
8100136	08KMS83SL	Arsenic	73.4	71.9	-
8100136	08KMS83SL	Nickel	27.2	-	22.8
8100136	08KMS83SL	Chromium	129	132	-

The detected results for arsenic and nickel in samples associated with the MS/MSD pair were qualified as estimated (J-) with a low bias. The detected results for chromium in samples associated with the MS/MSD pair were qualified as estimated (J+) with a high bias.

3. The RPD for mercury in spiked sample 08KMS01SL was above the 20% laboratory acceptance limit at 33.5%. The detected results for mercury in samples associated with the MS/MSD pair were qualified as estimated (J).

The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

E. Laboratory Duplicate Samples

Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project samples with the following exceptions:

1. The following RPDs were above the laboratory acceptance limits.

Laboratory Batch	Duplicate Source	Analyte	RPD	Limit (%)
8100108	08KMS01SL	Mercury	44.5	40
8100129	08KMS01SL	Nickel	24	20
8100129	08KMS01SL	Arsenic	21.3	20

8100114	08KMS84SL	Mercury	49.7	40
8100129	08KMS57SL	Nickel	21.3	20
8100129	08KMS57SL	Arsenic	24	20
8100135	08KMS58SL	Arsenic	20.2	20
8100136	08KMS83SL	Arsenic	38.4	20
8100136	08KMS83SL	Chromium	28.9	20

The mercury results for samples associated with quality control (QC) batches 8100108 and 8100114 were qualified as estimated (J). The nickel and arsenic results for samples associated with QC batches 8100129 and 8100129 were qualified as estimated (J). The arsenic results for samples associated with QC batch 8100135 were qualified as estimated (J). The chromium and arsenic results for samples associated with QC batch 8100136 were qualified as estimated (J).

The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

F. Field Duplicate Samples

Nine field duplicate samples collected and analyzed for arsenic, chromium, nickel and mercury were identified.

1. The RPDs between detected results for field duplicate pairs were within the 50% RPD control limit for 77% of compounds with detected results. The attached table 3 summarizes the detected results for the field duplicate samples and associated RPDs.

The analysis of field duplicate samples is a measure of both field and analytical precision. The imprecision in the results may be due to the sample matrix, sampling or laboratory technique, or method defects. Since the effect on the quality of the data is not known, data is not qualified for field duplicate failures.

II. Nitroaromatics by EPA Test Method 8330

Six project samples were collected and analyzed for nitroaromatics.. Qualifications were required for the reason noted in section A. Rejected results are not considered usable for any purposes.

A. Holding Times

Samples were received properly preserved. The 14-day holding time from sample collection to extraction was not met; samples collected 9/28/08 were extracted past holding time on 10/13/08. Detect results were qualified as estimated (J) and non-detect sample results were rejected (R).

The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

B. Blanks

Target analytes were not observed in laboratory method blanks associated with the project samples.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
Laboratory acceptance criteria were met for the MS/MSD samples associated with the project samples.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project samples.

F. Field Duplicate Samples
One field duplicate sample collected and analyzed for nitroaromatics was identified. Field duplicate RPD was not calculated as the results for the duplicate sample pair were below the reporting limit for target compounds. Precision was evaluated by laboratory duplicate sample results.

G. Surrogate Recoveries
Surrogate compounds recoveries were within the laboratory acceptance criteria.

III. Diesel Range Organics (DRO) (C10-C25) by Method AK102

One project sample was collected and analyzed for DRO. Overall, the data are usable as reported.

A. Holding Times
The 14 day technical holding time criteria were met for the project sample. The sample was received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project sample.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS/LCSD samples associated with the project sample.

D. Matrix Spike/Matrix Spike Duplicate
Laboratory acceptance criteria were met for the MS/MSD samples associated with the project sample.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project sample.

F. Field Duplicate Samples
Field duplicate samples were not identified.

G. Surrogate Recoveries
The surrogate spike concentration in sample KTN-10-08 was reduced to a level where the recovery calculation did not provide useful information. The sample result was accepted based upon other QC indicators.

IV. Gasoline Range Organics (GRO) (C6-C10) by Method AK 101-MS

One project sample was collected and analyzed for GRO. Overall, the data are usable as reported.

A. Holding Times
The 14 day technical holding time criteria were met for the project sample. The sample was received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project sample.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS/LCSD samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
MS/MSD samples were not analyzed with the project samples. The sample result was accepted based on LCS/LCSD recoveries.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project sample.

F. Field Duplicate Samples
Field duplicate samples were not identified.

G. Surrogate Recoveries
Surrogate spike recoveries met laboratory acceptance criteria for the project sample.

V. Total Metals by EPA Test Method 6010B/7471A

One project sample was collected and analyzed for total metals. Overall, the data are usable as reported, any added qualifiers. Qualifications were required for the reason noted in section D.

A. Holding Times
The 6-month technical holding time criteria for metals by 6010B and the 28 day technical holding time criteria for mercury were met for the project sample. The sample was received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project sample.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
Laboratory acceptance criteria were met for the MS/MSD sample associated with the project sample with the following exception:

1. The MS recovery for lead in spiked sample KTN-10-08 was below the 75-125% laboratory acceptance criteria at 50.1%. The result for lead in sample KTN-10-08 was qualified as estimated (J-) with a low bias.

2. Matrix spike duplicate samples were not analyzed with 6010B QC batch 8100541. Precision was evaluated by the laboratory duplicate sample results.

The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project sample.

F. Field Duplicate Samples
Field duplicate samples were not identified.

VI. Volatile Organic Compounds (VOCs) by EPA Test Method 8260B

One project sample was collected and analyzed for VOCs. Overall, the data are usable as reported.

A. Holding Times
The 14 day technical holding time criteria were met for the project sample. The sample was received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project sample.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS/LCSD samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
MS/MSD samples were not analyzed with the project samples. The sample result was accepted based on LCS/LCSD recoveries.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project sample.

F. Field Duplicate Samples
Field duplicate samples were not identified.

G. Surrogate Recoveries
Surrogate spike recoveries met laboratory acceptance criteria for the project sample.

VII. Semivolatile Organic Compounds (SVOCs) by EPA Test Method 8270C

One project sample was collected and analyzed for SVOCs. Overall, the data are usable as reported.

A. Holding Times
The 14-day holding time from sample collection to extraction and the 40-day holding time from extraction to analysis for SVOCs were met for project samples. Samples were received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project sample.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS/LCSD samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
MS/MSD samples were not analyzed with the project samples. The sample result was accepted based on LCS/LCSD recoveries.

E. Laboratory Duplicate Samples
Laboratory acceptance criteria were met for the laboratory duplicate samples associated with the project sample.

F. Field Duplicate Samples
Field duplicate samples were not identified.

G. Surrogate Recoveries
Surrogate spike recoveries met laboratory acceptance criteria for the project sample.

VIII. Mercury Speciation by Test Method FGS-069 (EPA Test Method 1631 modified)

Eight project samples were collected and analyzed for mercury speciation. Overall, the data are usable as reported, any added qualifiers. Qualifications were required for the reason noted in section E.

A. Holding Times
The 90-day technical holding time criteria for EPA Test Method 1631 were met for the project samples. The samples were received properly preserved.

B. Blanks
Target analytes were not observed in laboratory method blanks associated with the project samples.

C. Laboratory Control Samples
Laboratory acceptance criteria were met for the LCS/LCSD samples associated with the project samples.

D. Matrix Spike/Matrix Spike Duplicate
Laboratory acceptance criteria were met for the MS/MSD sample associated with the project sample with the following exception:

E. Matrix Duplicates

Laboratory acceptance criteria were met for the matrix duplicate and triplicate samples associated with the project samples, with the following exceptions:

1. The RPD for matrix duplicate sample for 08KMS98SL was above the laboratory acceptance criteria of 25% for mercury F-4 at 67.9%. Qualification was limited to the source sample, as another matrix duplicate result in the same QC batch was within criteria (source sample 08KMS93SL). Therefore, the total mercury and mercury F-4 results for sample 08KMS98SL were qualified as estimated (J/UJ).

2. The RPD for matrix duplicate sample for 08KMS98SL was above the laboratory acceptance criteria of 25% for mercury F-5 at 60.2%. Qualification was limited to the source sample, as another matrix duplicate result in the same QC batch was within criteria (source sample 08KMS95SL). Therefore, the total mercury and mercury F-5 result for sample 08KMS98SL was qualified as estimated (J).

The attached Table 2 presents the data qualifiers applied to the sample results as a result of the data review, along with the reason for the qualification of the data.

E. Field Duplicate Samples

Field duplicate samples were not identified.

SUMMARY AND USABILITY

Overall the sample results are considered valid and useable as qualified, with the exception of rejected results. Rejected results are not considered usable for any purposes. Estimated sample results (J/UJ) are usable only for limited purposes.

Review performed by:

Zachary Carroll
Staff Database Analyst I

Table 1
Sample Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (inches)	Site Sample ID	Laboratory Sample ID	Date Sampled	Sample Matrix	Sample Type	Laboratory	Analyses	Validation Level
BGS01	7	08KMS01SL	ARJ0018-01	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS01	14	08KMS02SL	ARJ0018-02	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS02	8	08KMS03SL	ARJ0018-03	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS02	8	08KMS04SL	ARJ0018-04	9/26/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS02	13	08KMS05SL	ARJ0018-05	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS03	6	08KMS06SL	ARJ0018-06	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS03	13	08KMS07SL	ARJ0018-07	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS04	Surface?	08KMS08SL	ARJ0018-08	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS04	13	08KMS09SL	ARJ0018-09	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS05	Surface?	08KMS10SL	ARJ0018-10	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS05	12	08KMS11SL	ARJ0018-11	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS06	Surface?	08KMS12SL	ARJ0018-12	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS06	13	08KMS13SL	ARJ0018-13	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS07	Surface?	08KMS14SL	ARJ0018-14	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS07	14	08KMS15SL	ARJ0018-15	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS08	Surface?	08KMS16SL	ARJ0018-16	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS08	Surface?	08KMS17SL	ARJ0018-17	9/26/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS08	12	08KMS18SL	ARJ0018-18	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS09	Surface?	08KMS19SL	ARJ0018-19	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS09	13	08KMS20SL	ARJ0018-20	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS10	Surface?	08KMS21SL	ARJ0018-21	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS10	14	08KMS22SL	ARJ0018-22	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS11	Surface?	08KMS23SL	ARJ0018-23	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS11	12	08KMS24SL	ARJ0018-24	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS12	Surface?	08KMS25SL	ARJ0018-25	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS12	13	08KMS26SL	ARJ0018-26	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS13	Surface?	08KMS27SL	ARJ0018-27	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS13	12.5	08KMS28SL	ARJ0018-28	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS14	Surface?	08KMS29SL	ARJ0018-29	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS14	Surface?	08KMS30SL	ARJ0018-30	9/26/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS14	15	08KMS31SL	ARJ0018-31	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS15	Surface?	08KMS32SL	ARJ0018-32	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS15	13	08KMS33SL	ARJ0018-33	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS16	Surface?	08KMS34SL	ARJ0018-34	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS16	12	08KMS35SL	ARJ0018-35	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS17	5	08KMS36SL	ARJ0018-36	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS17	11	08KMS37SL	ARJ0018-37	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS17	11	08KMS38SL	ARJ0018-38	9/26/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS18	5	08KMS39SL	ARJ0018-39	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II

Table 1
Sample Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (inches)	Site Sample ID	Laboratory Sample ID	Date Sampled	Sample Matrix	Sample Type	Laboratory	Analyses	Validation Level
BGS18	10	08KMS40SL	ARJ0018-40	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS19	4	08KMS41SL	ARJ0018-41	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS19	4	08KMS42SL	ARJ0018-42	9/26/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS19	10	08KMS43SL	ARJ0018-43	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS20	6	08KMS44SL	ARJ0018-44	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS20	12	08KMS45SL	ARJ0018-45	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS21	6	08KMS46SL	ARJ0018-46	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS21	12	08KMS47SL	ARJ0018-47	9/26/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS22	5	08KMS48SL	ARJ0018-48	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS22	13	08KMS49SL	ARJ0018-49	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS23	6	08KMS50SL	ARJ0018-50	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS23	12	08KMS51SL	ARJ0019-01	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS24	6	08KMS52SL	ARJ0019-02	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS24	13	08KMS53SL	ARJ0019-03	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS24	13	08KMS54SL	ARJ0019-04	9/27/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS25	5	08KMS55SL	ARJ0019-05	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS25	11	08KMS56SL	ARJ0019-06	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS26	6	08KMS57SL	ARJ0019-07	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS26	12	08KMS58SL	ARJ0019-08	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS27	5	08KMS59SL	ARJ0019-09	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS27	13	08KMS60SL	ARJ0019-10	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS28	4	08KMS61SL	ARJ0019-11	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS28	4	08KMS62SL	ARJ0019-12	9/27/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS28	8	08KMS63SL	ARJ0019-13	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS30	3	08KMS66SL	ARJ0019-14	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS30	7	08KMS67SL	ARJ0019-15	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS32	3	08KMS70SL	ARJ0019-16	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS32	8	08KMS71SL	ARJ0019-17	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS33	4	08KMS72SL	ARJ0019-18	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS33	9	08KMS73SL	ARJ0019-19	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS34	3	08KMS74SL	ARJ0019-20	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS34	3	08KMS75SL	ARJ0019-21	9/27/2008	Soil	Duplicate	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS34	9	08KMS76SL	ARJ0019-22	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS36	4	08KMS79SL	ARJ0019-23	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS36	12	08KMS80SL	ARJ0019-24	9/27/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS37	4	08KMS81SL	ARJ0019-25	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS37	10	08KMS82SL	ARJ0019-26	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS38	4	08KMS83SL	ARJ0019-27	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS38	9	08KMS84SL	ARJ0019-28	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II

Table 1
Sample Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (inches)	Site Sample ID	Laboratory Sample ID	Date Sampled	Sample Matrix	Sample Type	Laboratory	Analyses	Validation Level
BGS39	4	08KMS85SL	ARJ0019-29	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
BGS39	8	08KMS86SL	ARJ0019-30	9/28/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
Explosive shed, N. Center	3.5" bgs	08KMS87SL	ARJ0019-31	9/28/2008	Soil	Primary	Test America	Nitroaromatics	II
Explosive Shed, NE corner	2.5" bgs	08KMS88SL	ARJ0019-32	9/28/2008	Soil	Primary	Test America	Nitroaromatics	II
Explosive shed, SE corner	2" bgs	08KMS89SL	ARJ0019-33	9/28/2008	Soil	Primary	Test America	Nitroaromatics	II
Explosive shed, SE corner	2" bgs	08KMS90SL	ARJ0019-34	9/28/2008	Soil	Duplicate	Test America	Nitroaromatics	II
Explosice shed, near center	3" bgs	08KMS91SL	ARJ0019-35	9/28/2008	Soil	Primary	Test America	Nitroaromatics	II
Explosive shed, w to sw center wall	3" bgs	08KMS92SL	ARJ0019-36	9/28/2008	Soil	Primary	Test America	Nitroaromatics	II
Pit Area, n of ore cart	3" bgs	08KMS100SL	ARJ0019-37	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
Pit Area, n of ore cart	5" bgs	08KMS101SL	ARJ0019-38	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
Pit area w of comp and ore cart	4" bgs	08KMS102SL	ARJ0019-39	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
Pit Area	4" bgs	08KMS103SL	ARJ0019-40	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
Pit area, monofill location #2	6" bgs	08KMS104SL	ARJ0019-41	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
side of road above explosive shed	3" bgs	08KMS105SL	ARJ0019-42	9/30/2008	Soil	Primary	Test America	6010C (As, Cr, Ni), 7471 (Hg)	II
-	-	KTN-10-08	ARJ0020-01	10/3/2008	Soil	Primary	Test America	DRO, GRO, Total Metals, VOCs, SVOCs	II
-	-	08KMS93SL	0810037-01	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS94SL	0810037-02	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS95SL	0810037-03	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS96SL	0810037-04	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS97SL	0810037-05	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS98SL	0810037-06	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS99SL	0810037-07	9/29/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	08KMS102SL	0810037-08	9/30/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	HgS	0810037-09	10/7/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	GsC12	0810037-10	10/7/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II
-	-	NIST 2710	0810037-11	10/7/2008	Soil	Primary	Frontier GeoSciences	Mercury Speciation	II

Notes:
6010C (As, Cr, Ni): Arsenic, Chromium, and Nickel by EPA Test Method 6010C
7471 (Hg): Mercury by EPA Test Method 7471
Nitroaromatics: Nitroaromatics by EPA Test Method 8330
DRO: Diesel Range Organics (C10-C25) by Method AK102
GRO: Gasoline Range Organics (C6-C10) by Method AK 101-MS
Total Metals: Total Metals by EPA Test Method 6010B/7471A
VOCs: Volatile Organic Compounds by EPA Test Method 8260B
Semivolatile Organic Compounds by EPA Test Method 8270C
Mercury Speciation: Mercury speciation by Test Method FGS-069
Test America: Test America Laboratories Inc., Anchorage AK
Frontier GeoSciences: Frontier GeoSciences, Inc., Seattle, WA

Table 2
Qualified Data Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (ft)	Sample ID	Laboratory ID	Analysis Method	Compound	Result	Units	Validation Qualifier	Reason
BGS01	7	08KMS01SL	ARJ0018-01	7471	Mercury	144	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS01	14	08KMS02SL	ARJ0018-02	7471	Mercury	79.9	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS02	8	08KMS03SL	ARJ0018-03	7471	Mercury	93.9	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS02	8	08KMS04SL	ARJ0018-04	7471	Mercury	146	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS02	13	08KMS05SL	ARJ0018-05	7471	Mercury	101	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS03	6	08KMS06SL	ARJ0018-06	7471	Mercury	367	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS03	13	08KMS07SL	ARJ0018-07	7471	Mercury	208	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS04	Surface?	08KMS08SL	ARJ0018-08	7471	Mercury	94.1	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS04	13	08KMS09SL	ARJ0018-09	7471	Mercury	92.5	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS05	Surface?	08KMS10SL	ARJ0018-10	7471	Mercury	107	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS05	12	08KMS11SL	ARJ0018-11	7471	Mercury	104	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS06	Surface?	08KMS12SL	ARJ0018-12	7471	Mercury	108	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS06	13	08KMS13SL	ARJ0018-13	7471	Mercury	129	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS07	Surface?	08KMS14SL	ARJ0018-14	7471	Mercury	104	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS07	14	08KMS15SL	ARJ0018-15	7471	Mercury	89.3	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS08	Surface?	08KMS16SL	ARJ0018-16	7471	Mercury	530	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS08	Surface?	08KMS17SL	ARJ0018-17	7471	Mercury	337	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS08	12	08KMS18SL	ARJ0018-18	7471	Mercury	114	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS09	Surface?	08KMS19SL	ARJ0018-19	7471	Mercury	233	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS09	13	08KMS20SL	ARJ0018-20	7471	Mercury	65.7	ug/kg	J	MS/MSD RPD outlier, Laboratory Duplicate RPD outlie
BGS18	5	08KMS39SL	ARJ0018-39	6010C	Arsenic	4.56 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS18	5	08KMS39SL	ARJ0018-39	6010C	Nickel	5.24	mg/kg	J	Laboratory Duplicate RPD outlie
BGS18	10	08KMS40SL	ARJ0018-40	6010C	Arsenic	5.88	mg/kg	J	Laboratory Duplicate RPD outlie
BGS18	10	08KMS40SL	ARJ0018-40	6010C	Nickel	15	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	4	08KMS41SL	ARJ0018-41	6010C	Arsenic	2.45 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	4	08KMS41SL	ARJ0018-41	6010C	Nickel	1.87 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	4	08KMS42SL	ARJ0018-42	6010C	Arsenic	5.69	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	4	08KMS42SL	ARJ0018-42	6010C	Nickel	12.5	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	10	08KMS43SL	ARJ0018-43	6010C	Arsenic	9.61	mg/kg	J	Laboratory Duplicate RPD outlie
BGS19	10	08KMS43SL	ARJ0018-43	6010C	Nickel	22.2	mg/kg	J	Laboratory Duplicate RPD outlie
BGS20	6	08KMS44SL	ARJ0018-44	6010C	Arsenic	12.9	mg/kg	J	Laboratory Duplicate RPD outlie
BGS20	6	08KMS44SL	ARJ0018-44	6010C	Nickel	16.1	mg/kg	J	Laboratory Duplicate RPD outlie
BGS20	12	08KMS45SL	ARJ0018-45	6010C	Arsenic	11.2	mg/kg	J	Laboratory Duplicate RPD outlie
BGS20	12	08KMS45SL	ARJ0018-45	6010C	Nickel	21.9	mg/kg	J	Laboratory Duplicate RPD outlie
BGS21	6	08KMS46SL	ARJ0018-46	6010C	Arsenic	0.747 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS21	6	08KMS46SL	ARJ0018-46	6010C	Nickel	6.45	mg/kg	J	Laboratory Duplicate RPD outlie
BGS21	12	08KMS47SL	ARJ0018-47	6010C	Arsenic	4.97	mg/kg	J	Laboratory Duplicate RPD outlie
BGS21	12	08KMS47SL	ARJ0018-47	6010C	Nickel	19.2	mg/kg	J	Laboratory Duplicate RPD outlie
BGS22	5	08KMS48SL	ARJ0018-48	6010C	Arsenic	0.563 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS22	5	08KMS48SL	ARJ0018-48	6010C	Nickel	8.33	mg/kg	J	Laboratory Duplicate RPD outlie
BGS22	13	08KMS49SL	ARJ0018-49	6010C	Arsenic	1.05 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS22	13	08KMS49SL	ARJ0018-49	6010C	Nickel	3.78	mg/kg	J	Laboratory Duplicate RPD outlie
BGS23	6	08KMS50SL	ARJ0018-50	6010C	Arsenic	4.24 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS23	6	08KMS50SL	ARJ0018-50	6010C	Nickel	6.55	mg/kg	J	Laboratory Duplicate RPD outlie
BGS23	12	08KMS51SL	ARJ0019-01	6010C	Arsenic	10.4	mg/kg	J	Laboratory Duplicate RPD outlie

Table 2
Qualified Data Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (ft)	Sample ID	Laboratory ID	Analysis Method	Compound	Result	Units	Validation Qualifier	Reason
BGS23	12	08KMS51SL	ARJ0019-01	6010C	Nickel	20	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	6	08KMS52SL	ARJ0019-02	6010C	Arsenic	1.57 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	6	08KMS52SL	ARJ0019-02	6010C	Nickel	5.82	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	13	08KMS53SL	ARJ0019-03	6010C	Arsenic	51.8	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	13	08KMS53SL	ARJ0019-03	6010C	Nickel	14.4	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	13	08KMS54SL	ARJ0019-04	6010C	Arsenic	2.46 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS24	13	08KMS54SL	ARJ0019-04	6010C	Nickel	17.2	mg/kg	J	Laboratory Duplicate RPD outlie
BGS25	5	08KMS55SL	ARJ0019-05	6010C	Arsenic	20.2	mg/kg	J	Laboratory Duplicate RPD outlie
BGS25	5	08KMS55SL	ARJ0019-05	6010C	Nickel	11.8	mg/kg	J	Laboratory Duplicate RPD outlie
BGS25	11	08KMS56SL	ARJ0019-06	6010C	Arsenic	3.13 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS25	11	08KMS56SL	ARJ0019-06	6010C	Nickel	18.8	mg/kg	J	Laboratory Duplicate RPD outlie
BGS26	6	08KMS57SL	ARJ0019-07	6010C	Arsenic	6.72	mg/kg	J	Laboratory Duplicate RPD outlie
BGS26	6	08KMS57SL	ARJ0019-07	6010C	Nickel	16.4	mg/kg	J	Laboratory Duplicate RPD outlie
BGS26	12	08KMS58SL	ARJ0019-08	6010C	Arsenic	5.97	mg/kg	J	Laboratory Duplicate RPD outlie
BGS27	5	08KMS59SL	ARJ0019-09	6010C	Arsenic	1.36 J	mg/kg	J	Laboratory Duplicate RPD outlie
BGS27	13	08KMS60SL	ARJ0019-10	6010C	Arsenic	7.37	mg/kg	J	Laboratory Duplicate RPD outlie
BGS28	4	08KMS61SL	ARJ0019-11	6010C	Arsenic	8.71	mg/kg	J	Laboratory Duplicate RPD outlie
BGS28	4	08KMS62SL	ARJ0019-12	6010C	Arsenic	6.44	mg/kg	J	Laboratory Duplicate RPD outlie
BGS28	8	08KMS63SL	ARJ0019-13	6010C	Arsenic	10.1	mg/kg	J	Laboratory Duplicate RPD outlie
BGS30	3	08KMS66SL	ARJ0019-14	6010C	Arsenic	9.26	mg/kg	J	Laboratory Duplicate RPD outlie
BGS30	7	08KMS67SL	ARJ0019-15	6010C	Arsenic	6.42	mg/kg	J	Laboratory Duplicate RPD outlie
BGS32	3	08KMS70SL	ARJ0019-16	6010C	Arsenic	7.58	mg/kg	J	Laboratory Duplicate RPD outlie
BGS32	8	08KMS71SL	ARJ0019-17	6010C	Arsenic	7.05	mg/kg	J	Laboratory Duplicate RPD outlie
BGS33	4	08KMS72SL	ARJ0019-18	6010C	Arsenic	15.1	mg/kg	J	Laboratory Duplicate RPD outlie
BGS33	9	08KMS73SL	ARJ0019-19	6010C	Arsenic	19.8	mg/kg	J	Laboratory Duplicate RPD outlie
BGS34	3	08KMS74SL	ARJ0019-20	6010C	Arsenic	10	mg/kg	J	Laboratory Duplicate RPD outlie
BGS34	3	08KMS75SL	ARJ0019-21	6010C	Arsenic	8.76	mg/kg	J	Laboratory Duplicate RPD outlie
BGS34	9	08KMS76SL	ARJ0019-22	6010C	Arsenic	7.26	mg/kg	J	Laboratory Duplicate RPD outlie
BGS36	4	08KMS79SL	ARJ0019-23	6010C	Arsenic	12.3	mg/kg	J	Laboratory Duplicate RPD outlie
BGS36	12	08KMS80SL	ARJ0019-24	6010C	Arsenic	8.77	mg/kg	J	Laboratory Duplicate RPD outlie
BGS37	4	08KMS81SL	ARJ0019-25	6010C	Arsenic	19	mg/kg	J	Laboratory Duplicate RPD outlie
BGS37	10	08KMS82SL	ARJ0019-26	6010C	Arsenic	28.5	mg/kg	J	Laboratory Duplicate RPD outlie
BGS38	4	08KMS83SL	ARJ0019-27	6010C	Arsenic	24.7	mg/kg	J-	MS/MSD recovery low
BGS38	4	08KMS83SL	ARJ0019-27	6010C	Chromium	62.6	mg/kg	J+	MS/MSD recovery high
BGS38	4	08KMS83SL	ARJ0019-27	6010C	Nickel	156	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
BGS38	9	08KMS84SL	ARJ0019-28	6010C	Arsenic	11.8	mg/kg	J-	MS/MSD recovery low
BGS38	9	08KMS84SL	ARJ0019-28	6010C	Chromium	93	mg/kg	J+	MS/MSD recovery high
BGS38	9	08KMS84SL	ARJ0019-28	7471	Mercury	69200	ug/kg	J	Laboratory Duplicate RPD outlie
BGS38	9	08KMS84SL	ARJ0019-28	6010C	Nickel	136	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
BGS39	4	08KMS85SL	ARJ0019-29	6010C	Arsenic	158	mg/kg	J-	MS/MSD recovery low
BGS39	4	08KMS85SL	ARJ0019-29	6010C	Chromium	74.9	mg/kg	J+	MS/MSD recovery high
BGS39	4	08KMS85SL	ARJ0019-29	7471	Mercury	30200	ug/kg	J	Laboratory Duplicate RPD outlie
BGS39	4	08KMS85SL	ARJ0019-29	6010C	Nickel	152	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
BGS39	8	08KMS86SL	ARJ0019-30	6010C	Arsenic	71.9	mg/kg	J-	MS/MSD recovery low
BGS39	8	08KMS86SL	ARJ0019-30	6010C	Chromium	66.9	mg/kg	J+	MS/MSD recovery high

Table 2
Qualified Data Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (ft)	Sample ID	Laboratory ID	Analysis Method	Compound	Result	Units	Validation Qualifier	Reason
BGS39	8	08KMS86SL	ARJ0019-30	7471	Mercury	20900	ug/kg	J	Laboratory Duplicate RPD outlie
BGS39	8	08KMS86SL	ARJ0019-30	6010C	Nickel	124	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	1,3,5-Trinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	1,3-Dinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	2,4,6-Trinitrotoluene	ND (0.25)	mg/kg	r	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	2,4-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	2,6-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	4,Amino-2,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	HMX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	Nitrobezene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	RDX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, N. Cente	3.5" bgs	08KMS87SL	ARJ0019-31	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	1,3,5-Trinitrobenzene	0.063 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	1,3-Dinitrobenzene	0.066 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	2,4,6-Trinitrotoluene	0.073 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	2,4-Dinitrotoluene	0.058 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	2,6-Dinitrotoluene	0.073 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	4,Amino-2,6-dinitrotoluene	0.052 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	HMX	0.044 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	Nitrobezene	0.063 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	RDX	0.049 J	mg/kg	J	Extracted past holding time
Explosive Shed, NE corne	2.5" bgs	08KMS88SL	ARJ0019-32	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	1,3,5-Trinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	1,3-Dinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	2,4,6-Trinitrotoluene	0.026 J	mg/kg	J	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	2,4-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	2,6-Dinitrotoluene	0.038 J	mg/kg	J	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	4,Amino-2,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	HMX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	Nitrobezene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	RDX	0.054 J	mg/kg	J	Extracted past holding time
Explosive shed, SE corne	2" bgs	08KMS89SL	ARJ0019-33	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	1,3,5-Trinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time

