Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

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Prepared for:

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SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT, KOLMAKOF MINE SITE, ALASKA

Prepared for:

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APPENDICES

ACRONYMS

°C	degrees Celsius
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska Method
bgs	below ground surface
BLM	Bureau of Land Management
Brice	Brice Environmental Services Corporation
Calista	Calista Corporation
CFR	Code of Federal Regulations
COC	constituent of concern
DRO	diesel range organics
DQR	data quality review
EE/CA	engineering evaluation / cost analysis
E&E	Ecology & Environment
J	indicates an estimated quantity
KMS	Kolmakof mine site
LOD	limit of detection
mg/kg	milligrams per kilogram
NAC	Northern Air Cargo
PA/SI	preliminary assessment/site investigation
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RSI	removal site inspection
SGS	SGS North America, Inc.
TCLP	Toxicity Characteristic Leaching Procedure
TKC	The Kuskokwim Corporation
USEPA	U.S. Environmental Protection Agency
XRF	X-ray fluorescence analyzer

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1 INTRODUCTION

During the fall of 2016, Brice Environmental Services Corporation (Brice) conducted characterization activities in association with the former Kolmakof Mine Site (KMS or Site) near Aniak, Alaska (Figure 1). These activities were performed under a work plan prepared in August, 2016 (Brice, 2016).

1.1 SITE DESCRIPTION

The KMS is an abandoned cinnabar mine on the north bank of the Kuskokwim River. The site is located approximately 19.5 miles east of Aniak and approximately 10 miles west of Napaimute, Alaska, (the nearest known inhabited area). The legal description for the KMS is: North ½, Section 6, Township 17N, Range 53W, Seward Meridian, Alaska. A small, unnamed creek passes by portions of the site and flows into the Kuskokwim River near the Camp Area portion of the site (Figure 2). There are no roads to the site or aircraft landing strip nearby; access is by boat only.

The mine has three developed areas: a “Camp Area” on the bank of the Kuskokwim River; an upland “Mill Area”; and an open-pit/surface stripping mining area on the bluff above the river where waste rock was dumped down the bluff onto the river bank. The Camp Area is approximately 1.75 miles from the Mill Area. (Figure 2). The two areas are connected by a dirt road which parallels an unnamed creek that drains directly into the Kuskokwim River. From the Mill Area, the road continues uphill to the Mine Pit. Since the mine closure, the KMS became overgrown with vegetation and the roads narrowed to foot paths. During the 2006 BLM site inspection, the Mill Area was found to contain a collapsing ball mill structure with water flowing under and through it. Two sheds were found nearby, one containing about a dozen metal bottles which appeared to be empty mercury flasks. USEPA correspondence to BLM had mentioned a retort operation at the “upper camp” so it was assumed that the flasks indicated that the shed may have housed a retort or that one was nearby. Photos taken during the 2000 BLM site visit showed the larger shed housed an electric generator that had been removed by persons unknown by the 2006 BLM site visit. Numerous empty drums and fuel cans were found scattered around both inside and outside the sheds. The unnamed creek formed a small pond a few feet from the mill, and the source of the creek was reported to be water coming to the ground surface above and around the mill building from the steep hillside/berm immediately adjacent. An old pickup truck was found abandoned a short distance away. The former dynamite shed was represented by a pile of ash and burned metal debris. No evidence of spills, stains, odors or distressed vegetation beyond the ash at the former dynamite shed was noted by BLM. It also appeared that waste rock and tailings were dumped over the bluff into the Kuskokwim River from the mill building and the mining pit areas uphill and behind the river bluff.

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

1.2 SITE BACKGROUND

The KMS is an abandoned cinnabar (mercury ore) mine on the North Bank of the Kuskokwim river near the village of Napaimute, Alaska, and 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. Until conveyance, the land is administered by the U.S. Bureau of Land Management (BLM). A preliminary assessment/site investigation (PA/SI) was initiated by the United States Environmental Protection Agency (USEPA) in 1999, and two site inspections and removal actions were conducted by the BLM in 2000 and 2006. A Removal Site Inspection (RSI) was subsequently performed by Ecology and Environment, Inc. (E&E) in 2007 to identify facility features, inventory abandoned mine-related equipment and debris, and identify contaminants requiring possible remediation and or removal prior to transfer of the land to TKC and Calista. The RSI identified mercury as the primary contaminant of concern and identified the need for further investigation to further characterize the site for metals, petroleum hydrocarbons, and explosives, as well as the need for characterization and removal of hazardous and non-hazardous site materials. The RSI identified four areas of concern (AOC) within the site: Camp Area, Mill Area, Mine Pit, and Waste Rock/Tailings Dump Areas.

MACTEC Engineering and Consulting Inc. (MACTEC) conducted initial investigative removal activities in 2008, including metal background concentration investigations, a geophysical survey for a potential mono-fill location, explosives residue sampling, mercury speciation analysis, and an asbestos and lead-based paint survey. Field activities included removal and disposal of various hazardous and non-hazardous materials from abandoned waste containers and equipment.

In 2011, AMEC Environment & Infrastructure (AMEC, formerly MACTEC) prepared an Engineering Evaluation/Cost Analysis (EE/CA) work plan to complete site characterization activities required to delineate the extent of remaining contamination in each of the areas of concern (AOC) (AMEC, 2011). Field work including investigation of metals, petroleum hydrocarbons, and other contaminants of concern as well as a biological survey was conducted between September 25th and October 1st, 2011.

The EE/CA, completed in 2012 and subsequent 2013 Removal Action Memorandum identified oil, hazardous substances, and non-hazardous solid waste removal actions that were warranted within the mill, mine pit, and camp areas. The EE/CA results showed that removals of constituent of concern (COC) metals-contaminated soils were warranted in Investigation Areas (IAs) IA-1, IA-2, IA-3, IA-4, IA-5, IA-6, IA-8, and IA-13. IA-8 also required DRO impacted soil removal. Hazardous substances to be removed included mercury, arsenic, and chromium in soil as the contaminants of concern in both the Camp Area and the Mill Area, and localized petroleum hydrocarbon contamination of soil in the Mill Area (IA-8 only). Non-hazardous solid waste located within the Mine Pit, Mill Area, and Camp Area required removal as well (AMEC, 2012).

In 2012 BLM contracted with Brice to conduct Limited Removal Actions at the KMS during the 2013 field season. During the 2013 field season, Brice removed all camp buildings, infrastructure, and waste materials. Limited excavation was performed during the 2013 field activities to remove metals and fuel-contaminated soil in the areas noted in the EE/CA. Soil sampling analytical results indicated closure was obtained at all areas except IA-1 and IA-2. A

total of 46 cubic yards of COC metals-contaminated soil (including cinnabar residue from decontamination) was removed from IA-2, IA-3, IA-5, IA-6, and IA-8 of the Mill Area. An additional 14 cubic yards were removed from IA-1 at the Camp Area. This material was loaded into supersacks and transported off site for proper disposal. A landspread area was constructed with 23 cubic yards of DRO-impacted soil from IA-8. Initial baseline DRO concentrations were documented for the landspread area. Initial sampling of the landspread area indicated DRO concentrations exceeding the cleanup level of 250 milligrams per kilogram (mg/kg) and continued sampling was warranted. A landspread area maintenance and sampling and analysis plan was developed to formalize continued operation of the landspread area (Brice, 2014a).

In 2014, BLM contracted with Brice to conduct additional removal at the KMS during the 2014 field season. Brice prepared an addendum to the work plan used for the Limited Removal Actions performed in 2013 to plan the 2014 field activities (Brice, 2014b). During the 2014 season, Brice removed 6 cubic yards of soil from the site at the Upper Mill Area (IA-2) and 94 cubic yards of soil from the Retort Mound (IA-1). Confirmation sampling conducted at IA-2 indicated exceedance of the Alaska Department of Environmental Conservation (ADEC) cleanup level for mercury along the northeast sidewall of the excavation, and exceedances of the cleanup levels for chromium and mercury along the southwest sidewall of the excavation. Excavation confirmation soil sampling conducted at IA-1 indicated lateral exceedances of cleanup levels for mercury, arsenic, and chromium in soils surrounding the 2014 excavation area. Bedrock was encountered along the north and northeast walls of the excavation and further excavation in these directions should be limited to lateral removal to depths of placed material only. The presence of the firebrick platform, beads of elemental mercury, and buried burned ore suggest the retort facility described in the original PA/SI may be present in this area, but was buried by mine operations before the “beer keg retort” was placed there. Bedrock was encountered across the floor of the 2014 excavation limits at IA-1, and further removal of soil in this area is not warranted. Sampling results at the landspread area indicated DRO concentrations were reduced below the applicable cleanup level of 250 mg/kg and that final site closure had been met (Brice, 2014c).

In 2015, BLM contracted with Brice to conduct additional removal and characterization at IA-1 and IA-2 under an ADEC-approved work plan (Brice, 2015a). Confirmation samples collected from the excavation floor and sidewalls following the removal of 10 cubic yards of soil from IA-2 indicated residual COC metal concentrations meeting mill-area cleanup levels. Brice recommended closure of IA-2 based on analytical results. At IA-1, Brice installed fifteen characterization test pits and sampled fourteen of them for COC metals in an effort to fully characterize the distribution of COC metals in the vicinity of the retort mound. In addition, four cubic yards of soils were removed from the eastern sidewall of the 2013 excavation area and disposed of with soils from IA-2. The areal extent of mercury contamination yielded an estimated 3,800 square feet impacted to an average depth of 3 feet below ground surface (bgs) or approximately 422 cubic yards of in-situ soil exceeding the cleanup level for mercury. After deducting the 110 ex-situ, or 88 cubic yards of in-situ soil, removed in 2014 and 2015, the remaining soil in the vicinity of the retort mound was estimated to be approximately 334 cubic yards of in-situ, or 418 cubic yards of ex-situ soil. An additional 50 in-situ cubic yards were included to serve as contingency for areas of the characterization limit that were inferred due to mercury concentrations exceeding the camp area cleanup level in the outer-most test pits along the southwestern and northern areas of the estimated excavation perimeter (Brice, 2015b).

1.3 PROJECT OBJECTIVES

The objectives of the work performed and discussed in this report include:

- Advancing test pits and sampling soils in the immediate vicinity of the Retort Mound to re-characterize the area for additional past retort activities; and,
- Advancing test pits to assess the distribution of arsenic, chromium, mercury, and nickel in soils within and beyond the limits documented following assessment activities conducted in 2015 in this area.

2 REGULATORY CRITERIA

ADEC regulations applicable to this project are contained in Title 18 of the Alaska Administrative Code (AAC), Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75), as updated on November 6, 2016 (ADEC, 2016a).

2.1 SOIL REGULATORY CRITERIA

At the KMS, arsenic, chromium (total), mercury, and nickel have been identified as COCs. Background sampling of AOCs determined that naturally occurring metal concentrations at some of the AOCs is higher than the ADEC's most stringent action level (Method 2 Migration to Groundwater). For purposes of defining cleanup levels as they pertain to background metal concentrations, the AOCs have been divided into the Camp Area and the Mill Area. Since cleanup has been completed at the mill area, a summary of the action levels for COC metals at the Camp Area, or IA-1, are presented below:

Parameter	Method	Camp Area Soil Cleanup Level (mg/Kg)
Arsenic	EPA Method SW6020	10.7
Chromium, (Total)	EPA Method SW6020	29.2
Mercury	EPA Method SW7471	1.4
Nickel	EPA Method SW6020	86

Analytical results for arsenic, chromium, mercury and nickel were screened and evaluated using the site-specific cleanup levels calculated during the background study (AMEC, 2011) and ADEC Method Two, Table B1, Migration to Groundwater, whichever was greater for each metal.

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3 FIELD ACTIVITIES

A flyover of the site was performed by the BLM project manager on July 14, 2016 to inspect the conditions of the landing ramp. Based on photographs of the observed site conditions, the BLM and Brice project managers agreed that no ramp repair work would be necessary prior to mobilization for the field effort in 2016.

On September 12, 2016, Brice mobilized to the Site to load the barge for starting work on September 13, 2016. Field activities continued until demobilization on September 20, 2016. All activities were performed under the ADEC-approved work plan prepared in August, 2016 (Brice, 2016). BLM Project Manager Larry Beck performed on-site Project Inspector duties from September 13, to September 19, 2016.

Field activities were recorded in a bound field logbook. A photocopy of the field logbook is presented in Appendix A. Photographs of field activities are presented in Appendix B.

3.1 MOBILIZATION

On September 12, 2016, Brice Site Superintendent Carl Benson mobilized to Aniak to support equipment logistics for the work at the KMS. Equipment, fuel, and supplies were staged at the Aniak barge landing on the morning of September 13 for delivery to the site in the crew boat while the Kubota® BX25 tractor was loaded and transported to the site by a landing craft.

The Kubota® tractor, and the totes of supplies were mobilized from Anchorage and Fairbanks using Northern Air Cargo (NAC) prior to crew mobilization in September, 2016. All other equipment used on this project originated in Aniak. Brice mobilized one equipment operator to the site on September 13, and the barge was unloaded at the KMS barge ramp while the IA-1 test pit sampling locations were being established. No ramp improvements were required after landing.