Table 2
Qualified Data Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (ft)	Sample ID	Laboratory ID	Analysis Method	Compound	Result	Units	Validation Qualifier	Reason
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	1,3-Dinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	2,4,6-Trinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	2,4-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	2,6-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	4,Amino-2,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	HMX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	Nitrobezene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	RDX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, SE corner - DUF	2" bgs	08KMS90SL	ARJ0019-34	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	1,3,5-Trinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	1,3-Dinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	2,4,6-Trinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	2,4-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	2,6-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	4,Amino-2,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	HMX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	Nitrobezene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	RDX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosice shed, near cente	3" bgs	08KMS91SL	ARJ0019-35	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	1,3,5-Trinitrobenzene	0.03 J	mg/kg	J	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	1,3-Dinitrobenzene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	2,4,6-Trinitrotoluene	0.034 J	mg/kg	J	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	2,4-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	2,6-Dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	2-Amino-4,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	2-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	3-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	4,Amino-2,6-dinitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	4,-Nitrotoluene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	HMX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	Nitrobezene	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	RDX	ND (0.25)	mg/kg	R	Extracted past holding time
Explosive shed, w to sw center wa	3" bgs	08KMS92SL	ARJ0019-36	8330	Tertyl	ND (0.25)	mg/kg	R	Extracted past holding time
Pit Area, n of ore car	3" bgs	08KMS100SL	ARJ0019-37	6010C	Arsenic	6.39	mg/kg	J-	MS/MSD recovery low
Pit Area, n of ore car	3" bgs	08KMS100SL	ARJ0019-37	6010C	Chromium	19.7	mg/kg	J+	MS/MSD recovery high
Pit Area, n of ore car	3" bgs	08KMS100SL	ARJ0019-37	7471	Mercury	23400	ug/kg	J	Laboratory Duplicate RPD outlie
Pit Area, n of ore car	3" bgs	08KMS100SL	ARJ0019-37	6010C	Nickel	44.8	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim

Table 2
Qualified Data Summary
Kolmakof Mine Site 2008 Sampling Event

Sample Location	Depth (ft)	Sample ID	Laboratory ID	Analysis Method	Compound	Result	Units	Validation Qualifier	Reason
Pit Area, n of ore car	5" bgs	08KMS101SL	ARJ0019-38	6010C	Arsenic	6.84	mg/kg	J-	MS/MSD recovery low
Pit Area, n of ore car	5" bgs	08KMS101SL	ARJ0019-38	6010C	Chromium	23.3	mg/kg	J+	MS/MSD recovery high
Pit Area, n of ore car	5" bgs	08KMS101SL	ARJ0019-38	7471	Mercury	10800	ug/kg	J	Laboratory Duplicate RPD outlie
Pit Area, n of ore car	5" bgs	08KMS101SL	ARJ0019-38	6010C	Nickel	28.7	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
Pit area w of comp and ore car	4" bgs	08KMS102SL	ARJ0019-39	6010C	Arsenic	3.01 J	mg/kg	J-	MS/MSD recovery low
Pit area w of comp and ore car	4" bgs	08KMS102SL	ARJ0019-39	6010C	Chromium	55.8	mg/kg	J+	MS/MSD recovery high
Pit area w of comp and ore car	4" bgs	08KMS102SL	ARJ0019-39	7471	Mercury	31500	ug/kg	J	Laboratory Duplicate RPD outlie
Pit area w of comp and ore car	4" bgs	08KMS102SL	ARJ0019-39	6010C	Nickel	35.1	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
Pit Area	4" bgs	08KMS103SL	ARJ0019-40	6010C	Arsenic	3.13 J	mg/kg	J-	MS/MSD recovery low
Pit Area	4" bgs	08KMS103SL	ARJ0019-40	6010C	Chromium	95.5	mg/kg	J+	MS/MSD recovery high
Pit Area	4" bgs	08KMS103SL	ARJ0019-40	7471	Mercury	32800	ug/kg	J	Laboratory Duplicate RPD outlie
Pit Area	4" bgs	08KMS103SL	ARJ0019-40	6010C	Nickel	54	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
Pit area, monofill location #:	6" bgs	08KMS104SL	ARJ0019-41	6010C	Arsenic	5.78	mg/kg	J-	MS/MSD recovery low
Pit area, monofill location #:	6" bgs	08KMS104SL	ARJ0019-41	6010C	Chromium	41.4	mg/kg	J+	MS/MSD recovery high
Pit area, monofill location #:	6" bgs	08KMS104SL	ARJ0019-41	7471	Mercury	7200	ug/kg	J	Laboratory Duplicate RPD outlie
Pit area, monofill location #:	6" bgs	08KMS104SL	ARJ0019-41	6010C	Nickel	29.3	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
side of road above explosive she	3" bgs	08KMS105SL	ARJ0019-42	6010C	Arsenic	7.3	mg/kg	J-	MS/MSD recovery low
side of road above explosive she	3" bgs	08KMS105SL	ARJ0019-42	6010C	Chromium	25.2	mg/kg	J+	MS/MSD recovery high
side of road above explosive she	3" bgs	08KMS105SL	ARJ0019-42	7471	Mercury	2510	ug/kg	J	Laboratory Duplicate RPD outlie
side of road above explosive she	3" bgs	08KMS105SL	ARJ0019-42	6010C	Nickel	26.7	mg/kg	J-	MS recovery low, MS/MSD RPD exceced lim
-	-	KTN-10-08	ARJ0020-01	6010B	Lead	119	mg/kg	J-	MS recovery low
-	-	08KMS98SL	0810037-06	FGS-069	Mercury F-4	ND (314)	ng/g	UJ	Matrix duplicate RPD outlie
-	-	08KMS98SL	0810037-06	FGS-069	Mercury F-5	488	ng/g	J	Matrix duplicate RPD outlie
-	-	08KMS98SL	0810037-06	FGS-069	Total Mercury	5830	ng/g	J	Matrix duplicate RPD outlie

Table 3
Summary of Detected Results for Field Duplicates
Kolmakof Mine Site 2008 Sampling Event

Primary Sample ID	Laboratory ID	Compound	Units	Primary Results	Duplicate Sample ID	Laboratory ID	Duplicate Results	RPD
08KMS03SL	ARJ0018-03	Arsenic	mg/kg	6.87	08KMS04SL	ARJ0018-04	8.68	23.3
08KMS03SL	ARJ0018-03	Chromium	mg/kg	23.3	08KMS04SL	ARJ0018-04	24.3	4.2
08KMS03SL	ARJ0018-03	Mercury	ug/kg	93.9	08KMS04SL	ARJ0018-04	146	43.4
08KMS03SL	ARJ0018-03	Nickel	mg/kg	15.7	08KMS04SL	ARJ0018-04	18.5	16.4
08KMS16SL	ARJ0018-16	Arsenic	mg/kg	3.1 J	08KMS17SL	ARJ0018-17	2.67 J	N/A
08KMS16SL	ARJ0018-16	Chromium	mg/kg	11.6	08KMS17SL	ARJ0018-17	12.5	7.5
08KMS16SL	ARJ0018-16	Mercury	ug/kg	530	08KMS17SL	ARJ0018-17	337	44.5
08KMS16SL	ARJ0018-16	Nickel	mg/kg	13.9	08KMS17SL	ARJ0018-17	13.9	0.0
08KMS29SL	ARJ0018-29	Arsenic	mg/kg	ND (9.54)	08KMS30SL	ARJ0018-30	0.63 J	N/A
08KMS29SL	**ARJ0018-29**	**Chromium**	**mg/kg**	**3.87**	**08KMS30SL**	**ARJ0018-30**	**6.78**	**54.6**
08KMS29SL	ARJ0018-29	Mercury	ug/kg	277	08KMS30SL	ARJ0018-30	273	1.5
08KMS29SL	ARJ0018-29	Nickel	mg/kg	4.72 J	08KMS30SL	ARJ0018-30	5.29 J	N/A
08KMS37SL	ARJ0018-37	Arsenic	mg/kg	4.81 J	08KMS38SL	ARJ0018-38	5.6	N/A
08KMS37SL	**ARJ0018-37**	**Chromium**	**mg/kg**	**4.74**	**08KMS38SL**	**ARJ0018-38**	**11.1**	**80.3**
08KMS37SL	ARJ0018-37	Mercury	ug/kg	112	08KMS38SL	ARJ0018-38	69.3	47.1
08KMS37SL	**ARJ0018-37**	**Nickel**	**mg/kg**	**3.29**	**08KMS38SL**	**ARJ0018-38**	**9.2**	**94.6**
08KMS41SL	ARJ0018-41	Arsenic	mg/kg	2.45 J	08KMS42SL	ARJ0018-42	5.69	N/A
08KMS41SL	**ARJ0018-41**	**Chromium**	**mg/kg**	**4.07**	**08KMS42SL**	**ARJ0018-42**	**18**	**126.2**
08KMS41SL	**ARJ0018-41**	**Mercury**	**ug/kg**	**125**	**08KMS42SL**	**ARJ0018-42**	**517**	**122.1**
08KMS41SL	**ARJ0018-41**	**Nickel**	**mg/kg**	**1.87**	**08KMS42SL**	**ARJ0018-42**	**12.5**	**147.9**
08KMS53SL	ARJ0019-03	Arsenic	mg/kg	51.8	08KMS54SL	ARJ0019-04	2.46 J	N/A
08KMS53SL	ARJ0019-03	Chromium	mg/kg	22.8	08KMS54SL	ARJ0019-04	22.1	3.1
08KMS53SL	ARJ0019-03	Mercury	ug/kg	185	08KMS54SL	ARJ0019-04	176	5.0
08KMS53SL	ARJ0019-03	Nickel	mg/kg	14.4	08KMS54SL	ARJ0019-04	17.2	17.7
08KMS61SL	ARJ0019-11	Arsenic	mg/kg	8.71	08KMS62SL	ARJ0019-12	6.44	30.0
08KMS61SL	ARJ0019-11	Chromium	mg/kg	19.7	08KMS62SL	ARJ0019-12	22	11.0
08KMS61SL	ARJ0019-11	Mercury	ug/kg	1200	08KMS62SL	ARJ0019-12	1410	16.1
08KMS61SL	ARJ0019-11	Nickel	mg/kg	37.3	08KMS62SL	ARJ0019-12	34.1	9.0
08KMS74SL	ARJ0019-20	Arsenic	mg/kg	10	08KMS75SL	ARJ0019-21	8.76	13.2
08KMS74SL	ARJ0019-20	Chromium	mg/kg	15.4	08KMS75SL	ARJ0019-21	17.5	12.8
08KMS74SL	ARJ0019-20	Mercury	ug/kg	509	08KMS75SL	ARJ0019-21	487	4.4
08KMS74SL	ARJ0019-20	Nickel	mg/kg	49	08KMS75SL	ARJ0019-21	47.9	2.3

Notes:

N/A - Non-detect (ND) and estimated (J) results reported below the reporting limit are not useful for evaluating precision.

Values in bold indicate relative percent differences (RPDs) that exceeded the 50% control limit.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

October 28, 2008

Scott Ferguson
Apex Environmental
9410 E. 51sr Suite G
Tulsa, USA/OK 74145

RE: Ketchikan

Enclosed are the results of analyses for samples received by the laboratory on 10/06/08 17:05.
The following list is a summary of the Work Orders contained in this report, generated on 10/28/08 11:49.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
ARJ0020	Ketchikan	[none]

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
KTN-10-08	ARJ0020-01	Soil	10/03/08 13:42	10/06/08 17:05

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Diesel Range Organics (C10-C25) per AK102

TestAmerica Anchorage

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)			**Soil**			**Sampled: 10/03/08 13:42**					
Diesel Range Organics	AK 102	**2090**	-----	1560	mg/kg dry	100x	8100018	10/08/08 14:31	10/15/08 00 05	JN	**RL7**
Surrogate(s): 1-Chlorooctadecane				*NR*	*50 - 150 %*	"				"	***Z3***

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Physical Parameters by APHA/ASTM/EPA Methods

TestAmerica Anchorage

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
Dry Weight	TA-SOP	**62.7**	-----	1 00	%	1x	8100019	10/08/08 14:32	10/09/08 09:25	JN	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Gasoline Range Organics (C6-C10) per AK101-MS

TestAmerica Anchorage

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)			**Soil**			**Sampled: 10/03/08 13:42**					
Gasoline Range Organics	AK101 - MS	**14.0**	-----	4 74	mg/kg dry	0 751 x	8100023	10/10/08 08:56	10/10/08 22 50	ds	
Surrogate(s):	*4-BFB*		*101%*		*80 - 120 %*		"			"	
	Dibromofluoromethane		*103%*		*80 - 120 %*		"			"	
	a,a,a-TFT		*91.7%*		*50 - 150 %*		"			"	
	Toluene-d8		*96.8%*		*80 - 120 %*		"			"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Total Metals per EPA 6000/7000 Series Methods

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
Arsenic	EPA 6010B	**192**	-----	39 5	mg/kg dry	1x	8100541	10/14/08 11:17	10/15/08 21:39	WGM	
Barium	"	**104**	-----	0 790	"	"	"	"	"	WGM	
Cadmium	"	ND	-----	4 74	"	"	"	"	"	WGM	
Chromium	"	**40.7**	-----	2 37	"	"	"	"	"	WGM	
Lead	"	**119**	-----	15 8	"	"	"	"	"	WGM	
Selenium	"	ND	-----	39 5	"	"	"	"	"	WGM	
Silver	"	ND	-----	4 74	"	"	"	"	"	WGM	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Total Mercury per EPA Method 7471A

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
Mercury	EPA 7471A	ND	-----	0 119	mg/kg dry	1x	8100351	10/09/08 10:40	10/09/08 13:46	jcs	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Volatile Organic Compounds per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
Acetone	EPA 8260B	ND	-----	4920	ug/kg dry	1x	8100514	10/14/08 09:00	10/14/08 17:30	TDB	
Benzene	"	ND	-----	39 4	"	"	"	"	"	TDB	
Bromobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Bromochloromethane	"	ND	-----	197	"	"	"	"	"	TDB	
Bromodichloromethane	"	ND	-----	197	"	"	"	"	"	TDB	
Bromoform	"	ND	-----	197	"	"	"	"	"	TDB	
Bromomethane	"	ND	-----	985	"	"	"	"	"	TDB	
2-Butanone (MEK)	"	ND	-----	1970	"	"	"	"	"	TDB	
n-Butylbenzene	"	ND	-----	985	"	"	"	"	"	TDB	
sec-Butylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
tert-Butylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Carbon disulfide	"	ND	-----	1970	"	"	"	"	"	TDB	
Carbon tetrachloride	"	ND	-----	197	"	"	"	"	"	TDB	
Chlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Chloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
Chloroform	"	ND	-----	197	"	"	"	"	"	TDB	
Chloromethane	"	ND	-----	985	"	"	"	"	"	TDB	
2-Chlorotoluene	"	ND	-----	197	"	"	"	"	"	TDB	
4-Chlorotoluene	"	ND	-----	197	"	"	"	"	"	TDB	
1,2-Dibromo-3-chloropropane	"	ND	-----	985	"	"	"	"	"	TDB	
Dibromochloromethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,2-Dibromoethane	"	ND	-----	197	"	"	"	"	"	TDB	
Dibromomethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,2-Dichlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
1,3-Dichlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
1,4-Dichlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Dichlorodifluoromethane	"	ND	-----	985	"	"	"	"	"	TDB	
1,1-Dichloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,2-Dichloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,1-Dichloroethene	"	ND	-----	197	"	"	"	"	"	TDB	
cis-1,2-Dichloroethene	"	ND	-----	197	"	"	"	"	"	TDB	
trans-1,2-Dichloroethene	"	ND	-----	197	"	"	"	"	"	TDB	
1,2-Dichloropropane	"	ND	-----	197	"	"	"	"	"	TDB	
1,3-Dichloropropane	"	ND	-----	197	"	"	"	"	"	TDB	
2,2-Dichloropropane	"	ND	-----	197	"	"	"	"	"	TDB	
1,1-Dichloropropene	"	ND	-----	197	"	"	"	"	"	TDB	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Volatile Organic Compounds per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
cis-1,3-Dichloropropene	EPA 8260B	ND	-----	197	ug/kg dry	1x	8100514	10/14/08 09:00	10/14/08 17:30	TDB	
trans-1,3-Dichloropropene	"	ND	-----	197	"	"	"	"	"	TDB	
Ethylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Hexachlorobutadiene	"	ND	-----	788	"	"	"	"	"	TDB	
2-Hexanone	"	ND	-----	1970	"	"	"	"	"	TDB	
Isopropylbenzene	"	ND	-----	394	"	"	"	"	"	TDB	
p-Isopropyltoluene	"	ND	-----	394	"	"	"	"	"	TDB	
4-Methyl-2-pentanone	"	ND	-----	985	"	"	"	"	"	TDB	
Methyl tert-butyl ether	"	ND	-----	197	"	"	"	"	"	TDB	
Methylene chloride	"	ND	-----	985	"	"	"	"	"	TDB	
Naphthalene	"	**4810**	-----	394	"	"	"	"	"	TDB	
n-Propylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Styrene	"	ND	-----	197	"	"	"	"	"	TDB	
1,1,1,2-Tetrachloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,1,2,2-Tetrachloroethane	"	ND	-----	197	"	"	"	"	"	TDB	C
Tetrachloroethene	"	ND	-----	197	"	"	"	"	"	TDB	
Toluene	"	**4050**	-----	197	"	"	"	"	"	TDB	
1,2,3-Trichlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
1,2,4-Trichlorobenzene	"	ND	-----	197	"	"	"	"	"	TDB	
1,1,1-Trichloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,1,2-Trichloroethane	"	ND	-----	197	"	"	"	"	"	TDB	
Trichloroethene	"	ND	-----	197	"	"	"	"	"	TDB	
Trichlorofluoromethane	"	ND	-----	197	"	"	"	"	"	TDB	
1,2,3-Trichloropropane	"	ND	-----	197	"	"	"	"	"	TDB	
1,2,4-Trimethylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
1,3,5-Trimethylbenzene	"	ND	-----	197	"	"	"	"	"	TDB	
Vinyl chloride	"	ND	-----	197	"	"	"	"	"	TDB	
o-Xylene	"	ND	-----	197	"	"	"	"	"	TDB	
m,p-Xylene	"	ND	-----	394	"	"	"	"	"	TDB	

Surrogate(s):	*4-BFB*	*143%*	*75 - 125 %*	*0.01x*	"
	1,2-DCA-d4	*148%*	*75 - 125 %*	"	"
	Dibromofluoromethane	*139%*	*75 - 125 %*	"	"
	Toluene-d8	*147%*	*75 - 125 %*	"	"

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					**RL3**
Acenaphthene	EPA 8270C	ND	-----	4 20	mg/kg dry	4x	8100535	10/14/08 18:45	10/17/08 22:43	lqn	
Acenaphthylene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Anthracene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzo (a) anthracene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzo (a) pyrene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzo (b) fluoranthene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzo (ghi) perylene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzo (k) fluoranthene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Benzoic Acid	"	ND	-----	12 7	"	"	"	"	"	lqn	
Benzyl alcohol	"	ND	-----	12 7	"	"	"	"	"	lqn	
4-Bromophenyl phenyl ether	"	ND	-----	4 20	"	"	"	"	"	lqn	
Butyl benzyl phthalate	"	ND	-----	4 20	"	"	"	"	"	lqn	
4-Chloro-3-methylphenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
4-Chloroaniline	"	ND	-----	25 5	"	"	"	"	"	lqn	
Bis(2-chloroethoxy)methane	"	ND	-----	4 20	"	"	"	"	"	lqn	
Bis(2-chloroethyl)ether	"	ND	-----	4 20	"	"	"	"	"	lqn	
Bis(2-chloroisopropyl)ether	"	ND	-----	4 20	"	"	"	"	"	lqn	
2-Chloronaphthalene	"	ND	-----	4 20	"	"	"	"	"	lqn	
2-Chlorophenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
4-Chlorophenyl phenyl ether	"	ND	-----	4 20	"	"	"	"	"	lqn	
Chrysene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Di-n-butyl phthalate	"	ND	-----	12 7	"	"	"	"	"	lqn	
Di-n-octyl phthalate	"	ND	-----	4 20	"	"	"	"	"	lqn	
Dibenzo (a,h) anthracene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Dibenzofuran	"	ND	-----	4 20	"	"	"	"	"	lqn	
1,2-Dichlorobenzene	"	ND	-----	12 7	"	"	"	"	"	lqn	
1,3-Dichlorobenzene	"	ND	-----	12 7	"	"	"	"	"	lqn	
1,4-Dichlorobenzene	"	ND	-----	12 7	"	"	"	"	"	lqn	
3,3´-Dichlorobenzidine	"	ND	-----	12 7	"	"	"	"	"	lqn	
2,4-Dichlorophenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
Diethyl phthalate	"	ND	-----	4 20	"	"	"	"	"	lqn	
2,4-Dimethylphenol	"	ND	-----	12 7	"	"	"	"	"	lqn	
Dimethyl phthalate	"	ND	-----	4 20	"	"	"	"	"	lqn	
4,6-Dinitro-2-methylphenol	"	ND	-----	12 7	"	"	"	"	"	lqn	
2,4-Dinitrophenol	"	ND	-----	25 5	"	"	"	"	"	lqn	
2,4-Dinitrotoluene	"	ND	-----	6 36	"	"	"	"	"	lqn	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					**RL3**
2,6-Dinitrotoluene	EPA 8270C	ND	-----	6 36	mg/kg dry	4x	8100535	10/14/08 18:45	10/17/08 22:43	lqn	
Bis(2-ethylhexyl)phthalate	"	ND	-----	25 5	"	"	"	"	"	lqn	
Fluoranthene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Fluorene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Hexachlorobenzene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Hexachlorobutadiene	"	ND	-----	12 7	"	"	"	"	"	lqn	
Hexachlorocyclopentadiene	"	ND	-----	12 7	"	"	"	"	"	lqn	
Hexachloroethane	"	ND	-----	12 7	"	"	"	"	"	lqn	
Indeno (1,2,3-cd) pyrene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Isophorone	"	ND	-----	4 20	"	"	"	"	"	lqn	
2-Methylnaphthalene	"	ND	-----	4 20	"	"	"	"	"	lqn	
2-Methylphenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
3-,4-Methylphenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
Naphthalene	"	**4.50**	-----	4 20	"	"	"	"	"	lqn	
2-Nitroaniline	"	ND	-----	4 20	"	"	"	"	"	lqn	
3-Nitroaniline	"	ND	-----	12 7	"	"	"	"	"	lqn	
4-Nitroaniline	"	ND	-----	4 20	"	"	"	"	"	lqn	
Nitrobenzene	"	ND	-----	4 20	"	"	"	"	"	lqn	
2-Nitrophenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
4-Nitrophenol	"	ND	-----	12 7	"	"	"	"	"	lqn	
N-Nitrosodi-n-propylamine	"	ND	-----	4 20	"	"	"	"	"	lqn	
N-Nitrosodiphenylamine	"	ND	-----	4 20	"	"	"	"	"	lqn	
Pentachlorophenol	"	ND	-----	12 7	"	"	"	"	"	lqn	
Phenanthrene	"	ND	-----	4 20	"	"	"	"	"	lqn	
Phenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
Pyrene	"	ND	-----	4 20	"	"	"	"	"	lqn	
1,2,4-Trichlorobenzene	"	ND	-----	12 7	"	"	"	"	"	lqn	
2,4,5-Trichlorophenol	"	ND	-----	4 20	"	"	"	"	"	lqn	
2,4,6-Trichlorophenol	"	ND	-----	4 20	"	"	"	"	"	lqn	

Surrogate(s):	*2-Fluorobiphenyl*	*102%*	*30 - 126 %*	"	"
	2-Fluorophenol	*83.3%*	*28 - 119 %*	"	"
	Nitrobenzene-d5	*91.3%*	*26 - 117 %*	"	"
	Phenol-d6	*88.4%*	*35 - 125 %*	"	"
	p-Terphenyl-d14	*71.7%*	*26 - 143 %*	"	"
	2,4,6-Tribromophenol	*83.1%*	*30 - 127 %*	"	"

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Percent Dry Weight (Solids) per Standard Methods

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0020-01 (KTN-10-08)		**Soil**				**Sampled: 10/03/08 13:42**					
% Solids	NCA SOP	**62.7**	-----	0 0100	% by Weight	1x	8100966	10/24/08 12:24	10/24/08 12:24	MJP	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Diesel Range Organics (C10-C25) per AK102 - Laboratory Quality Control Results

TestAmerica Anchorage

QC Batch: 8100018 **Soil Preparation Method: EPA 3545**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100018-BLK1)								**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	ND	---	20 0	mg/kg wet	1x	--	--	--	--	--	--	10/09/08 12:10	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 99.3%*			*Limits: 50-150%*	"							*10/09/08 12:10*	
LCS (8100018-BS1)								**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	143	---	20 0	mg/kg wet	1x	--	129	111%	(75-125)	--	--	10/09/08 12:42	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 105%*			*Limits: 60-120%*	"							*10/09/08 12:42*	
LCS Dup (8100018-BSD1)								**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	145	---	20 0	mg/kg wet	1x	--	129	112%	(75-125)	0 853%	(20)	10/09/08 13:13	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 103%*			*Limits: 60-120%*	"							*10/09/08 13:13*	
Duplicate (8100018-DUP1)					**QC Source: ARJ0015-11**			**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	42 2	---	20 9	mg/kg dry	1x	42 5	--	--	--	0 686%	(20)	10/09/08 12:10	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 123%*			*Limits: 50-150%*	"							*10/09/08 12:10*	
Matrix Spike (8100018-MS1)					**QC Source: ARJ0015-11**			**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	208	---	21 3	mg/kg dry	1x	42 5	137	121%	(75-125)	--	--	10/09/08 13:13	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 127%*			*Limits: 50-150%*	"							*10/09/08 13:13*	
Matrix Spike Dup (8100018-MSD1)					**QC Source: ARJ0015-11**			**Extracted: 10/08/08 14:31**						
Diesel Range Organics	AK 102	211	---	21 1	mg/kg dry	1x	42 5	136	124%	(75-125)	1 48%	(25)	10/09/08 13:45	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 129%*			*Limits: 50-150%*	"							*10/09/08 13:45*	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Physical Parameters by APHA/ASTM/EPA Methods - Laboratory Quality Control Results

TestAmerica Anchorage

QC Batch: 8100019 **Soil Preparation Method: *** DEFAULT PREP**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100019-DUP1)				**QC Source: ARJ0017-04**					**Extracted: 10/08/08 14:32**					
Dry Weight	TA-SOP	70 4	---	1 00	%	1x	70 3	--	--	--	0 201%	(25)	10/09/08 09:25	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Gasoline Range Organics (C6-C10) per AK101-MS - Laboratory Quality Control Results