3.2 TEST PIT INSTALLATION AND SAMPLING ACTIVITIES

Contamination assessment activities were conducted at the Retort Mound Area (IA-1) from September 13 through September 19, 2016. Contamination assessment activities at IA-1 commenced on September 13 with the excavation and sampling of five test pits located radially around the retort mound area. On September 14, the remaining eight test pits of the first full set of contamination assessment test pits, pits TP-16 through TP-28, surrounding the retort mound were installed and sampled. One primary soil sample was collected from each of these first thirteen test pits. Communications with the laboratory on September 14 determined that 24-hour turnaround analytical results would not be available due to equipment malfunction. Therefore, the first set of perimeter test pit results would not be available to plan the necessity or location of any subsequent contamination assessment test pits, and the soil samples for test pits TP-16 through TP-28 were submitted on a standard turnaround time basis. Test pit depths ranged from 1 foot bgs at Test Pits TP-16 and TP-28, to 5.5 feet bgs at TP-23 (Figure 3).

On September 15 and 16, nine characterization test pits were installed within the boundary of the retort mound for the purpose of characterizing past activities and determining the distribution of COC metal contamination. Test pits within the retort mound were sampled at two depths

each. Test pits within the retort mound area ranged in depth from 3.0 feet bgs at test pit M1, to 5.0 feet bgs at test pits M5, M6, and M7 (Figure 3).

A second set of contamination assessment step out test pits were installed and sampled on September 16 and 17. The second set of step out test pits comprised ten test pits, TP-29 through TP-38, arranged around the retort mound perimeter beyond test pits sampled in 2015 that did not meet the mercury cleanup level. These test pits ranged in depth from 1 foot bgs at TP-32 to 4 feet bgs at TP-35 (Figure 3). Two soil samples were collected from each of the ten second-step out test pits. Only one soil sample was collected from test pits TP-32 and TP-36 where excavations were not more than one foot bgs in total depth.

Bedrock or native silt soil was encountered at the total depth of all test pits. Figure 3 shows the location of test pits excavated during 2016 contamination and characterization work conducted at IA-1. Photographs of a typical installation and a test pit profile are presented in the photo log in Appendix B.

3.2.1 FIELD SCREENING

Soil was screened using both visual observation and an XRF. Field screening samples were screened ex-situ in plastic bags at a frequency of one per foot, or upon noted changes in observed lithology. Samples were collected directly from the test pit sidewalls. Test pits were screened at each depth indicating a visual change in soil type or suspected COC metals contamination as indicated by color.

Soil was screened for arsenic, chromium, mercury and nickel using a handheld XRF analyzer, and visual observation for red staining indicative of cinnabar-impacted soil. The Thermo Scientific Niton® Model XL3t 600 XRF was used according to SW-846 Method 6200 for in-situ field screening analysis (USEPA, 2007). This unit has limits of detection (LOD) below the action levels for arsenic, chromium and nickel; however, the lowest anticipated LOD for mercury with this instrument was approximately 5 parts per million (ppm) which is above the mercury cleanup level of 1.4 mg/Kg for the Camp Area. None of the XRF instruments available on the market can attain sensitivity down to 1.4 ppm. Therefore, a non-detect reading for mercury did not confirm that mercury cleanup levels had been achieved. Test pit characterization and contamination assessment soil samples for COC metals analyses were collected from the locations where XRF field screening results indicated both non-detect for mercury and the highest levels of arsenic and chromium.

3.2.2 TEST PIT SOIL SAMPLING

Soil sampling was conducted along the sidewall of each test pit following installation which included measurement of total depth, logging of soil lithology, and photographing the test pit sidewall. Test pit soil samples were collected from the locations along the sidewall yielding the highest field screening results for the COC metals. Soil sampling was performed using disposable sampling equipment and new sampling gloves. New disposable sampling scoops were used to expose material for sampling in the test pits at each location and depth. Up to two soil samples were collected from each test pit based on the depth of the highest screening result or visual changes in the soil lithology.

Characterization and contamination assessment soil samples were collected in amber jars and placed into coolers at the Site. One set of contamination assessment soil samples were transported to Anchorage via air cargo and submitted to SGS on September 15, 2016. The remaining samples were flown to Fairbanks during demobilization where they were submitted on September 22 and 28, 2016 as follows. The retort mound characterization samples were submitted to SGS in Fairbanks on September 22, 2016. Following receipt and evaluation of the analytical results from test pits TP-16 through TP-28, the final set of contamination assessment samples for test pits TP-29 through TP-38 were selected and submitted to SGS in Fairbanks on September 29, 2016. Analytical results were compared to the cleanup levels established for the site as shown in Section 2.

Field duplicate samples were collected for field precision evaluation at a rate of one per 10 soil samples collected. Sampling protocols, sample handling, custody, and transporting procedures followed those specified in the work plan.

3.3 DEMOBILIZATION

In preparation for site demobilization, a horizontal site survey of sampling locations was conducted following the completion of sampling activities on September 17, 2016. Staked test pit locations were field verified and an elevation survey was performed on September 19, 2016. The field sampling equipment was demobilized from the Site on September 19, 2016 following the completion of the site survey. The Brice Site Superintendent left Aniak for Fairbanks on September 20, 2016. The Kubota® tractor was loaded on the landing craft by the Brice operator and transported back to Aniak on September 26, 2016. The Kubota® tractor was flown back to Anchorage on October 1, 2016 using NAC, and delivered to the BLM warehouse by Sourdough Express on October 3, 2016.

3.4 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance/quality control (QA/QC) procedures were maintained throughout the sampling activities. The QC procedures included the analysis of field duplicates and preparation of a laboratory data quality report (DQR) by qualified Brice staff. The DQR included the completion of an ADEC Laboratory Data Review Checklist for each analytical report included in Appendix C. The QA procedures included adherence to appropriate sample collection methodology as described in Brice's ADEC approved work plan (Brice, 2016). Any reported data discrepancies associated with the soil samples collected from the Site were identified in the DQR (Appendix D) and are summarized in Section 4.2.

3.5 WASTE MANAGEMENT

The laboratory disposed of all sample material submitted for analysis, and all used sampling and PPE materials from on-site activities were disposed of in the Aniak landfill.

In addition to submitting discrete analytical samples for analysis, aliquots of all soils sampled in 2016 were used to comprise four composite samples for waste characterization purposes. A north and a south composite of the contamination assessment test pit samples was prepared for Toxicity Characteristic Leaching Procedure (TCLP) analysis of COC metals. In addition, two

composite samples, north and south, were prepared from aliquots of the retort mound characterization samples. These samples were collected to characterize the general waste stream to be generated during future site excavation and disposal. In prior years, soils from the site were disposed of under facility-approved waste profiles developed for the soils from the same AOC in 2013 and renewed by the receiving facility in 2014. The purpose of the composite sample collection in 2016 was for renewal of the waste profile for 2017 using composite soil samples comprising soil spanning the estimated area of excavation.

4 FIELD SCREENING AND ANALYTICAL RESULTS

This section describes the findings of sampling conducted in support of the 2016 characterization and contamination assessment performed at the KMS. The nomenclature for sample IDs and AOCs for this project are defined in the example below:

16KRM-16(1) = 2016 sample from Kolmakof Retort Mound (IA-1) collected at test pit TP-16 at a depth of 1-foot bgs.

Field notes included in Appendix A provide a detailed account of the field screening and sampling activities conducted at the Site. The following sections detail the results for sampling conducted at each area at KMS in 2016.

4.1 RETORT MOUND AREA (IA-1) TEST PIT SAMPLING RESULTS

Three sets of test pits were installed and sampled around the retort mound at IA-1 in 2016. The first step-out test pits TP-16 through TP-28 were installed on September 13th and 14th. Test pits M-1 through M-9 were installed and sampled on September 15th and 16th to characterize conditions, including evidence of past retort activities or discarded equipment, in the retort mound. Test Pits TP-29 through TP-38, the second step-out test pits, were installed and sampled on September 16th and 17th. Analytical results for the first step-out test pits were not available until after demobilization and the second set of step-out test pits, TP-29 through TP-38, were installed to support potential exceedances at all of the first step-out test pits .

Metal concentrations in soil samples collected from test pits in the vicinity of the Retort Mound are presented in Table 1. Complete laboratory analytical reports are provided in Appendix C. Completed ADEC laboratory data checklists and a quality assurance review of the laboratory data are included as Appendix D. The estimated horizontal limits of excavation at the retort mound and soil analytical data are presented on Figure 3. Cross-sections depicting local lithology, soil analytical data, and estimated vertical limits of excavation are presented on Figures 4 and 5. Test pit location data including soil sample depths, and horizontal and vertical locations are presented in the summary of survey data in Appendix E.

Detectable concentrations of all target metal analytes were found in all samples.

Arsenic concentrations ranged from 3.78 mg/kg in sample 16KRM-29(0.75) to 20.9 mg/kg in sample 16KRM-26(1.5).

Chromium concentrations ranged from 22.1 mg/kg in sample 16KRM-29(0.75) to 36.3 mg/kg in sample 16KRM-33(1).

Mercury concentrations ranged from an estimated concentration of 0.135 mg/kg in the duplicate sample collected from test Pit M-9 at 1.5 feet bgs, 16KRM-M9(10), to 28.1 mg/kg in sample 16KRM-M2(2.5).

Nickel concentrations ranged from 18.4 mg/kg in sample 16KRM-M2(2.5) to 49.3 mg/kg in sample 16KRM-16(1).

Confirmation soil sampling indicated the exceedances of ADEC cleanup levels for one or more of the target metals at all sample locations except 16KRM-25(0.75) at TP-25, 16KRM-27(1.5) at

TP-27, 16KRM-33(2) at TP-33, 16KRM-M1(0.75) at M-1, and 16KRM-M9(10) the duplicate sample collected from 1.5 feet bgs at M-9.

4.2 WASTE CHARACTERIZATION SAMPLING FOR TCLP METALS

Two sets of composite samples were collected from within and surrounding the retort mound at IA-1 in 2016. Composite samples were prepared from aliquots of all analytical soil samples collected from the northern and southern halves of the retort mound, or "M" test pits. A second set of composite samples were comprised analytical soil sample aliquots from all northern and southern step-out, or "TP" test pits installed beyond the toe of the retort mound.

Results for TCLP analysis of composite waste characterization soil samples are presented in Table 2.

Arsenic was not detected above the method detection limit concentration of 0.0750 mg/L in TCLP leachate prepared from any of the waste characterization samples collected from within or surrounding the retort mound area.

Chromium was detected at estimated concentrations ranging from 0.0922 mg/L in the composite soil sample collected from the southern portion within the retort mound, to 0.129 mg/L in the composite sample of all contamination assessment samples collected south of the retort mound limits.

Mercury was not detected above the method detection limit concentration of 0.00310 mg/L in TCLP leachate prepared from any of the waste characterization samples collected from within or surrounding the retort mound area.

Nickel was detected in only one of the four waste characterization composite samples at an estimated concentration of 0.0328 mg/L in the composite of contamination assessment samples collected north of the retort mound area.

None of the composite samples analyzed for COC TCLP metals exceeded toxicity characteristic threshold concentrations, as defined in the Resource Conservation and Recovery Act (RCRA) under Title 40, Chapter I, Subchapter I, Part 261.24 of the Code of Federal Regulations (40 CFR 261.24), for arsenic, chromium, or mercury. There is no RCRA TCLP concentration defined for nickel.

4.3 ANALYTICAL DATA QUALITY

The laboratory reports for all samples are presented in Appendix C. Although the data were deemed acceptable for use, there were precision goals for mercury in work order 1168620 that were not met by the analytical laboratory. These are described in detail in Brice's DQR in Appendix D and discussed briefly here:

- The RPD between primary samples and the field duplicates were in agreement in all cases except for mercury in work order 1168620. The RPD of 60% for mercury between parent sample 16KRM-M5(2) (0.724 mg/kg) and duplicate sample 16KRM-M5(10) (1.35

mg/kg) was greater than 50%. The RPD of 63% for mercury between parent sample 16KRM-M9(1.5) (0.258 mg/kg) and duplicate sample 16KRM-M9(10) (0.135 mg/kg) was greater than 50%. Both sets of primary/duplicate results were considered estimates for mercury with an unknown bias due to sample heterogeneity.

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5 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are presented below.

5.1 CONCLUSIONS

Test pit confirmation soil sampling conducted in the vicinity of the retort mound at IA-1 indicate that further contaminated media removal is required. The test pits installed at IA-1 in 2016 did not extend to soils meeting cleanup levels generally to the north or southwest despite extending significantly beyond the limits of excavation identified in the 2015 investigation report (Brice, 2015b).

Analytical results for arsenic and chromium in soil samples collected from test pits within and on the outer perimeter of the estimated excavation limits were within or near the upper range of values observed from soil samples collected from the Camp Area during the background study conducted by AMEC in 2008 (AMEC, 2011). Concentrations of arsenic and chromium that are elevated relative to the cleanup levels established for the Camp Area do not correlate with exceedances for the mercury cleanup level established for that area. Therefore, elevated arsenic and chromium concentrations are likely associated with background variation in the occurrence of these COC metals and are not associated with the distribution of cinnabar ore at the Site.

The inferred area of soil at IA-1 with mercury concentrations exceeding the Camp Area cleanup level of 1.4 mg/kg is presented in Figure 3. Cross-sections of the retort mound area show the depth of soils impacted above the Camp Area cleanup level of 1.4 mg/kg. As shown in Figure 3, the total area bounded by the analytically-determined and inferred limits of theestimated excavation boundary, based on sample analytical results, is approximately 5,271 square feet. Based on an east-to-west average soil thickness of approximately 3.5 feet to bedrock or undisturbed soil meeting cleanup levels (Figure 4), and a north-to-south average soil thickness of approximately 2.5 feet to bedrock or undisturbed soil meeting cleanup levels (Figure 5), Brice estimates an average site-wide depth of removal of 3.0 feet bgs. Removal of soil to this depth involve approximately 586 in-situ cubic yards of soil exceeding the Camp Area cleanup level.