TestAmerica Anchorage

QC Batch: 8100023 **Soil Preparation Method: AK101 Field Prep**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100023-BLK1)								Extracted: 10/10/08 08:56						
Gasoline Range Organics	AK101 - MS	ND	---	3 33	mg/kg wet	1x	--	--	--	--	--	--	10/10/08 17:47	
Surrogate(s): *4-BFB*		*Recovery:* *99.9%*			*Limits:* *80-120%*	"							*10/10/08 17:47*	
Dibromofluoromethane		*102%*			*80-120%*	"							"	
a,a,a-TFT		*103%*			*50-150%*	"							"	
Toluene-d8		*96.8%*			*80-120%*	"							"	
LCS (8100023-BS1)								Extracted: 10/10/08 08:56						
Gasoline Range Organics	AK101 - MS	21 4	---	3 33	mg/kg wet	1x	--	22 0	97 4%	(60-120)	--	--	10/10/08 16:39	
Surrogate(s): *4-BFB*		*Recovery:* *98.2%*			*Limits:* *80-120%*	"							*10/10/08 16:39*	
Dibromofluoromethane		*105%*			*80-120%*	"							"	
Toluene-d8		*96.8%*			*80-120%*	"							"	
a,a,a-TFT		*101%*			*80-120%*	"							"	
LCS Dup (8100023-BSD1)								Extracted: 10/10/08 08:56						
Gasoline Range Organics	AK101 - MS	22 1	---	3 33	mg/kg wet	1x	--	22 0	100%	(60-120)	3 04%	(20)	10/10/08 17:13	
Surrogate(s): *4-BFB*		*Recovery:* *99.5%*			*Limits:* *80-120%*	"							*10/10/08 17:13*	
Dibromofluoromethane		*104%*			*80-120%*	"							"	
Toluene-d8		*98.4%*			*80-120%*	"							"	
a,a,a-TFT		*103%*			*80-120%*	"							"	
Duplicate (8100023-DUP1)					QC Source: ARJ0025-02			Extracted: 10/10/08 08:56						
Gasoline Range Organics	AK101 - MS	ND	---	3 62	mg/kg dry	3x	ND	--	--	--		(35 8)	10/10/08 18:21	
Surrogate(s): *4-BFB*		*Recovery:* *99.4%*			*Limits:* *80-120%*	"							*10/10/08 18:21*	
Dibromofluoromethane		*102%*			*80-120%*	"							"	
Toluene-d8		*98.1%*			*80-120%*	"							"	
a,a,a-TFT		*123%*			*50-150%*	"							"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100541 **Other wet Preparation Method: EPA 3050**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100541-BLK1)								Extracted: 10/14/08 11:17						
Arsenic	EPA 6010B	ND	---	25 0	mg/kg wet	1x	--	--	--	--	--	--	10/15/08 19:24	
Barium	"	ND	---	0 500	"	"	--	--	--	--	--	--	"	
Cadmium	"	ND	---	3 00	"	"	--	--	--	--	--	--	"	
Chromium	"	ND	---	1 50	"	"	--	--	--	--	--	--	"	
Lead	"	ND	---	10 0	"	"	--	--	--	--	--	--	"	
Selenium	"	ND	---	25 0	"	"	--	--	--	--	--	--	"	
Silver	"	ND	---	3 00	"	"	--	--	--	--	--	--	"	
LCS (8100541-BS1)								Extracted: 10/14/08 11:17						
Arsenic	EPA 6010B	0 496	---	0 248	mg/kg wet	1x	--	0 495	100%	(80-120)	--	--	10/15/08 19:30	
Barium	"	2 42	---	0 00495	"	"	--	2 48	97 8%	"	--	--	"	
Cadmium	"	0 248	---	0 0297	"	"	--	0 248	100%	"	--	--	"	
Chromium	"	0 502	---	0 0149	"	"	--	0 495	101%	"	--	--	"	
Lead	"	0 492	---	0 0990	"	"	--	"	99 4%	"	--	--	"	
Selenium	"	0 469	---	0 248	"	"	--	"	94 8%	"	--	--	"	
Silver	"	0 222	---	0 0297	"	"	--	0 248	89 7%	"	--	--	"	
Duplicate (8100541-DUP1)					QC Source: PRI0169-02				Extracted: 10/14/08 11:17					
Arsenic	EPA 6010B	ND	---	46 0	mg/kg dry	1x	ND	--	--	--	8 07%	(20)	10/15/08 19:43	
Barium	"	139	---	0 919	"	"	134	--	--	--	3 88%	"	"	
Cadmium	"	ND	---	5 51	"	"	ND	--	--	--	12 8%	"	"	
Chromium	"	27 9	---	2 76	"	"	26 3	--	--	--	5 68%	"	"	
Lead	"	ND	---	18 4	"	"	ND	--	--	--	4 53%	(40)	"	
Selenium	"	ND	---	46 0	"	"	ND	--	--	--	NR	(20)	"	
Silver	"	ND	---	5 51	"	"	ND	--	--	--	0 814%	"	"	
Matrix Spike (8100541-MS1)					QC Source: PRI0169-02				Extracted: 10/14/08 11:17					
Arsenic	EPA 6010B	77 5	---	44 6	mg/kg dry	1x	5 05	89 2	81 2%	(75-125)	--	--	10/15/08 19:49	
Barium	"	508	---	0 892	"	"	134	446	83 8%	"	--	--	"	
Cadmium	"	36 6	---	5 35	"	"	0 618	44 6	80 7%	"	--	--	"	
Chromium	"	105	---	2 68	"	"	26 3	89 2	87 8%	"	--	--	"	
Lead	"	83 7	---	17 8	"	"	12 7	"	79 6%	"	--	--	"	
Selenium	"	66 2	---	44 6	"	"	ND	"	74 2%	"	--	--	"	M8
Silver	"	35 9	---	5 35	"	"	0 331	44 6	79 8%	"	--	--	"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100541 **Other wet Preparation Method: EPA 3050**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike (8100541-MS2)					**QC Source: ARJ0020-01**			**Extracted: 10/14/08 11:17**						
Arsenic	EPA 6010B	279	---	40 3	mg/kg dry	1x	192	80 6	107%	(75-125)	--	--	10/15/08 21:45	
Barium	"	465	---	0 806	"	"	104	403	89 6%	"	--	--	"	
Cadmium	"	41 4	---	4 83	"	"	1 52	40 3	99 0%	"	--	--	"	
Chromium	"	112	---	2 42	"	"	40 7	80 6	89 2%	"	--	--	"	
Lead	"	159	---	16 1	"	"	119	"	50 1%	"	--	--	"	M8
Selenium	"	73 5	---	40 3	"	"	1 04	"	90 0%	"	--	--	"	
Silver	"	37 7	---	4 83	"	"	0 347	40 3	92 8%	"	--	--	"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Total Mercury per EPA Method 7471A - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100351 **Soil Preparation Method: EPA 7471A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100351-BLK1)									**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	ND	---	0 100	mg/kg wet	1x	--	--	--	--	--	--	10/09/08 13:27	
LCS (8100351-BS1)									**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	0 672	---	0 100	mg/kg wet	1x	--	0 625	107%	(80-120)	--	--	10/09/08 13:29	
LCS Dup (8100351-BSD1)									**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	0 672	---	0 100	mg/kg wet	1x	--	0 625	107%	(80-120)	0 0301%	(20)	10/09/08 13:32	
Duplicate (8100351-DUP1)				**QC Source: PRJ0267-02**					**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	ND	---	0 0826	mg/kg dry	1x	ND	--	--	--	NR	(40)	10/09/08 13:35	
Matrix Spike (8100351-MS1)				**QC Source: PRJ0267-02**					**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	0 540	---	0 0811	mg/kg dry	1x	ND	0 507	106%	(75-125)	--	--	10/09/08 13:37	
Matrix Spike Dup (8100351-MSD1)				**QC Source: PRJ0267-02**					**Extracted: 10/09/08 10:40**					
Mercury	EPA 7471A	0 542	---	0 0796	mg/kg dry	1x	ND	0 498	109%	(75-125)	0 436%	(40)	10/09/08 13:40	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Volatile Organic Compounds per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100514 **Soil Preparation Method: EPA 5035A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100514-BLK1)								Extracted: 10/14/08 09:00						
Acetone	EPA 8260B	ND	---	2480	ug/kg wet	1x	--	--	--	--	--	--	10/14/08 11 53	
Benzene	"	ND	---	19 8	"	"	--	--	--	--	--	--	"	
Bromobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Bromochloromethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Bromodichloromethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Bromoform	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Bromomethane	"	ND	---	496	"	"	--	--	--	--	--	--	"	
2-Butanone (MEK)	"	ND	---	992	"	"	--	--	--	--	--	--	"	
n-Butylbenzene	"	ND	---	496	"	"	--	--	--	--	--	--	"	
sec-Butylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
tert-Butylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Carbon disulfide	"	ND	---	992	"	"	--	--	--	--	--	--	"	
Carbon tetrachloride	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Chlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Chloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Chloroform	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Chloromethane	"	ND	---	496	"	"	--	--	--	--	--	--	"	
2-Chlorotoluene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
4-Chlorotoluene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2-Dibromo-3-chloropropane	"	ND	---	496	"	"	--	--	--	--	--	--	"	
Dibromochloromethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2-Dibromoethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Dibromomethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2-Dichlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,3-Dichlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,4-Dichlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Dichlorodifluoromethane	"	ND	---	496	"	"	--	--	--	--	--	--	"	
1,1-Dichloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2-Dichloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1-Dichloroethene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
cis-1,2-Dichloroethene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
trans-1,2-Dichloroethene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2-Dichloropropane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,3-Dichloropropane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
2,2-Dichloropropane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1-Dichloropropene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
cis-1,3-Dichloropropene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
trans-1,3-Dichloropropene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Volatile Organic Compounds per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100514 **Soil Preparation Method: EPA 5035A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100514-BLK1)								**Extracted: 10/14/08 09:00**						
Hexachlorobutadiene	EPA 8260B	ND	---	397	ug/kg wet	1x	--	--	--	--	--	--	10/14/08 11 53	
2-Hexanone	"	ND	---	992	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	198	"	"	--	--	--	--	--	--	"	
p-Isopropyltoluene	"	ND	---	198	"	"	--	--	--	--	--	--	"	
4-Methyl-2-pentanone	"	ND	---	496	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Methylene chloride	"	ND	---	496	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	198	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Styrene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1,1,2-Tetrachloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1,2,2-Tetrachloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Tetrachloroethene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2,3-Trichlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2,4-Trichlorobenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1,1-Trichloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,1,2-Trichloroethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Trichloroethene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Trichlorofluoromethane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2,3-Trichloropropane	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
Vinyl chloride	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
o-Xylene	"	ND	---	99 2	"	"	--	--	--	--	--	--	"	
m,p-Xylene	"	ND	---	198	"	"	--	--	--	--	--	--	"	

Surrogate(s):	*4-BFB*	*Recovery:*	*107%*	*Limits:* *75-125%*	*0.01x*	*10/14/08 11:53*
	1,2-DCA-d4		*102%*	*75-125%*	*"*	*"*
	Dibromofluoromethane		*99.4%*	*75-125%*	*"*	*"*
	Toluene-d8		*103%*	*75-125%*	*"*	*"*

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Volatile Organic Compounds per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100514 **Soil Preparation Method: EPA 5035A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS (8100514-BS1)								Extracted: 10/14/08 09:00						
Benzene	EPA 8260B	2110	---	20 0	ug/kg wet	1x	--	2000	105%	(81 9-125)	--	--	10/14/08 09 50	
Chlorobenzene	"	2130	---	100	"	"	--	"	106%	(79 2-125)	--	--	"	
1,1-Dichloroethene	"	2040	---	100	"	"	--	"	102%	(66 1-125)	--	--	"	
Toluene	"	2110	---	100	"	"	--	"	106%	(80-125)	--	--	"	
Trichloroethene	"	2090	---	100	"	"	--	"	105%	(76-125)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 101%*			*Limits: 75-125%*	*0.01x*							*10/14/08 09:50*	
1,2-DCA-d4		*101%*			*75-125%*	"							"	
Dibromofluoromethane		*101%*			*75-125%*	"							"	
Toluene-d8		*102%*			*75-125%*	"							"	
Matrix Spike (8100514-MS1)					QC Source: PRJ0435-01			Extracted: 10/14/08 09:00						
Benzene	EPA 8260B	2090	---	18 5	ug/kg dry	1x	ND	1710	122%	(68 5-150)	--	--	10/14/08 10:27	
Chlorobenzene	"	2110	---	92 4	"	"	ND	"	124%	(65 9-150)	--	--	"	
1,1-Dichloroethene	"	2030	---	92 4	"	"	ND	"	119%	(55 8-150)	--	--	"	
Toluene	"	2140	---	92 4	"	"	ND	"	125%	(70 3-150)	--	--	"	
Trichloroethene	"	2060	---	92 4	"	"	ND	"	120%	(65 5-150)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 107%*			*Limits: 75-125%*	*0.01x*							*10/14/08 10:27*	
1,2-DCA-d4		*101%*			*75-125%*	"							"	
Dibromofluoromethane		*105%*			*75-125%*	"							"	
Toluene-d8		*106%*			*75-125%*	"							"	
Matrix Spike Dup (8100514-MSD1)					QC Source: PRJ0435-01			Extracted: 10/14/08 09:00						
Benzene	EPA 8260B	2030	---	18 5	ug/kg dry	1x	ND	1710	119%	(68 5-150)	2 78%	(25)	10/14/08 10 56	
Chlorobenzene	"	2050	---	92 4	"	"	ND	"	120%	(65 9-150)	3 15%	"	"	
1,1-Dichloroethene	"	1950	---	92 4	"	"	ND	"	114%	(55 8-150)	4 08%	"	"	
Toluene	"	2060	---	92 4	"	"	ND	"	121%	(70 3-150)	3 65%	"	"	
Trichloroethene	"	2000	---	92 4	"	"	ND	"	117%	(65 5-150)	3 05%	"	"	
Surrogate(s): 4-BFB		*Recovery: 109%*			*Limits: 75-125%*	*0.01x*							*10/14/08 10:56*	
1,2-DCA-d4		*108%*			*75-125%*	"							"	
Dibromofluoromethane		*108%*			*75-125%*	"							"	
Toluene-d8		*110%*			*75-125%*	"							"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100535 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100535-BLK1)								Extracted: 10/14/08 18:45						
Acenaphthene	EPA 8270C	ND	---	0 329	mg/kg wet	1x	--	--	--	--	--	--	10/16/08 14:16	
Acenaphthylene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Benzoic Acid	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Benzyl alcohol	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
4-Bromophenyl phenyl ether	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Butyl benzyl phthalate	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
4-Chloro-3-methylphenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
4-Chloroaniline	"	ND	---	2 00	"	"	--	--	--	--	--	--	"	
Bis(2-chloroethoxy)methane	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Bis(2-chloroethyl)ether	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Bis(2-chloroisopropyl)ether	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Chloronaphthalene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Chlorophenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
4-Chlorophenyl phenyl ether	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Di-n-butyl phthalate	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Di-n-octyl phthalate	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Dibenzofuran	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
1,2-Dichlorobenzene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
1,3-Dichlorobenzene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
1,4-Dichlorobenzene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
3,3 -Dichlorobenzidine	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
2,4-Dichlorophenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Diethyl phthalate	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2,4-Dimethylphenol	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Dimethyl phthalate	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
4,6-Dinitro-2-methylphenol	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
2,4-Dinitrophenol	"	ND	---	2 00	"	"	--	--	--	--	--	--	"	
2,4-Dinitrotoluene	"	ND	---	0 499	"	"	--	--	--	--	--	--	"	
2,6-Dinitrotoluene	"	ND	---	0 499	"	"	--	--	--	--	--	--	"	
Bis(2-ethylhexyl)phthalate	"	ND	---	2 00	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100535 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100535-BLK1)								Extracted: 10/14/08 18:45						
Fluorene	EPA 8270C	ND	---	0 329	mg/kg wet	1x	--	--	--	--	--	--	10/16/08 14:16	
Hexachlorobenzene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Hexachlorobutadiene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Hexachlorocyclopentadiene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Hexachloroethane	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Isophorone	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Methylnaphthalene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Methylphenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
3-,4-Methylphenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Nitroaniline	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
3-Nitroaniline	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
4-Nitroaniline	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Nitrobenzene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2-Nitrophenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
4-Nitrophenol	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
N-Nitrosodi-n-propylamine	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
N-Nitrosodiphenylamine	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Pentachlorophenol	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Phenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
1,2,4-Trichlorobenzene	"	ND	---	0 998	"	"	--	--	--	--	--	--	"	
2,4,5-Trichlorophenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	
2,4,6-Trichlorophenol	"	ND	---	0 329	"	"	--	--	--	--	--	--	"	

Surrogate(s):	*2-Fluorobiphenyl*	*Recovery: 104%*	*Limits: 30-126%*	"	*10/16/08 14:16*
	2-Fluorophenol	*91.6%*	*28-119%*	"	"
	Nitrobenzene-d5	*90.5%*	*26-117%*	"	"
	Phenol-d6	*100%*	*35-125%*	"	"
	p-Terphenyl-d14	*128%*	*26-143%*	"	"
	2,4,6-Tribromophenol	*88.0%*	*30-127%*	"	"

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100535 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS (8100535-BS1)								Extracted: 10/14/08 18:45						
Acenaphthene	EPA 8270C	2 18	---	0 329	mg/kg wet	1x	--	2 50	87 4%	(46-120)	--	--	10/16/08 14:38	
4-Chloro-3-methylphenol	"	2 11	---	0 329	"	"	--	"	84 6%	(36-138)	--	--	"	
2-Chlorophenol	"	2 01	---	0 329	"	"	--	"	80 7%	(18-137)	--	--	"	
1,4-Dichlorobenzene	"	1 96	---	0 998	"	"	--	"	78 5%	(7-135)	--	--	"	
2,4-Dinitrotoluene	"	2 22	---	0 499	"	"	--	"	89 0%	(49-125)	--	--	"	
4-Nitrophenol	"	2 21	---	0 998	"	"	--	"	88 5%	(40-148)	--	--	"	
N-Nitrosodi-n-propylamine	"	2 35	---	0 329	"	"	--	"	94 1%	(20-138)	--	--	"	
Pentachlorophenol	"	1 62	---	0 998	"	"	--	"	65 1%	(22-129)	--	--	"	
Phenol	"	1 87	---	0 329	"	"	--	"	74 8%	(37-122)	--	--	"	
Pyrene	"	2 48	---	0 329	"	"	--	"	99 3%	(26-143)	--	--	"	
1,2,4-Trichlorobenzene	"	2 06	---	0 998	"	"	--	"	82 7%	(25-129)	--	--	"	
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 91.8%*			*Limits: 30-126%*	"							*10/16/08 14:38*	
2-Fluorophenol		*81.6%*			*28-119%*	"							"	
Nitrobenzene-d5		*82.1%*			*26-117%*	"							"	
Phenol-d6		*88.1%*			*35-125%*	"							"	
p-Terphenyl-d14		*119%*			*26-143%*	"							"	
2,4,6-Tribromophenol		*101%*			*30-127%*	"							"	
Matrix Spike (8100535-MS1)					QC Source: PRI0169-02			Extracted: 10/14/08 18:45						
Acenaphthene	EPA 8270C	3 54	---	2 42	mg/kg dry	4x	ND	4 59	77 2%	(26-150)	--	--	10/16/08 16:28	
4-Chloro-3-methylphenol	"	3 52	---	2 42	"	"	ND	"	76 7%	"	--	--	"	
2-Chlorophenol	"	3 26	---	2 42	"	"	ND	"	71 0%	(8-150)	--	--	"	
1,4-Dichlorobenzene	"	2 96	---	7 34	"	"	ND	"	64 6%	(4-150)	--	--	"	
2,4-Dinitrotoluene	"	3 52	---	3 67	"	"	ND	"	76 7%	(32-150)	--	--	"	
4-Nitrophenol	"	3 60	---	7 34	"	"	ND	"	78 6%	(20-175)	--	--	"	
N-Nitrosodi-n-propylamine	"	3 21	---	2 42	"	"	ND	"	70 1%	(10-150)	--	--	"	
Pentachlorophenol	"	2 61	---	7 34	"	"	ND	"	56 8%	(12-150)	--	--	"	
Phenol	"	3 01	---	2 42	"	"	ND	"	65 6%	(17-150)	--	--	"	
Pyrene	"	3 99	---	2 42	"	"	0 259	"	81 4%	(16-175)	--	--	"	
1,2,4-Trichlorobenzene	"	3 11	---	7 34	"	"	ND	"	67 7%	(18-150)	--	--	"	
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 61.4%*			*Limits: 30-126%*	"							*10/16/08 16:28*	
2-Fluorophenol		*57.5%*			*28-119%*	"							"	
Nitrobenzene-d5		*60.8%*			*26-117%*	"							"	
Phenol-d6		*61.4%*			*35-125%*	"							"	
p-Terphenyl-d14		*68.4%*			*26-143%*	"							"	
2,4,6-Tribromophenol		*60.9%*			*30-127%*	"							"	

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Semivolatile Organic Compounds per EPA Method 8270C - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8100535 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (8100535-MSD1)					QC Source: PRI0169-02				Extracted: 10/14/08 18:45					
Acenaphthene	EPA 8270C	3 49	---	2 40	mg/kg dry	4x	ND	4 54	77 0%	(26-150)	1 34%	(60)	10/16/08 16 50	
4-Chloro-3-methylphenol	"	3 57	---	2 40	"	"	ND	"	78 6%	"	1 34%	"	"	
2-Chlorophenol	"	3 09	---	2 40	"	"	ND	"	68 1%	(8-150)	5 21%	"	"	
1,4-Dichlorobenzene	"	2 85	---	7 27	"	"	ND	"	62 7%	(4-150)	3 93%	"	"	
2,4-Dinitrotoluene	"	3 52	---	3 63	"	"	ND	"	77 5%	(32-150)	0 0447%	"	"	
4-Nitrophenol	"	4 15	---	7 27	"	"	ND	"	91 5%	(20-175)	14 2%	"	"	
N-Nitrosodi-n-propylamine	"	3 17	---	2 40	"	"	ND	"	69 8%	(10-150)	1 45%	"	"	
Pentachlorophenol	"	2 84	---	7 27	"	"	ND	"	62 5%	(12-150)	8 49%	"	"	
Phenol	"	3 00	---	2 40	"	"	ND	"	66 0%	(17-150)	0 345%	"	"	
Pyrene	"	3 77	---	2 40	"	"	0 259	"	77 3%	(16-175)	5 76%	"	"	
1,2,4-Trichlorobenzene	"	2 90	---	7 27	"	"	ND	"	63 8%	(18-150)	6 91%	"	"	

Surrogate(s):	*2-Fluorobiphenyl*	*Recovery:*	*74.7%*	*Limits: 30-126%*	"	*10/16/08 16:50*
	2-Fluorophenol		*71.1%*	*28-119%*	"	"
	Nitrobenzene-d5		*72.1%*	*26-117%*	"	"
	Phenol-d6		*77.8%*	*35-125%*	"	"
	p-Terphenyl-d14		*82.0%*	*26-143%*	"	"
	2,4,6-Tribromophenol		*77.1%*	*30-127%*	"	"

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

Apex Environmental	Project Name:	**Ketchikan**	
9410 E. 51sr Suite G	Project Number:	[none]	Report Created:
Tulsa, USA/OK 74145	Project Manager:	Scott Ferguson	10/28/08 11:49

Notes and Definitions

Report Specific Notes:

C	-	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
M8	-	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
RL3	-	Reporting limit raised due to high concentrations of non-target analytes.
RL7	-	Sample required dilution due to high concentrations of target analyte.
Z3	-	The sample required a dilution due to the nature of the sample matrix. Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica Anchorage

Troy Engstrom

Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 X

CHAIN OF CUSTODY REPORT

Work Order #: ARJ0020

CLIENT: APEX COMPANIES

REPORT TO: SCOTT FERGUSON
ADDRESS: APEX COMPANIES
9410 E. 51ST ST SUITE G
TULSA OK 74145
PHONE: 918-610-3543 FAX:

INVOICE TO: SAME

P.O. NUMBER: AK-2710.108

PROJECT NAME:

PROJECT NUMBER:

SAMPLED BY: MICHAEL LANDSMAN

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: X STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: X STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: COOL | COOL | COOL | MEOH ANOL

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	RCRA8 GAS/GRA	DRO AK101	SVOCs 8270C	GRO AK101	VOCs 8260B	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	KTN-10-08	10/03/08 1342	✓	✓	✓	✓	✓	S	8		1
2											
3											
4											
5											
6											
7											
8											
9											
10											

RELEASED BY:		DATE: 10/6/08	RECEIVED BY: EDD ALASKAAIR BILL		DATE:
PRINT NAME: Michael Landsman	FIRM: APEX	TIME: 0830	PRINT NAME: 73132544	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE: 10/6/08
PRINT NAME:	FIRM:	TIME:	PRINT NAME: Kyle Burrows	FIRM: TestAmerica AK	TIME: 1705

ADDITIONAL REMARKS:

TEMP: 0.7

PAGE 1 OF 1

TAL-1000(0408)

Test America Anchorage Cooler Receipt Form

(Army Corps. Compliant)

WORK ORDER # AR30020 **CLIENT:** APEX **PROJECT:** Ketchikan

Date /Time Cooler Arrived 10 / 6 / 08 17 : 05 Cooler signed for by: Kyle Burrows (Print name)

Preliminary Examination Phase:

Date cooler opened: ☒ same as date received *or* ____/____/____

Cooler opened by (print) Kyle Burrows (sign) [signature]

1. Delivered by ☒ ALASKA AIRLINES ☐ Fed-Ex ☐ UPS ☐ NAC ☐ LYNDEN ☐ CLIENT ☐ Other: ____

   Shipment Tracking # if applicable ____ (include copy of shipping papers in file)

2. Number of Custody Seals 2 Signed by Michael Landsman Date 10 / 6 / 08

   Were custody seals unbroken and intact on arrival? ☒ Yes ☐ No

3. Were custody papers sealed in a plastic bag? ☒ Yes ☐ No

4. Were custody papers filled out properly (ink, signed, etc.)? ☒ Yes ☐ No

5. Did you sign the custody papers in the appropriate place? ☒ Yes ☐ No

6. Was ice used? ☒ Yes ☐ No Type of ice: ☐ blue ice ☒ gel ice ☐ real ice ☐ dry ice Condition of Ice: melting

   Temperature by Digi-Thermo Probe 0.7 °C Thermometer # Rec #3
   Acceptance Criteria: 0 - 6°C

7. Packing in Cooler: ☒ bubble wrap ☒ ~~styro~~foam ☐ cardboard ☐ Other: ____

8. Did samples arrive in plastic bags? ☒ Yes ☐ No

9. Did all bottles arrive unbroken, and with labels in good condition? ☒ Yes ☐ No

10. Are all bottle labels complete (ID, date, time, etc.) ☒ Yes ☐ No

11. Do bottle labels and Chain of Custody agree? ☒ Yes ☐ No

12. Are the containers and preservatives correct for the tests indicated? ☒ Yes ☐ No

13. Conoco Phillips, Alyeska, BP H2O samples only: pH < 2? ☐ Yes ☐ No ☒ N/A

14. Is there adequate volume for the tests requested? ☒ Yes ☐ No

15. Were VOA vials free of bubbles? ☒ N/A ☐ Yes ☐ No

    If "NO" which containers contained "head space" or bubbles? ____

Log-in Phase:

Date of sample log-in 10 / 7 / 08

Samples logged in by (print) Kyle Burrows (sign) [signature]

1. Was project identifiable from custody papers? ☒ Yes ☐ No
2. Do Turn Around Times and Due Dates agree? ☒ Yes ☐ No
3. Was the Project Manager notified of status? ☒ Yes ☐ No
4. Was the Lab notified of status? ☒ Yes ☐ No
5. Was the COC scanned and copied? ☒ Yes ☐ No

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
149077

Custody Seal 10/6/07

DATE

SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
149077

Custody Seal 10/6/07

DATE

SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
149067

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
149067

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

November 03, 2008

Steve Wrenn
MACTEC Engineering and Consulting
601 East 57th Place
Anchorage, AK/USA 99518

RE: Kolmakof Mine Site

Enclosed are the results of analyses for samples received by the laboratory on 10/06/08 15:19.
The following list is a summary of the Work Orders contained in this report, generated on 11/03/08 16:43.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
ARJ0019	Kolmakof Mine Site	[none]

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
08KMS51SL	ARJ0019-01	Soil	09/27/08 11:46	10/06/08 15:19
08KMS52SL	ARJ0019-02	Soil	09/27/08 11:50	10/06/08 15:19
08KMS53SL	ARJ0019-03	Soil	09/27/08 11:55	10/06/08 15:19
08KMS54SL	ARJ0019-04	Soil	09/27/08 12:00	10/06/08 15:19
08KMS55SL	ARJ0019-05	Soil	09/27/08 12:10	10/06/08 15:19
08KMS56SL	ARJ0019-06	Soil	09/27/08 12:15	10/06/08 15:19
08KMS57SL	ARJ0019-07	Soil	09/27/08 12:25	10/06/08 15:19
08KMS58SL	ARJ0019-08	Soil	09/27/08 12:30	10/06/08 15:19
08KMS59SL	ARJ0019-09	Soil	09/27/08 12:35	10/06/08 15:19
08KMS60SL	ARJ0019-10	Soil	09/27/08 12:40	10/06/08 15:19
08KMS61SL	ARJ0019-11	Soil	09/27/08 15:20	10/06/08 15:19
08KMS62SL	ARJ0019-12	Soil	09/27/08 15:25	10/06/08 15:19
08KMS63SL	ARJ0019-13	Soil	09/27/08 15:30	10/06/08 15:19
08KMS66SL	ARJ0019-14	Soil	09/27/08 15:50	10/06/08 15:19
08KMS67SL	ARJ0019-15	Soil	09/27/08 15:55	10/06/08 15:19
08KMS70SL	ARJ0019-16	Soil	09/27/08 16:30	10/06/08 15:19
08KMS71SL	ARJ0019-17	Soil	09/27/08 16:35	10/06/08 15:19
08KMS72SL	ARJ0019-18	Soil	09/27/08 18:05	10/06/08 15:19
08KMS73SL	ARJ0019-19	Soil	09/27/08 18:10	10/06/08 15:19
08KMS74SL	ARJ0019-20	Soil	09/27/08 18:15	10/06/08 15:19
08KMS75SL	ARJ0019-21	Soil	09/27/08 18:20	10/06/08 15:19
08KMS76SL	ARJ0019-22	Soil	09/27/08 18:25	10/06/08 15:19
08KMS79SL	ARJ0019-23	Soil	09/27/08 18:40	10/06/08 15:19
08KMS80SL	ARJ0019-24	Soil	09/27/08 18:50	10/06/08 15:19
08KMS81SL	ARJ0019-25	Soil	09/28/08 16:15	10/06/08 15:19
08KMS82SL	ARJ0019-26	Soil	09/28/08 16:20	10/06/08 15:19
08KMS83SL	ARJ0019-27	Soil	09/28/08 16:40	10/06/08 15:19
08KMS84SL	ARJ0019-28	Soil	09/28/08 16:45	10/06/08 15:19
08KMS85SL	ARJ0019-29	Soil	09/28/08 17:10	10/06/08 15:19
08KMS86SL	ARJ0019-30	Soil	09/28/08 17:15	10/06/08 15:19
08KMS87SL	ARJ0019-31	Soil	09/28/08 18:15	10/06/08 15:19
08KMS88SL	ARJ0019-32	Soil	09/28/08 18:20	10/06/08 15:19
08KMS89SL	ARJ0019-33	Soil	09/28/08 18:30	10/06/08 15:19
08KMS90SL	ARJ0019-34	Soil	09/28/08 18:35	10/06/08 15:19
08KMS91SL	ARJ0019-35	Soil	09/28/08 18:40	10/06/08 15:19

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
08KMS92SL	ARJ0019-36	Soil	09/28/08 18:55	10/06/08 15:19
08KMS100SL	ARJ0019-37	Soil	09/30/08 18:51	10/06/08 15:19
08KMS101SL	ARJ0019-38	Soil	09/30/08 18:58	10/06/08 15:19
08KMS102SL	ARJ0019-39	Soil	09/30/08 19:05	10/06/08 15:19
08KMS103SL	ARJ0019-40	Soil	09/30/08 19:13	10/06/08 15:19
08KMS104SL	ARJ0019-41	Soil	09/30/08 19:20	10/06/08 15:19
08KMS105SL	ARJ0019-42	Soil	09/30/08 19:40	10/06/08 15:19

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-01 (08KMS51SL)		**Soil**				**Sampled: 09/27/08 11:46**					
Arsenic	EPA 6010C	**10.4**	-----	4 11	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:25	ICP	
Chromium	"	**24.8**	-----	0 821	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.268**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:16	ZZZ	
Nickel	EPA 6010C	**20.0**	-----	2 46	"	"	8100129	10/16/08 10:55	10/18/08 00:25	ICP	
ARJ0019-02 (08KMS52SL)		**Soil**				**Sampled: 09/27/08 11:50**					
Arsenic	EPA 6010C	ND	-----	5 94	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:31	ICP	
Chromium	"	**6.88**	-----	1 19	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.227**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:19	ZZZ	
Nickel	EPA 6010C	**5.82**	-----	3 56	"	"	8100129	10/16/08 10:55	10/18/08 00:31	ICP	
ARJ0019-03 (08KMS53SL)		**Soil**				**Sampled: 09/27/08 11:55**					
Arsenic	EPA 6010C	**51.8**	-----	5 24	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:37	ICP	
Chromium	"	**22.8**	-----	1 05	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.185**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:21	ZZZ	
Nickel	EPA 6010C	**14.4**	-----	3 14	"	"	8100129	10/16/08 10:55	10/18/08 00:37	ICP	
ARJ0019-04 (08KMS54SL)		**Soil**				**Sampled: 09/27/08 12:00**					
Arsenic	EPA 6010C	ND	-----	4 03	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:42	ICP	
Chromium	"	**22.1**	-----	0 805	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.176**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:23	ZZZ	
Nickel	EPA 6010C	**17.2**	-----	2 42	"	"	8100129	10/16/08 10:55	10/18/08 00:42	ICP	
ARJ0019-05 (08KMS55SL)		**Soil**				**Sampled: 09/27/08 12:10**					
Arsenic	EPA 6010C	**20.2**	-----	5 08	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:48	ICP	
Chromium	"	**17.3**	-----	1 02	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.203**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:25	ZZZ	
Nickel	EPA 6010C	**11.8**	-----	3 05	"	"	8100129	10/16/08 10:55	10/18/08 00:48	ICP	
ARJ0019-06 (08KMS56SL)		**Soil**				**Sampled: 09/27/08 12:15**					
Arsenic	EPA 6010C	ND	-----	3 92	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00 53	ICP	
Chromium	"	**22.0**	-----	0 785	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.179**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:28	ZZZ	
Nickel	EPA 6010C	**18.8**	-----	2 35	"	"	8100129	10/16/08 10:55	10/18/08 00 53	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-07 (08KMS57SL)		**Soil**				**Sampled: 09/27/08 12:25**					
Arsenic	EPA 6010C	**6.72**	-----	3 68	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00 59	ICP	
Chromium	"	**21.5**	-----	0 735	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.196**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:30	ZZZ	
Nickel	EPA 6010C	**16.4**	-----	2 21	"	"	8100129	10/16/08 10:55	10/18/08 00 59	ICP	
ARJ0019-08 (08KMS58SL)		**Soil**				**Sampled: 09/27/08 12:30**					
Arsenic	EPA 6010C	**5.97**	-----	4 07	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10:31	ICP	
Chromium	"	**21.0**	-----	0 813	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.171**	-----	0 0500	"	"	8100110	10/15/08 10:50	10/16/08 12:37	ZZZ	
Nickel	EPA 6010C	**14.5**	-----	2 44	"	"	8100135	10/17/08 08:17	10/18/08 10:31	ICP	
ARJ0019-09 (08KMS59SL)		**Soil**				**Sampled: 09/27/08 12:35**					
Arsenic	EPA 6010C	ND	-----	5 21	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10:36	ICP	
Chromium	"	**13.3**	-----	1 04	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.165**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 12 53	ZZZ	
Nickel	EPA 6010C	**6.12**	-----	3 12	"	"	8100135	10/17/08 08:17	10/18/08 10:36	ICP	
ARJ0019-10 (08KMS60SL)		**Soil**				**Sampled: 09/27/08 12:40**					
Arsenic	EPA 6010C	**7.37**	-----	4 06	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10:42	ICP	
Chromium	"	**21.0**	-----	0 812	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.130**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 12 56	ZZZ	
Nickel	EPA 6010C	**17.3**	-----	2 44	"	"	8100135	10/17/08 08:17	10/18/08 10:42	ICP	
ARJ0019-11 (08KMS61SL)		**Soil**				**Sampled: 09/27/08 15:20**					
Arsenic	EPA 6010C	**8.71**	-----	4 34	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10:47	ICP	
Chromium	"	**19.7**	-----	0 868	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1.20**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 12 58	ZZZ	
Nickel	EPA 6010C	**37.3**	-----	2 60	"	"	8100135	10/17/08 08:17	10/18/08 10:47	ICP	
ARJ0019-12 (08KMS62SL)		**Soil**				**Sampled: 09/27/08 15:25**					
Arsenic	EPA 6010C	**6.44**	-----	4 23	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10 53	ICP	
Chromium	"	**22.0**	-----	0 846	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1.41**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13 00	ZZZ	
Nickel	EPA 6010C	**34.1**	-----	2 54	"	"	8100135	10/17/08 08:17	10/18/08 10 53	ICP	

TestAmerica Anchorage

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-13 (08KMS63SL)		**Soil**				**Sampled: 09/27/08 15:30**					
Arsenic	EPA 6010C	**10.1**	-----	3 53	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 10 59	ICP	
Chromium	"	**24.9**	-----	0 705	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.736**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13 07	ZZZ	
Nickel	EPA 6010C	**17.4**	-----	2 12	"	"	8100135	10/17/08 08:17	10/18/08 10 59	ICP	
ARJ0019-14 (08KMS66SL)		**Soil**				**Sampled: 09/27/08 15:50**					
Arsenic	EPA 6010C	**9.26**	-----	3 01	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11:24	ICP	
Chromium	"	**30.7**	-----	0 602	"	"	"	"	"	ICP	
Mercury	EPA 7471	**42.9**	-----	5 00	"	100x	8100113	10/16/08 06:27	10/17/08 10 06	ZZZ	
Nickel	EPA 6010C	**44.5**	-----	1 81	"	1x	8100135	10/17/08 08:17	10/18/08 11:24	ICP	
ARJ0019-15 (08KMS67SL)		**Soil**				**Sampled: 09/27/08 15:55**					
Arsenic	EPA 6010C	**6.42**	-----	2 94	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11:30	ICP	
Chromium	"	**26.6**	-----	0 588	"	"	"	"	"	ICP	
Mercury	EPA 7471	**20.6**	-----	2 50	"	50x	8100113	10/16/08 06:27	10/17/08 10 08	ZZZ	
Nickel	EPA 6010C	**46.7**	-----	1 76	"	1x	8100135	10/17/08 08:17	10/18/08 11:30	ICP	
ARJ0019-16 (08KMS70SL)		**Soil**				**Sampled: 09/27/08 16:30**					
Arsenic	EPA 6010C	**7.58**	-----	2 82	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11:35	ICP	
Chromium	"	**27.8**	-----	0 564	"	"	"	"	"	ICP	
Mercury	EPA 7471	**7.14**	-----	1 25	"	25x	8100113	10/16/08 06:27	10/17/08 10:10	ZZZ	
Nickel	EPA 6010C	**50.5**	-----	1 69	"	1x	8100135	10/17/08 08:17	10/18/08 11:35	ICP	
ARJ0019-17 (08KMS71SL)		**Soil**				**Sampled: 09/27/08 16:35**					
Arsenic	EPA 6010C	**7.05**	-----	2 87	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11:41	ICP	
Chromium	"	**26.0**	-----	0 573	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1.58**	-----	1 25	"	25x	8100113	10/16/08 06:27	10/17/08 10:13	ZZZ	
Nickel	EPA 6010C	**44.0**	-----	1 72	"	1x	8100135	10/17/08 08:17	10/18/08 11:41	ICP	
ARJ0019-18 (08KMS72SL)		**Soil**				**Sampled: 09/27/08 18:05**					
Arsenic	EPA 6010C	**15.1**	-----	3 01	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11:46	ICP	
Chromium	"	**15.3**	-----	0 602	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.824**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:30	ZZZ	
Nickel	EPA 6010C	**48.1**	-----	1 81	"	"	8100135	10/17/08 08:17	10/18/08 11:46	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-19 (08KMS73SL)		**Soil**				**Sampled: 09/27/08 18:10**					
Arsenic	EPA 6010C	**19.8**	-----	2 97	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11 52	ICP	
Chromium	"	**12.1**	-----	0 593	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1.09**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:32	ZZZ	
Nickel	EPA 6010C	**51.9**	-----	1 78	"	"	8100135	10/17/08 08:17	10/18/08 11 52	ICP	
ARJ0019-20 (08KMS74SL)		**Soil**				**Sampled: 09/27/08 18:15**					
Arsenic	EPA 6010C	**10.0**	-----	2 86	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 11 58	ICP	
Chromium	"	**15.4**	-----	0 573	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.509**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:34	ZZZ	
Nickel	EPA 6010C	**49.0**	-----	1 72	"	"	8100135	10/17/08 08:17	10/18/08 11 58	ICP	
ARJ0019-21 (08KMS75SL)		**Soil**				**Sampled: 09/27/08 18:20**					
Arsenic	EPA 6010C	**8.76**	-----	2 93	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12 03	ICP	
Chromium	"	**17.5**	-----	0 586	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.487**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:37	ZZZ	
Nickel	EPA 6010C	**47.9**	-----	1 76	"	"	8100135	10/17/08 08:17	10/18/08 12 03	ICP	
ARJ0019-22 (08KMS76SL)		**Soil**				**Sampled: 09/27/08 18:25**					
Arsenic	EPA 6010C	**7.26**	-----	2 87	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12 09	ICP	
Chromium	"	**17.5**	-----	0 575	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.563**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:39	ZZZ	
Nickel	EPA 6010C	**53.3**	-----	1 72	"	"	8100135	10/17/08 08:17	10/18/08 12 09	ICP	
ARJ0019-23 (08KMS79SL)		**Soil**				**Sampled: 09/27/08 18:40**					
Arsenic	EPA 6010C	**12.3**	-----	2 93	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12:14	ICP	
Chromium	"	**16.7**	-----	0 586	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.304**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:46	ZZZ	
Nickel	EPA 6010C	**46.7**	-----	1 76	"	"	8100135	10/17/08 08:17	10/18/08 12:14	ICP	
ARJ0019-24 (08KMS80SL)		**Soil**				**Sampled: 09/27/08 18:50**					
Arsenic	EPA 6010C	**8.77**	-----	2 82	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12:40	ICP	
Chromium	"	**14.0**	-----	0 564	"	"	"	"	"	ICP	
Mercury	EPA 7471	**0.182**	-----	0 0500	"	"	8100113	10/16/08 06:27	10/16/08 13:48	ZZZ	
Nickel	EPA 6010C	**38.5**	-----	1 69	"	"	8100135	10/17/08 08:17	10/18/08 12:40	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-25 (08KMS81SL)		**Soil**				**Sampled: 09/28/08 16:15**					
Arsenic	EPA 6010C	**19.0**	-----	2 78	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12:45	ICP	
Chromium	"	**18.6**	-----	0 557	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1.85**	-----	1 25	"	25x	8100113	10/16/08 06:27	10/17/08 10:15	ZZZ	
Nickel	EPA 6010C	**49.2**	-----	1 67	"	1x	8100135	10/17/08 08:17	10/18/08 12:45	ICP	
ARJ0019-26 (08KMS82SL)		**Soil**				**Sampled: 09/28/08 16:20**					
Arsenic	EPA 6010C	**28.5**	-----	2 73	mg/kg dry	1x	8100135	10/17/08 08:17	10/18/08 12 51	ICP	
Chromium	"	**22.9**	-----	0 546	"	"	"	"	"	ICP	
Mercury	EPA 7471	**2.03**	-----	0 500	"	10x	8100113	10/16/08 06:27	10/17/08 10:17	ZZZ	
Nickel	EPA 6010C	**69.9**	-----	1 64	"	1x	8100135	10/17/08 08:17	10/18/08 12 51	ICP	
ARJ0019-27 (08KMS83SL)		**Soil**				**Sampled: 09/28/08 16:40**					
Arsenic	EPA 6010C	**24.7**	-----	2 86	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 13:23	ICP	
Chromium	"	**62.6**	-----	0 573	"	"	"	"	"	ICP	
Mercury	EPA 7471	**68.5**	-----	5 00	"	100x	8100113	10/16/08 06:27	10/17/08 10:20	ZZZ	
Nickel	EPA 6010C	**156**	-----	1 72	"	1x	8100136	10/17/08 08:19	10/18/08 13:23	ICP	
ARJ0019-28 (08KMS84SL)		**Soil**				**Sampled: 09/28/08 16:45**					
Arsenic	EPA 6010C	**11.8**	-----	2 92	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 13:28	ICP	
Chromium	"	**93.0**	-----	0 585	"	"	"	"	"	ICP	
Mercury	EPA 7471	**69.2**	-----	5 00	"	100x	8100114	10/16/08 06:28	10/17/08 10:22	ZZZ	
Nickel	EPA 6010C	**136**	-----	1 75	"	1x	8100136	10/17/08 08:19	10/18/08 13:28	ICP	
ARJ0019-29 (08KMS85SL)		**Soil**				**Sampled: 09/28/08 17:10**					
Arsenic	EPA 6010C	**158**	-----	2 76	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 13 54	ICP	
Chromium	"	**74.9**	-----	0 552	"	"	"	"	"	ICP	
Mercury	EPA 7471	**30.2**	-----	5 00	"	100x	8100114	10/16/08 06:28	10/17/08 10:24	ZZZ	
Nickel	EPA 6010C	**152**	-----	1 66	"	1x	8100136	10/17/08 08:19	10/18/08 13 54	ICP	
ARJ0019-30 (08KMS86SL)		**Soil**				**Sampled: 09/28/08 17:15**					
Arsenic	EPA 6010C	**71.9**	-----	2 74	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 13 59	ICP	
Chromium	"	**66.9**	-----	0 548	"	"	"	"	"	ICP	
Mercury	EPA 7471	**20.9**	-----	2 50	"	50x	8100114	10/16/08 06:28	10/17/08 10:26	ZZZ	
Nickel	EPA 6010C	**124**	-----	1 64	"	1x	8100136	10/17/08 08:19	10/18/08 13 59	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-37 (08KMS100SL)		**Soil**				**Sampled: 09/30/08 18:51**					
Arsenic	EPA 6010C	**6.39**	-----	2 90	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14 04	ICP	
Chromium	"	**19.7**	-----	0 579	"	"	"	"	"	ICP	
Mercury	EPA 7471	**23.4**	-----	2 50	"	50x	8100114	10/16/08 06:28	10/17/08 10:33	ZZZ	
Nickel	EPA 6010C	**44.8**	-----	1 74	"	1x	8100136	10/17/08 08:19	10/18/08 14 04	ICP	
ARJ0019-38 (08KMS101SL)		**Soil**				**Sampled: 09/30/08 18:58**					
Arsenic	EPA 6010C	**6.84**	-----	2 99	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14:10	ICP	
Chromium	"	**23.3**	-----	0 599	"	"	"	"	"	ICP	
Mercury	EPA 7471	**10.8**	-----	1 25	"	25x	8100114	10/16/08 06:28	10/17/08 10:36	ZZZ	
Nickel	EPA 6010C	**28.7**	-----	1 80	"	1x	8100136	10/17/08 08:19	10/18/08 14:10	ICP	
ARJ0019-39 (08KMS102SL)		**Soil**				**Sampled: 09/30/08 19:05**					
Arsenic	EPA 6010C	ND	-----	3 30	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14:16	ICP	
Chromium	"	**55.8**	-----	0 661	"	"	"	"	"	ICP	
Mercury	EPA 7471	**31.5**	-----	2 50	"	50x	8100114	10/16/08 06:28	10/17/08 10:38	ZZZ	
Nickel	EPA 6010C	**35.1**	-----	1 98	"	1x	8100136	10/17/08 08:19	10/18/08 14:16	ICP	
ARJ0019-40 (08KMS103SL)		**Soil**				**Sampled: 09/30/08 19:13**					
Arsenic	EPA 6010C	ND	-----	3 58	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14:21	ICP	
Chromium	"	**95.5**	-----	0 715	"	"	"	"	"	ICP	
Mercury	EPA 7471	**32.8**	-----	2 50	"	50x	8100114	10/16/08 06:28	10/17/08 10:40	ZZZ	
Nickel	EPA 6010C	**54.0**	-----	2 15	"	1x	8100136	10/17/08 08:19	10/18/08 14:21	ICP	
ARJ0019-41 (08KMS104SL)		**Soil**				**Sampled: 09/30/08 19:20**					
Arsenic	EPA 6010C	**5.78**	-----	3 48	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14:27	ICP	
Chromium	"	**41.4**	-----	0 695	"	"	"	"	"	ICP	
Mercury	EPA 7471	**7.20**	-----	1 25	"	25x	8100114	10/16/08 06:28	10/17/08 10:42	ZZZ	
Nickel	EPA 6010C	**29.3**	-----	2 09	"	1x	8100136	10/17/08 08:19	10/18/08 14:27	ICP	
ARJ0019-42 (08KMS105SL)		**Soil**				**Sampled: 09/30/08 19:40**					
Arsenic	EPA 6010C	**7.30**	-----	3 00	mg/kg dry	1x	8100136	10/17/08 08:19	10/18/08 14:32	ICP	
Chromium	"	**25.2**	-----	0 600	"	"	"	"	"	ICP	
Mercury	EPA 7471	**2.51**	-----	0 250	"	5x	8100114	10/16/08 06:28	10/17/08 10:45	ZZZ	
Nickel	EPA 6010C	**26.7**	-----	1 80	"	1x	8100136	10/17/08 08:19	10/18/08 14:32	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-01 (08KMS51SL)		**Soil**				**Sampled: 09/27/08 11:46**					
% Solids	TA SOP	**60.9**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-02 (08KMS52SL)		**Soil**				**Sampled: 09/27/08 11:50**					
% Solids	TA SOP	**42.1**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-03 (08KMS53SL)		**Soil**				**Sampled: 09/27/08 11:55**					
% Solids	TA SOP	**47.7**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-04 (08KMS54SL)		**Soil**				**Sampled: 09/27/08 12:00**					
% Solids	TA SOP	**62.1**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-05 (08KMS55SL)		**Soil**				**Sampled: 09/27/08 12:10**					
% Solids	TA SOP	**49.2**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-06 (08KMS56SL)		**Soil**				**Sampled: 09/27/08 12:15**					
% Solids	TA SOP	**63.7**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-07 (08KMS57SL)		**Soil**				**Sampled: 09/27/08 12:25**					
% Solids	TA SOP	**68.0**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-08 (08KMS58SL)		**Soil**				**Sampled: 09/27/08 12:30**					
% Solids	TA SOP	**61.5**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-09 (08KMS59SL)		**Soil**				**Sampled: 09/27/08 12:35**					
% Solids	TA SOP	**48.0**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-10 (08KMS60SL)		**Soil**				**Sampled: 09/27/08 12:40**					
% Solids	TA SOP	**61.6**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0019-11 (08KMS61SL)		**Soil**				**Sampled: 09/27/08 15:20**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-11 (08KMS61SL)		**Soil**				**Sampled: 09/27/08 15:20**					
% Solids	TA SOP	**57.6**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-12 (08KMS62SL)		**Soil**				**Sampled: 09/27/08 15:25**					
% Solids	TA SOP	**59.1**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-13 (08KMS63SL)		**Soil**				**Sampled: 09/27/08 15:30**					
% Solids	TA SOP	**70.9**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-14 (08KMS66SL)		**Soil**				**Sampled: 09/27/08 15:50**					
% Solids	TA SOP	**83.0**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-15 (08KMS67SL)		**Soil**				**Sampled: 09/27/08 15:55**					
% Solids	TA SOP	**85.1**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-16 (08KMS70SL)		**Soil**				**Sampled: 09/27/08 16:30**					
% Solids	TA SOP	**88.6**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-17 (08KMS71SL)		**Soil**				**Sampled: 09/27/08 16:35**					
% Solids	TA SOP	**87.2**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-18 (08KMS72SL)		**Soil**				**Sampled: 09/27/08 18:05**					
% Solids	TA SOP	**83.1**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-19 (08KMS73SL)		**Soil**				**Sampled: 09/27/08 18:10**					
% Solids	TA SOP	**84.3**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-20 (08KMS74SL)		**Soil**				**Sampled: 09/27/08 18:15**					
% Solids	TA SOP	**87.3**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-21 (08KMS75SL)		**Soil**				**Sampled: 09/27/08 18:20**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-21 (08KMS75SL)		**Soil**				**Sampled: 09/27/08 18:20**					
% Solids	TA SOP	**85.3**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-22 (08KMS76SL)		**Soil**				**Sampled: 09/27/08 18:25**					
% Solids	TA SOP	**87.0**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-23 (08KMS79SL)		**Soil**				**Sampled: 09/27/08 18:40**					
% Solids	TA SOP	**85.3**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-24 (08KMS80SL)		**Soil**				**Sampled: 09/27/08 18:50**					
% Solids	TA SOP	**88.7**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-25 (08KMS81SL)		**Soil**				**Sampled: 09/28/08 16:15**					
% Solids	TA SOP	**89.8**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-26 (08KMS82SL)		**Soil**				**Sampled: 09/28/08 16:20**					
% Solids	TA SOP	**91.6**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-27 (08KMS83SL)		**Soil**				**Sampled: 09/28/08 16:40**					
% Solids	TA SOP	**87.3**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-28 (08KMS84SL)		**Soil**				**Sampled: 09/28/08 16:45**					
% Solids	TA SOP	**85.5**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-29 (08KMS85SL)		**Soil**				**Sampled: 09/28/08 17:10**					
% Solids	TA SOP	**90.6**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-30 (08KMS86SL)		**Soil**				**Sampled: 09/28/08 17:15**					
% Solids	TA SOP	**91.2**	-----	0 0100	% by Weight	1x	8100119	10/16/08 08:38	10/17/08 07:45	HB	
ARJ0019-37 (08KMS100SL)		**Soil**				**Sampled: 09/30/08 18:51**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-37 (08KMS100SL)		**Soil**				**Sampled: 09/30/08 18:51**					
% Solids	TA SOP	**86.3**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	
ARJ0019-38 (08KMS101SL)		**Soil**				**Sampled: 09/30/08 18:58**					
% Solids	TA SOP	**83.5**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	
ARJ0019-39 (08KMS102SL)		**Soil**				**Sampled: 09/30/08 19:05**					
% Solids	TA SOP	**75.7**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	
ARJ0019-40 (08KMS103SL)		**Soil**				**Sampled: 09/30/08 19:13**					
% Solids	TA SOP	**69.9**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	
ARJ0019-41 (08KMS104SL)		**Soil**				**Sampled: 09/30/08 19:20**					
% Solids	TA SOP	**71.9**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	
ARJ0019-42 (08KMS105SL)		**Soil**				**Sampled: 09/30/08 19:40**					
% Solids	TA SOP	**83.4**	-----	0 0100	% by Weight	1x	8100120	10/16/08 08:39	10/17/08 07:45	HB	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

SW846 8330

TestAmerica West Sacramento

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-31 (08KMS87SL)		**Soil**				**Sampled: 09/28/08 18:15**					
1,3,5-Trinitrobenzene	SW846 8330	ND	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 09 07	FK	
2,4-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
1,3-Dinitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,6-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,4,6-Trinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	ND	-----	0 25	"	"	"	"	"	FK	
Nitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
RDX	"	ND	-----	0 25	"	"	"	"	"	FK	
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*95%*	*78 - 108 %*		"				"	
ARJ0019-32 (08KMS88SL)		**Soil**				**Sampled: 09/28/08 18:20**					
1,3,5-Trinitrobenzene	SW846 8330	**0.063**	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 11:39	FK	**J**
2,4-Dinitrotoluene	"	**0.058**	-----	0 25	"	"	"	"	"	FK	**J**
1,3-Dinitrobenzene	"	**0.066**	-----	0 25	"	"	"	"	"	FK	**J**
2,6-Dinitrotoluene	"	**0.073**	-----	0 25	"	"	"	"	"	FK	**J**
2,4,6-Trinitrotoluene	"	**0.073**	-----	0 25	"	"	"	"	"	FK	**J**
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	**0.052**	-----	0 25	"	"	"	"	"	FK	**J**
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	**0.044**	-----	0 25	"	"	"	"	"	FK	**J**
Nitrobenzene	"	**0.063**	-----	0 25	"	"	"	"	"	FK	**J**
RDX	"	**0.049**	-----	0 25	"	"	"	"	"	FK	**J**
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*96%*	*78 - 108 %*		"				"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

SW846 8330

TestAmerica West Sacramento

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-33 (08KMS89SL)		**Soil**				**Sampled: 09/28/08 18:30**					
1,3,5-Trinitrobenzene	SW846 8330	ND	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 12:30	FK	
2,4-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
1,3-Dinitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,6-Dinitrotoluene	"	**0.038**	-----	0 25	"	"	"	"	"	FK	**J**
2,4,6-Trinitrotoluene	"	**0.026**	-----	0 25	"	"	"	"	"	FK	**J**
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	ND	-----	0 25	"	"	"	"	"	FK	
Nitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
RDX	"	**0.054**	-----	0 25	"	"	"	"	"	FK	**J**
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*92%*		*78 - 108 %*		"			"	
ARJ0019-34 (08KMS90SL)		**Soil**				**Sampled: 09/28/08 18:35**					
1,3,5-Trinitrobenzene	SW846 8330	ND	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 13:20	FK	
2,4-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
1,3-Dinitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,6-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,4,6-Trinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	ND	-----	0 25	"	"	"	"	"	FK	
Nitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
RDX	"	ND	-----	0 25	"	"	"	"	"	FK	
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*90%*		*78 - 108 %*		"			"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

SW846 8330

TestAmerica West Sacramento

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0019-35 (08KMS91SL)		**Soil**				**Sampled: 09/28/08 18:40**					
1,3,5-Trinitrobenzene	SW846 8330	ND	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 14:11	FK	
2,4-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
1,3-Dinitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,6-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,4,6-Trinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	ND	-----	0 25	"	"	"	"	"	FK	
Nitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
RDX	"	ND	-----	0 25	"	"	"	"	"	FK	
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*92%*		*78 - 108 %*		"			"	
ARJ0019-36 (08KMS92SL)		**Soil**				**Sampled: 09/28/08 18:55**					
1,3,5-Trinitrobenzene	SW846 8330	**0.03**	-----	0 25	mg/kg	1x	8287599	10/13/08 18:00	10/24/08 15 01	FK	**J**
2,4-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
1,3-Dinitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,6-Dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2,4,6-Trinitrotoluene	"	**0.034**	-----	0 25	"	"	"	"	"	FK	**J**
2-Amino-4,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
2-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Amino-2,6-dinitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
4-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
3-Nitrotoluene	"	ND	-----	0 25	"	"	"	"	"	FK	
HMX	"	ND	-----	0 25	"	"	"	"	"	FK	
Nitrobenzene	"	ND	-----	0 25	"	"	"	"	"	FK	
RDX	"	ND	-----	0 25	"	"	"	"	"	FK	
Tetryl	"	ND	-----	0 25	"	"	"	"	"	FK	
Surrogate(s): 3,4-Dinitrotoluene			*94%*		*78 - 108 %*		"			"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100110 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100110-BLK1)									**Extracted: 10/15/08 10:50**					
Mercury	EPA 7471	ND	---	0 0500	mg/kg wet	1x	--	--	--	--	--	--	10/16/08 11:47	
LCS (8100110-BS1)									**Extracted: 10/15/08 10:50**					
Mercury	EPA 7471	0 104	---	0 0500	mg/kg wet	1x	--	0 100	104%	(80-120)	--	--	10/16/08 16:13	
Duplicate (8100110-DUP1)				**QC Source: SRJ0051-41**					**Extracted: 10/15/08 10:50**					
Mercury	EPA 7471	0 112	---	0 0500	mg/kg dry	1x	0 125	--	--	--	10 3%	(40)	10/16/08 12:39	
Matrix Spike (8100110-MS1)				**QC Source: SRJ0051-41**					**Extracted: 10/15/08 10:50**					
Mercury	EPA 7471	0 284	---	0 0500	mg/kg dry	1x	0 125	0 178	89 8%	(80-120)	--	--	10/16/08 12:41	
Matrix Spike Dup (8100110-MSD1)				**QC Source: SRJ0051-41**					**Extracted: 10/15/08 10:50**					
Mercury	EPA 7471	0 274	---	0 0500	mg/kg dry	1x	0 125	0 178	83 8%	(80-120)	3 82%	(20)	10/16/08 12:44	

QC Batch: 8100113 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100113-BLK1)									**Extracted: 10/16/08 06:27**					
Mercury	EPA 7471	ND	---	0 0500	mg/kg wet	1x	--	--	--	--	--	--	10/16/08 12 51	
LCS (8100113-BS1)									**Extracted: 10/16/08 06:27**					
Mercury	EPA 7471	0 106	---	0 0500	mg/kg wet	1x	--	0 100	106%	(80-120)	--	--	10/16/08 12:49	
Duplicate (8100113-DUP1)				**QC Source: ARJ0019-09**					**Extracted: 10/16/08 06:27**					
Mercury	EPA 7471	0 147	---	0 0500	mg/kg dry	1x	0 165	--	--	--	11 7%	(40)	10/16/08 14 06	
Matrix Spike (8100113-MS1)				**QC Source: ARJ0019-09**					**Extracted: 10/16/08 06:27**					
Mercury	EPA 7471	0 350	---	0 0500	mg/kg dry	1x	0 165	0 208	88 6%	(80-120)	--	--	10/16/08 14 08	
Matrix Spike Dup (8100113-MSD1)				**QC Source: ARJ0019-09**					**Extracted: 10/16/08 06:27**					
Mercury	EPA 7471	0 354	---	0 0500	mg/kg dry	1x	0 165	0 208	90 6%	(80-120)	1 18%	(20)	10/16/08 14:10	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100114 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100114-BLK1)								Extracted: 10/16/08 06:28						
Mercury	EPA 7471	ND	---	0 0500	mg/kg wet	1x	--	--	--	--	--	--	10/16/08 14:15	
LCS (8100114-BS1)								Extracted: 10/16/08 06:28						
Mercury	EPA 7471	0 104	---	0 0500	mg/kg wet	1x	--	0 100	104%	(80-120)	--	--	10/16/08 14:13	
Duplicate (8100114-DUP1)				QC Source: ARJ0019-28				Extracted: 10/16/08 06:28						
Mercury	EPA 7471	115	---	5 00	mg/kg dry	100x	69 2	--	--	--	49 7%	(40)	10/17/08 11 08	R2
Matrix Spike (8100114-MS1)				QC Source: ARJ0019-28				Extracted: 10/16/08 06:28						
Mercury	EPA 7471	87 5	---	10 0	mg/kg dry	200x	69 2	0 117	15600	(80-120)	--	--	10/17/08 12 09	MHA
Matrix Spike Dup (8100114-MSD1)				QC Source: ARJ0019-28				Extracted: 10/16/08 06:28						
Mercury	EPA 7471	78 6	---	5 00	mg/kg dry	100x	69 2	0 117	8000%	(80-120)	10 7%	(20)	10/17/08 11:13	MHA

QC Batch: 8100129 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100129-BLK1)								Extracted: 10/16/08 10:55						
Nickel	EPA 6010C	ND	---	1 50	mg/kg wet	1x	--	--	--	--	--	--	10/17/08 22:35	
Chromium	"	ND	---	0 500	"	"	--	--	--	--	--	--	"	
Arsenic	"	ND	---	2 50	"	"	--	--	--	--	--	--	"	
LCS (8100129-BS1)								Extracted: 10/16/08 10:55						
Arsenic	EPA 6010C	51 3	---	2 50	mg/kg wet	1x	--	50 0	103%	(80-120)	--	--	10/17/08 22:30	
Chromium	"	54 1	---	0 500	"	"	--	"	108%	"	--	--	"	
Nickel	"	54 9	---	1 50	"	"	--	"	110%	"	--	--	"	
Duplicate (8100129-DUP1)				QC Source: ARJ0019-07				Extracted: 10/16/08 10:55						
Chromium	EPA 6010C	25 4	---	0 735	mg/kg dry	1x	21 5	--	--	--	16 7%	(20)	10/18/08 01 05	
Arsenic	"	8 32	---	3 68	"	"	6 72	--	--	--	21 3%	"	"	R2
Nickel	"	20 8	---	2 21	"	"	16 4	--	--	--	24 0%	"	"	R2
Matrix Spike (8100129-MS1)				QC Source: ARJ0019-07				Extracted: 10/16/08 10:55						
Nickel	EPA 6010C	98 5	---	2 21	mg/kg dry	1x	16 4	73 5	112%	(75-125)	--	--	10/18/08 10:10	
Chromium	"	102	---	0 735	"	"	21 5	"	109%	"	--	--	"	
Arsenic	"	86 7	---	3 68	"	"	6 72	"	109%	"	--	--	"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100129 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (8100129-MSD1)					QC Source: ARJ0019-07				Extracted: 10/16/08 10:55					
Chromium	EPA 6010C	105	---	0 735	mg/kg dry	1x	21 5	73 5	113%	(75-125)	2 88%	(20)	10/18/08 10:15	
Arsenic	"	85 3	---	3 68	"	"	6 72	"	107%	"	1 61%	"	"	
Nickel	"	99 8	---	2 21	"	"	16 4	"	114%	"	1 33%	"	"	