During soil removal actions in 2013 and 2014, 110 cubic yards of ex-situ soils were removed from within this area. Based on a 25 percent swell factor of excavated soils, the prior removal efforts deduct 88 cubic yards from the 586 in-situ cubic yards estimated above. The resulting in-situ volume of soil remaining above the Camp Area cleanup level for mercury is approximately 497 cubic yards. Assuming an excavated soil swell factor of 25 percent, the volume of soils requiring ex-situ management to attain cleanup levels is estimated at approximately 622 cubic yards. This estimate does not include additional excavation beyond the inferred limits of estimated excavation presented in Figure 3.

5.2 RECOMMENDATIONS

Brice recommends the use of mercury data only as guide for cleanup at IA-1. The spatial occurrence of remaining COC metals do not correlate with mercury concentrations and, therefore, do not appear to indicate the presence of cinnabar ore.

Brice recommends the removal, transport, and disposal of up to 497 cubic yards of in-situ soil not meeting the mercury cleanup level of 1.4 mg/kg from the vicinity of the retort mound at IA-1 as referenced on Figures 3, 4, and 5. This volume corresponds to an approximate ex-situ volume of 622 cubic yards after imposition of a swell factor of 25 percent to determine the volume of soil requiring handling. Removal of this material should be limited by the occurrence of underlying bedrock or undisturbed soils documented to contain mercury concentrations below the Camp Area cleanup level of 1.4 mg/kg as depicted in Figures 3, 4, and 5.

Given the linear extent of excavation perimeter characterized as “inferred” due to analytical results in outer test pits exceeding the 1.4 mg/kg cleanup level (Figure 3), Brice recommends an additional 50 cubic yard in-situ contingency factor for planning purposes. This volume corresponds to an additional 65 cubic yards of ex-situ soil requiring management as a contingency toward attainment of the mercury cleanup level.

6 REFERENCES

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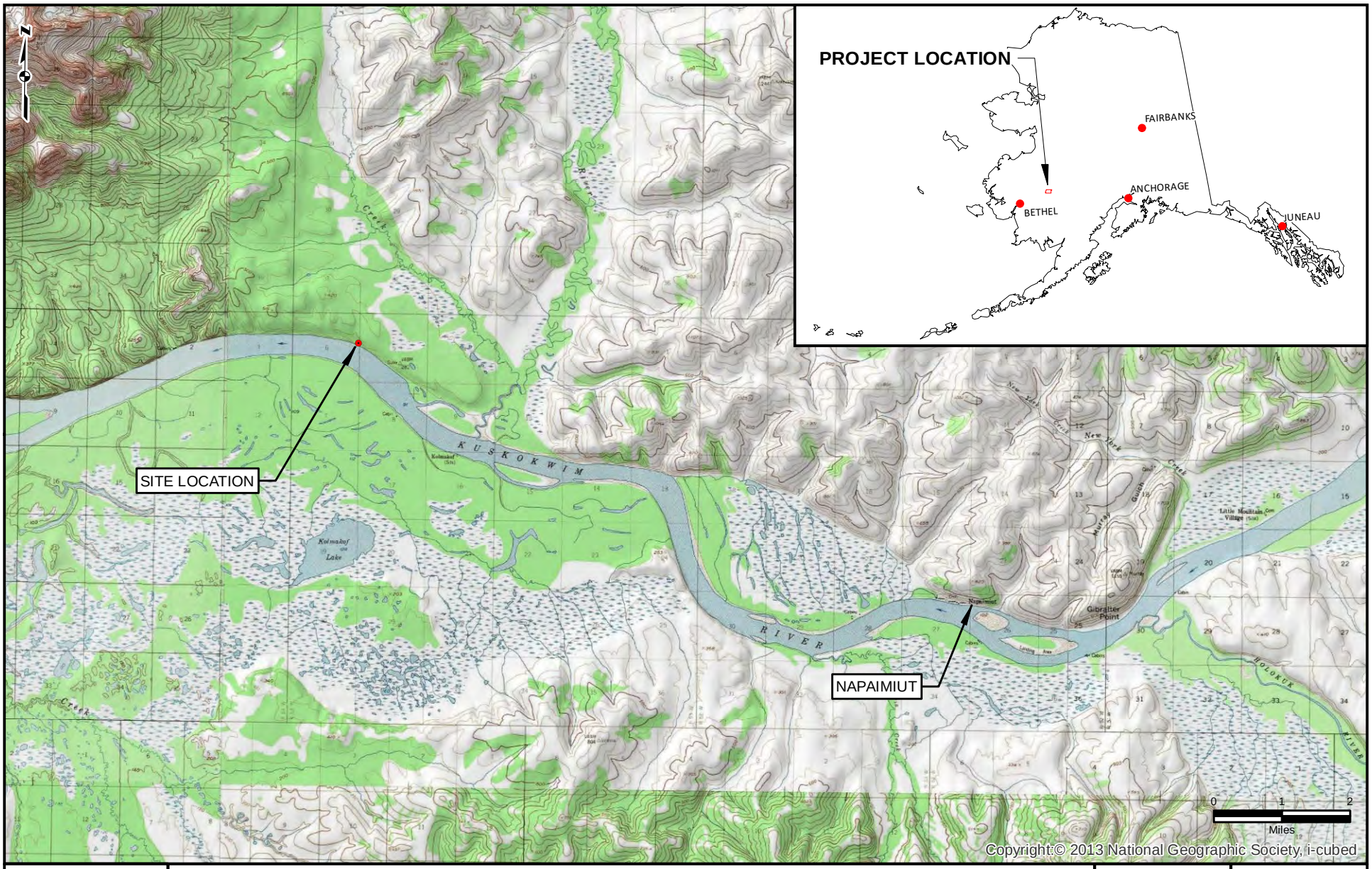
FIGURES



Brice (An ANC 8(a)) Environmental Services Corporation

SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT

KOLMAKOF MINE SITE, ALASKA

STATE AND SITE VICINITY

DATE: 12/2/2016

PROJECT No.: 210101

DRAWN: D.H.

FIGURE: 1

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Brice An ANC 8(a) Environmental

SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT
KOLMAKOF MINE SITE, ALASKA

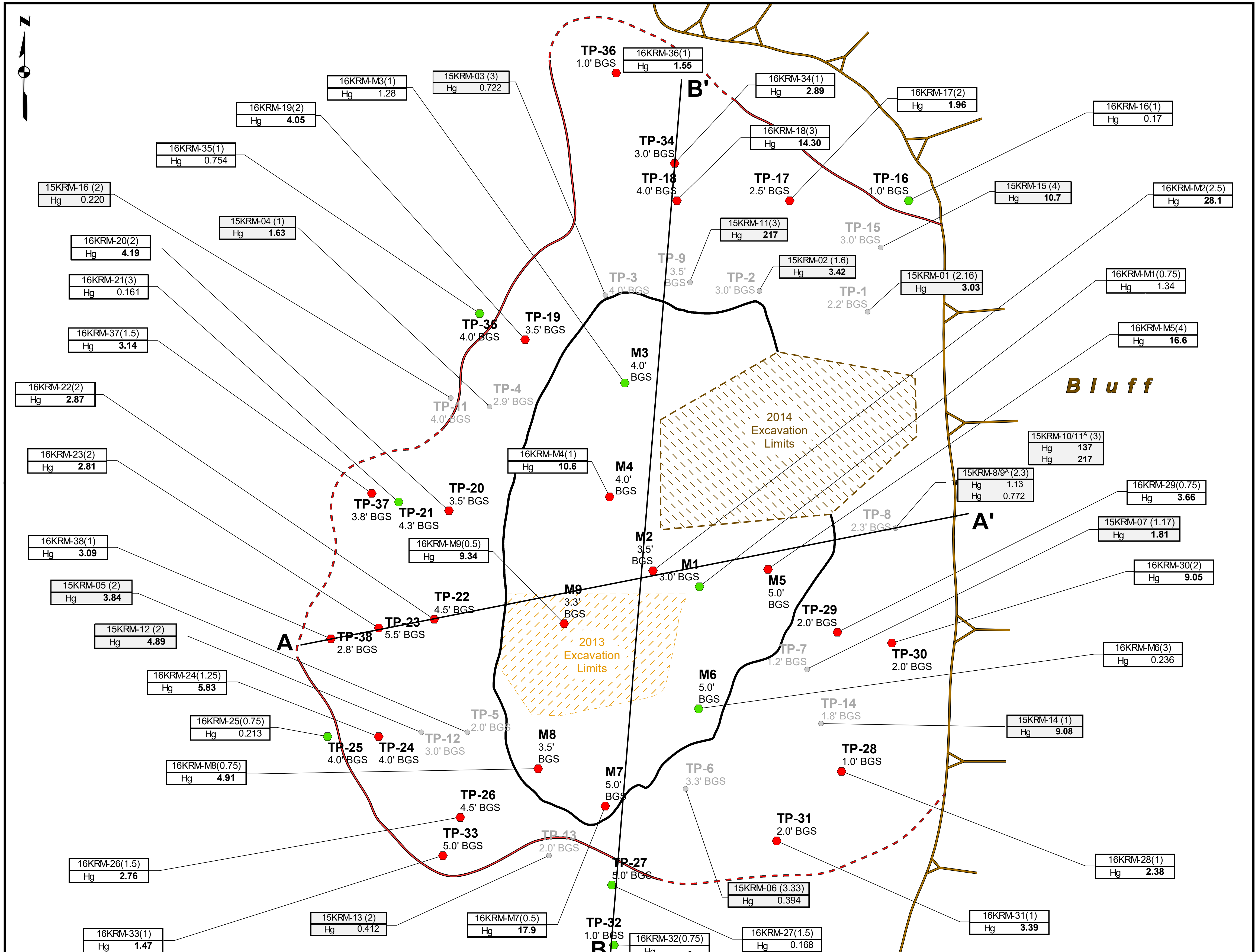
SITE OVERVIEW

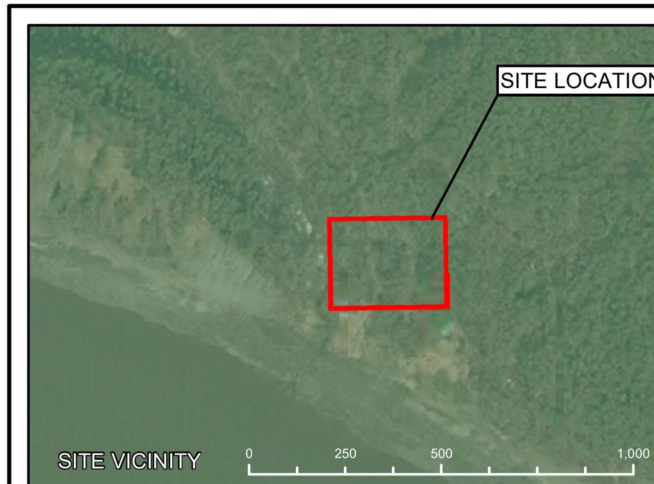
DATE: 08/09/2016

PROJECT NO:. 210101

DRAWN: D.H.

FIGURE: 2





1 INCH

Legend

- TP-13 1.8' BGS — 2015 Test Pit Location
- M7 5' BGS — 2016 Test Pit Location
- M7 5' BGS — 2016 Test Pit Location in Exceedance (>1.4 mg/kg)
- Estimated Excavation Limit - Dashed Where Inferred
- Retort Mound Toe of Slope
- Toe of Bluff Slope
- 2013 Excavation Limits
- 2014 Excavation Limits
- A A' — Cross Section
- Hg 9.08 — Mercury Concentration in mg/kg (Bold where exceeding cleanup level of 1.4 mg/kg)

1 INCH

12 6 0 12 24

SCALE IN FEET

Fairbanks Office
301 Cushman Street, Street 100
Fairbanks, AK 99701
907.456.1955 (office)
907.452.5018 (fax)

Anchorage Office
3800 Centerpoint Drive, Suite 400
Anchorage, AK 99503
907.275.2896 (Office and Fax)

SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT
KOLMAKOF MINE SITE, ALASKA

RETORT MOUND (IA-1) TEST PIT SAMPLING RESULTS DIAGRAM

PROJECT No.: 210101	DATE: 12/2/2016	FIGURE: 3
P.M.: C.B.	DRAWN: D.H.	

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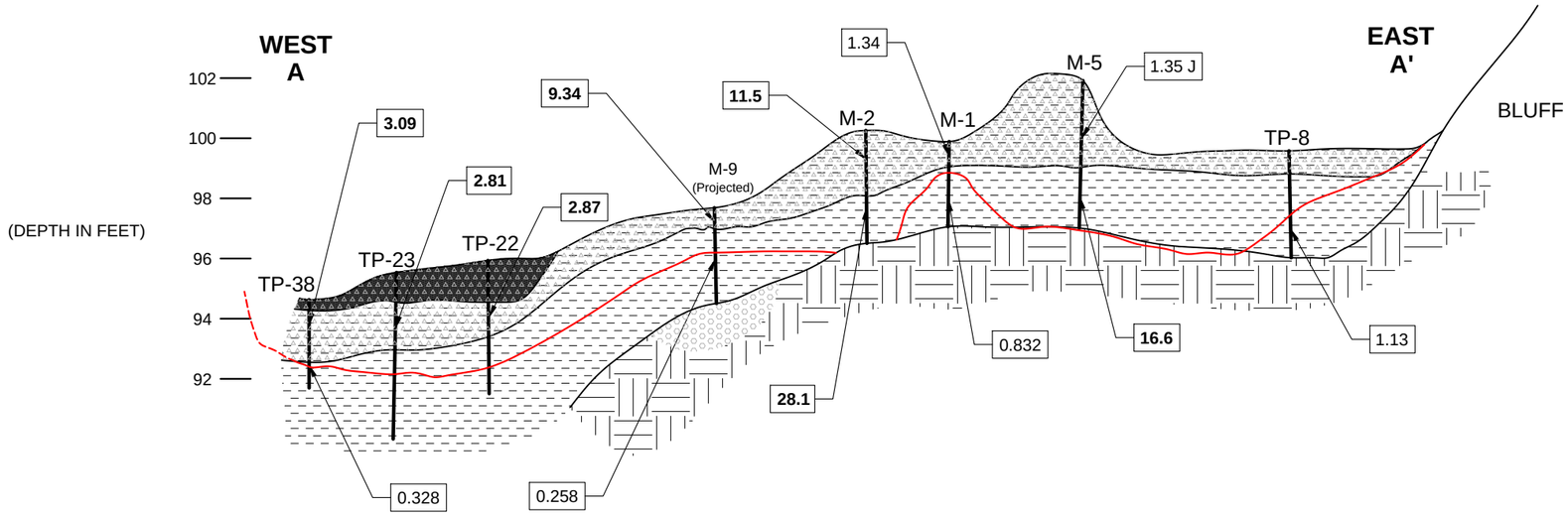

LEGEND:

- ESTIMATED DEPTH OF EXCAVATION (DASHED WHERE INFERRED)
- FILL PLACED BEFORE 2013 (GP-GM)
- FILL PLACED IN 2013 (GP-GM)
- BEDROCK
- COBBLE AND COARSE GRAVEL (GP)
- NATIVE SILT (ML)
- 1.55 -MERCURY CONC. IN SOIL, mg/Kg (Bold where exceeding cleanup level of 1.4 mg/kg)

VERTICAL EXAGGERATION 2:1

0 10
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1 INCH

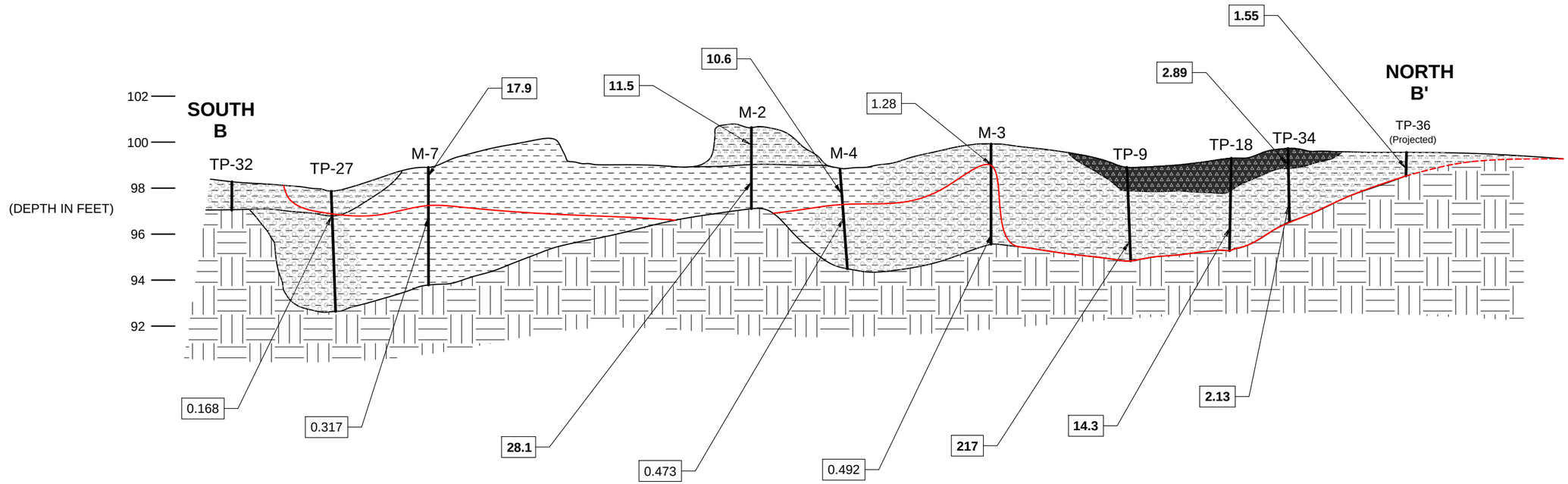
Brice An ANC 8(a) Environmental Services Corporation
3800 Centerpoint Dr. Ste. 520
Anchorage, AK 99503

SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT
KOLMAKOF MINE SITE, ALASKA

RETORT MOUND CROSS SECTION A - A'

DATE: 11.21.16
PROJECT No.: 210101
DRAWN: D.H.

FIGURE: 4



LEGEND:

- ESTIMATED DEPTH OF EXCAVATION (DASHED WHERE INFERRED)
- FILL PLACED BEFORE 2013 (GP-GM)
- FILL PLACED IN 2013 (GP-GM)
- BEDROCK
- COBBLE WITH SILT (GP-GM)
- NATIVE SILT (ML)
- 1.55 -MERCURY CONC. IN SOIL, mg/Kg (Bold where exceeding cleanup level of 1.4 mg/kg)

VERTICAL EXAGGERATION 2:1

0 10

SCALE IN FEET

1 INCH

Brice An ANC 8(a) Environmental Services Corporation
3800 Centerpoint Dr. Ste. 520
Anchorage, AK 99503

SITE CHARACTERIZATION AND CONTAMINATION ASSESSMENT REPORT

KOLMAKOF MINE SITE, ALASKA

RETORT MOUND CROSS-SECTION B - B'

DATE: 11.21.16

PROJECT No.: 210101

DRAWN: D.H.

FIGURE: 5

TABLES

Table 1

Test Pit Soil Sample Analytical Results

2016 Kolmakof Mine Site Retort Mound Characterization

Field Sample ID	Sample Location	Date Sampled	USEPA Method 6020A			
			Arsenic (mg/kg)	Chromium (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)
ADEC Cleanup Levels			10.7	29.2	1.4	86
First Step-Out Test Pit Samples						
16KRM-16(1)	Test Pit 16 @ 1'bgs	9/13/2016	**11.2**	**30.6**	0.171	53.5
16KRM-17(2)	Test Pit 17 @ 2'bgs	9/13/2016	**11.5**	**29.6**	**1.96**	36.7
16KRM-18(3)	Test Pit 18 @ 3'bgs	9/13/2016	9.96	**30.1**	**14.3**	40.2
16KRM-19(2)	Test Pit 19 @ 2'bgs	9/13/2016	**11.5**	**29.5**	**4.05**	34.6
16KRM-20(2)	Test Pit 20 @ 2'bgs	9/14/2016	10.3	**29.7**	**4.19**	35.8
16KRM-20(10)*	Dup of Test Pit 20 @ 2'bgs	9/14/2016	9.72	**29.4**	**3.36**	36.1
16KRM-21(3)	Test Pit 21 @ 3'bgs	9/13/2016	8.02	**26.9**	0.161	18.8
16KRM-22(2)	Test Pit 22 @ 2'bgs	9/14/2016	10.3	**30.9**	**2.87**	36.3
16KRM-23(2)	Test Pit 23 @ 2'bgs	9/14/2016	9.57	28.5	**2.81**	34.1
16KRM-23(4)	Test Pit 23 @ 4'bgs	9/14/2016	--	--	--	--
16KRM-24(1.25)	Test Pit 24 @ 1.25'bgs	9/14/2016	9.94	**29.6**	**5.83**	35.5
16KRM-24(4)	Test Pit 24 @ 4'bgs	9/14/2016	--	--	--	--
16KRM-25(0.75)	Test Pit 25 @ 0.75'bgs	9/14/2016	9.39	26.8	0.213	22.6
16KRM-25(2.5)	Test Pit 25 @ 2.5'bgs	9/14/2016	--	--	--	--
16KRM-26(1.5)	Test Pit 26 @ 1.5'bgs	9/14/2016	**20.9**	28.7	**2.76**	36.8
16KRM-27(1.5)	Test Pit 27 @ 1.5'bgs	9/14/2016	6.39	23.1	0.168	19.3
16KRM-28(1)	Test Pit 28 @ 1'bgs	9/14/2016	8.99	**29.6**	**2.38**	39.1
16KRM-28(10)*	Dup of Test Pit 28 @ 1' bgs	9/14/2016	9.72	**30.7**	**1.62**	41.6
Second Step-Out Test Pit Samples						
16KRM-29(0.75)	Test Pit 29 @ 0.75" bgs	9/16/2016	3.78	22.1	**3.66**	20.3
16KRM-29(1.5)	Test Pit 29 @ 1.5'bgs	9/16/2016	9.73	34.1	**2.49**	41.4
16KRM-30(1)	Test Pit 30 @ 1'bgs	9/16/2016	3.99	22.9	**1.73**	20.0
16KRM-30(2)	Test Pit 30 @ 2'bgs	9/16/2016	9.48	**33.4**	**9.05**	46.3
16KRM-31(1)	Test Pit 31 @ 1'bgs	9/16/2016	9.52	**31.5**	**3.39**	41.3
16KRM-31(2)	Test Pit 31 @ 2'bgs	9/16/2016	10.5	**35.5**	**1.46**	41.9
16KRM-32(0.75)	Test Pit 32 @ 0.75'bgs	9/16/2016	--	--	--	--
16KRM-33(1)	Test Pit 33 @ 1'bgs	9/16/2016	10.5	**36.3**	**1.47**	49.3
16KRM-33(2)	Test Pit 33 @ 2'bgs	9/16/2016	9.77	27.9	0.239	22.9
16KRM-34(1)	Test Pit 34 @ 1'bgs	9/17/2016	9.3	**34.1**	**2.89**	42.2
16KRM-34(10)*	Dup of Test Pit 34 @ 1'bgs	9/17/2016	9.19	**34.7**	**2.82**	43.5
16KRM-34(2.5)	Test Pit 34 @ 2.5'bgs	9/17/2016	8.63	**31.8**	**2.13**	34.4
16KRM-35(1)	Test Pit 35 @ 1'bgs	9/17/2016	8.14	**32.7**	0.754	45
16KRM-35(2)	Test Pit 35 @ 2'bgs	9/17/2016	9.78	**32.5**	0.425	33.3

Table 1
Test Pit Soil Sample Analytical Results
2016 Kolmakof Mine Site Retort Mound Characterization

Field Sample ID	Sample Location	Date Sampled	USEPA Method 6020A			
			Arsenic (mg/kg)	Chromium (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)
16KRM-36(1)	Test Pit 36 @ 1'bgs	9/17/2016	9.02	**33.8**	**1.55**	47.5
ADEC Cleanup Levels			10.7	29.2	1.4	86
Second Step-Out Test Pit Samples (continued)						
16KRM-37(1.5)	Test Pit 37 @ 1.5' bgs	9/17/2016	9.31	**33**	**3.14**	45.6
16KRM-37(2.5)	Test Pit 37@ 2.5' bgs	9/17/2016	7.57	**31.6**	**1.77**	21.6
16KRM-38(1)	Test Pit 38@ 1' bgs	9/17/2016	10.4	**33.2**	**3.09**	39.9
16KRM-38(2.5)	Test Pit 38@ 2.5' bgs	9/17/2016	**13.1**	**35.1**	0.328	37.1
Retort Mound Samples						
16KRM-M1(0.75)	Test Pit M1@ 0.75' bgs	9/15/2016	9.32	28.4	1.34	23.3
16KRM-M1(2)	Test Pit M1@ 2.0' bgs	9/15/2016	9.34	**30.5**	0.832	31.9
16KRM-M2(1)	Test Pit M2@ 1' bgs	9/15/2016	8.82	26.7	**11.5**	30
16KRM-M2(2.5)	Test Pit M2@ 2.5' bgs	9/15/2016	7.77	28.1	**28.1**	18.4
16KRM-M3(1)	Test Pit M3@ 1' bgs	9/15/2016	9.76	**31.1**	1.28	31.5
16KRM-M3(4)	Test Pit M3@ 4' bgs	9/15/2016	**11.9**	**29.7**	0.492	32.1
16KRM-M4(1)	Test Pit M4@ 1' bgs	9/15/2016	7.25	27.5	**10.6**	25
16KRM-M4(2)	Test Pit M4@ 2' bgs	9/15/2016	**10.9**	**29.5**	0.473	31.2
16KRM-M5(2)	Test Pit M5@ 2' bgs	9/15/2016	**11.7**	**30.9**	0.724 J	35.9
16KRM-M5(10)*	Dup of Test Pit M5@ 2' bgs	9/15/2016	10.2	**30.6**	1.35 J	32
16KRM-M5(4)	Test Pit M5@ 4' bgs	9/15/2016	8.75	**30.2**	**16.6**	33.4
16KRM-M6(1)	Test Pit M6@ 1' bgs	9/15/2016	**12.3**	**34.2**	0.179	35.9
16KRM-M6(3)	Test Pit M6@ 3' bgs	9/15/2016	10.5	**33.3**	0.236	30.9
16KRM-M7(0.5)	Test Pit M7@ 0.5' bgs	9/15/2016	10.5	**30.5**	**17.9**	32.9
16KRM-M7(2)	Test Pit M7@ 2' bgs	9/15/2016	8.36	**31.4**	0.317	22.9
16KRM-M8(0.75)	Test Pit M8@ 0.75' bgs	9/16/2016	9.06	**30.6**	**4.91**	36.7
16KRM-M8(1.5)	Test Pit M8@ 1.5' bgs	9/16/2016	9.3	**31.6**	0.394	24.1
16KRM-M9(0.5)	Test Pit M9@ 0.5' bgs	9/16/2016	**10.9**	**30.9**	**9.34**	37.9
16KRM-M9(1.5)	Test Pit M9@ 1.5' bgs	9/16/2016	7.7	**29.9**	0.258 J	21.2
16KRM-M9(10)*	Dup of Test Pit M9@ 1.5' bgs	9/16/2016	7.89	28.6	0.135 J	20