QC Batch: 8100135 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100135-BLK1)									Extracted: 10/17/08 08:17					
Nickel	EPA 6010C	ND	---	1 50	mg/kg wet	1x	--	--	--	--	--	--	10/18/08 10:26	
Arsenic	"	ND	---	2 50	"	"	--	--	--	--	--	--	"	
Chromium	"	ND	---	0 500	"	"	--	--	--	--	--	--	"	
LCS (8100135-BS1)									Extracted: 10/17/08 08:17					
Nickel	EPA 6010C	56 8	---	1 50	mg/kg wet	1x	--	50 0	114%	(80-120)	--	--	10/18/08 10:21	
Arsenic	"	52 4	---	2 50	"	"	--	"	105%	"	--	--	"	
Chromium	"	56 2	---	0 500	"	"	--	"	112%	"	--	--	"	
Duplicate (8100135-DUP1)					QC Source: ARJ0019-08				Extracted: 10/17/08 08:17					
Nickel	EPA 6010C	16 0	---	2 44	mg/kg dry	1x	14 5	--	--	--	10 1%	(20)	10/18/08 12 56	
Arsenic	"	7 32	---	4 07	"	"	5 97	--	--	--	20 2%	"	"	R2
Chromium	"	23 8	---	0 813	"	"	21 0	--	--	--	12 2%	"	"	
Matrix Spike (8100135-MS1)					QC Source: ARJ0019-08				Extracted: 10/17/08 08:17					
Chromium	EPA 6010C	107	---	0 813	mg/kg dry	1x	21 0	81 3	106%	(75-125)	--	--	10/18/08 13 02	
Arsenic	"	83 1	---	4 07	"	"	5 97	"	94 9%	"	--	--	"	
Nickel	"	107	---	2 44	"	"	14 5	"	114%	"	--	--	"	
Matrix Spike Dup (8100135-MSD1)					QC Source: ARJ0019-08				Extracted: 10/17/08 08:17					
Nickel	EPA 6010C	103	---	2 44	mg/kg dry	1x	14 5	81 3	109%	(75-125)	4 03%	(20)	10/18/08 13 08	
Arsenic	"	88 6	---	4 07	"	"	5 97	"	102%	"	6 34%	"	"	
Chromium	"	109	---	0 813	"	"	21 0	"	108%	"	1 64%	"	"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100136 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100136-BLK1)								Extracted: 10/17/08 08:19						
Arsenic	EPA 6010C	ND	---	2 50	mg/kg wet	1x	--	--	--	--	--	--	10/18/08 13:18	
Chromium	"	ND	---	0 500	"	"	--	--	--	--	--	--	"	
Nickel	"	ND	---	1 50	"	"	--	--	--	--	--	--	"	
LCS (8100136-BS1)								Extracted: 10/17/08 08:19						
Nickel	EPA 6010C	55 8	---	1 50	mg/kg wet	1x	--	50 0	112%	(80-120)	--	--	10/18/08 13:13	
Arsenic	"	51 4	---	2 50	"	"	--	"	103%	"	--	--	"	
Chromium	"	55 2	---	0 500	"	"	--	"	110%	"	--	--	"	
Duplicate (8100136-DUP1)				QC Source: ARJ0019-27				Extracted: 10/17/08 08:19						
Arsenic	EPA 6010C	16 8	---	2 86	mg/kg dry	1x	24 7	--	--	--	38 4%	(20)	10/18/08 15 54	R2
Nickel	"	146	---	1 72	"	"	156	--	--	--	6 57%	"	"	
Chromium	"	83 7	---	0 573	"	"	62 6	--	--	--	28 9%	"	"	R2
Matrix Spike (8100136-MS1)				QC Source: ARJ0019-27				Extracted: 10/17/08 08:19						
Arsenic	EPA 6010C	66 8	---	2 86	mg/kg dry	1x	24 7	57 3	73 4%	(75-125)	--	--	10/18/08 16 00	M8
Nickel	"	171	---	1 72	"	"	156	"	27 2%	"	--	--	"	M8
Chromium	"	137	---	0 573	"	"	62 6	"	129%	"	--	--	"	M7
Matrix Spike Dup (8100136-MSD1)				QC Source: ARJ0019-27				Extracted: 10/17/08 08:19						
Chromium	EPA 6010C	138	---	0 573	mg/kg dry	1x	62 6	57 3	132%	(75-125)	0 922%	(20)	10/18/08 16:25	M7
Arsenic	"	66 0	---	2 86	"	"	24 7	"	71 9%	"	1 29%	"	"	M8
Nickel	"	215	---	1 72	"	"	156	"	104%	"	22 8%	"	"	R

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100118 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100118-DUP1)					**QC Source: ARJ0019-10**				**Extracted: 10/15/08 15:00**					
% Solids	TA SOP	65 2	---	0 0100	% by Weight	1x	61 6	--	--	--	5 68%	(5)	10/16/08 07 00	R2

QC Batch: 8100119 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100119-DUP1)					**QC Source: ARJ0019-29**				**Extracted: 10/16/08 08:38**					
% Solids	TA SOP	92 8	---	0 0100	% by Weight	1x	90 6	--	--	--	2 40%	(5)	10/17/08 07:45	

QC Batch: 8100120 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100120-DUP1)					**QC Source: SRJ0068-15**				**Extracted: 10/16/08 08:39**					
% Solids	TA SOP	93 2	---	0 0100	% by Weight	1x	95 0	--	--	--	1 91%	(5)	10/17/08 07:45	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

SW846 8330 - Laboratory Quality Control Results

TestAmerica West Sacramento

QC Batch: 8287599 **SOLID Preparation Method: 8330**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (G8J100447001D)				**QC Source: ARJ0019-31**				**Extracted: 10/13/08 18:00**						
2,4-Dinitrotoluene	SW846 8330	1 02	---	0 25	mg/kg	1x	ND	1	102%	(83-113)	1 1%	(22)	10/24/08 10:48	
1,3,5-Trinitrobenzene	"	1 01	---	0 25	"	"	ND	"	101%	(84-114)	0 49%	(20)	"	
1,3-Dinitrobenzene	"	1 02	---	0 25	"	"	ND	"	102%	(83-113)	0 09%	"	"	
2,6-Dinitrotoluene	"	1 02	---	0 25	"	"	ND	"	102%	"	0 39%	(31)	"	
2,4,6-Trinitrotoluene	"	0 916	---	0 25	"	"	ND	"	92%	(77-107)	0 73%	(22)	"	
2-Amino-4,6-dinitrotoluene	"	1 02	---	0 25	"	"	ND	"	102%	(83-113)	1 4%	(25)	"	
4-Amino-2,6-dinitrotoluene	"	0 988	---	0 25	"	"	ND	"	99%	(82-112)	1 6%	(20)	"	
2-Nitrotoluene	"	1 02	---	0 25	"	"	ND	"	102%	(77-125)	0%	(46)	"	
4-Nitrotoluene	"	1	---	0 25	"	"	ND	"	100%	(80-110)	0 97%	(20)	"	
3-Nitrotoluene	"	1 01	---	0 25	"	"	ND	"	101%	(82-112)	0 19%	(39)	"	
HMX	"	1 02	---	0 25	"	"	ND	"	102%	(83-113)	1 4%	(20)	"	
Nitrobenzene	"	0 973	---	0 25	"	"	ND	"	97%	"	3 2%	"	"	
RDX	"	0 97	---	0 25	"	"	ND	"	97%	(84-114)	1%	(29)	"	
Tetryl	"	0 823	---	0 25	"	"	ND	"	82%	(63-101)	5 9%	(20)	"	
Surrogate(s): 3,4-Dinitrotoluene		*Recovery: 96%*		*Limits: 78-108%*	"								*10/24/08 10:48*	
Matrix Spike (G8J100447001S)				**QC Source: ARJ0019-31**				**Extracted: 10/13/08 18:00**						
2,4-Dinitrotoluene	SW846 8330	1	---	0 25	mg/kg	1x	ND	1	100%	(83-113)	--	--	10/24/08 09 57	
1,3,5-Trinitrobenzene	"	1 01	---	0 25	"	"	ND	"	101%	(84-114)	--	--	"	
2,6-Dinitrotoluene	"	1 01	---	0 25	"	"	ND	"	101%	(83-113)	--	--	"	
1,3-Dinitrobenzene	"	1 02	---	0 25	"	"	ND	"	102%	"	--	--	"	
2-Amino-4,6-dinitrotoluene	"	1 01	---	0 25	"	"	ND	"	101%	"	--	--	"	
2,4,6-Trinitrotoluene	"	0 909	---	0 25	"	"	ND	"	91%	(77-107)	--	--	"	
4-Amino-2,6-dinitrotoluene	"	0 972	---	0 25	"	"	ND	"	97%	(82-112)	--	--	"	
2-Nitrotoluene	"	1 02	---	0 25	"	"	ND	"	102%	(77-125)	--	--	"	
4-Nitrotoluene	"	0 992	---	0 25	"	"	ND	"	99%	(80-110)	--	--	"	
HMX	"	1 01	---	0 25	"	"	ND	"	101%	(83-113)	--	--	"	
3-Nitrotoluene	"	1	---	0 25	"	"	ND	"	100%	(82-112)	--	--	"	
Nitrobenzene	"	1	---	0 25	"	"	ND	"	100%	(83-113)	--	--	"	
RDX	"	0 96	---	0 25	"	"	ND	"	96%	(84-114)	--	--	"	
Tetryl	"	0 873	---	0 25	"	"	ND	"	87%	(63-101)	--	--	"	
Surrogate(s): 3,4-Dinitrotoluene		*Recovery: 96%*		*Limits: 78-108%*	"								*10/24/08 09:57*	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

SW846 8330 - Laboratory Quality Control Results

TestAmerica West Sacramento

QC Batch: 8287599 **SOLID Preparation Method: 8330**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (G8J130000599B)				QC Source:				Extracted: 10/13/08 18:00						
1,3,5-Trinitrobenzene	SW846 8330	ND	---	0 25	mg/kg	1x	--	--	--	--	--	--	10/24/08 07:26	
2,4-Dinitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
2,6-Dinitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
1,3-Dinitrobenzene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
2-Amino-4,6-dinitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
2,4,6-Trinitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
4-Amino-2,6-dinitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
2-Nitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
4-Nitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
3-Nitrotoluene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
HMX	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
Nitrobenzene	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
RDX	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
Tetryl	"	ND	---	0 25	"	"	--	--	--	--	--	--	"	
Surrogate(s): 3,4-Dinitrotoluene		*Recovery: 97%*		*Limits: 78-108%*		"							*10/24/08 07:26*	
LCS (G8J130000599C)				QC Source:				Extracted: 10/13/08 18:00						
1,3,5-Trinitrobenzene	SW846 8330	1 02	---	0 25	mg/kg	1x	--	1	102%	(84-114)	--	--	10/24/08 08:16	
2,4-Dinitrotoluene	"	1	---	0 25	"	"	--	"	100%	(83-113)	--	--	"	
2,6-Dinitrotoluene	"	1 01	---	0 25	"	"	--	"	101%	"	--	--	"	
1,3-Dinitrobenzene	"	1 03	---	0 25	"	"	--	"	103%	"	--	--	"	
2-Amino-4,6-dinitrotoluene	"	1 01	---	0 25	"	"	--	"	101%	"	--	--	"	
2,4,6-Trinitrotoluene	"	0 904	---	0 25	"	"	--	"	90%	(77-107)	--	--	"	
2-Nitrotoluene	"	1 03	---	0 25	"	"	--	"	103%	(77-125)	--	--	"	
4-Amino-2,6-dinitrotoluene	"	0 982	---	0 25	"	"	--	"	98%	(82-112)	--	--	"	
4-Nitrotoluene	"	0 969	---	0 25	"	"	--	"	97%	(80-110)	--	--	"	
3-Nitrotoluene	"	0 988	---	0 25	"	"	--	"	99%	(82-112)	--	--	"	
HMX	"	1 02	---	0 25	"	"	--	"	102%	(83-113)	--	--	"	
Nitrobenzene	"	0 995	---	0 25	"	"	--	"	99%	"	--	--	"	
RDX	"	1 02	---	0 25	"	"	--	"	102%	(84-114)	--	--	"	
Tetryl	"	0 881	---	0 25	"	"	--	"	88%	(63-101)	--	--	"	
Surrogate(s): 3,4-Dinitrotoluene		*Recovery: 95%*		*Limits: 78-108%*		"							*10/24/08 08:16*	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	11/03/08 16:43

Notes and Definitions

Report Specific Notes:

J	-	Estimated result. Result is less than RL.
M7	-	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	-	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	-	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
R	-	The RPD exceeded the method control limit due to sample matrix effects. The individual analyte QA/QC recoveries, however, were within acceptance limits.
R2	-	The RPD exceeded the acceptance limit.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0019

CLIENT: MACTEC

REPORT TO: Steve Wrean

ADDRESS:

PHONE: 261-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmo Rot Mine Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

PRESERVATIVE: Acid Nitric

REQUESTED ANALYSES: 8010 HFT

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.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	8010	HFT	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS 51 SL	9/27/08 1146	/		S	/		1
2	08KMS 52SL	1150	/					2
3	08KMS 53SL	1155	/					3
4	08KMS 54SL	1200	/					4
5	08KMS 55SL	1210	/					5
6	08KMS 56SL	1215	/					6
7	08KMS 57SL	1225	/					7
8	08KMS 58SL	1230	/					8
9	08KMS 59SL	1235	/					9
10	08KMS 60SL	1240	/					10

RELEASED BY: Scott Finnegan	DATE: 10/6/08	RECEIVED BY: [signature]	DATE: 10/06/08
PRINT NAME: Scott Finnegan	FIRM: MACTEC / TIME: 1519	PRINT NAME: Johnnie Drehr	FIRM: Anchorage / TIME: 1519
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM: / TIME:	PRINT NAME:	FIRM: / TIME:

ADDITIONAL REMARKS:

TEMP: 5.5°C

PAGE OF

Cooler #2

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0019

CLIENT: MACTEC

REPORT TO: S. Wrenn

ADDRESS:

PHONE: 261-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kalmo Left Min Site

PROJECT NUMBER:

SAMPLED BY: D.S. Finnegan

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 4 3 2 1 <1

STD.

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE

REQUESTED ANALYSES: As, Cr, Ni - 6010; Hg - 7471

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	As, Cr, Ni - 6010	Hg - 7471	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS 61 SL	9/27/08 1520	1		S	1		11
2	08KMS 62 SL	1525	1					12
3	08KMS 63 SL	1530	1					13
4	~~08KMS 64 SL~~	~~1535~~	~~1~~					
5	~~08KMS 65 SL~~	~~1540~~	~~1~~					
6	08KMS 66 SL	1550	1					14
7	08KMS 67 SL	1555	1					15
8	~~08KMS 68 SL~~	~~1608~~	~~1~~					
9	~~08KMS 69 SL~~	~~1615~~	~~1~~					
10	08KMS 70 SL	1630	1					16

10/6/08 (2) 10/6/08 (2) 10/6/08 (2) 10/6/08

RELEASED BY: Scott Finnegan DATE: 10/6/08
PRINT NAME: Scott Finnegan FIRM: MACTEC TIME: 1519

RECEIVED BY: DATE: 10/06/08
PRINT NAME: Johanna Drehr FIRM: Anchorage TIME: 1519

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP: 5.5°C

PAGE OF

Cooler #2

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0019

CLIENT: MACTEC

REPORT TO: S. Wrenn

ADDRESS:

PHONE: 281-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmokof Min Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

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: As, Ni, Cu - 6010; Hg - 7471

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	As, Ni, Cu - 6010; Hg - 7471	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS 71 SL	9/27/08 1635	1	S	1		17
2	08KMS 72 SL	1805	1				18
3	08KMS 73 SL	1810	1				19
4	08KMS 74 SL	1815	1				20
5	08KMS 75 SL	1820	1				21
6	08KMS 76 SL	1825	1				22
	~~08KMS 77 SL~~	~~1830~~	~~1~~				
	~~08KMS 78 SL~~	~~1835~~	~~1~~				
9	08KMS 79 SL	1840	1				23
10	08KMS 80 SL	1850	1				24

Cancelled — Cancelled

RELEASED BY: Scott Finnegan	DATE: 10/6/08	RECEIVED BY: John Drew	DATE: 10/06/08
PRINT NAME: Scott Finnegan	FIRM: MACTEC	PRINT NAME: Johnna Drew	FIRM: Anchorage
	TIME: 1519		TIME: 1519
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM:	PRINT NAME:	FIRM:
	TIME:		TIME:

ADDITIONAL REMARKS:

TEMP: 5.5°C

PAGE OF

Cooler #2

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0019

CLIENT: MACTEC

REPORT TO: S. Wrenn

ADDRESS:

PHONE: 261-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmokoff Mine Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

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		As, Cr, Ni - 6010	Hg - 7471	Nitrate/nitrite 8330								MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS 81 SL	9/28/08	1615		1									S	1		25
2	08KMS 82 SL		1620		1												26
3	08KMS 83 SL		1640		1												27
4	08KMS 84 SL		1645		1												28
5	08KMS 85 SL		1710		1												29
6	08KMS 86 SL		1715		1												30
7	08KMS 87 SL		1815			1											31
8	08KMS 88 SL		1820			1											32
9	08KMS 89 SL		1830			1											33
10	08KMS 90 SL		1835			1											34

RELEASED BY: Scott Finnegan	FIRM: MACTEC	DATE: 10/6/08 TIME: 1519	RECEIVED BY: Johanna Drew	FIRM: Anchorage	DATE: 10/06/08 TIME: 1519
PRINT NAME: Scott Finnegan			PRINT NAME: Johanna Drew		
RELEASED BY:	FIRM:	DATE: TIME:	RECEIVED BY:	FIRM:	DATE: TIME:
PRINT NAME:			PRINT NAME:		

ADDITIONAL REMARKS:

TEMP: 5.5°C

PAGE OF

TAL-1000(0408)

Cooler #2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0019

CLIENT: MACTEC

REPORT TO: S. Wrenn

ADDRESS:

PHONE: 261-7430 FAX:

PROJECT NAME: Kolmolof Mine Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

INVOICE TO: MACTEC

P.O. NUMBER:

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		Nitrate/nitrite 8330		As, Cr, Ni - Cooke	Hg - 7471								MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS91SL	9/28/08	1840	1											S	1		35
2	08KMS92SL	9/28/08	1855	1														36
3	08KMS100SL	9/30/08	1851			1												37
4	08KMS101SL	9/30/08	1858			1												38
5	08KMS102SL	9/30/08	1905			1												39
6	08KMS103SL	9/30/08	1913			1												40
7	08KMS104SL	9/30/08	1920			1												41
8	08KMS105SL	9/30/08	1940			1												42
9																		
10																		

RELEASED BY: Scott Finnegan	DATE: 10/6/08	RECEIVED BY: Johanna Dreher	DATE: 10/06/08
PRINT NAME: Scott Finnegan	FIRM: MATC	TIME: 1519	PRINT NAME: Johanna Dreher	FIRM: Anchorage	TIME: 1519
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: 55°C

PAGE OF

Cooler #2

TAL-1000(0408)

#2

Test America Anchorage Cooler Receipt Form

(Army Corps. Compliant)

WORK ORDER # ARJ0019 **CLIENT:** MACTECH **PROJECT:** Kolmokof Mine Site

Date /Time Cooler Arrived 10 / 6 / 08 15 : 19 Cooler signed for by: Johanna Dreher (Print name)

Preliminary Examination Phase:

Date cooler opened: ☒ same as date received *or* ___/___/___

Cooler opened by (print) Johanna Dreher (sign) [signature]

1. Delivered by ☐ALASKA AIRLINES ☐Fed-Ex ☐UPS ☐NAC ☐LYNDEN ☒CLIENT ☐Other: ___

   Shipment Tracking # if applicable ___ (include copy of shipping papers in file)

2. Number of Custody Seals 0 Signed by N/A Date ___/___/___

   Were custody seals unbroken and intact on arrival? ↓ ☐ Yes ☐ No

3. Were custody papers sealed in a plastic bag? ☐ Yes ☐ No

4. Were custody papers filled out properly (ink, signed, etc.)? ☒ Yes ☐ No

5. Did you sign the custody papers in the appropriate place? ☒ Yes ☐ No

6. Was ice used? ☒ Yes ☐ No Type of ice: ☐blue ice ☒gel ice ☐real ice ☐dry ice Condition of Ice: solid

   Temperature by Digi-Thermo Probe 5.5 °C Thermometer # rec #4
   Acceptance Criteria: 0 - 6°C

7. Packing in Cooler: ☒ bubble wrap ☐ styrofoam ☒ cardboard ☐ Other: ___

8. Did samples arrive in plastic bags? ☐ Yes ☒ No

9. Did all bottles arrive unbroken, and with labels in good condition? ☑ Yes ☐ No

10. Are all bottle labels complete (ID, date, time, etc.) ☑ Yes ☐ No

11. Do bottle labels and Chain of Custody agree? ☑ Yes ☐ No

12. Are the containers and preservatives correct for the tests indicated? ☑ Yes ☐ No

13. Conoco Phillips, Alyeska, BP H2O samples only: pH < 2? ☐ Yes ☐ No ☑ N/A

14. Is there adequate volume for the tests requested? ☑ Yes ☐ No

15. Were VOA vials free of bubbles? ☑ N/A ☐ Yes ☐ No

    If "NO" which containers contained "head space" or bubbles? ___

Log-in Phase:

Date of sample log-in 10 / 06 / 08

Samples logged in by (print) DALJOET MAHTAL (sign) [signature]

1. Was project identifiable from custody papers? ☑ Yes ☐ No
2. Do Turn Around Times and Due Dates agree? ☑ Yes ☐ No
3. Was the Project Manager notified of status? ☑ Yes ☐ No
4. Was the Lab notified of status? ☑ Yes ☐ No
5. Was the COC scanned and copied? ☑ Yes ☐ No

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph (907) 563 9200 fa (907) 563 9210
CS Approval Number: UST-067

April 03, 2009

Steve Wrenn
MACTEC Engineering and Consulting
601 East 57th Place
Anchorage, AK/USA 99518

RE: Kolmakof Mine Site

Enclosed are the results of analyses for samples received by the laboratory on 10/06/08 15:17.
The following list is a summary of the Work Orders contained in this report, generated on 04/03/09 10:49.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
ARJ0018	Kolmakof Mine Site	[none]

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
08KMS01SL	ARJ0018-01	Soil	09/26/08 12:00	10/06/08 15:17
08KMS02SL	ARJ0018-02	Soil	09/26/08 12:05	10/06/08 15:17
08KMS03SL	ARJ0018-03	Soil	09/26/08 12:15	10/06/08 15:17
08KMS04SL	ARJ0018-04	Soil	09/26/08 12:20	10/06/08 15:17
08KMS05SL	ARJ0018-05	Soil	09/26/08 12:25	10/06/08 15:17
08KMS06SL	ARJ0018-06	Soil	09/26/08 12:30	10/06/08 15:17
08KMS07SL	ARJ0018-07	Soil	09/26/08 12:35	10/06/08 15:17
08KMS08SL	ARJ0018-08	Soil	09/26/08 12:40	10/06/08 15:17
08KMS09SL	ARJ0018-09	Soil	09/26/08 12:45	10/06/08 15:17
08KMS10SL	ARJ0018-10	Soil	09/26/08 12:50	10/06/08 15:17
08KMS11SL	ARJ0018-11	Soil	09/26/08 12:55	10/06/08 15:17
08KMS12SL	ARJ0018-12	Soil	09/26/08 13:00	10/06/08 15:17
08KMS13SL	ARJ0018-13	Soil	09/26/08 13:05	10/06/08 15:17
08KMS14SL	ARJ0018-14	Soil	09/26/08 13:10	10/06/08 15:17
08KMS15SL	ARJ0018-15	Soil	09/26/08 13:15	10/06/08 15:17
08KMS16SL	ARJ0018-16	Soil	09/26/08 13:48	10/06/08 15:17
08KMS17SL	ARJ0018-17	Soil	09/26/08 13:55	10/06/08 15:17
08KMS18SL	ARJ0018-18	Soil	09/26/08 14:00	10/06/08 15:17
08KMS19SL	ARJ0018-19	Soil	09/26/08 14:05	10/06/08 15:17
08KMS20SL	ARJ0018-20	Soil	09/26/08 14:10	10/06/08 15:17
08KMS21SL	ARJ0018-21	Soil	09/26/08 15:50	10/06/08 15:17
08KMS22SL	ARJ0018-22	Soil	09/26/08 15:55	10/06/08 15:17
08KMS23SL	ARJ0018-23	Soil	09/26/08 16:00	10/06/08 15:17
08KMS24SL	ARJ0018-24	Soil	09/26/08 16:05	10/06/08 15:17
08KMS25SL	ARJ0018-25	Soil	09/26/08 16:10	10/06/08 15:17
08KMS26SL	ARJ0018-26	Soil	09/26/08 16:15	10/06/08 15:17
08KMS27SL	ARJ0018-27	Soil	09/26/08 16:20	10/06/08 15:17
08KMS28SL	ARJ0018-28	Soil	09/26/08 16:25	10/06/08 15:17
08KMS29SL	ARJ0018-29	Soil	09/26/08 16:40	10/06/08 15:17
08KMS30SL	ARJ0018-30	Soil	09/26/08 16:45	10/06/08 15:17
08KMS31SL	ARJ0018-31	Soil	09/26/08 16:50	10/06/08 15:17
08KMS32SL	ARJ0018-32	Soil	09/26/08 16:55	10/06/08 15:17
08KMS33SL	ARJ0018-33	Soil	09/26/08 17:00	10/06/08 15:17
08KMS34SL	ARJ0018-34	Soil	09/26/08 17:05	10/06/08 15:17
08KMS35SL	ARJ0018-35	Soil	09/26/08 17:10	10/06/08 15:17

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
08KMS36SL	ARJ0018-36	Soil	09/26/08 17:45	10/06/08 15:17
08KMS37SL	ARJ0018-37	Soil	09/26/08 17:50	10/06/08 15:17
08KMS38SL	ARJ0018-38	Soil	09/26/08 17:55	10/06/08 15:17
08KMS39SL	ARJ0018-39	Soil	09/26/08 18:00	10/06/08 15:17
08KMS40SL	ARJ0018-40	Soil	09/26/08 18:05	10/06/08 15:17
08KMS41SL	ARJ0018-41	Soil	09/26/08 19:00	10/06/08 15:17
08KMS42SL	ARJ0018-42	Soil	09/26/08 19:05	10/06/08 15:17
08KMS43SL	ARJ0018-43	Soil	09/26/08 19:10	10/06/08 15:17
08KMS44SL	ARJ0018-44	Soil	09/26/08 19:15	10/06/08 15:17
08KMS45SL	ARJ0018-45	Soil	09/26/08 19:20	10/06/08 15:17
08KMS46SL	ARJ0018-46	Soil	09/26/08 19:25	10/06/08 15:17
08KMS47SL	ARJ0018-47	Soil	09/26/08 19:30	10/06/08 15:17
08KMS48SL	ARJ0018-48	Soil	09/27/08 11:30	10/06/08 15:17
08KMS49SL	ARJ0018-49	Soil	09/27/08 11:35	10/06/08 15:17
08KMS50SL	ARJ0018-50	Soil	09/27/08 11:43	10/06/08 15:17