Notes:
* Duplicate of preceeding sample
Results in bold exceed ADEC cleanup levels

Abbreviations:
-- - not analyzed
ADEC - Alaska Department of Environmental Conservation
bgs - below ground surface
J - estimated value
mg/kg - milligrams per kilogram
USEPA - United States Environmental Protection Agency

Table 2
Waste Characterization Sample TCLP Analytical Results
2016 Kolmakof Mine Site Retort Mound Characterization

Field Sample ID	Sample Location	Date Sampled	USEPA Method 1311/6020A			
			Arsenic (mg/L)	Chromium (mg/L)	Mercury (mg/L)	Nickel (mg/L)
RCRA Hazardous Waste Threshold Concentration			5.0	5.0	0.2	N/A
Site Characterization Composite Samples						
TCLP Comp North	Northern half composite of characterization samples	9/19/2016	ND [0.0750]	0.0989 J	ND [0.00310]	0.0328 J
TCLP Comp South	Southern half composite of characterization samples	9/19/2016	ND [0.0750]	0.129 J	ND [0.00310]	ND [0.0310]
Retort Mound Composite Samples						
TCLP Mound North	Northern half composite of mound samples	9/19/2016	ND [0.0750]	ND [0.0650]	ND [0.00310]	ND [0.0310]
TCLP Mound South	Southern half composite of mound samples	9/19/2016	ND [0.0750]	0.0922 J	ND [0.00310]	ND [0.0310]

Abbreviations:

J - estimated value between method reporting limit and method detection limit
mg/L - milligrams per liter
N/A - not applicable
ND - not detected at or above the [Limit of Detection]
RCRA - Resource Conservation Recovery Act
TCLP - Toxicity Characteristic Leaching Procedure
USEPA - United States Environmental Protection Agency

APPENDIX A

FIELD LOG BOOK

Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

Bureau of Land Management Alaska State Office

4700 BLM Road

Anchorage, AK 99507-2591

January 2017

Rite in the Rain®
ALL-WEATHER WRITING PAPER

5015 Business Park Blvd
Ste 3200
Anch Ak 99503

Name Carl Benson
Brice Environmental
Address 301 Cushman St., Suite 300
Fairbanks, Ak 99701
Phone 459-3052
388-5481

Project Kolmakof Mine site Characterize

Brice Project # 210101

Field Phone # 799-4342

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	Anne Marie (AWEC) Palmieri – 766-3184	
	Allen Simeon: 675-4216 or 676-0591	
	NAC: 243-3331 / Anich – 675-4295	
	Colin Dolan: Acct #: 101630	
	Sourdough Express: 243-2545 Shannon Martindale / Rob Acct #: @1brice.en	
	SGS: 562-2343	
	~~Jason~~ Justin Nelson 550-3205 Julie.Shumway@sgs.com	
	RAVN: 675-4572	
	ACCT#	
	Doug Moffet: 676-0669 o(623) 889-1140	
	Rob Kinkade: 299-3503	
	Dave Yancey: 675-4464 Cell 444-6421 Cell	

SGS North American Inc
200 W. Potter Drive
Anchorage, AK 99518

9/12/2016 Carl Benson KMS Rain 50°F

Leave Fairbanks @ 0730. Arrive Aniak @ 1100. Purchased Truck rental, checked into Aniak Air Guide's and unloaded freight from WAC. Fueled diesel tanks & Allen's boat for tomorrow's work. Kubota tractor Arriving @ 1815 for pickup. Picked up tractor and showed Larry where the landing craft was parked. Called Davy and Allen to set up OBW start tomorrow.

2000 - End of Day

9/13/2016 Carl Benson, KMS, 40°F cloudy

0730 Packing gear for day [illegible] picking up Larry & Allen

0830 Leaving Allendale for KMS

1000 Arrive [illegible]

1000–1300 Re-acquired all 2015 test pits and mapped the clean and inferred boundaries and N/S divider east to west for TCLP collection. (Photo #1)

1300–1330 Lunch

1330 – establishing staked locations for 2016 test pits.

1430 Marked out locations for test pits TP-16 through TP-28. With Larry Beck.

1400 Kubota Arrived, 03 fueled, and Larry lined out Allen on the operation of The Unit.

– Continued on Next Page —

[signature]

Carl Benson, KMS, 9/13/2016, 40°F rain

~~TP-16 : 12" – screening @12" CO~~

- 1445 Excavating TP-16 – fills with water immediately. Collecting Sample @ 12" bgs. Sample = 16KMS16, 12" bgs, TD = 12" bgs to bedrock. @1500
- 1530 Excavating TP-17. Photo shows approximately 1.5' of overburden over Native ground elevation. (Fill from hillside) Sample Collected @ 2' bgs TD = 2.5' bgs Sample = 16KRM17(2)@1600.
- 1600 Excavating TP18. Photo of Roots at 18" bgs in TP18 Marking pre 2013 grade. TD @TP-18 = 48"; hole is filling from below with water. Sample 16KRM-18(3) @ 36" bgs. TD = 48"
- 1710 Excavating TP-19 @1700. Fill to 6" to 12" on North end of pit under road. Native material to bedrock @TD of 3.5 Sample = 16KRM-19(2) @1745. at 2' bgs
- 1800 Starting excavation @ TP-21. Fill to 18" bgs. Silt loam with mottling and iron staining to 4'4" bgs. No bedrock encountered. Reserved a Sample from 4' bgs. 16KRM21(3) @ [illegible] 1930 leaving site

2030 Arrive Anvik – End of Day

- XRF Screening Table -

# TP	Depth	Hg (1)	As (1)	Cr (1)	Ni (1)
(2) 16	12"	ND	11	80	ND
17	12"	ND	ND	106	ND
(7) 17	2.5	ND	ND	37	ND
(8) 17	2.0	ND	ND	100	ND
(9) 17	2.0	ND	11	83	ND
(9) 18	2.0	ND	ND	97	ND
(10) 18	3.0	ND	25	98	ND
(11) 18	4.0	ND	ND	89	ND
(13) 19	3.0	ND	ND	77	ND
(14) 19	2.0	ND	ND	88	ND
(16) 21	1.0	ND	ND	105	ND
(17) 21	2.0	~~ND~~ ND	ND	63	ND
(18) 21	3.0	ND	9	86	ND
(19) 21	4.0	ND	ND	75	ND
(21) 20	1 fill	ND	ND	87	ND
(22) 20	1.5 org.	ND	ND	79	ND
(23) 20	2.0 [illegible] silt	ND	ND	84	ND
(24) 20	3.0 silt	ND	ND	71	ND
(25) 23	2.0	ND	ND	71	ND
(26) 23	4.0 silt	ND	ND	99	ND
(28) 22	1.0 new fill	ND	ND	60	ND
(29) 22	2.0 old fill	ND	11	90	ND
~~(30) 22~~	~~4.0 silt~~				

- XRF Screening Cont'd -

#	TP	Depth	Hg	As	Cr	Ni
40	24	0.5	ND	11	85	ND
41	24	1.25	ND	ND	68	ND
41	24	4.0	ND	ND	74	ND
43	26	0.5	ND	ND	72	ND
44	26	1.5	ND	ND	71	ND
45	26	3.0	ND	ND	59	ND
48	27	0.75	ND	ND	82	ND
47	27	1.5	ND	8	97	ND
49	27	3.0	ND	ND	81	ND
51	28	1.0	ND	ND	85	ND
52	25	0.25	ND	9	81	ND
53	25	0.75	ND	ND	66	ND
54	25	2.5	ND	ND	57/77	63/ND

Sampling Table

Sample	TP	Time	Depth	TD	Date
16KRM-16(1)	16	1520	1.0'	1.0'	9/13/16
16KRM-17(2)	17	1600	2.0'	2.5'	9/13/16
16KRM-18(3)	18	1700	3.0'	4.0'	9/13/16
~~16KRM-21~~	~~21~~	~~1800~~	~~3.0~~	~~4.5~~	~~9/13/16~~
16KRM-19(2)	19	1745	2.0'	3.5'	9/13/16
16KRM-21(3)	21	1900	3.0'	4'4"	9/13/16
16KRM-20(2)	20	1115	2.0	3.5'	9/14/16
*16KRM-20(10)	20	0900	2.0	3.5'	9/14/16
16KRM-23(2)	23	1200	2.0	5.5'	9/14/16
16KRM-23(4)	23	1215	4.0	5.5'	9/14/16
16KRM-22(2)	22	1330	2.0	4.5'	9/14/16
16KRM-24(1.25)	24	1400	1.25	4.0	9/14/16
16KRM-24(4)	24	1415	4.0	4.0	9/14/16
16KRM-26(1.5)	26	1445	1.5	4.5	9/14/16
16KRM-27(1.5)	27	1530	1.5	5.0	9/14/16
16KRM-28(1)	28	1600	1.0	1.0	9/14/16
*16KRM-28(10)	28	1615	1.0	1.0	9/14/16
16KRM25 (0.75)	25	1645	0.75	4.0	9/14/16
16KRM25 (2.5)	25	1700	2.5	4.0	9/14/16

* - duplicate of preceding sample

9/14/2016

0800 Pick up Allen & Larry & buy food

0800 leave Anch. & Arrive site @ 1000

Do tailgate & HASP meeting review for day. @ 1000.

1015 - Starting TP 20

2013 Fill depth = ~~0.5'~~ 0'-1'

Natural below fill = Gray organic @ ~~0.5~~ 1'-1.5'

~~Total depth~~ → reddish silt & gravel 1.5'-2'

below 2' = Native undisturbed silt

Sample = 16KRM20(2) @ 1115 w/duplicate.

1120 - Starting excavation @ TP-23

2013 Fill depth = 0'-1' bgs

Silt + Rock = 1'-2.5' bgs (disturbed before 2013)

Silt = 2.5'-5.5' bgs Apparent undisturbed.

Sample = 16KRM23 @ 2' bgs @ 1200

Reserve = 16KRM 23 @ 4' bgs @ 1215

1220 - Starting TP-22. TP 22 Profile:

0-1.5' 2014 Placed fill

1.5-2.5' Pre-2013 fill layer

2.5-4.5 Silt TD = 4.5' bgs

Sample = 16KRM 22 (2) @ 1330

1300 Starting TP-24 TP 24 Profile:

(over)

Carl Benson, LCMS characterization 9/14/2016

TP 24 Profile

0 - 0.5' 2013 placed fill
0.5' - 2.0' Pre-2013 fill material
2.0' - 4.0' Silt

TD = 4.0'

Sample = 16KRM24 (1.25) @ 1400
Reserve = 16KRM24 (4) @ 1415

TP26 Profile:

0 - 0.5' 2013 fill layer
0.5' - 1.5' Pre 2013 fill
1.5' - 4.5' silt
- Bedrock @ 4.5' bgs. TD.

Sample = 16KRM26 (1.5) @ 1445

1440 Starting TP27

TP27 Profile.

0 - 1 fill & reworked material
1 - 2.5 Silt
2.5 - 5.0 - Incompetent rock in Silt
TD = 5.0 with more competent Rock
Sample = 16KRM27 (1.5) @ 1330

Call Doug M. w/ billing Address & project #.

Carl Benson LCMS characterization 9/14/2016

1530 Starting TP-28.

TP28 Profile:

0 - 1' Disturbed overburden
1' TD = Bedrock
Sample = 16KRM28 (1) 1600
Duplicate = 16KRM28 (10) 1615

1630 Starting TP-25

TP25 Profile:

0 - 0.5 New placed gravel
0.5 - 0.75 old surface
~~TD = 4' bgs~~
0.75 - 4' = Silt
TD = 4' Silt.
Sample = 16KRM25 (0.75) @ 1645
Reserve = 16KRM25 (2.5) @ 1700
No Photo of TP28

1700 - Test Pits Completed for day
Cleaning up site & putting away gear,
1730 - Leaving Site
1830 - Arrive Airlock
1900 - Drop off Allen & fill out travel card.
2030 - Finish completing COC for shipping
End of Day

Carl Benson

Rite in the Rain.

9/15/2016 Carl Benson, WMS, 60°F Pt. Cldy.

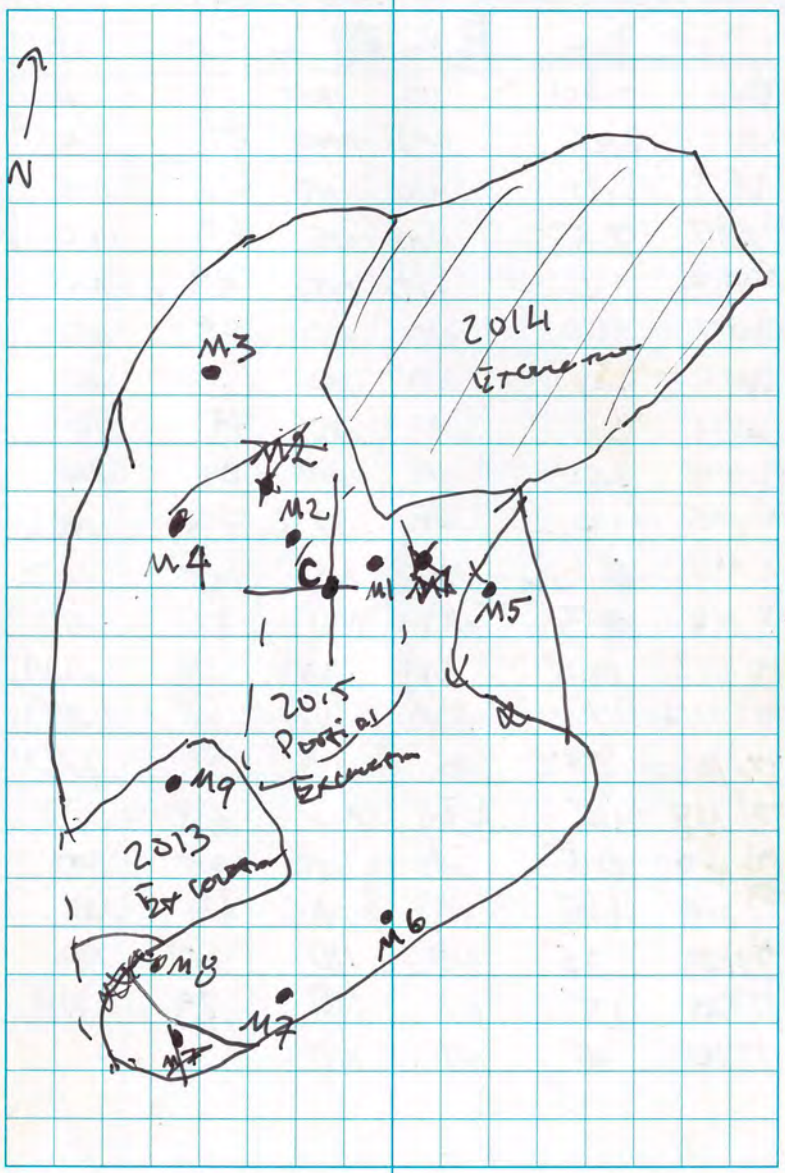
0630 Coordinating with lab and checking COC prior to delivery Samples to RAVN.
Air Waybill NO: 808 7139624
Arrive Ank @ 11:30

0730 Samples marked to RAVN for shipping to Anchorage.

0800 Picking up Crew.

0830 Leaving Anvik

0930 Arrive @ WMS & hold safety meeting & warm up Cabin.
Discussed Sampling objectives with Luigi
- Up to 10 test pits in Area of Wood
- North and South Composite TCLP
- 2 Metal Samples from each pit
- 2 grab Samples if Anomalies observed. (TCLP)



9/15/16 Report Mound Screening

Pit #	Depth	Hg	As	Cr	Ni
(57) M1	0.75'	ND	ND	69	ND
58 M1	2.0'	ND	ND	82	ND
59 M2	1.0	ND	ND	63	ND
(60) M2	2.5	ND	ND	73	ND
(62) M3	1.0	ND	ND	74	ND
(63) M3	4.0	ND	ND	58	ND
(64) M4	1.0	ND	ND	66	ND
(65) M4	2.0	ND	ND	78	ND
(67) M5	2.0	ND	ND	84	ND
(70) M5	4.0	ND	11	77	ND
(72) M6	1	ND	ND	105	ND
(73) M6	3	ND	ND	82	ND
(74) M7	0.5	ND	ND	79	ND
(75) M7	2	ND	ND	65	ND
(77) M8	.75'	ND	ND	91	ND
(78) M8	1.5	ND	ND	67	ND
(79) M9	0.5	ND	ND	95	ND
(80) M9	1.5	ND	ND	64	ND
(82) TP29	.75'	ND	ND	60	ND
(83) TP29	1.5	ND	ND	79	ND
TP30	1.0'	ND	ND		

9/15/16 Report Mound Screening Cont'd

Retort mound sampling

Sample #	Depth	TD	Time	Date
16kRM-M1	(0.75)	3.0	1050	9/15/2016
16kRM-M1	(2.0)	3.0	1055	9/15/2016
16kRM-M2	(1)	3.5	1140	9/15/2016
16kRM-M2	(2.5)	3.5	1145	9/15/2016
16kRM-M3	(1)	4	1310	9/15/2016
16kRM-M3	(4)	4	1315	9/15/2016
16kRM-M4	(1)	4	1400	9/15/2016
16kRM-M4	(2)	4	1405	9/15/2016
16kRM-M5	(2)	5	1530	9/15/2016
16kRM-M5	(6)	5	1535	9/15/2016
16kRM-M5	(4)	5	1540	9/15/2016
16kRM-M6	(1)	5	1620	9/15/2016
16kRM-M6	(3)	5	1625	9/15/2016
16kRM-M7	(0.5)	5	1650	9/15/2016
16kRM-M7	(2)	5	1655	9/15/2016
16kRM-M9	(1.75)	3.5	1045	9/16/2016
16kRM-M8	(1.5)	3.5	1050	9/16/2016
16kRM-M9	(0.5)	3.25	1115	9/16/2016
16kRM-M9	(1.5)	3.25	1120	9/16/2016
16kRM-M9	(10)	3.25	1125	9/16/2016

TCLP Composites for Mound Area

TCLP Comp South = M1, M5, M6, M7, M8, M9

TCLP Comp North = M2, M3, M4, ~~M5~~,

9/15/16 Carl Benson KMS 55° Ptly Cldy

Test Pit M1, 3' TD, Disturbed material to 1' bgs, Overlying 2' of Silt w/ rock bedrock in silt @ 3' bgs.
Samples = 16KRM-M1 (0.75) @ 1050
16KRM-M1 (2.0) @ 1055

Test Pit M2, 3.5' TD, Disturbed Material TO 2' bgs, Native Silt to Bedrock @ 3.5' bgs.
Samples = 16KRM-M2 (1) @ 1140
16KRM-M2 (2.5) @ 1145

Test Pit M3,
Silt loam with Cobble to 4' bgs
Organic horizon at approximately 1' bgs.
Samples: 16KRM-M3(1) @ 1310
16KRM-M3(4) @ 1315

Test Pit M4,
Silt loam to 1' bgs
Silt loam with rock Cobble to weathered bedrock @ 4' bgs.
Samples: 16KRM-M4 (1) @ 1400
16KRM-M4 (2) @ 1405

Test Pit M5
Depth of M5 ranges from 3' bgs to 8' bgs due to increasing slope to west on mound. (Depths ref'd below are from E end)
Disturbed Silt loam TO 3' bgs
Silt from 3' bgs to 5' bgs with rock occurring @ 5' bgs.
Samples = 16KRM-M5 (2) @ 1530
*16KRM-M5 (10) @ 1535
16KRM-M5 (4) @ 1540

Test Pit M6
Silt + organic rock TO 1' bgs
1' TO 5' bgs - Silt and Cobble mixed and apparently reworked.
Reddish Color @ 3' on east end.
Samples: 16KRM-M6 (1) @ 1620
16KRM-M6 (3) @ 1625

Test Pit M7
0' - 0.5' Silt with Organics
0.5' - 5' Silt to bedrock @ TD
TD = 5'
Samples: 16KRM-M7 (0.5) @ 1650
16KRM-M7 (2) @ 1655

✓ • Container inventory
✓ • e-mail Laura Stream W/ W-9 Form
✓ • Send billing address To Laura
✓ • Get Allen Set up as vendor.
✓ • Samples on 9/15 to Standard TAT,

1730 Leave LLMS
1830 Arrive Anvik, unpack boat, fuel purchase, take crew home
1900 Arrive @ office & manage gear, email, plans & plan for Friday.
2000 End of Day.

9/16/2016 Carl Benson, LLMS, Light Rain 60°F

0800 pick up crew
0900 Start up river after working on engine
1000 Arrive @ LLMS
1015 Tailgate meeting
1030 Start remaining test pits in Mound.

Test Pit M8
0-0.25' organic Material
0.25-0.75' Rock and Silt indicating prior disturbance.
0.75-3.5' Silt
3.5'- Bedrock
TD = 3.5'
Samples = 16KRM-M8(0.75)@1045
16KRM-M8(1.5)@1050

Test Pit M9
0-0.5'-Old placed ground Pre-2013
0.5'-3'-Silt and Submerged ground
3'-3.25'-Channel cobble
3.25'-TD
Samples: KRM16-M9 (0.5)@1045 1115
KRM16-M9 (1.5)@1020 1120
*KRM16-M9(10) ~~0800~~ @1125

9/16/2016 Carl Benson, KMS, 55°F cloudy

1130 Called Doug Moffett's wife to inform Doug that a lot of driftwood had built up on the landing craft. She will pass on the message and he will call back @ 1400.

1300 Selected step-out boring locations to collect "hold" samples for potential submission based on TP-16 through TP-28 results.

Test Pit 29

0 - 1' bgs Fill & disturbed Material
1' - 2' bgs Silt & Rock
1.5' bgs = bedrock
Samples = 16KRM-29 (0.75) 1320
16KRM-29 (1.5) 1325

Test Pit 30

0 - 1.5 Fill on old organic Matter
1.5 - 2.0 Silt and bedrock rind
2.0 - bedrock
16KRM - 30 (1) @ 1340
16KRM - 30 (2) @ 1345

9/16/2016 Carl Benson MAKS, 55°F cldy

Test Pit 31

~~16KRM-31 (~~
0 - 2' bgs silt and cobble
2' - bedrock move competent (refusal)
Samples: 16KRM-31(1) @ 1420
16KRM-31(2) @ 1425

Test Pit 32

0 - 1' bgs - Cobble & Silt
1.0 = TD = bedrock refusal
Sample = 16KRM-32 (0.75) @ 1445
- Small chip of Cinnabar found loose in hole.

Test Pit 33

0 - 1' Fill & silt, 0 - 6" = 2013 fill, 6" - 1' = old pre 2013 fill
1' - 5' Silt with laminations and Iron concretions.
End of Test Pit = 5' bgs in silt.
Samples = 16KRM-33 (1) @ 1515
16KRM-33 (2) @ 1520

1600 Backfilling test pits 29-33
Leaving KMS
Arrive Aniak
[illegible]

- Step-Out test pit Screening -

Test pit	Depth	Hg	As	Cu	Ni
TP29	82 0.75	ND	ND	60	ND
TP29	83 1.5	ND	ND	79	ND
TP30	84 1	ND	ND	65	NT
TP30	85 2	ND	ND	71	ND
TP31	86 1	ND	ND	78	ND
TP31	87 2	ND	ND	63	ND
TP32	92 0.75	ND	ND	81	ND
~~TP32~~	~~LO~~				
TP33	93 1	ND	ND	102	ND
TP33	94 3	ND	ND	78	ND
TP34	96 1	ND	11	74	ND
TP34	2.5	ND	12	84	ND
TP35					
TP35	2	ND	9	83	ND
TP36	102 1	ND	14	94	ND
TP37	104 1.5	ND	ND	93	ND
TP37	105 2.5	ND	ND	64	ND
TP38	106 1	ND	15	85	ND
TP38	107 2.5	ND	9	50	ND

- Step-Out test pit Sampling -

Sample ID	Depth	TID	Time	Date
16KRM-29 (0.75)	.75	2	1320	9/16/2016
16KRM-29 (1.5)	1.5	2	1325	9/16/2016
16KRM-30 (1)	1	2	1340	9/16/2016
16KRM-30 (2)	2	2	1345	9/16/2016
16KRM-31 (1)	1	2	1420	9/16/2016
16KRM-31 (2)	2	2	1425	9/16/2016
16KRM-32 ~~(0.75)~~ (0.75)	.75	1	1445	9/16/2016
16KRM-33 (1)	~~1~~	5	1515	9/16/2016
* 16KRM-33 (2)	~~2~~	5	1520	9/16/2016
~~16KRM-33~~		~~CS~~		
~~16KRM-33 (10)~~		~~CS~~		
16KRM-34 (1)			1025	9/17/2016
16KRM-34 (2.5)			1030	9/17/2016
* 16KRM-34 (10)			0900	9/17/2016
16KRM-35 (1)			1130	9/17/2016
16KRM-35 (2)			1135	9/17/2016
16KRM-36 (1)			1200	9/17/2016
16KRM-37 (1.5)			1330	9/17/2016
16KRM-37 (2.5)			1335	9/17/2016
16KRM-38 (1)			1420	9/17/2016
16KRM-38 (2.5)			1425	9/17/2016

Carl Benson 9/17/2016 KMS 45°F dry

0800 pick up Allen & Lenny
0830 leave truck
0930 Arrive @ KMS
0945 Health & safety Meeting.
1015 Starting test pits.