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-01 (08KMS01SL)			**Soil**			**Sampled: 09/26/08 12:00**					
Arsenic	EPA 6010C	**7.83**	*0.116*	4 15	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:15	ICP	
Chromium	"	**17.6**	*0.0166*	0 831	"	"	"	"	"	ICP	
Mercury	EPA 7471	**144**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:25	ZZZ	
Nickel	EPA 6010C	**14.1**	*0.0498*	2 49	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:15	ICP	
ARJ0018-02 (08KMS02SL)			**Soil**			**Sampled: 09/26/08 12:05**					
Arsenic	EPA 6010C	**12.0**	*0.0884*	3 16	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:21	ICP	
Chromium	"	**20.8**	*0.0126*	0 631	"	"	"	"	"	ICP	
Mercury	EPA 7471	**79.9**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:27	ZZZ	
Nickel	EPA 6010C	**22.5**	*0.0379*	1 89	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:21	ICP	
ARJ0018-03 (08KMS03SL)			**Soil**			**Sampled: 09/26/08 12:15**					
Arsenic	EPA 6010C	**6.87**	*0.0992*	3 54	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:26	ICP	
Chromium	"	**23.3**	*0.0142*	0 708	"	"	"	"	"	ICP	
Mercury	EPA 7471	**93.9**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:29	ZZZ	
Nickel	EPA 6010C	**15.7**	*0.0425*	2 12	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:26	ICP	
ARJ0018-04 (08KMS04SL)			**Soil**			**Sampled: 09/26/08 12:20**					
Arsenic	EPA 6010C	**8.68**	*0.102*	3 64	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:32	ICP	
Chromium	"	**24.3**	*0.0146*	0 729	"	"	"	"	"	ICP	
Mercury	EPA 7471	**146**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:32	ZZZ	
Nickel	EPA 6010C	**18.5**	*0.0437*	2 19	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:32	ICP	
ARJ0018-05 (08KMS05SL)			**Soil**			**Sampled: 09/26/08 12:25**					
Arsenic	EPA 6010C	**10.6**	*0.0833*	2 98	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:37	ICP	
Chromium	"	**26.8**	*0.0119*	0 595	"	"	"	"	"	ICP	
Mercury	EPA 7471	**101**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:34	ZZZ	
Nickel	EPA 6010C	**21.6**	*0.0357*	1 79	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:37	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-06 (08KMS06SL)		**Soil**				**Sampled: 09/26/08 12:30**					
Arsenic	EPA 6010C	**8.06**	*0.116*	4 13	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:43	ICP	
Chromium	"	**25.2**	*0.0165*	0 826	"	"	"	"	"	ICP	
Mercury	EPA 7471	**367**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:36	ZZZ	
Nickel	EPA 6010C	**17.5**	*0.0496*	2 48	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:43	ICP	
ARJ0018-07 (08KMS07SL)		**Soil**				**Sampled: 09/26/08 12:35**					
Arsenic	EPA 6010C	**6.28**	*0.106*	3 78	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17:49	ICP	
Chromium	"	**24.4**	*0.0151*	0 755	"	"	"	"	"	ICP	
Mercury	EPA 7471	**208**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:39	ZZZ	
Nickel	EPA 6010C	**16.3**	*0.0453*	2 27	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17:49	ICP	
ARJ0018-08 (08KMS08SL)		**Soil**				**Sampled: 09/26/08 12:40**					
Arsenic	EPA 6010C	**5.78**	*0.0990*	3 54	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 17 54	ICP	
Chromium	"	**25.3**	*0.0141*	0 707	"	"	"	"	"	ICP	
Mercury	EPA 7471	**94.1**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:46	ZZZ	
Nickel	EPA 6010C	**14.8**	*0.0424*	2 12	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 17 54	ICP	
ARJ0018-09 (08KMS09SL)		**Soil**				**Sampled: 09/26/08 12:45**					
Arsenic	EPA 6010C	**7.06**	*0.0960*	3 43	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:14	ICP	
Chromium	"	**25.8**	*0.0137*	0 686	"	"	"	"	"	ICP	
Mercury	EPA 7471	**92.5**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09:48	ZZZ	
Nickel	EPA 6010C	**16.0**	*0.0412*	2 06	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:14	ICP	
ARJ0018-10 (08KMS10SL)		**Soil**				**Sampled: 09/26/08 12:50**					
Arsenic	EPA 6010C	**5.48**	*0.103*	3 67	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:20	ICP	
Chromium	"	**26.9**	*0.0147*	0 733	"	"	"	"	"	ICP	
Mercury	EPA 7471	**107**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09 50	ZZZ	
Nickel	EPA 6010C	**16.2**	*0.0440*	2 20	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:20	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-11 (08KMS11SL)		**Soil**				**Sampled: 09/26/08 12:55**					
Arsenic	EPA 6010C	**7.10**	*0.0945*	3 37	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:25	ICP	
Chromium	"	**29.3**	*0.0135*	0 675	"	"	"	"	"	ICP	
Mercury	EPA 7471	**104**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09 52	ZZZ	
Nickel	EPA 6010C	**19.5**	*0.0405*	2 02	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:25	ICP	
ARJ0018-12 (08KMS12SL)		**Soil**				**Sampled: 09/26/08 13:00**					
Arsenic	EPA 6010C	**5.84**	*0.113*	4 05	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:31	ICP	
Chromium	"	**25.3**	*0.0162*	0 810	"	"	"	"	"	ICP	
Mercury	EPA 7471	**108**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09 55	ZZZ	
Nickel	EPA 6010C	**15.5**	*0.0486*	2 43	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:31	ICP	
ARJ0018-13 (08KMS13SL)		**Soil**				**Sampled: 09/26/08 13:05**					
Arsenic	EPA 6010C	**11.4**	*0.104*	3 71	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:36	ICP	
Chromium	"	**28.4**	*0.0149*	0 743	"	"	"	"	"	ICP	
Mercury	EPA 7471	**129**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09 57	ZZZ	
Nickel	EPA 6010C	**19.6**	*0.0446*	2 23	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:36	ICP	
ARJ0018-14 (08KMS14SL)		**Soil**				**Sampled: 09/26/08 13:10**					
Arsenic	EPA 6010C	**6.94**	*0.102*	3 65	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:42	ICP	
Chromium	"	**24.7**	*0.0146*	0 730	"	"	"	"	"	ICP	
Mercury	EPA 7471	**104**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 09 59	ZZZ	
Nickel	EPA 6010C	**16.4**	*0.0438*	2 19	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:42	ICP	
ARJ0018-15 (08KMS15SL)		**Soil**				**Sampled: 09/26/08 13:15**					
Arsenic	EPA 6010C	**7.15**	*0.101*	3 61	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18:47	ICP	
Chromium	"	**27.8**	*0.0144*	0 722	"	"	"	"	"	ICP	
Mercury	EPA 7471	**89.3**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10 02	ZZZ	
Nickel	EPA 6010C	**21.6**	*0.0433*	2 16	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18:47	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-16 (08KMS16SL)		**Soil**				**Sampled: 09/26/08 13:48**					
Arsenic	EPA 6010C	**3.10**	*0.157*	5 62	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18 53	ICP	J
Chromium	"	**11.6**	*0.0225*	1 12	"	"	"	"	"	ICP	
Mercury	EPA 7471	**530**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10 04	ZZZ	
Nickel	EPA 6010C	**13.9**	*0.0674*	3 37	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18 53	ICP	
ARJ0018-17 (08KMS17SL)		**Soil**				**Sampled: 09/26/08 13:55**					
Arsenic	EPA 6010C	**2.67**	*0.169*	6 02	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 18 59	ICP	J
Chromium	"	**12.5**	*0.0241*	1 20	"	"	"	"	"	ICP	
Mercury	EPA 7471	**337**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10 06	ZZZ	
Nickel	EPA 6010C	**13.9**	*0.0723*	3 61	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 18 59	ICP	
ARJ0018-18 (08KMS18SL)		**Soil**				**Sampled: 09/26/08 14:00**					
Arsenic	EPA 6010C	**3.40**	*0.103*	3 69	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 19 04	ICP	J
Chromium	"	**15.4**	*0.0148*	0 739	"	"	"	"	"	ICP	
Mercury	EPA 7471	**114**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10:13	ZZZ	
Nickel	EPA 6010C	**13.8**	*0.0443*	2 22	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 19 04	ICP	
ARJ0018-19 (08KMS19SL)		**Soil**				**Sampled: 09/26/08 14:05**					
Arsenic	EPA 6010C	**2.07**	*0.114*	4 07	mg/kg dry	1x	8100126	10/16/08 10:42	10/17/08 19:24	ICP	J
Chromium	"	**9.17**	*0.0163*	0 814	"	"	"	"	"	ICP	
Mercury	EPA 7471	**233**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10:15	ZZZ	
Nickel	EPA 6010C	**7.48**	*0.0489*	2 44	mg/kg dry	"	8100126	10/16/08 10:42	10/17/08 19:24	ICP	
ARJ0018-20 (08KMS20SL)		**Soil**				**Sampled: 09/26/08 14:10**					
Arsenic	EPA 6010C	**7.33**	*0.0907*	3 24	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 19 56	ICP	
Chromium	"	**24.1**	*0.0130*	0 648	"	"	"	"	"	ICP	
Mercury	EPA 7471	**65.7**	*10.2*	50 0	ug/kg dry	"	8100108	10/15/08 09:34	10/16/08 10:18	ZZZ	
Nickel	EPA 6010C	**30.4**	*0.0389*	1 94	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 19 56	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-21 (08KMS21SL)		**Soil**				**Sampled: 09/26/08 15:50**					
Arsenic	EPA 6010C	**8.05**	*0.107*	3 82	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20 02	ICP	
Chromium	"	**18.7**	*0.0153*	0 763	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1430**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10:32	ZZZ	
Nickel	EPA 6010C	**12.4**	*0.0458*	2 29	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 20 02	ICP	
ARJ0018-22 (08KMS22SL)		**Soil**				**Sampled: 09/26/08 15:55**					
Arsenic	EPA 6010C	**7.65**	*0.110*	3 94	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20 07	ICP	
Chromium	"	**22.6**	*0.0157*	0 787	"	"	"	"	"	ICP	
Mercury	EPA 7471	**2490**	*51.0*	250	ug/kg dry	5x	8100109	10/15/08 10:49	10/16/08 16:18	ZZZ	
Nickel	EPA 6010C	**12.5**	*0.0472*	2 36	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20 07	ICP	
ARJ0018-23 (08KMS23SL)		**Soil**				**Sampled: 09/26/08 16:00**					
Arsenic	EPA 6010C	**7.39**	*0.0894*	3 19	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:13	ICP	
Chromium	"	**17.1**	*0.0128*	0 639	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1600**	*51.0*	250	ug/kg dry	5x	8100109	10/15/08 10:49	10/16/08 16:20	ZZZ	
Nickel	EPA 6010C	**9.57**	*0.0383*	1 92	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:13	ICP	
ARJ0018-24 (08KMS24SL)		**Soil**				**Sampled: 09/26/08 16:05**					
Arsenic	EPA 6010C	**8.38**	*0.0992*	3 54	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:32	ICP	
Chromium	"	**22.3**	*0.0142*	0 708	"	"	"	"	"	ICP	
Mercury	EPA 7471	**2080**	*51.0*	250	ug/kg dry	5x	8100109	10/15/08 10:49	10/16/08 16:22	ZZZ	
Nickel	EPA 6010C	**16.1**	*0.0425*	2 12	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:32	ICP	
ARJ0018-25 (08KMS25SL)		**Soil**				**Sampled: 09/26/08 16:10**					
Arsenic	EPA 6010C	**7.99**	*0.127*	4 53	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:38	ICP	
Chromium	"	**20.2**	*0.0181*	0 906	"	"	"	"	"	ICP	
Mercury	EPA 7471	**188**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10:49	ZZZ	
Nickel	EPA 6010C	**14.7**	*0.0543*	2 72	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 20:38	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-26 (08KMS26SL)		**Soil**				**Sampled: 09/26/08 16:15**					
Arsenic	EPA 6010C	**8.23**	*0.0986*	3 52	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:44	ICP	
Chromium	"	**25.7**	*0.0141*	0 704	"	"	"	"	"	ICP	
Mercury	EPA 7471	**580**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10 51	ZZZ	
Nickel	EPA 6010C	**23.1**	*0.0423*	2 11	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 20:44	ICP	
ARJ0018-27 (08KMS27SL)		**Soil**				**Sampled: 09/26/08 16:20**					
Arsenic	EPA 6010C	**10.7**	*0.111*	3 97	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20:49	ICP	
Chromium	"	**23.2**	*0.0159*	0 794	"	"	"	"	"	ICP	
Mercury	EPA 7471	**230**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10 53	ZZZ	
Nickel	EPA 6010C	**18.1**	*0.0476*	2 38	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 20:49	ICP	
ARJ0018-28 (08KMS28SL)		**Soil**				**Sampled: 09/26/08 16:25**					
Arsenic	EPA 6010C	**7.93**	*0.103*	3 69	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 20 55	ICP	
Chromium	"	**22.0**	*0.0147*	0 737	"	"	"	"	"	ICP	
Mercury	EPA 7471	**220**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10 56	ZZZ	
Nickel	EPA 6010C	**18.1**	*0.0442*	2 21	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 20 55	ICP	
ARJ0018-29 (08KMS29SL)		**Soil**				**Sampled: 09/26/08 16:40**					
Arsenic	EPA 6010C	ND	*0.267*	9 54	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21 00	ICP	
Chromium	"	**3.87**	*0.0382*	1 91	"	"	"	"	"	ICP	
Mercury	EPA 7471	**277**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 10 58	ZZZ	
Nickel	EPA 6010C	**4.72**	*0.115*	5 73	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21 00	ICP	J
ARJ0018-30 (08KMS30SL)		**Soil**				**Sampled: 09/26/08 16:45**					
Arsenic	EPA 6010C	**0.630**	*0.273*	9 77	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21 06	ICP	J
Chromium	"	**6.78**	*0.0391*	1 95	"	"	"	"	"	ICP	
Mercury	EPA 7471	**273**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11 00	ZZZ	
Nickel	EPA 6010C	**5.29**	*0.117*	5 86	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21 06	ICP	J

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-31 (08KMS31SL)		**Soil**				**Sampled: 09/26/08 16:50**					
Arsenic	EPA 6010C	**2.57**	*0.164*	5 85	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21:12	ICP	J
Chromium	"	**8.24**	*0.0234*	1 17	"	"	"	"	"	ICP	
Mercury	EPA 7471	**153**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11 03	ZZZ	
Nickel	EPA 6010C	**4.51**	*0.0703*	3 51	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21:12	ICP	
ARJ0018-32 (08KMS32SL)		**Soil**				**Sampled: 09/26/08 16:55**					
Arsenic	EPA 6010C	**1.12**	*0.152*	5 42	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21:17	ICP	J
Chromium	"	**12.9**	*0.0217*	1 08	"	"	"	"	"	ICP	
Mercury	EPA 7471	**321**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11 05	ZZZ	
Nickel	EPA 6010C	**3.83**	*0.0651*	3 25	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21:17	ICP	
ARJ0018-33 (08KMS33SL)		**Soil**				**Sampled: 09/26/08 17:00**					
Arsenic	EPA 6010C	**7.36**	*0.0936*	3 34	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21:23	ICP	
Chromium	"	**14.9**	*0.0134*	0 668	"	"	"	"	"	ICP	
Mercury	EPA 7471	**119**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:12	ZZZ	
Nickel	EPA 6010C	**27.2**	*0.0401*	2 01	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21:23	ICP	
ARJ0018-34 (08KMS34SL)		**Soil**				**Sampled: 09/26/08 17:05**					
Arsenic	EPA 6010C	**12.9**	*0.0846*	3 02	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21:46	ICP	
Chromium	"	**28.5**	*0.0121*	0 605	"	"	"	"	"	ICP	
Mercury	EPA 7471	**376**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:14	ZZZ	
Nickel	EPA 6010C	**44.9**	*0.0363*	1 81	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21:46	ICP	
ARJ0018-35 (08KMS35SL)		**Soil**				**Sampled: 09/26/08 17:10**					
Arsenic	EPA 6010C	**16.7**	*0.0842*	3 01	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21 51	ICP	
Chromium	"	**23.7**	*0.0120*	0 602	"	"	"	"	"	ICP	
Mercury	EPA 7471	**368**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:16	ZZZ	
Nickel	EPA 6010C	**44.1**	*0.0361*	1 81	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21 51	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-36 (08KMS36SL)		**Soil**				**Sampled: 09/26/08 17:45**					
Arsenic	EPA 6010C	**0.526**	*0.196*	7 00	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 21 57	ICP	J
Chromium	"	**3.51**	*0.0280*	1 40	"	"	"	"	"	ICP	
Mercury	EPA 7471	**174**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:19	ZZZ	
Nickel	EPA 6010C	**1.77**	*0.0840*	4 20	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 21 57	ICP	J
ARJ0018-37 (08KMS37SL)		**Soil**				**Sampled: 09/26/08 17:50**					
Arsenic	EPA 6010C	**4.81**	*0.148*	5 29	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 22 02	ICP	J
Chromium	"	**4.74**	*0.0211*	1 06	"	"	"	"	"	ICP	
Mercury	EPA 7471	**112**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:21	ZZZ	
Nickel	EPA 6010C	**3.29**	*0.0634*	3 17	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 22 02	ICP	
ARJ0018-38 (08KMS38SL)		**Soil**				**Sampled: 09/26/08 17:55**					
Arsenic	EPA 6010C	**5.60**	*0.129*	4 60	mg/kg dry	1x	8100127	10/16/08 10:44	10/17/08 22 08	ICP	
Chromium	"	**11.1**	*0.0184*	0 919	"	"	"	"	"	ICP	
Mercury	EPA 7471	**69.3**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:24	ZZZ	
Nickel	EPA 6010C	**9.20**	*0.0551*	2 76	mg/kg dry	"	8100127	10/16/08 10:44	10/17/08 22 08	ICP	
ARJ0018-39 (08KMS39SL)		**Soil**				**Sampled: 09/26/08 18:00**					
Arsenic	EPA 6010C	**4.56**	*0.133*	4 73	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 22 57	ICP	J
Chromium	"	**5.21**	*0.0189*	0 947	"	"	"	"	"	ICP	
Mercury	EPA 7471	**103**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:26	ZZZ	
Nickel	EPA 6010C	**5.24**	*0.0568*	2 84	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 22 57	ICP	
ARJ0018-40 (08KMS40SL)		**Soil**				**Sampled: 09/26/08 18:05**					
Arsenic	EPA 6010C	**5.88**	*0.107*	3 83	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23 03	ICP	
Chromium	"	**18.9**	*0.0153*	0 766	"	"	"	"	"	ICP	
Mercury	EPA 7471	**250**	*10.2*	50 0	ug/kg dry	"	8100109	10/15/08 10:49	10/16/08 11:28	ZZZ	
Nickel	EPA 6010C	**15.0**	*0.0459*	2 30	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23 03	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-41 (08KMS41SL)		**Soil**				**Sampled: 09/26/08 19:00**					
Arsenic	EPA 6010C	**2.45**	*0.124*	4 44	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23 08	ICP	J
Chromium	"	**4.07**	*0.0178*	0 888	"	"	"	"	"	ICP	
Mercury	EPA 7471	**125**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 11:49	ZZZ	
Nickel	EPA 6010C	**1.87**	*0.0533*	2 66	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23 08	ICP	J
ARJ0018-42 (08KMS42SL)		**Soil**				**Sampled: 09/26/08 19:05**					
Arsenic	EPA 6010C	**5.69**	*0.120*	4 28	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:14	ICP	
Chromium	"	**18.0**	*0.0171*	0 856	"	"	"	"	"	ICP	
Mercury	EPA 7471	**517**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 11 51	ZZZ	
Nickel	EPA 6010C	**12.5**	*0.0514*	2 57	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:14	ICP	
ARJ0018-43 (08KMS43SL)		**Soil**				**Sampled: 09/26/08 19:10**					
Arsenic	EPA 6010C	**9.61**	*0.104*	3 70	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:20	ICP	
Chromium	"	**25.4**	*0.0148*	0 740	"	"	"	"	"	ICP	
Mercury	EPA 7471	**200**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 11 53	ZZZ	
Nickel	EPA 6010C	**22.2**	*0.0444*	2 22	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:20	ICP	
ARJ0018-44 (08KMS44SL)		**Soil**				**Sampled: 09/26/08 19:15**					
Arsenic	EPA 6010C	**12.9**	*0.104*	3 70	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:25	ICP	
Chromium	"	**20.1**	*0.0148*	0 741	"	"	"	"	"	ICP	
Mercury	EPA 7471	**179**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 11 56	ZZZ	
Nickel	EPA 6010C	**16.1**	*0.0444*	2 22	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:25	ICP	
ARJ0018-45 (08KMS45SL)		**Soil**				**Sampled: 09/26/08 19:20**					
Arsenic	EPA 6010C	**11.2**	*0.137*	4 90	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:31	ICP	
Chromium	"	**24.6**	*0.0196*	0 980	"	"	"	"	"	ICP	
Mercury	EPA 7471	**251**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 11 58	ZZZ	
Nickel	EPA 6010C	**21.9**	*0.0588*	2 94	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:31	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-46 (08KMS46SL)		**Soil**				**Sampled: 09/26/08 19:25**					
Arsenic	EPA 6010C	**0.747**	*0.186*	6 63	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:37	ICP	J
Chromium	"	**5.94**	*0.0265*	1 33	"	"	"	"	"	ICP	
Mercury	EPA 7471	**515**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 12 00	ZZZ	
Nickel	EPA 6010C	**6.45**	*0.0796*	3 98	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:37	ICP	
ARJ0018-47 (08KMS47SL)		**Soil**				**Sampled: 09/26/08 19:30**					
Arsenic	EPA 6010C	**4.97**	*0.104*	3 70	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:42	ICP	
Chromium	"	**23.8**	*0.0148*	0 740	"	"	"	"	"	ICP	
Mercury	EPA 7471	**268**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 12 03	ZZZ	
Nickel	EPA 6010C	**19.2**	*0.0444*	2 22	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:42	ICP	
ARJ0018-48 (08KMS48SL)		**Soil**				**Sampled: 09/27/08 11:30**					
Arsenic	EPA 6010C	**0.563**	*0.237*	8 47	mg/kg dry	1x	8100129	10/16/08 10:55	10/17/08 23:48	ICP	J
Chromium	"	**4.72**	*0.0339*	1 69	"	"	"	"	"	ICP	
Mercury	EPA 7471	**1650**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 12 09	ZZZ	
Nickel	EPA 6010C	**8.33**	*0.102*	5 08	mg/kg dry	"	8100129	10/16/08 10:55	10/17/08 23:48	ICP	
ARJ0018-49 (08KMS49SL)		**Soil**				**Sampled: 09/27/08 11:35**					
Arsenic	EPA 6010C	**1.05**	*0.128*	4 56	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:14	ICP	J
Chromium	"	**3.53**	*0.0182*	0 912	"	"	"	"	"	ICP	
Mercury	EPA 7471	**555**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 12:12	ZZZ	
Nickel	EPA 6010C	**3.78**	*0.0547*	2 74	mg/kg dry	"	8100129	10/16/08 10:55	10/18/08 00:14	ICP	
ARJ0018-50 (08KMS50SL)		**Soil**				**Sampled: 09/27/08 11:43**					
Arsenic	EPA 6010C	**4.24**	*0.176*	6 30	mg/kg dry	1x	8100129	10/16/08 10:55	10/18/08 00:20	ICP	J
Chromium	"	**11.2**	*0.0252*	1 26	"	"	"	"	"	ICP	
Mercury	EPA 7471	**474**	*10.2*	50 0	ug/kg dry	"	8100110	10/15/08 10:50	10/16/08 12:14	ZZZ	
Nickel	EPA 6010C	**6.55**	*0.0756*	3 78	mg/kg dry	"	8100129	10/16/08 10:55	10/18/08 00:20	ICP	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-01 (08KMS01SL)		**Soil**				**Sampled: 09/26/08 12:00**					
% Solids	TA SOP	**60.2**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-02 (08KMS02SL)		**Soil**				**Sampled: 09/26/08 12:05**					
% Solids	TA SOP	**79.2**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-03 (08KMS03SL)		**Soil**				**Sampled: 09/26/08 12:15**					
% Solids	TA SOP	**70.6**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-04 (08KMS04SL)		**Soil**				**Sampled: 09/26/08 12:20**					
% Solids	TA SOP	**68.6**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-05 (08KMS05SL)		**Soil**				**Sampled: 09/26/08 12:25**					
% Solids	TA SOP	**84.0**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-06 (08KMS06SL)		**Soil**				**Sampled: 09/26/08 12:30**					
% Solids	TA SOP	**60.5**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-07 (08KMS07SL)		**Soil**				**Sampled: 09/26/08 12:35**					
% Solids	TA SOP	**66.2**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-08 (08KMS08SL)		**Soil**				**Sampled: 09/26/08 12:40**					
% Solids	TA SOP	**70.7**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-09 (08KMS09SL)		**Soil**				**Sampled: 09/26/08 12:45**					
% Solids	TA SOP	**72.9**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-10 (08KMS10SL)		**Soil**				**Sampled: 09/26/08 12:50**					
% Solids	TA SOP	**68.2**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-11 (08KMS11SL)		**Soil**				**Sampled: 09/26/08 12:55**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-11 (08KMS11SL)		**Soil**				**Sampled: 09/26/08 12:55**					
% Solids	TA SOP	**74.1**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-12 (08KMS12SL)		**Soil**				**Sampled: 09/26/08 13:00**					
% Solids	TA SOP	**61.7**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-13 (08KMS13SL)		**Soil**				**Sampled: 09/26/08 13:05**					
% Solids	TA SOP	**67.3**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-14 (08KMS14SL)		**Soil**				**Sampled: 09/26/08 13:10**					
% Solids	TA SOP	**68.5**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-15 (08KMS15SL)		**Soil**				**Sampled: 09/26/08 13:15**					
% Solids	TA SOP	**69.3**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-16 (08KMS16SL)		**Soil**				**Sampled: 09/26/08 13:48**					
% Solids	TA SOP	**44.5**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-17 (08KMS17SL)		**Soil**				**Sampled: 09/26/08 13:55**					
% Solids	TA SOP	**41.5**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-18 (08KMS18SL)		**Soil**				**Sampled: 09/26/08 14:00**					
% Solids	TA SOP	**67.7**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-19 (08KMS19SL)		**Soil**				**Sampled: 09/26/08 14:05**					
% Solids	TA SOP	**61.4**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-20 (08KMS20SL)		**Soil**				**Sampled: 09/26/08 14:10**					
% Solids	TA SOP	**77.2**	-----	0 0100	% by Weight	1x	8100116	10/15/08 15:50	10/16/08 07 00	HB	
ARJ0018-21 (08KMS21SL)		**Soil**				**Sampled: 09/26/08 15:50**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-21 (08KMS21SL)		**Soil**				**Sampled: 09/26/08 15:50**					
% Solids	TA SOP	**65.5**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-22 (08KMS22SL)		**Soil**				**Sampled: 09/26/08 15:55**					
% Solids	TA SOP	**63.5**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-23 (08KMS23SL)		**Soil**				**Sampled: 09/26/08 16:00**					
% Solids	TA SOP	**78.3**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-24 (08KMS24SL)		**Soil**				**Sampled: 09/26/08 16:05**					
% Solids	TA SOP	**70.6**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-25 (08KMS25SL)		**Soil**				**Sampled: 09/26/08 16:10**					
% Solids	TA SOP	**55.2**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-26 (08KMS26SL)		**Soil**				**Sampled: 09/26/08 16:15**					
% Solids	TA SOP	**71.0**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-27 (08KMS27SL)		**Soil**				**Sampled: 09/26/08 16:20**					
% Solids	TA SOP	**63.0**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-28 (08KMS28SL)		**Soil**				**Sampled: 09/26/08 16:25**					
% Solids	TA SOP	**67.8**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-29 (08KMS29SL)		**Soil**				**Sampled: 09/26/08 16:40**					
% Solids	TA SOP	**26.2**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-30 (08KMS30SL)		**Soil**				**Sampled: 09/26/08 16:45**					
% Solids	TA SOP	**25.6**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-31 (08KMS31SL)		**Soil**				**Sampled: 09/26/08 16:50**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-31 (08KMS31SL)		**Soil**				**Sampled: 09/26/08 16:50**					
% Solids	TA SOP	**42.7**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-32 (08KMS32SL)		**Soil**				**Sampled: 09/26/08 16:55**					
% Solids	TA SOP	**46.1**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-33 (08KMS33SL)		**Soil**				**Sampled: 09/26/08 17:00**					
% Solids	TA SOP	**74.8**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-34 (08KMS34SL)		**Soil**				**Sampled: 09/26/08 17:05**					
% Solids	TA SOP	**82.7**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-35 (08KMS35SL)		**Soil**				**Sampled: 09/26/08 17:10**					
% Solids	TA SOP	**83.1**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-36 (08KMS36SL)		**Soil**				**Sampled: 09/26/08 17:45**					
% Solids	TA SOP	**35.7**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-37 (08KMS37SL)		**Soil**				**Sampled: 09/26/08 17:50**					
% Solids	TA SOP	**47.3**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-38 (08KMS38SL)		**Soil**				**Sampled: 09/26/08 17:55**					
% Solids	TA SOP	**54.4**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-39 (08KMS39SL)		**Soil**				**Sampled: 09/26/08 18:00**					
% Solids	TA SOP	**52.8**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-40 (08KMS40SL)		**Soil**				**Sampled: 09/26/08 18:05**					
% Solids	TA SOP	**65.3**	-----	0 0100	% by Weight	1x	8100117	10/15/08 15:15	10/16/08 07 00	HB	
ARJ0018-41 (08KMS41SL)		**Soil**				**Sampled: 09/26/08 19:00**					

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
ARJ0018-41 (08KMS41SL)		**Soil**				**Sampled: 09/26/08 19:00**					
% Solids	TA SOP	**56.3**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-42 (08KMS42SL)		**Soil**				**Sampled: 09/26/08 19:05**					
% Solids	TA SOP	**58.4**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-43 (08KMS43SL)		**Soil**				**Sampled: 09/26/08 19:10**					
% Solids	TA SOP	**67.6**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-44 (08KMS44SL)		**Soil**				**Sampled: 09/26/08 19:15**					
% Solids	TA SOP	**67.5**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-45 (08KMS45SL)		**Soil**				**Sampled: 09/26/08 19:20**					
% Solids	TA SOP	**51.0**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-46 (08KMS46SL)		**Soil**				**Sampled: 09/26/08 19:25**					
% Solids	TA SOP	**37.7**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-47 (08KMS47SL)		**Soil**				**Sampled: 09/26/08 19:30**					
% Solids	TA SOP	**67.6**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-48 (08KMS48SL)		**Soil**				**Sampled: 09/27/08 11:30**					
% Solids	TA SOP	**29.5**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-49 (08KMS49SL)		**Soil**				**Sampled: 09/27/08 11:35**					
% Solids	TA SOP	**54.8**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	
ARJ0018-50 (08KMS50SL)		**Soil**				**Sampled: 09/27/08 11:43**					
% Solids	TA SOP	**39.7**	-----	0 0100	% by Weight	1x	8100118	10/15/08 15:00	10/16/08 07 00	HB	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100108 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100108-BLK1)									Extracted: 10/15/08 09:34					
Mercury	EPA 7471	ND	10 2	50 0	ug/kg wet	1x	--	--	--	--	--	--	10/16/08 09:23	
LCS (8100108-BS1)									Extracted: 10/15/08 09:34					
Mercury	EPA 7471	105	10 2	50 0	ug/kg wet	1x	--	100	105%	(80-120)	--	--	10/16/08 09:20	
Duplicate (8100108-DUP1)				QC Source: ARJ0018-01					Extracted: 10/15/08 09:34					
Mercury	EPA 7471	226	10 2	50 0	ug/kg dry	1x	144	--	--	--	44 5%	(40)	10/16/08 10:20	R2
Matrix Spike (8100108-MS1)				QC Source: ARJ0018-01					Extracted: 10/15/08 09:34					
Mercury	EPA 7471	322	10 2	50 0	ug/kg dry	1x	144	166	107%	(80-120)	--	--	10/16/08 10:22	
Matrix Spike Dup (8100108-MSD1)				QC Source: ARJ0018-01					Extracted: 10/15/08 09:34					
Mercury	EPA 7471	452	10 2	50 0	ug/kg dry	1x	144	166	185%	(80-120)	33 5%	(20)	10/16/08 10:25	M7, R2

QC Batch: 8100109 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100109-BLK1)									Extracted: 10/15/08 10:49					
Mercury	EPA 7471	22 2	10 2	50 0	ug/kg wet	1x	--	--	--	--	--	--	10/16/08 10:29	J
LCS (8100109-BS1)									Extracted: 10/15/08 10:49					
Mercury	EPA 7471	106	10 2	50 0	ug/kg wet	1x	--	100	106%	(80-120)	--	--	10/16/08 10:27	
Duplicate (8100109-DUP1)				QC Source: ARJ0018-21					Extracted: 10/15/08 10:49					
Mercury	EPA 7471	1320	10 2	50 0	ug/kg dry	1x	1430	--	--	--	8 01%	(40)	10/16/08 11:31	
Matrix Spike (8100109-MS1)				QC Source: ARJ0018-21					Extracted: 10/15/08 10:49					
Mercury	EPA 7471	1840	20 4	100	ug/kg dry	2x	1430	153	269%	(80-120)	--	--	10/16/08 16:24	M7
Matrix Spike Dup (8100109-MSD1)				QC Source: ARJ0018-21					Extracted: 10/15/08 10:49					
Mercury	EPA 7471	2070	20 4	100	ug/kg dry	2x	1430	153	421%	(80-120)	11 9%	(20)	10/16/08 16:27	M7

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100110 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100110-BLK1)									Extracted: 10/15/08 10:50					
Mercury	EPA 7471	22 9	10 2	50 0	ug/kg wet	1x	--	--	--	--	--	--	10/16/08 11:47	J
LCS (8100110-BS1)									Extracted: 10/15/08 10:50					
Mercury	EPA 7471	104	10 2	50 0	ug/kg wet	1x	--	100	104%	(80-120)	--	--	10/16/08 16:13	
Duplicate (8100110-DUP1)					QC Source: ARJ0018-41				Extracted: 10/15/08 10:50					
Mercury	EPA 7471	112	10 2	50 0	ug/kg dry	1x	125	--	--	--	10 3%	(40)	10/16/08 12:39	
Matrix Spike (8100110-MS1)					QC Source: ARJ0018-41				Extracted: 10/15/08 10:50					
Mercury	EPA 7471	284	10 2	50 0	ug/kg dry	1x	125	178	89 8%	(80-120)	--	--	10/16/08 12:41	
Matrix Spike Dup (8100110-MSD1)					QC Source: ARJ0018-41				Extracted: 10/15/08 10:50					
Mercury	EPA 7471	274	10 2	50 0	ug/kg dry	1x	125	178	83 8%	(80-120)	3 82%	(20)	10/16/08 12:44	

QC Batch: 8100126 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100126-BLK1)									Extracted: 10/16/08 10:42					
Arsenic	EPA 6010C	ND	0 0700	2 50	mg/kg wet	1x	--	--	--	--	--	--	10/17/08 17:10	
Chromium	"	0 181	0 0100	0 500	"	"	--	--	--	--	--	--	"	J
Nickel	"	0 551	0 0300	1 50	"	"	--	--	--	--	--	--	"	J
LCS (8100126-BS1)									Extracted: 10/16/08 10:42					
Chromium	EPA 6010C	54 3	0 0100	0 500	mg/kg wet	1x	--	50 0	109%	(80-120)	--	--	10/17/08 17 05	
Arsenic	"	51 3	0 0700	2 50	"	"	--	"	103%	"	--	--	"	
Nickel	"	55 2	0 0300	1 50	"	"	--	"	110%	"	--	--	"	
Duplicate (8100126-DUP1)					QC Source: ARJ0018-18				Extracted: 10/16/08 10:42					
Nickel	EPA 6010C	13 5	0 0443	2 22	mg/kg dry	1x	13 8	--	--	--	2 27%	(20)	10/17/08 19:30	
Arsenic	"	2 86	0 103	3 69	"	"	3 40	--	--	--	17 1%	"	"	J
Chromium	"	15 2	0 0148	0 739	"	"	15 4	--	--	--	0 993%	"	"	
Matrix Spike (8100126-MS1)					QC Source: ARJ0018-18				Extracted: 10/16/08 10:42					
Chromium	EPA 6010C	88 8	0 0148	0 739	mg/kg dry	1x	15 4	73 9	99 5%	(75-125)	--	--	10/17/08 19:35	
Arsenic	"	76 1	0 103	3 69	"	"	3 40	"	98 4%	"	--	--	"	
Nickel	"	88 0	0 0443	2 22	"	"	13 8	"	100%	"	--	--	"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100126 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (8100126-MSD1)					QC Source: ARJ0018-18				Extracted: 10/16/08 10:42					
Nickel	EPA 6010C	98 4	0 0443	2 22	mg/kg dry	1x	13 8	73 9	114%	(75-125)	11 1%	(20)	10/17/08 19:41	
Arsenic	"	79 6	0 103	3 69	"	"	3 40	"	103%	"	4 57%	"	"	
Chromium	"	97 3	0 0148	0 739	"	"	15 4	"	111%	"	9 12%	"	"	

QC Batch: 8100127 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100127-BLK1)									Extracted: 10/16/08 10:44					
Chromium	EPA 6010C	0 0845	0 0100	0 500	mg/kg wet	1x	--	--	--	--	--	--	10/17/08 19 51	J
Nickel	"	0 218	0 0300	1 50	"	"	--	--	--	--	--	--	"	J
Arsenic	"	ND	0 0700	2 50	"	"	--	--	--	--	--	--	"	
LCS (8100127-BS1)									Extracted: 10/16/08 10:44					
Chromium	EPA 6010C	52 8	0 0100	0 500	mg/kg wet	1x	--	50 0	106%	(80-120)	--	--	10/17/08 19:46	
Arsenic	"	50 0	0 0700	2 50	"	"	--	"	100%	"	--	--	"	
Nickel	"	53 2	0 0300	1 50	"	"	--	"	106%	"	--	--	"	
Duplicate (8100127-DUP1)					QC Source: ARJ0018-38				Extracted: 10/16/08 10:44					
Nickel	EPA 6010C	8 97	0 0551	2 76	mg/kg dry	1x	9 20	--	--	--	2 57%	(20)	10/17/08 22:14	
Arsenic	"	5 15	0 129	4 60	"	"	5 60	--	--	--	8 34%	"	"	
Chromium	"	10 7	0 0184	0 919	"	"	11 1	--	--	--	3 83%	"	"	
Matrix Spike (8100127-MS1)					QC Source: ARJ0018-38				Extracted: 10/16/08 10:44					
Chromium	EPA 6010C	102	0 0184	0 919	mg/kg dry	1x	11 1	91 9	98 8%	(75-125)	--	--	10/17/08 22:19	
Arsenic	"	93 5	0 129	4 60	"	"	5 60	"	95 7%	"	--	--	"	
Nickel	"	100	0 0551	2 76	"	"	9 20	"	99 0%	"	--	--	"	
Matrix Spike Dup (8100127-MSD1)					QC Source: ARJ0018-38				Extracted: 10/16/08 10:44					
Nickel	EPA 6010C	96 9	0 0551	2 76	mg/kg dry	1x	9 20	91 9	95 4%	(75-125)	3 30%	(20)	10/17/08 22:25	
Arsenic	"	97 1	0 129	4 60	"	"	5 60	"	99 6%	"	3 78%	"	"	
Chromium	"	98 5	0 0184	0 919	"	"	11 1	"	95 0%	"	3 52%	"	"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Total Metals by EPA 6010/7000 Series Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100129 **Soil Preparation Method: Metals**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8100129-BLK1)								**Extracted: 10/16/08 10:55**						
Chromium	EPA 6010C	0 0792	0 0100	0 500	mg/kg wet	1x	--	--	--	--	--	--	10/17/08 22:35	J
Nickel	"	0 641	0 0300	1 50	"	"	--	--	--	--	--	--	"	J
Arsenic	"	ND	0 0700	2 50	"	"	--	--	--	--	--	--	"	
LCS (8100129-BS1)								**Extracted: 10/16/08 10:55**						
Nickel	EPA 6010C	54 9	0 0300	1 50	mg/kg wet	1x	--	50 0	110%	(80-120)	--	--	10/17/08 22:30	
Arsenic	"	51 3	0 0700	2 50	"	"	--	"	103%	"	--	--	"	
Chromium	"	54 1	0 0100	0 500	"	"	--	"	108%	"	--	--	"	
Duplicate (8100129-DUP1)				**QC Source: SRJ0052-07**				**Extracted: 10/16/08 10:55**						
Nickel	EPA 6010C	20 8	0 0441	2 21	mg/kg dry	1x	16 4	--	--	--	24 0%	(20)	10/18/08 01 05	R2
Chromium	"	25 4	0 0147	0 735	"	"	21 5	--	--	--	16 7%	"	"	
Arsenic	"	8 32	0 103	3 68	"	"	6 72	--	--	--	21 3%	"	"	R2
Matrix Spike (8100129-MS1)				**QC Source: SRJ0052-07**				**Extracted: 10/16/08 10:55**						
Nickel	EPA 6010C	98 5	0 0441	2 21	mg/kg dry	1x	16 4	73 5	112%	(75-125)	--	--	10/18/08 10:10	
Chromium	"	102	0 0147	0 735	"	"	21 5	"	109%	"	--	--	"	
Arsenic	"	86 7	0 103	3 68	"	"	6 72	"	109%	"	--	--	"	
Matrix Spike Dup (8100129-MSD1)				**QC Source: SRJ0052-07**				**Extracted: 10/16/08 10:55**						
Chromium	EPA 6010C	105	0 0147	0 735	mg/kg dry	1x	21 5	73 5	113%	(75-125)	2 88%	(20)	10/18/08 10:15	
Nickel	"	99 8	0 0441	2 21	"	"	16 4	"	114%	"	1 33%	"	"	
Arsenic	"	85 3	0 103	3 68	"	"	6 72	"	107%	"	1 61%	"	"	

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica Spokane

QC Batch: 8100116 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100116-DUP1)					**QC Source: ARJ0018-20**				**Extracted: 10/15/08 15:50**					
% Solids	TA SOP	79 4	---	0 0100	% by Weight	1x	77 2	--	--	--	2 81%	(5)	10/16/08 07 00	

QC Batch: 8100117 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100117-DUP1)					**QC Source: ARJ0018-40**				**Extracted: 10/15/08 15:15**					
% Solids	TA SOP	63 3	---	0 0100	% by Weight	1x	65 3	--	--	--	3 11%	(5)	10/16/08 07 00	

QC Batch: 8100118 **Soil Preparation Method: Wet Chem**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8100118-DUP1)					**QC Source: SRJ0052-10**				**Extracted: 10/15/08 15:00**					
% Solids	TA SOP	65 2	---	0 0100	% by Weight	1x	61 6	--	--	--	5 68%	(5)	10/16/08 07 00	R2

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ANCHORAGE, AK 2000 W. INTERNATIONAL AIRPORT ROAD, SUITE A-10
ANCHORAGE, AK 99502-1119
ph: (907) 563.9200 fax: (907) 563.9210
CS Approval Number: UST-067

MACTEC Engineering and Consulting	Project Name:	**Kolmakof Mine Site**	
601 East 57th Place	Project Number:	[none]	Report Created:
Anchorage, AK/USA 99518	Project Manager:	Steve Wrenn	04/03/09 10:49

Notes and Definitions

Report Specific Notes:

J	-	Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
M7	-	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
R2	-	The RPD exceeded the acceptance limit.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica Anchorage

Johanna Dreher

Johanna L Dreher For Troy J Engstrom, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0018

CLIENT: MACTEC

REPORT TO: Steve Wrenn
ADDRESS: 601 E. 57th Place
Anch AK 99518
PHONE: 561-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmakof Mine Site
PROJECT NUMBER:
SAMPLED BY: S. Finnegan

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		6010 As Cr Ni	7471 Hg	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 08KMS01SL	9/~~28~~ 210/08	1200	1		S	1		1
2 08KMS02SL		1205	1					2
3 08KMS03SL		1215	1					3
4 08KMS04SL		1220	1					4
5 08KMS05SL		1225	1					5
6 08KMS06SL		1230	1					6
7 08KMS07SL		1235	1					7
8 08KMS08SL		1240	1					8
9 08KMS09SL		1245	1					9
10 08KMS10SL		1250	1					10

RELEASED BY:	DATE: 10-6-08	RECEIVED BY:	DATE: 10/06/08
PRINT NAME: Chad Thompson	FIRM: MACTEC / TIME: 1517	PRINT NAME: Johanna Drehn	FIRM: Anchorage / TIME: 1517
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM: / TIME:	PRINT NAME:	FIRM: / TIME:

ADDITIONAL REMARKS:

TEMP: °C 5.3

PAGE OF

Cooler #1

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0018

CLIENT: MACTEC
REPORT TO: Steve Wrenn
ADDRESS:
PHONE: 261-7430 FAX:

INVOICE TO: MACTEC
P.O. NUMBER:

PROJECT NAME: Kolmakof Mine Site
PROJECT NUMBER:
SAMPLED BY: S. Finneyan

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: HNO3 (Cr, Ni)

REQUESTED ANALYSES: 6010 / 7471 Hg

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		6010 / 7471 Hg	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS11SL	9/26/08	1255	1	S	1		11
2	08KMS12SL		1300	1				12
3	08KMS13SL		1305	1				13
4	08KMS14SL		1310	1				14
5	08KMS15SL		1315	1				15
6	08KMS16SL		1348	1				16
7	08KMS17SL		1355	1				17
8	08KMS18SL		1400	1				18
9	08KMS19SL		1405	1				19
10	08KMS20SL		1410	1				20

RELEASED BY: [signature]	DATE: 10-6-08	RECEIVED BY: [signature]	DATE: 10/06/08
PRINT NAME: Chad Thompson	FIRM: MACTEC / TIME: 1517	PRINT NAME: Johanna Dreher	FIRM: Anchorage / TIME: 1517
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM: / TIME:	PRINT NAME:	FIRM: / TIME:

ADDITIONAL REMARKS:

TEMP: °C 5.3

PAGE OF

Cooler #1

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0018

CLIENT: MACTEC

REPORT TO: Steve Wrenn

ADDRESS:

PHONE: 241-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmakof Min Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

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: Ni, Cr, As; Hg

REQUESTED ANALYSES: 6010; 7471

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	6010	7471	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08 KMS 21 SL	9/26/08 1550	1		S	1		21
2	08 KMS 22 SL	1555	1					22
3	08 KMS 23 SL	1600	1					23
4	08 KMS 24 SL	1605	1					24
5	08 KMS 25 SL	1610	1					25
6	08 KMS 26 SL	1615	1					26
7	08 KMS 27 SL	1620	1					27
8	08 KMS 28 SL	1625	1					28
9	08 KMS 29 SL	1640	1					29
10	08 KMS 30 SL	1645	1					30

RELEASED BY:		DATE: 10-6-08	RECEIVED BY:		DATE: 10/06/08
PRINT NAME: Chad Thompson	FIRM: MACTEC	TIME: 1517	PRINT NAME: Johanna Drake	FIRM: Anchorage	TIME: 1517
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: 5.3°C

PAGE OF

Cooler #1

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0018

CLIENT: MACTEC

REPORT TO: Steve Wrenn

ADDRESS:

PHONE: 241-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kolmakof Mine Site

PROJECT NUMBER:

SAMPLED BY: S. Finnegan

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: As, Cr, Ni; Hg

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME													MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS31SL	9/26/08 1650		6010	7471										S	1		31
2	08KMS32SL	1655																32
3	08KMS33SL	1700																33
4	08KMS34SL	1705																34
5	08KMS35SL	1710																35
6	08KMS36SL	1745																36
7	08KMS37SL	1750																37
8	08KMS38SL	1755																38
9	08KMS39SL	1800																39
10	08KMS40SL	1805																40

RELEASED BY:		DATE: 10-6-08	RECEIVED BY:		DATE: 10/06/08
PRINT NAME: Chad Thompson	FIRM: MACTEC	TIME: 1517	PRINT NAME: Johanna Drehr	FIRM: Anchorage	TIME: 1517
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: °C 5.3

PAGE OF

Cooler # 1

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 #: ARJ0018

CLIENT: MACTEC

REPORT TO: Steve Wrenn

ADDRESS:

PHONE: 261-7430 FAX:

INVOICE TO: MACTEC

P.O. NUMBER:

PROJECT NAME: Kalmakoff Mine Site

PROJECT NUMBER:

SAMPLED BY: C. Thompson

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: HNO3, Cool, None

REQUESTED ANALYSES: 6010 7471 Hg

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		6010 7471 Hg	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	08KMS41SL	9/26/08	1900	1	S	1		41
2	08KMS42SL	9/26/08	1905	1	S	1		42
3	08KMS43SL		1910	1	S	1		43
4	08KMS44SL		1915	1	S	1		44
5	08KMS45SL		1920	1	S	1		45
6	08KMS46SL		1925	1	S	1		46
7	08KMS47SL		1930	1	S	1		47
8	08KMS48SL	9/27/08	1130	1	S	1		48
9	08KMS49SL		1135	1	S	1		49
10	08KMS50SL		1143	1	S	1		50

RELEASED BY:	DATE: 10-6-08	RECEIVED BY:	DATE: 10/06/08
PRINT NAME: Chad Thompson	FIRM: MACTEC / TIME: 1522	PRINT NAME: Johanna Drehr	FIRM: Anchorage / TIME: 1517
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME:	FIRM: / TIME:	PRINT NAME:	FIRM: / TIME:

ADDITIONAL REMARKS:

TEMP: 5.3°C

PAGE OF

TAL-1000(0408)

Cooler #1

#1

Test America Anchorage Cooler Receipt Form

(Army Corps. Compliant)

WORK ORDER # ARJ0018 **CLIENT:** MACTEC **PROJECT:** KOLMAKOF MINE SITE

Date /Time Cooler Arrived 10 / 06 / 08 15 : 17 Cooler signed for by: JOHANNA DREHER (Print name)

Preliminary Examination Phase:

Date cooler opened: ☑ same as date received *or* ___/___/___

Cooler opened by (print) JOHANNA DREHER (sign) Johanna Dreher

1. Delivered by ☐ ALASKA AIRLINES ☐ Fed-Ex ☐ UPS ☐ NAC ☐ LYNDEN ☑ CLIENT ☐ Other: ___

   Shipment Tracking # if applicable ___ (include copy of shipping papers in file)

2. Number of Custody Seals Ø Signed by NA Date ___/___/___

   Were custody seals unbroken and intact on arrival? ☐ Yes ☐ No

3. Were custody papers sealed in a plastic bag? ☐ Yes ☐ No

4. Were custody papers filled out properly (ink, signed, etc.)? ☑ Yes ☐ No

5. Did you sign the custody papers in the appropriate place? ☑ Yes ☐ No

6. Was ice used? ☑ Yes ☐ No Type of ice: ☐ blue ice ☑ gel ice ☐ real ice ☐ dry ice Condition of Ice: Solid

   Temperature by Digi-Thermo Probe 5.3°C °C Thermometer # rec #4
   Acceptance Criteria: 0 - 6°C

7. Packing in Cooler: ☑ bubble wrap ☐ styrofoam ☑ cardboard ☐ Other: ___

8. Did samples arrive in plastic bags? ☐ Yes ☑ No

9. Did all bottles arrive unbroken, and with labels in good condition? ☑ Yes ☐ No

10. Are all bottle labels complete (ID, date, time, etc.) ☑ Yes ☐ No

11. Do bottle labels and Chain of Custody agree? ☐ Yes ☑ No COC & bottle labels do not match for ARJ0018-35, 36, 37, 38, 39 ↳ Confirmed that COC is correct.

12. Are the containers and preservatives correct for the tests indicated? ☑ Yes ☐ No

13. Conoco Phillips, Alyeska, BP H2O samples only: pH < 2? ☐ Yes ☐ No ☑ N/A

14. Is there adequate volume for the tests requested? ☑ Yes ☐ No

15. Were VOA vials free of bubbles? ☑ N/A ☐ Yes ☐ No

    If "NO" which containers contained "head space" or bubbles? ___

Log-in Phase:

Date of sample log-in 10 / 06 / 08

Samples logged in by (print) DALJEET MAHAL (sign) [signature]

1. Was project identifiable from custody papers? ☑ Yes ☐ No
2. Do Turn Around Times and Due Dates agree? ☑ Yes ☐ No
3. Was the Project Manager notified of status? ☑ Yes ☐ No
4. Was the Lab notified of status? ☑ Yes ☐ No
5. Was the COC scanned and copied? ☑ Yes ☐ No

APPENDIX A2

ADEC LABORATORY DATA REVIEW CHECKLIST

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

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 ○ NA (Please explain.) 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 ○ NA (Please explain) Comments:

2. Chain of Custody (COC)

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

○ Yes ○ No ○ NA (Please explain) Comments:

b. Correct analyses requested?

○ Yes ○ No ○ NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

4. Case Narrative

a. Present and understandable?

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

c. Were all corrective actions documented?

○ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

5. Samples Results

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

○ Yes ○ No ○ NA (Please explain) Comments:

b. All applicable holding times met?

○ Yes ○ No ○ NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

6. QC Samples

a. Method Blank

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

○ Yes ○ No ○ NA (Please explain) Comments:

ii. All method blank results less than PQL?

○ Yes ○ No ○ NA (Please explain) Comments:

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 ○ NA (Please explain) Comments:

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

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

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

vii. Data quality or usability affected? (Please explain) Comments:

c. Surrogates - Organics Only

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to 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 for each cooler containing volatile samples? (If not, enter explanation below.)

○ Yes ○ No ○ NA (Please explain.) Comments:

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

○ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

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

Comments:

e. Field Duplicate

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

○ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

○ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 Sample Concentration

R_2 Field Duplicate Concentration

○ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ○ NA (Please explain) Comments:

i. All results less than PQL?

○ Yes ○ No ○ NA (Please explain) Comments:

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

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

a. Defined and appropriate?

○ Yes ○ No ○ NA (Please explain) Comments:

Reset Form

APPENDIX B

GEOPHYSICAL SURVEY REPORT - 2008

This report presents the results of MACTEC Engineering and Consulting, Inc. (MACTEC) geophysical investigation at the Kolmakof Mine, an abandoned mine located along the Kuskokwim River near the village of Napaimute, Alaska. The investigation objective was to assess the depth and configuration of the bedrock surface. MACTEC understands that the investigation results will be used to help find a favorable location for a disposal pit into which refuse from past mining activities will be buried. The investigation, which consisted of Seismic Refraction and Ground Penetrating Radar (GPR) surveys, was performed on September 28 – 30, 2008 by MACTEC geophysicist Roark W. Smith.

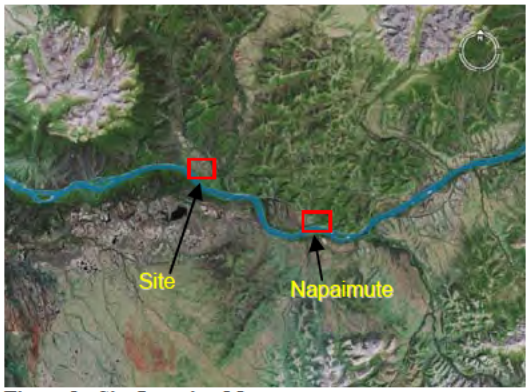


Figure 1 - Site Location Map

SUMMARY OF FINDINGS

- Two seismic velocity layers were identified: an upper 5- to 22-foot thick low-velocity layer (V_1) representing soil and deeply weathered bedrock, and a lower layer (V_2) exhibiting higher velocities ranging from 5100 to 6900 fps representing harder bedrock. Accordingly, the depth to "hard bedrock" ranges from 5 to 22 feet below ground surface (bgs) and is most commonly found between 15 and 20 feet bgs.

- The top-of-bedrock surface, as defined by the top of layer V_2, is uniform and generally mimics the ground surface topography. Tomographic modeling of the seismic data indicates the presence of a localized low-velocity zone within layer V_2 that could represent an area of weaker bedrock. Thus, this low-velocity zone could be a favorable location for a disposal pit (Figure 3). However, it is worth noting that the low seismic velocities exhibited by layer V_1 indicate that the upper 15 to 20 feet of material throughout the site can be readily excavated.

- The site included several mounds and small ridges which were not surveyed because they were covered with dense vegetation. By necessity, the seismic refraction lines were positioned along the cleared roadways and because of that it is not known if the mounds and ridges represent elevated knobs of hard bedrock or are spoils mounds from past mining activities and thus unrelated to variations in the bedrock surface.

SITE DESCRIPTION

The site is located on the top of a bluff overlooking the Kuskokwim River. The terrain was undulating with mounds and small ridges, and was also heavily wooded. Prior to the arrival of the geophysics crew, a bulldozer was used to clear the old mine roads to facilitate access for the soil sampling crew. Because of the dense vegetation, the seismic lines were positioned along the cleared roadways.

SEISMIC REFRACTION (SR) METHOD OVERVIEW

The seismic refraction method uses compressional (P-) wave energy to delineate seismic velocity layers within the subsurface. Interpretation entails correlating the velocity layers to geologic features such as soil and various types of bedrock. To perform a refraction survey, an elastic wave (compressional, or P-wave) is generated at certain locations (shotpoints) along a survey line. The P-wave energy is usually produced with a small explosion or by striking the ground with a sledgehammer. As the P-wave propagates through the ground it is refracted along boundaries between geologic layers with different seismic velocities.

Part of the refracted P-wave energy returns to the ground surface where it is detected by vibration-sensitive devices called geophones, which are placed in a co-linear array along the seismic survey line. The geophone data are fed to a seismograph, where they are recorded, and then to a computer, where they are analyzed to determine the depth and velocities of subsurface seismic layers. Key data for refraction analysis are the positions of the geophones and shotpoints along a seismic line, and the amount of time it takes for the refracted wave to travel from the shotpoint to each geophone location. Because the P-wave is the fastest traveling of all types of seismic waves, it can be readily identified as the first deflection ("first break") on a seismic trace.

FIELD PROCEDURES

MACTEC obtained seismic refraction data along nine lines as shown on Figure 3. As dictated by site conditions, the lines ranged in length from 75 to 210 feet and comprised 24 geophones and from five to seven shot points. Using a tape measure, the geophones were placed on the ground at 2.5- to 10-foot intervals. For the longer lines, shot points were located 5 feet beyond each end of the geophone spread and at the quarter-points and midpoint of the spread. To increase the investigation depth for the shorter lines, MACTEC eliminated the quarter-point shopoints in favor of "off-end" shotpoints, which were located approximately 30 feet off each end of the geophone spread.

MACTEC produced P-waves through multiple impacts with a 16-lb sledge hammer against a metal plate placed on the ground surface at each shotpoint location. The P-waves produced by the hammer impacts were detected using Sensor SM-15 14-Hz high output geophones. The detected seismic signals were digitized by a DAQLink II data acquisition system and recorded on a laptop computer. After the seismic data were obtained, MACTEC performed a hand-level survey to measure the relative elevation of each geophone and shotpoint so that the ground surface topography could be incorporated into the data analysis.

MACTEC also obtained ground penetrating radar (GPR) data using a GSSI Model SIR-2 GPR system. GPR data were obtained by hand-pulling a 400-MHz antenna across the ground surface. Distance marks were placed on the GPR profiles at 5-foot intervals as the antenna passed 5-foot marks on a tape measure placed on the ground surface along each GPR survey line.

Finally, MACTEC mapped the site roads and seismic survey line locations using a Trimble Pro-XR Global Positioning System (GPS).

DATA QUALITY

The seismic refraction data quality for this project was good and first break picks were made with high confidence. To enhance data quality, MACTEC stacked between 5 and 20 hammer blows at each shotpoint. The additive affect of stacking of multiple hammer blows at the same location enhances or increases the amplitude of the signal (i.e., the refracted wave arrival) while amplitude of the background noise, which, being random in nature, tends to cancel itself on successive hammer blows and remains largely unchanged.

GPR data quality was poor owing to the electrically conductive soil, which is to be expected given the wet, muddy conditions at the site. GPR signal penetration was limited to less than three feet below ground surface; accordingly, no bedrock information could be obtained from the GPR data.

DATA ANALYSIS

Seismic data were processed using the SeisImager software package by Geometrics, Inc. Briefly, SeisImager is a computer inversion program that generates an initial velocity layer model, produces synthetic data from the model, and then adjusts the model so that the synthetic data better matches the observed field data. The agreement between the synthetic and observed data provides an indication of how well the model represents the true subsurface conditions.

First, MACTEC used the module *PickWin* to interpret ("pick") the P-wave arrivals ("first breaks") for each of the five to seven shopoint data sets ("shot gathers") per line. *PickWin* was also used to check (against the geophysicst's field log) that the proper locations were assigned to the geophones and shotpoints. Next, the first break files were fed to the SeisImager module *PlotRefra*, which was used to review time-distance (TD) plots for the two seismic lines and assign a seismic layer to each arrival time. For the initial refraction analysis, each P-wave arrival is considered to have refracted from a distinct seismic layer. The number of layers resolved by the seismic survey, and their thickness and average velocity, are revealed by straight line segments on the TD plot; because these straight-line segments represent a constant velocity condition within the subsurface, they usually represent a distinct geologic layer. The topographic elevation files were incorporated into the analysis at this point. Next, a time-term inversion was performed to produce a preliminary layered velocity model.

The layered velocity model was then used as starting model for the tomographic inversion process that produced the velocity models presented on Figures 4 - 5. Briefly, tomographic inversion is a grid-based modeling process wherein the subsurface is divided into rectangular cells based on the geophone spacing. The tomography software assigns a velocity to each cell, produces a synthetic arrival time data set based on seismic raypaths projected through the velocity grid, and then compares the synthetic data to the real data recorded in the field. The cell velocities are then

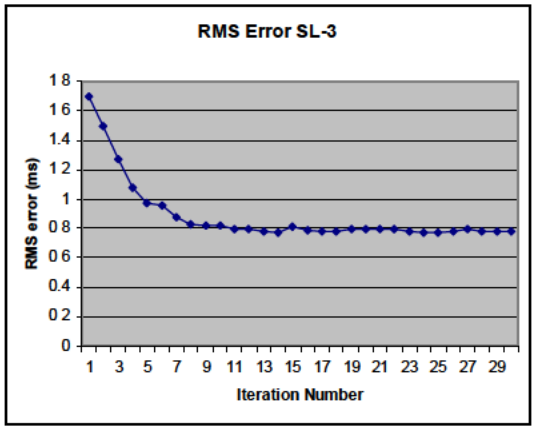


Figure 2 - Graph of RMS error for tomographic inversion of Kolmakof seismic line SL-3

adjusted and re-adjusted until the synthetic data achieve a "best fit" with the observed field data. The degree of fit between the model values and observed values is measured as the root mean square (RMS) of the difference between the two datasets. The RMS values for each model adjustment (iteration) are documented in a text file output by the tomographic modeling program. The RMS error for the one of the Kolmakof seismic lines is presented on Figure 2 (right), which shows that the RMS error settles to 0.77 milliseconds after approximately 14 iterations (the modeling process was run for a total of 30 iterations).

Tomographic modeling is often used to complement layered modeling at sites where gradual velocity transitions, such as those often seen between weathered and unweathered bedrock, are expected. Tomographic modeling can also depict lateral velocity variations within the subsurface more accurately than a layered modeling approach. The final model output is a colored profile showing velocity variations both laterally and with depth, with the various colors corresponding to different velocities within the subsurface.