TP-34 Description
0-1' - 2013 cover fill material
1'-3' - Silt & cobble (old worked fill)
3' - Refusal bedrock
Samples = 16KRM-34(1) @ 1025
16KRM-34(10) @ 0800
16KRM-34(2.5) @ 1030

TP-35 Description
0-0.75 - 2013 cover fill
0.75-4' - Silt & Cobble
Bedrock refusal @ 4' bgs
Samples = 16KRM-35(1) @ 1130
16KRM-35(2) @ 1135

TP-36 Description
Step out from TP-34 due to obscuring of burned ore chunks. ~18' from TP 34
0-1' Silt & Cobble & gravel
1'- bedrock refusal

Carl Benson, 9/17/2016, KMS, 45°F Cloudy

TP-36 Sample = 16KRM-36(1) @ 1200

TP-37 Description
0'-1' 2013 Paving layer from hillside
1'-2' Silt & gravel w/cobble
2'-3.75' Silt with laminations & iron Concretions.
TD = 3.75' bgs.
Sample = 16KRM-37(1.5) @ 1330
16KRM-37(2.5) @ 1335

~~TP-38 Description~~
~~0-0.25' 2013 Paving layer from Hillside~~
~~0.25'-2.0' Peat layer over 1.5' Silt & gravel~~
~~2.0-2.75' Silt with laminations & iron Concretions.~~
~~Sample = 16KRM-38(1.0) @~~
~~16KRM-38(2.5) @~~

TP-38 Description
0-0.25' 2013 fill
0.25'-2.0' Silt w/gravel & cobble
2.0-2.75' Silt w/laminations & Concretions
Samples = 16KRM-38(1) @ 1420
16KRM-38(2.5) @ 1425

Rain in the Rain.

Point	R	N	E	W	S	Elev
TP-29	21		20.5		4.5	3' 11 7/8"
TP-30			26.8 26.8		5.75	3' 8"
TP-7			17.0		8.75	4' 4 3/4"
TP-14			10.6		15	4' 6"
TP-28			21		20.5	4' 6"
M-6			4.5		13.3	3' 9"
TP-6			3.0	22.5 ~~32.5~~		5' 8"
TP-31			13.5		28.5	4' 3 3/4"
TP-32				5.25	40.5	5' 6"
TP-27				5.5	33.6	5' 10 1/2"
M-7				6.25	24.6	4' 8 1/2"
TP-13				12.75	30.2	2"
M-8				14.0	20.2	7' 3/4"
TP-26				23.0	25.8	8' 9"
TP-33				25.0	30.2	8' 7"
TP-38				37.9	5.25	.. 5' 7 3/4"
TP-25				38.3	16.5	.. 7' 1 1/2"
TP-24				32.4	16.5	.. 5' 6 1/2"
TP-23				32.4	4.0	.. 4' 10 1/2"
TP-22				26.0	3.0	.. 4' 3 1/2"
TP-12				27.5	16	.. 5' 5 7/8"
TP-5				22.2	16.0	8' 6"
M-9				11	3.5	5' 11 3/4"
TP-37		16.5		33.2		7' 2"

Point	R	N	E	W	S	Elev.
TP-21		10.5		30.1		7' 2"
TP-20		9.5		24.3		6' 9" ~~6' 8"~~
TP-4		22.5		24.1		6' 3 1/2"
TP-4		21.5		19.6		6' 2 1/2"
M-4		11.1		5.75		4' 7 1/2"
M-2		2.6		0.75		3' 2' 1/4"
		~~HI~~				
M-3		24.2		~~23.4~~		3' 9 1/2"
TP-19		29.2		15.5		5' 7 1/2"
TP-35		32.2		20.75		5' 5"
TP-3		34.3		6.25		5' 5"
TP-36		59.9		5.0		3' 11 1/4"
TP-34		49.5	1.75	B		3' 11"
TP-18		45.2	2.0			4' ~~8~~ 4"
TP-17		45.2	15			3' 4 1/2"
TP-16		45.2	28.75			2' 8 1/4"
TP-9		35.8	3.5			~~8~~ 4' 7 1/2"
TP-2		34.8	11.5			3' 10 1/2"
TP-15		39.8	25.5			3' 1/4"
TP-1		32.4	24.0			3' 9"
M-1		0.75	4.6			3' 8 1/2"
M-5		2.75	12.5			1' 7"
TP-8		7.5	27.2			3' 10 3/8"
						•3' 6.5"

Instrument • = Center setup
•• = TP-20 setup

Rite in the Rain

1800 Mapping Complete and leaving site.

9/19/2016

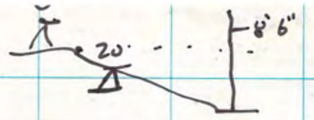
0800 Prep @ NAC for shipping lab/soon
0900 head up river to take levels
1100-1400 level measurements and
check mapped stake locations.
1430 - TCLP sample prep.

TCLP Comp. South - 9/19/2016 @ 1430

TCLP Comp. North - 9/19/2016 @ 1435

TCLP Mound South - 9/19/2016 @ 1440

TCLP Mound North - 9/19/2016 @ 1445



Center to TP-5 = 8' 6"
Inst ht @ C = 3' 6 1/2"
C Above TP 5 = 4' 11 1/2

Center to TP-20 = 6' 9"
Inst over TP20 = 3' 5 1/4"
•• Drop from initial setup = 3' 3 3/4"

So, TP-5 was @ 8' 6"
Now TP-5 is @ 5' 2 1/8"
within 1/8"
Should have been 5' 2 1/4"

need to Add 5' 2 1/8" to all •• (re-station) points to get elevation w.r.t. Center.

Calculated Δ from Center to TP-371 at re-station should be 3' 3 3/4"

7' 2" - 3' 3 3/4" = 3' 10 1/4"

Measured = 3' 10 3/8"

The application failed to start because its side configuration is incorrect. see the event log or use the command-line sxstrace tool for more detail

4' 2" - 3 3/4" =
4' - 1 3/4 = 3' 10 1/4" 3' 10 1/4"

sxstrace.exe

APPENDIX B

PROJECT PHOTOGRAPHS

Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

Bureau of Land Management Alaska State Office

4700 BLM Road

Anchorage, AK 99507-2591

January 2017

Photo 1 - Excavating at test pit TP-22

Photo 2 - Soil profile at TP-22.

Photo 3 - Soil profile at TP-38 - new coarse material overlying silt and gravel mix overlying native silt.

Photo 4 - South end of retort mound viewed from east.

Photo 5 – East side of retort mound viewed from south.

Photo 6 – East side of retort mound viewed from north.

Photo 7 – West side of retort mound viewed from north.

APPENDIX C

LABORATORY ANALYTICAL DATA REPORTS

Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

Bureau of Land Management Alaska State Office

4700 BLM Road

Anchorage, AK 99507-2591

January 2017

Laboratory Report of Analysis

To: Brice Environmental Srv Co.
301 Cushman St., Suite 200
Fairbanks, AK 99701
(907)459-3052

Report Number: **1165493**

Client Project: **210101 Kolmakof Mine Site**

Dear Carl Benson,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

Print Date: 09/26/2016 1:32:12PM

Case Narrative

SGS Client: **Brice Environmental Srv Co.**
SGS Project: **1165493**
Project Name/Site: **210101 Kolmakof Mine Site**
Project Contact: **Carl Benson**

Refer to sample receipt form for information on sample condition.

1165493001(1353312MS) (1353313) MS

6020A - Metals MS recovery for barium (136%) does not meet QC criteria. The post digestion spike was successful.

1165493001(1353312MSD) (1353314) MSD

6020A - Metals MSD recovery for barium (143%) does not meet QC criteria. The post digestion spike was successful.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Print Date: 09/26/2016 1:32:15PM

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
16KRM-16(1)	1165493001	09/13/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-17(2)	1165493002	09/13/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-18(3)	1165493003	09/13/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-19(2)	1165493004	09/13/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-20(2)	1165493005	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-20(10)	1165493006	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-21(3)	1165493007	09/13/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-22(2)	1165493008	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-23(2)	1165493009	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-24(1.25)	1165493010	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-25(0.75)	1165493011	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-26(1.5)	1165493012	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-27(1.5)	1165493013	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-28(1)	1165493014	09/14/2016	09/15/2016	Soil/Solid (dry weight)
16KRM-28(10)	1165493015	09/14/2016	09/15/2016	Soil/Solid (dry weight)

Method	Method Description
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **16KRM-16(1)**
Lab Sample ID: 1165493001
Metals by ICP/MS

Parameter	Result	Units
Arsenic	11.2	mg/Kg
Chromium	30.6	mg/Kg
Mercury	0.171	mg/Kg
Nickel	53.5	mg/Kg

Client Sample ID: **16KRM-17(2)**
Lab Sample ID: 1165493002
Metals by ICP/MS

Parameter	Result	Units
Arsenic	11.5	mg/Kg
Chromium	29.6	mg/Kg
Mercury	1.96	mg/Kg
Nickel	36.7	mg/Kg

Client Sample ID: **16KRM-18(3)**
Lab Sample ID: 1165493003
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.96	mg/Kg
Chromium	30.1	mg/Kg
Mercury	14.3	mg/Kg
Nickel	40.2	mg/Kg

Client Sample ID: **16KRM-19(2)**
Lab Sample ID: 1165493004
Metals by ICP/MS

Parameter	Result	Units
Arsenic	11.5	mg/Kg
Chromium	29.5	mg/Kg
Mercury	4.05	mg/Kg
Nickel	34.6	mg/Kg

Client Sample ID: **16KRM-20(2)**
Lab Sample ID: 1165493005
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.3	mg/Kg
Chromium	29.7	mg/Kg
Mercury	4.19	mg/Kg
Nickel	35.8	mg/Kg

Client Sample ID: **16KRM-20(10)**
Lab Sample ID: 1165493006
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.72	mg/Kg
Chromium	29.4	mg/Kg
Mercury	3.36	mg/Kg
Nickel	36.1	mg/Kg

Client Sample ID: **16KRM-21(3)**
Lab Sample ID: 1165493007
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.02	mg/Kg
Chromium	26.9	mg/Kg
Mercury	0.161	mg/Kg
Nickel	18.8	mg/Kg

Detectable Results Summary

Client Sample ID: **16KRM-22(2)**
Lab Sample ID: 1165493008
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.3	mg/Kg
Chromium	30.9	mg/Kg
Mercury	2.87	mg/Kg
Nickel	36.3	mg/Kg

Client Sample ID: **16KRM-23(2)**
Lab Sample ID: 1165493009
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.57	mg/Kg
Chromium	28.5	mg/Kg
Mercury	2.81	mg/Kg
Nickel	34.1	mg/Kg

Client Sample ID: **16KRM-24(1.25)**
Lab Sample ID: 1165493010
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.94	mg/Kg
Chromium	29.6	mg/Kg
Mercury	5.83	mg/Kg
Nickel	35.5	mg/Kg

Client Sample ID: **16KRM-25(0.75)**
Lab Sample ID: 1165493011
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.39	mg/Kg
Chromium	26.8	mg/Kg
Mercury	0.213	mg/Kg
Nickel	22.6	mg/Kg

Client Sample ID: **16KRM-26(1.5)**
Lab Sample ID: 1165493012
Metals by ICP/MS

Parameter	Result	Units
Arsenic	20.9	mg/Kg
Chromium	28.7	mg/Kg
Mercury	2.76	mg/Kg
Nickel	36.8	mg/Kg

Client Sample ID: **16KRM-27(1.5)**
Lab Sample ID: 1165493013
Metals by ICP/MS

Parameter	Result	Units
Arsenic	6.39	mg/Kg
Chromium	23.1	mg/Kg
Mercury	0.168	mg/Kg
Nickel	19.3	mg/Kg

Client Sample ID: **16KRM-28(1)**
Lab Sample ID: 1165493014
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.99	mg/Kg
Chromium	29.6	mg/Kg
Mercury	2.38	mg/Kg
Nickel	39.1	mg/Kg

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Detectable Results Summary

Client Sample ID: **16KRM-28(10)**
Lab Sample ID: 1165493015

Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.72	mg/Kg
Chromium	30.7	mg/Kg
Mercury	1.62	mg/Kg
Nickel	41.6	mg/Kg

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Results of **16KRM-16(1)**

Client Sample ID: **16KRM-16(1)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493001
Lab Project ID: 1165493

Collection Date: 09/13/16 15:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):83.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	11.2		1.16	0.360	mg/Kg	10		09/23/16 10:17
Chromium	30.6		0.465	0.151	mg/Kg	10		09/23/16 10:17
Mercury	0.171		0.0465	0.0139	mg/Kg	10		09/23/16 10:17
Nickel	53.5		0.232	0.0720	mg/Kg	10		09/23/16 10:17

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 10:17
Container ID: 1165493001-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.032 g
Prep Extract Vol: 50 mL

Results of **16KRM-17(2)**

Client Sample ID: **16KRM-17(2)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493002
Lab Project ID: 1165493

Collection Date: 09/13/16 16:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):80.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	11.5		1.20	0.371	mg/Kg	10		09/23/16 11:07
Chromium	29.6		0.479	0.156	mg/Kg	10		09/23/16 11:07
Mercury	1.96		0.0479	0.0144	mg/Kg	10		09/23/16 11:07
Nickel	36.7		0.239	0.0742	mg/Kg	10		09/23/16 11:07

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:07
Container ID: 1165493002-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.033 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-18(3)**

Client Sample ID: **16KRM-18(3)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493003
Lab Project ID: 1165493

Collection Date: 09/13/16 17:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):82.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.96		1.20	0.373	mg/Kg	10		09/23/16 11:11
Chromium	30.1		0.481	0.156	mg/Kg	10		09/23/16 11:11
Mercury	14.3		0.120	0.0361	mg/Kg	25		09/23/16 13:01
Nickel	40.2		0.241	0.0746	mg/Kg	10		09/23/16 11:11