For the final step, MACTEC picked the top-of-bedrock surface on the velocity models. In general, the bedrock surface is indicated by the band of tightly-bunched velocity contours, which reflects the abrupt change (increase) in velocity across the soil-bedrock interface. MACTEC digitized and contoured the bedrock depths using the GEOSOFT mapping system contouring software.

RESULTS

Seismic line locations are shown on Figure 3. Figure 3 also includes a contour map showing the approximate depth to bedrock as interpreted from seismic velocity layer models. The seismic velocity models are presented on Figures 4 and 5. Figure 4 shows models for seismic lines SL-1, SL-2, and SL-3. Figure 5 shows models for SL-4, -5, -6, -7, and SL-8. Please note that lines SL-5, -7, and -8 are combined into a single seismic profile. In general, two seismic velocity layers were identified: an upper 5- to 22-foot thick low-velocity layer (V_1) representing soil and deeply weathered bedrock, and a lower layer (V_2) representing harder bedrock. Layer V_2 exhibits higher velocities ranging from 5100 to 6900 feet per second. Accordingly, the depth to "hard bedrock" ranges from 5 to 22 feet below ground surface along the seismic lines, and is most commonly found between 15 and 20 feet bgs.

The top-of-bedrock surface, as defined by the top of layer V_2, is uniform and generally mimics the ground surface topography. Tomographic modeling of the seismic data indicates the presence of a localized low-velocity zone within layer V_2 that could represent an area of weaker bedrock. Thus, this low-velocity zone could be a favorable location for a disposal pit. However, it is worth noting that the low seismic velocities exhibited by layer V_1 indicate that the upper 15 to 20 feet of material throughout the site can be readily excavated. The location of the low-velocity zone is shown on the site map (Figure 3) and the seismic profiles (Figures 4 and 5).

The site included several mounds and small ridges which were not surveyed because they were covered with dense vegetation. By necessity, the seismic refraction lines were positioned along the cleared roadways and because of that it is not known if the mounds and ridges represent elevated knobs of hard bedrock or are spoils mounds from past mining activities and thus unrelated to variations in the bedrock surface.

It is also worth noting that the northeast portion of the site exhibits higher V_2 velocity (6900 fps) than the southwest portion of the site (approximately 5500 fps). The higher velocities are attributed to geologic variation and could represent harder bedrock. Finally, SL-6 exhibited numerous erratic arrival times that did not plot along straight line segments on the TD plot. Such erratic arrival times are indicative of highly heterogeneous subsurface conditions and the absence of laterally continuous layering beneath the seismic line. Such data are produced in areas of discontinuous permafrost, or, by the more likely mine-site condition of a buried jumble of large blocks of hard bedrock.

EXCAVATION CHARACTERISTICS (RIPPABILITY)

The velocities calculated from the investigation data indicate that most of the bedrock layer V_2 is rippable with a Caterpillar D8R tractor. Table 1, below, presents the Caterpillar Performance Handbook's correlation between seismic velocity and rippability.

Seismic velocity charts relating seismic velocity and excavation characteristics have been developed from field tests by others. These charts list the seismic velocity of various types of bedrock materials and their relative ease of excavation using different types of rippers. Caterpillar Tractor Company publishes a performance manual that lists ripper performance charts for various size tractors and types of rippers. The range of rippability obtained from the ripper performance chart from the Caterpillar Performance Handbook (October, 1997) is as follows (in feet per second):

Table 1 Rip Chart for Volcanic Rock (from Caterpillar Performance Handbook)

Ripper	**Rippable**	**Marginally Rippable**	**Non-Rippable**
D8R	less than 6,400	6,400 to 8,000	greater than 8,000
D9R	less than 7,600	7,600 to 8,600	greater than 8,600
D10R	less than 8,000	8,000 to 9,000	greater than 9,000

This information should only be used as a general guide, however, as many other factors should also be considered. These factors include the rock jointing and fracture patterns, the experience of the equipment operator, and the equipment and excavation methods selected. Based on the observed velocities, it appears that the bedrock beneath the seismic refraction lines is rippable for a D9R. However, this information should be combined with a complete and thorough analysis of geotechnical boring data, as well as local ripping experience (if available) to make a final assessment.

CLOSING

All geophysical data and field notes collected as a part of this investigation will be archived at the MACTEC office. The data collection and interpretation methods used in this investigation are consistent with standard practices applied to similar geophysical investigations. The correlation of geophysical responses with probable subsurface features is based on the past

results of similar surveys although it is possible that some variation could exist at this site. Due to the nature of geophysical data, no guarantees can be made or implied regarding the targets identified or the presence or absence of additional objects or targets.

MACTEC appreciates working for you at Kolmakof Mine and we look forward to working with you again.

Sincerely,

Roark W. Smith GP 987
Senior Geophysicist

Attachments:	Appendix A:	Seismic Velocity and Limitations of the Refraction Method
	Figure 1:	Site Location Map (imbedded in Report text)
	Figure 2:	Graph of RMS Error for SL-3 (imbedded in Report text)
	Figure 3:	Geophysical Survey Coverage and Results
	Figure 4:	Seismic Refraction Profiles SL-1, SL-2, SL-3
	Figure 5:	Seismic Refraction Profiles SL-4, SL-5, SL-6, SL-7, SL-8

APPENDIX A

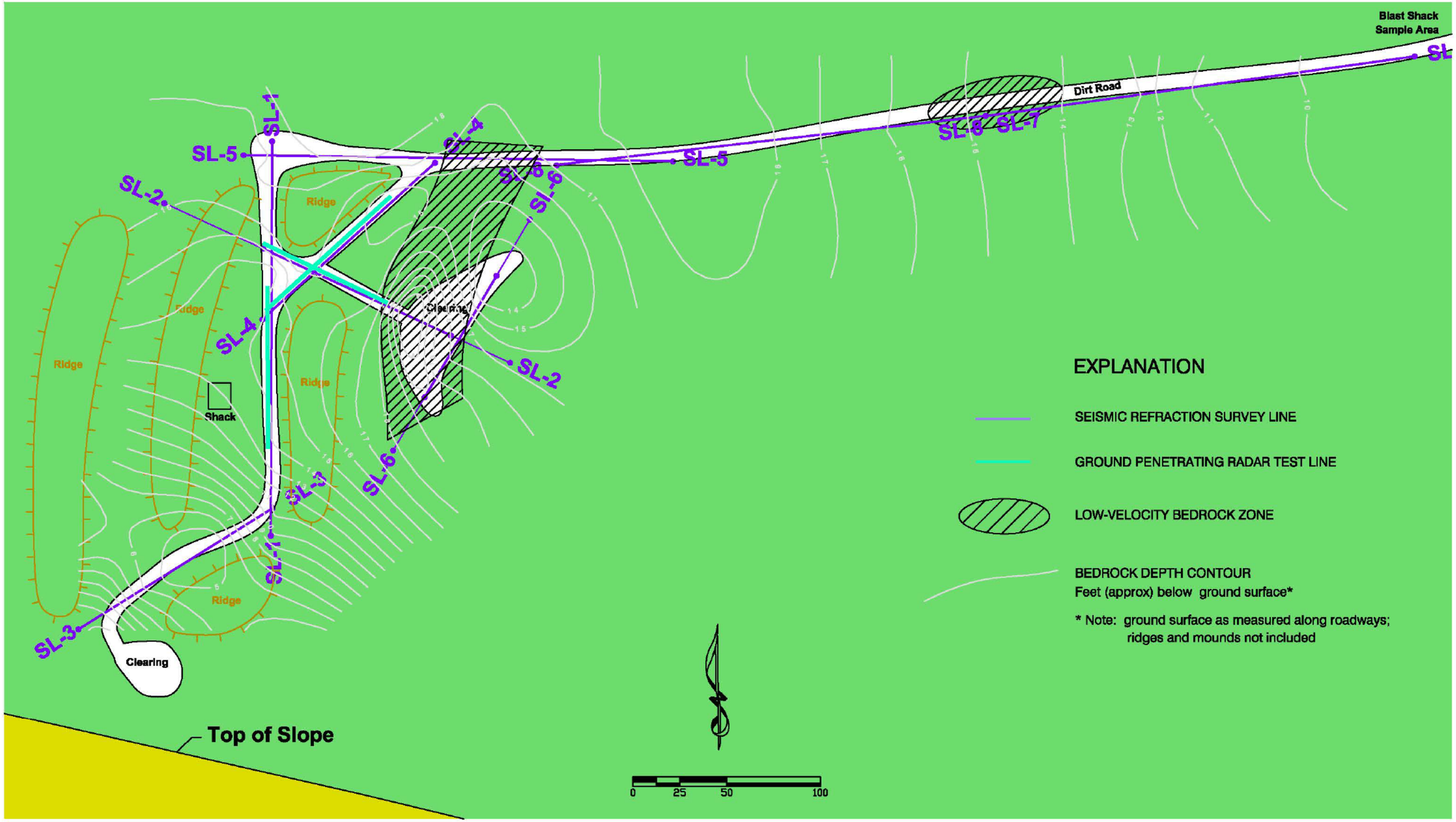
SEISMIC VELOCITY AND LIMITATIONS OF THE REFRACTION METHOD

The physical properties of earth materials (fill, sediment, rock) such as compaction, density, hardness, and induration dictate the corresponding seismic velocity of the material. Additionally, other factors such as bedding, fracturing, weathering, and saturation can also affect seismic velocity. In general, low velocities indicate loose soil, poorly compacted fill material, poorly to semi-consolidated sediments, deeply weathered, and highly fractured rock. Conversely, high velocities are indicative of competent rock or dense and highly compacted sediments and fill. The highest velocities are measured in unweathered and little fractured rock.

There are certain limitations associated with the SR method as applied for this investigation. These limitations are primarily based on assumptions that are made by the data analysis routine. The data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer. The data analysis routine also assumes that the velocity of subsurface materials increase with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected.

The quality of the field data is critical to the construction of an accurate depth and velocity profile. Strong, clear “first-break” information from refracted interfaces will make the data processing, analysis, and interpretation much more accurate and meaningful. Vibrational noise or poor subsurface conditions can decrease the ability to accurately locate and pick seismic waves from the interfaces.

Due to these and other limitations inherent to the seismic refraction method, resultant velocity cross-sections should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally.

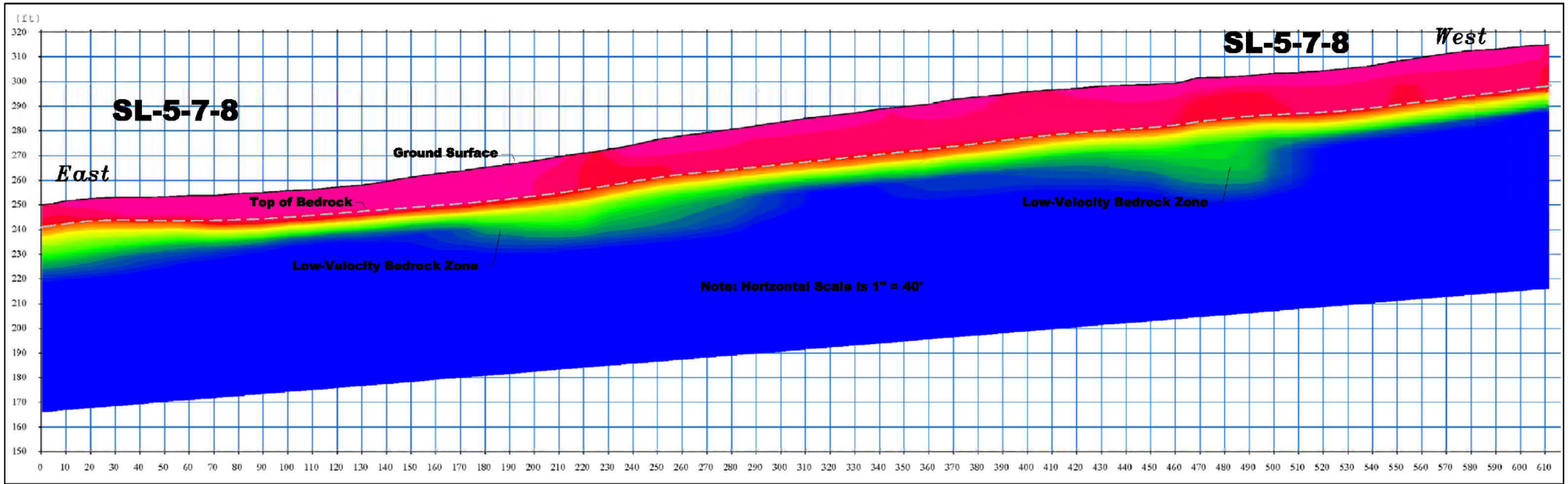


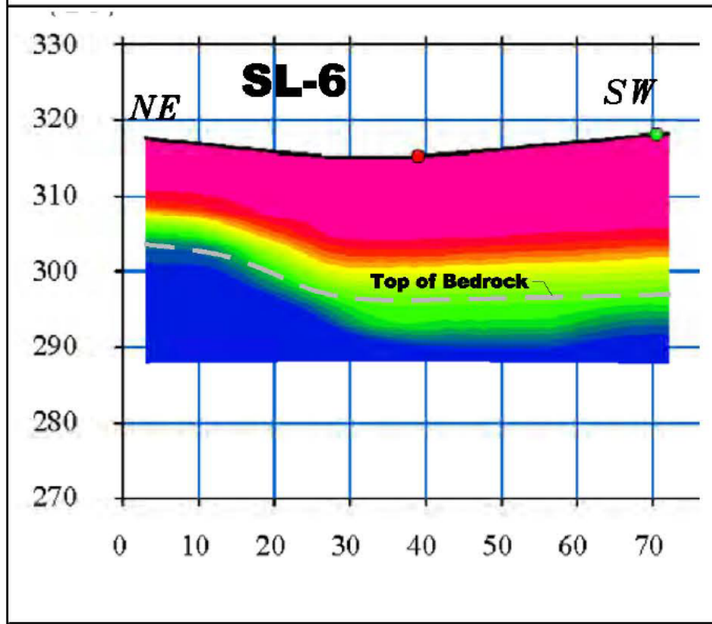
MACTEC
Engineering and Consulting, Inc.

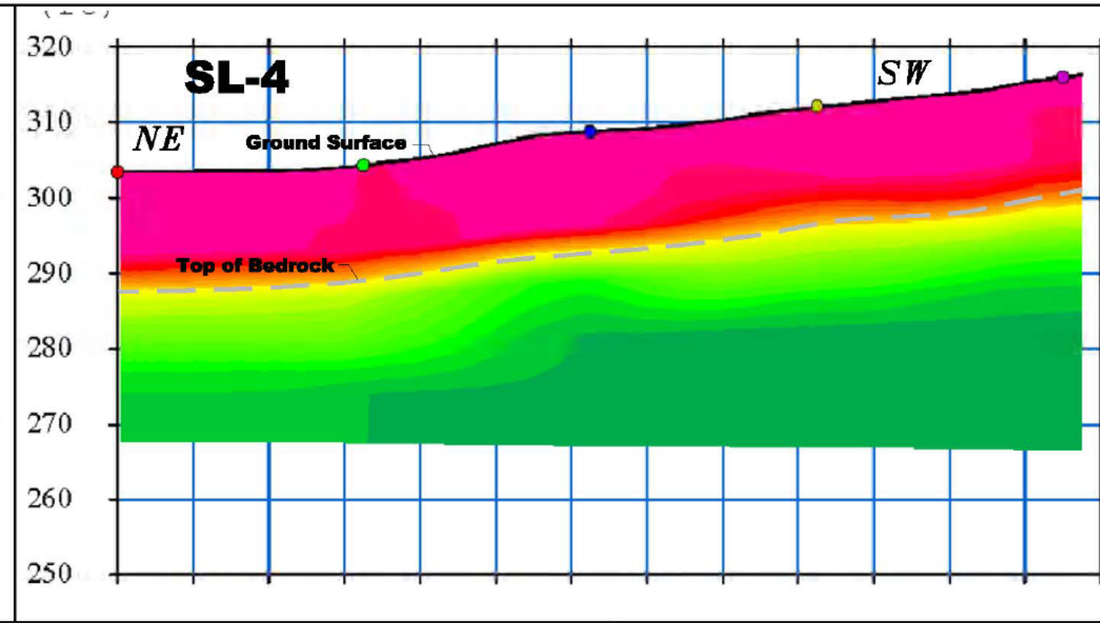
Geophysical Survey Coverage and Results
BLM Kolmakof Mine Site EE/CA
Napaimute, Alsaska

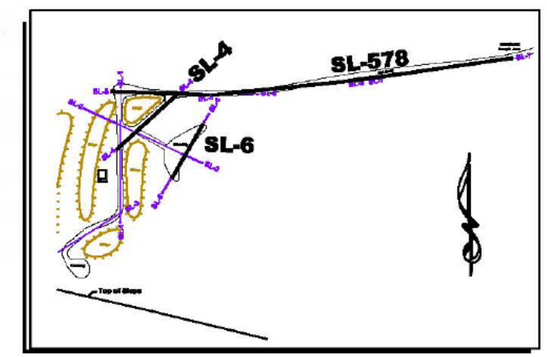
FIGURE
3

DRAWN	PROJECT NUMBER	APPROVED	DATE
Rws	4038080005		3/09

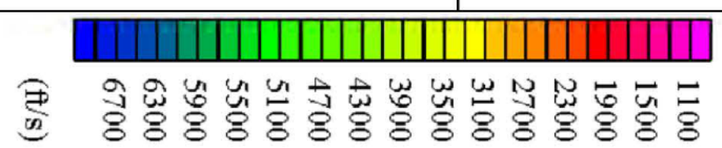








Index Map



MACTEC
Engineering and Consulting, Inc.

Seismic Refraction Profiles SL-4, SL-6, SL-578
Geophysical Investigation
BLM Kolmakof Mine Site EE/CA
Napaimute, Alsaska

FIGURE **5**

DRAWN	PROJECT NUMBER	APPROVED	DATE
Rws	4038080005		3/09

APPENDIX C

ASBESTOS CONTAINING MATERIALS AND LEAD BASED PAINT SURVEY REPORT – 2008

Appendix C

Asbestos Containing Materials and Lead Based Paint Survey Report

MACTEC conducted asbestos containing materials (ACM) and lead based paint (LBP) surveys of the remaining buildings at the Kolmakof Mine Site (KMS) as part of field activities conducted in September 2008 as described in the BLM Statement of Work dated June 13, 2008 and in our proposal dated July 28, 2008. This report presents the results of the ACM and LBP surveys.

Asbestos Containing Materials Survey

Following a visual inspection of the project area for suspect asbestos-containing materials (ACM) on September 29 and 30, 2008, MACTEC collected 30 bulk samples from the onsite buildings that were suspected to contain asbestos. These materials included rolled roofing, fiberboard, tar paper, and mastic. Prior to the 2008 field activities, three of the buildings in the Camp Area; a bunk house, the cook house, and the manager's house had been burned and therefore, could not be sampled for asbestos.

The asbestos survey was completed in general accordance with EPA Standards 40 CFR 763, Subpart E, Asbestos Hazard Emergency Response Act (AHERA), 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP), and Occupational Safety & Health Administration (OSHA) Standard 29 1926.1101 sampling protocol; however, insufficient samples (a minimum of three samples of each suspect material is required) to meet NESHAP criteria were collected for:

- Red rolled asphalt roofing on the large shed (two samples)
- Black tar like sealant on the large shed (two samples)
- Black tar/paint on fiber board on the small shed (one sample)
- Green rolled asphalt roofing on the small shed (two samples)
- Red rolled asphalt roofing on the pit shed (two samples)
- Gray rolled asphalt roofing on the generator shed (two samples)
- Tar like sealant roofing on the generator shed (one sample)
- Black tar paper/felt on the generator shed (one sample)
- Black tar like sealant on the pink building (two samples)

Samples were submitted to TestAmerica Laboratory, located in Anchorage Alaska and subcontracted to EMLab P&K located in San Bruno California, accredited through the National Voluntary Laboratory Accredited Program (NVLAP), for bulk sampling analysis by Environmental Protection Agency (EPA) Method 600/R-93/166 (100204) for asbestos content.

The laboratory report indicates that the presence of asbestos was not identified in the project samples submitted for analysis. A copy of the laboratory report is included as an attachment to this report.

Additional samples of the materials listed above will be collected during the 2011 field event and submitted to the laboratory for bulk sample analysis to complete the NESHAP demolition criteria of three samples per material.

Lead Based Paint Survey

On September 29 and 30, 2008, painted surfaces at the KMS were surveyed for lead-based paint using a Niton XRF Spectrum Analyzer, supplied by BLM. Prior to the 2008 field activities, three of the buildings in the Camp Area; a bunk house, the cook house, and the manager's house had been burned down and

therefore, could not be screened for the presence of lead. A total of 37 locations were screened for lead including the following:

- Painted window sills
- Painted plywood and wallboard
- Shelf supports
- Painted door frames
- Various painted interior and perimeter walls

Results of the field screening for lead in painted surfaces at the KMS using XRF did not identify any positive results for lead. In order to confirm the non-detect results reported from the XRF screening performed in 2008, the above described locations will be re-screened during the 2011 field effort using XRF, and one sample from each area (5 samples total) will be collected and submitted to Test America Laboratories for lead analysis.

APPENDIX D

HAZARDOUS AND NON-HAZARDOUS WASTE REMOVAL REPORT – 2008

Appendix D

Hazardous and Non-Hazardous Materials Removal Report

MACTEC conducted a limited hazardous and non-hazardous waste removal program during the 2008 field activities at the Kolmakof Mine Site as described in the BLM Statement of Work dated June 13, 2008 and in our proposal dated July 28, 2008.

MACTEC personnel performed inventories and prepared the following hazardous materials for transport to offsite disposal facilities:

- 12 mercury flasks from the large shed in the Mill Area
- Approximately one cubic yard (cy) of soil from the floor of the large shed in the Mill Area
- Approximately one cy of processed cinnabar and associated containers (sewer pipe, split open drum, bottom of a 55-gallon drum) found at the retort mound in the Camp Area
- Other containers in the Camp Area that contained cinnabar found at the retort mound (corrugated sheet metal, beer keg retort)

On October 2, 2008, approximately 4.25 tons of hazardous waste was manifested and subsequently transported offsite by Emerald Services Inc, (Emerald Services) of Anchorage, Alaska to the following fully permitted Clean Harbor and U.S. Ecology facilities for final treatment and disposal:

- U.S. Ecology Idaho, Inc., Grandview Idaho
- Clean Harbors Aragonite, LLC, Aragonite, Utah for disposal to Lambton, Ontario

Copies of Hazardous Waste Manifests 000293238FLE and 000293240FLE are included as part of this report.

In addition to hazardous waste removal, the following fluids from the two abandoned pieces of equipment (pickup truck at the Mill Area and air compressor west of the Pit Area) and materials from 13 of the drums located around the KMS were containerized in into three drums and removed from the site by Emerald Services for off-site non-hazardous waste disposal, energy recovery or recycling:

Drum 1:

- 2 gallons crankcase oil (abandoned truck)
- 0.5 gallons rear differential oil (abandoned truck)
- 1 gallon transfer case oil (abandoned truck)
- < 0.5 gallons front differential oil (abandoned truck)
- approximately 3 to 3.5 gallons crank case oil (abandoned compressor)
- 2.5 to 3 gallons compressor oil (abandoned compressor)

Drum 2:

- 5 to 6 gallons antifreeze (abandoned compressor)

Drum 3:

- 15 gallons mixed fuel/water total from 13 drums surrounding the retort mound

AK08392 (RP)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
AKR000004317	1	1-800-424-9300	000293238 FLE

5. Generator's Name and Mailing Address
BLM - KOLMAKOF MINE
6881 ABBOTT LOOP ROAD
ANCHORAGE, AK 99507
Generator's Phone: (907) 267-1226

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: NORTHERN AIR CARGO, INC.
U.S. EPA ID Number: AKD003845526

7. Transporter 2 Company Name: EMERALD SERVICES, INC.
U.S. EPA ID Number: WAD053364647

8. Designated Facility Name and Site Address
US ECOLOGY IDAHO, INC.
20400 LEMLEY RD
GRAND VIEW, ID 83624
Facility's Phone: (800) 274-1515
U.S. EPA ID Number: ID0073114654

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3077, RQ, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (MERCURY), 9, PG-III, RQ=MERCURY, ERG#171 "Marine Pollutant"	1	DM	113 ~~65~~	P	D009
X	2. UN3077, RQ, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (MERCURY), 9, PG-III, RQ=MERCURY, ERG#171 "Marine Pollutant"	4	BA	4000	P	D009
	3.					
	4.					

14. Special Handling Instructions and Additional Information
A) USE#1135 DEBRIS WITH MERCURY FOR MACROENCAPSULATION
B) USE#1135 DEBRIS WITH MERCURY FOR MACROENCAPSULATION

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Laurence J. Beck BLM
Signature:
Month 10 Day 02 Year 09

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Darlene [illegible]
Signature:
Month 10 Day [illegible] Year [illegible]

Transporter 2 Printed/Typed Name: Chris [illegible]
Signature:
Month 10 Day 12 Year 08

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H132	H132		

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: [illegible]
Signature:
Month [illegible] Day [illegible] Year [illegible]

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF DISPOSAL

February 03,2009

BLM - KOLMAKOF MINE

ANIAK, AK 99557

This is to certify that waste as defined on Uniform Hazardous Waste Manifest number **000293238 FLE/** was received by U.S. Ecology, Inc., on **11/10/2008** .The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **11/14/2008** in accordance with permits and laws regulating this facility.

Reference Number: 08110723399-000293238 FLE-1-2

Material: 2 CUBIC YARD BAG (ENCAP MATERIAL) 1 + 2 of 4

Process: Macroencap

Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Type: RCRA HAZARDOUS WASTE

Customer: EMERALD ALASKA ROXANNE

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

CERTIFICATE OF DISPOSAL

February 03,2009

BLM - KOLMAKOF MINE

ANIAK, AK 99557

This is to certify that waste as defined on Uniform Hazardous Waste Manifest number **000293238 FLE/** was received by U.S. Ecology, Inc., on **11/10/2008** .The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **11/14/2008** in accordance with permits and laws regulating this facility.

Reference Number: 08110723399-000293238 FLE-1-2

Material: 2 CUBIC YARD BAG (ENCAP MATERIAL) 3 of 4

Process: Macroencap

Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Type: RCRA HAZARDOUS WASTE

Customer: EMERALD ALASKA ROXANNE

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

CERTIFICATE OF DISPOSAL

December 10,2008

BLM - KOLMAKOF MINE

ANIAK, AK 99557

This is to certify that waste as defined on Uniform Hazardous Waste Manifest number **000293238 FLE/** was received by U.S. Ecology, Inc., on **11/10/2008** .The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **12/03/2008** in accordance with permits and laws regulating this facility.

Reference Number: 08110723399-000293238 FLE-1-1

Material: 1 30 GALLON DRUM (ENCAP MATERIAL)

Process: Macroencap

Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Type: RCRA HAZARDOUS WASTE

Customer: EMERALD ALASKA ROXANNE

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

CERTIFICATE OF DISPOSAL

February 03,2009

BLM - KOLMAKOF MINE

ANIAK, AK 99557

This is to certify that waste as defined on Uniform Hazardous Waste Manifest number **000293238 FLE/** was received by U.S. Ecology, Inc., on **11/10/2008** .The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **12/03/2008** in accordance with permits and laws regulating this facility.

Reference Number: 08110723399-000293238 FLE-1-1

Material: 1 30 GALLON DRUM (CRUSHED EMPTY CONT)

Process: Macroencap

Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Type: RCRA HAZARDOUS WASTE

Customer: EMERALD ALASKA ROXANNE

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

AK083927 (RP)

DI 2126242

000293240FLE

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AKR000004337
2. Page 1 of: 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000293240 FLE

5. Generator's Name and Mailing Address: BLM - KOLMAKOF MINE, 5881 ABBOTT LOOP ROAD, ANCHORAGE, AK 99507
Generator's Phone: (907) 267-1226
Generator's Site Address (if different than mailing address):

RECEIVED DEC 04 2008

6. Transporter 1 Company Name: NORTHERN AIR CARGO, INC. — U.S. EPA ID Number: AKD003845126
7. Transporter 2 Company Name: EMERALD SERVICES, INC. — U.S. EPA ID Number: WAD058284647
8. Designated Facility Name and Site Address: CLEAN HARBORS (ARAGONITE), LLC, 11600 N. APTUS ROAD, EXIT 56, ARAGONITE, UT 84029
Facility's Phone: (801) 323-8100
U.S. EPA ID Number: UTD981552177

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. ~~UN3077, RQ, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (MERCURY), 9, PG-III "MARINE POLLUTANT", RQ-MERCURY, ERG#171~~		DM		P	~~D009~~ ~~D013~~
X	2. UN3077, RQ, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (MERCURY), 9, PG-III "MARINE POLLUTANT", RQ-MERCURY, ERG#171	2 ~~4~~	SA	4400	P	D009
	3.					
	4.					

14. Special Handling Instructions and Additional Information
~~a) CONTAINS MERCURY CONTAMINATED SOIL FOR RETORT~~
b) CONTAINS MERCURY CONTAMINATED SOIL FOR RETORT 2 X SUPER SAK

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Lawrence J. Beck, BLM — Signature: [signature] — Month 10 Day 02 Year 08

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Northern Air Cargo — Signature: [signature] — Month Day Year
Transporter 2 Printed/Typed Name: Chris Apsen JC Company — Signature: [signature] — Month 10 Day 17 Year 08

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. — 2. H141 — 3. — 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Ashley Clark — Signature: [signature] — Month 11 Day 21 Year 08

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

Clean Harbors Aragonite LLC
11600 North Aptus Road
Grantsville UT, 84029
UTD981552177
(435) 884-8100

CERTIFICATE OF DISPOSAL

Generator Contact Name:		Sales Order #:	DI2126242
Generator Facility Name:	BUREAU OF LAND MANAGEMENT	Date Received:	11/21/2008
Generator Address:	KOLMAKOF MINE - ANIAK, AK 6881 ABBOTT LOOP ROAD ANCHORAGE, AK 99507		
Generator EPA ID:	AKR000004317	Manifest #:	000293240FLE

Line #	Profile/Description	Disposal Date	Method of Disposal	Disposal Facility
2	CH332346 MERCURY CONTAMINATED SOIL FOR RETORT	7/16/2009	Landfill	Lambton, ON Facility

Under Civil and Criminal Penalties of Law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the information contained in or accompanying this document is true, accurate, and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

Name: Paul A. Mills

Title: Director Facility Applications

Date: Thursday, February 11, 2010