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:11
Container ID: 1165493003-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.013 g
Prep Extract Vol: 50 mL

Results of **16KRM-19(2)**

Client Sample ID: **16KRM-19(2)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493004
Lab Project ID: 1165493

Collection Date: 09/13/16 17:45
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):82.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	11.5		1.14	0.354	mg/Kg	10		09/23/16 11:15
Chromium	29.5		0.456	0.148	mg/Kg	10		09/23/16 11:15
Mercury	4.05		0.0456	0.0137	mg/Kg	10		09/23/16 11:15
Nickel	34.6		0.228	0.0707	mg/Kg	10		09/23/16 11:15

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:15
Container ID: 1165493004-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.068 g
Prep Extract Vol: 50 mL

Results of **16KRM-20(2)**

Client Sample ID: **16KRM-20(2)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493005
Lab Project ID: 1165493

Collection Date: 09/14/16 11:15
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):84.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.3		1.18	0.366	mg/Kg	10		09/23/16 11:20
Chromium	29.7		0.472	0.153	mg/Kg	10		09/23/16 11:20
Mercury	4.19		0.0472	0.0142	mg/Kg	10		09/23/16 11:20
Nickel	35.8		0.236	0.0732	mg/Kg	10		09/23/16 11:20

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:20
Container ID: 1165493005-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.008 g
Prep Extract Vol: 50 mL

Results of **16KRM-20(10)**

Client Sample ID: **16KRM-20(10)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493006
Lab Project ID: 1165493

Collection Date: 09/14/16 08:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):84.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.72		1.16	0.360	mg/Kg	10		09/23/16 11:24
Chromium	29.4		0.465	0.151	mg/Kg	10		09/23/16 11:24
Mercury	3.36		0.0465	0.0139	mg/Kg	10		09/23/16 11:24
Nickel	36.1		0.232	0.0720	mg/Kg	10		09/23/16 11:24

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:24
Container ID: 1165493006-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.025 g
Prep Extract Vol: 50 mL

Results of **16KRM-21(3)**

Client Sample ID: **16KRM-21(3)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493007
Lab Project ID: 1165493

Collection Date: 09/13/16 19:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):71.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.02		1.37	0.424	mg/Kg	10		09/23/16 11:29
Chromium	26.9		0.547	0.178	mg/Kg	10		09/23/16 11:29
Mercury	0.161		0.0547	0.0164	mg/Kg	10		09/23/16 11:29
Nickel	18.8		0.273	0.0847	mg/Kg	10		09/23/16 11:29

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:29
Container ID: 1165493007-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.019 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-22(2)**

Client Sample ID: **16KRM-22(2)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493008
Lab Project ID: 1165493

Collection Date: 09/14/16 13:30
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):84.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.3		1.16	0.359	mg/Kg	10		09/23/16 11:33
Chromium	30.9		0.464	0.151	mg/Kg	10		09/23/16 11:33
Mercury	2.87		0.0464	0.0139	mg/Kg	10		09/23/16 11:33
Nickel	36.3		0.232	0.0719	mg/Kg	10		09/23/16 11:33

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:33
Container ID: 1165493008-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.021 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-23(2)**

Client Sample ID: **16KRM-23(2)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493009
Lab Project ID: 1165493

Collection Date: 09/14/16 12:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):84.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.57		1.12	0.346	mg/Kg	10		09/23/16 11:51
Chromium	28.5		0.446	0.145	mg/Kg	10		09/23/16 11:51
Mercury	2.81		0.0446	0.0134	mg/Kg	10		09/23/16 11:51
Nickel	34.1		0.223	0.0692	mg/Kg	10		09/23/16 11:51

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:51
Container ID: 1165493009-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.065 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-24(1.25)**

Client Sample ID: **16KRM-24(1.25)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493010
Lab Project ID: 1165493

Collection Date: 09/14/16 14:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):85.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.94		1.11	0.343	mg/Kg	10		09/23/16 11:56
Chromium	29.6		0.443	0.144	mg/Kg	10		09/23/16 11:56
Mercury	5.83		0.111	0.0332	mg/Kg	25		09/23/16 13:06
Nickel	35.5		0.221	0.0686	mg/Kg	10		09/23/16 11:56

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 11:56
Container ID: 1165493010-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.063 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-25(0.75)**

Client Sample ID: **16KRM-25(0.75)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493011
Lab Project ID: 1165493

Collection Date: 09/14/16 16:45
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):71.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.39		1.35	0.420	mg/Kg	10		09/23/16 12:00
Chromium	26.8		0.542	0.176	mg/Kg	10		09/23/16 12:00
Mercury	0.213		0.0542	0.0162	mg/Kg	10		09/23/16 12:00
Nickel	22.6		0.271	0.0839	mg/Kg	10		09/23/16 12:00

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 12:00
Container ID: 1165493011-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.027 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-26(1.5)**

Client Sample ID: **16KRM-26(1.5)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493012
Lab Project ID: 1165493

Collection Date: 09/14/16 14:45
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):81.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	20.9		1.22	0.377	mg/Kg	10		09/23/16 12:05
Chromium	28.7		0.487	0.158	mg/Kg	10		09/23/16 12:05
Mercury	2.76		0.0487	0.0146	mg/Kg	10		09/23/16 12:05
Nickel	36.8		0.244	0.0755	mg/Kg	10		09/23/16 12:05

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 12:05
Container ID: 1165493012-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.005 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-27(1.5)**

Client Sample ID: **16KRM-27(1.5)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493013
Lab Project ID: 1165493

Collection Date: 09/14/16 15:30
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):66.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	6.39		1.43	0.443	mg/Kg	10		09/23/16 12:09
Chromium	23.1		0.572	0.186	mg/Kg	10		09/23/16 12:09
Mercury	0.168		0.0572	0.0172	mg/Kg	10		09/23/16 12:09
Nickel	19.3		0.286	0.0886	mg/Kg	10		09/23/16 12:09

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 12:09
Container ID: 1165493013-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.054 g
Prep Extract Vol: 50 mL

Results of **16KRM-28(1)**

Client Sample ID: **16KRM-28(1)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493014
Lab Project ID: 1165493

Collection Date: 09/14/16 16:00
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):85.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.99		1.07	0.333	mg/Kg	10		09/23/16 12:14
Chromium	29.6		0.429	0.140	mg/Kg	10		09/23/16 12:14
Mercury	2.38		0.0429	0.0129	mg/Kg	10		09/23/16 12:14
Nickel	39.1		0.215	0.0666	mg/Kg	10		09/23/16 12:14

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 12:14
Container ID: 1165493014-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.088 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Results of **16KRM-28(10)**

Client Sample ID: **16KRM-28(10)**
Client Project ID: **210101 Kolmakof Mine Site**
Lab Sample ID: 1165493015
Lab Project ID: 1165493

Collection Date: 09/14/16 16:15
Received Date: 09/15/16 16:54
Matrix: Soil/Solid (dry weight)
Solids (%):85.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.72		1.12	0.346	mg/Kg	10		09/23/16 12:18
Chromium	30.7		0.446	0.145	mg/Kg	10		09/23/16 12:18
Mercury	1.62		0.0446	0.0134	mg/Kg	10		09/23/16 12:18
Nickel	41.6		0.223	0.0692	mg/Kg	10		09/23/16 12:18

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/23/16 12:18
Container ID: 1165493015-A

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 09/21/16 07:39
Prep Initial Wt./Vol.: 1.046 g
Prep Extract Vol: 50 mL

Print Date: 09/26/2016 1:32:17PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1743427 [MXX/30214]
Blank Lab ID: 1353310

Matrix: Soil/Solid (dry weight)

QC for Samples:
1165493001, 1165493002, 1165493003, 1165493004, 1165493005, 1165493006, 1165493007, 1165493008, 1165493009, 1165493010, 1165493011, 1165493012, 1165493013, 1165493014, 1165493015

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Chromium	0.200U	0.400	0.130	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Nickel	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 9/23/2016 10:58:02AM

Prep Batch: MXX30214
Prep Method: SW3050B
Prep Date/Time: 9/21/2016 7:39:22AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1165493 [MXX30214]
Blank Spike Lab ID: 1353311
Date Analyzed: 09/23/2016 11:02

Matrix: Soil/Solid (dry weight)

QC for Samples: 1165493001, 1165493002, 1165493003, 1165493004, 1165493005, 1165493006, 1165493007, 1165493008, 1165493009, 1165493010, 1165493011, 1165493012, 1165493013, 1165493014, 1165493015

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	50	48.3	97	(82-118)
Chromium	20	19.5	97	(83-119)
Mercury	0.5	0.518	104	(74-126)
Nickel	50	49.9	100	(84-119)

Batch Information

Analytical Batch: **MMS9546**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXX30214**
Prep Method: **SW3050B**
Prep Date/Time: **09/21/2016 07:39**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1353312
MS Sample ID: 1353313 MS
MSD Sample ID: 1353314 MSD

Analysis Date: 09/23/2016 10:17
Analysis Date: 09/23/2016 10:22
Analysis Date: 09/23/2016 10:26
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1165493001, 1165493002, 1165493003, 1165493004, 1165493005, 1165493006, 1165493007, 1165493008, 1165493009, 1165493010, 1165493011, 1165493012, 1165493013, 1165493014, 1165493015

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	9.37	50.0	54.4	90	48.2	56.2	97	82-118	3.36	(< 20)
Chromium	25.6	20.0	46.7	106	19.3	46.8	110	83-119	0.14	(< 20)
Mercury	0.143	0.500	.635	98	0.482	0.614	98	74-126	3.30	(< 20)
Nickel	44.7	50.0	91.1	93	48.2	91.3	97	84-119	0.15	(< 20)

Batch Information

Analytical Batch: MMS9546
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 9/23/2016 10:22:07AM

Prep Batch: MXX30214
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 9/21/2016 7:39:22AM
Prep Initial Wt./Vol.: 1.00g
Prep Extract Vol: 50.00mL

Print Date: 09/26/2016 1:32:26PM

Method Blank

Blank ID: MB for HBN 1743451 [SPT/10003]
Blank Lab ID: 1353418

Matrix: Soil/Solid (dry weight)

QC for Samples:
1165493001, 1165493002, 1165493003, 1165493004, 1165493005, 1165493006, 1165493007, 1165493008, 1165493009, 1165493010, 1165493011, 1165493012, 1165493013, 1165493014, 1165493015

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10003
Analytical Method: SM21 2540G
Instrument:
Analyst: IAS
Analytical Date/Time: 9/20/2016 5:55:00PM

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Duplicate Sample Summary

Original Sample ID: 1165553003
Duplicate Sample ID: 1353419

Analysis Date: 09/20/2016 17:55
Matrix: Soil/Solid (dry weight)

QC for Samples:

1165493001, 1165493002, 1165493003, 1165493004, 1165493005, 1165493006, 1165493007, 1165493008, 1165493009, 1165493010, 1165493011, 1165493012, 1165493013, 1165493014, 1165493015

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	85.8	85.9	%	0.08	(< 15)

Batch Information

Analytical Batch: SPT10003
Analytical Method: SM21 2540G
Instrument:
Analyst: IAS

Print Date: 09/26/2016 1:32:28PM

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SGS North America Inc.
CHAIN OF CUSTODY RECORD

1165493

.ocations Nationwide

a	Maryland
Jersey	New York
Carolina	Indiana
Virgina	Kentucky

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 799-4342 (Field) 388-5481 (cell)

PROJECT NAME: Kalmbach Mine Site PROJECT/ PWSID/ PERMIT#: 210101

REPORTS TO: Carl Benson E-MAIL: Carlb@briceenvironmental.com

INVOICE TO: Carl Benson Brice Environmental QUOTE #: 335662 P.O. #:

Section 3

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: 6020 - As, Cr, Ni, Hg	REMARKS/ LOC ID
1 A	16kRM-16(1)	09/13/16	15:00	S	1	G	X	
2 A	16kRM-17(2)	09/13/16	16:00	S	1	G	X	
3 A	16kRM-18(3)	09/13/16	17:00	S	1	G	X	
4 A	16kRM-19(2)	09/13/16	17:45	S	1	G	X	
5 A	16kRM-20(2)	09/14/16	11:15	S	1	G	X	
6 A	16kRM-20(10)	09/14/16	08:00	S	1	G	X	
7 A	16kRM-21(3)	09/13/16	19:00	S	1	G	X	
8 A	16kRM-22(2)	09/14/16	13:30	S	1	G	X	
9 A	16kRM-23(2)	09/14/16	12:00	S	1	G	X	
10 A	16kRM-24(1.25)	09/14/16	14:00	S	1	G	X	

Section 5

	Date	Time	
Relinquished By: (1) Carl Benson	9/15/16	0730	Received By:
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 9/15/16	Time 16:54	Received For Laboratory By:

Section 4

DOD Project? Yes No

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

24-Hr TAT STANDARD TAT PER JUSTIN

Temp Blank °C:

or Ambient X

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) IF IP

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

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SGS North America Inc.
CHAIN OF CUSTODY RECORD

1165493

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental
CONTACT: Carl Benson PHONE NO: 799-9342 (Field) 388-5481 cell
PROJECT NAME: Kdmakof Mine site PROJECT/ PWSID/ PERMIT#: 210101
REPORTS TO: Carl Benson E-MAIL: Carlb@briceenvironmental.com
INVOICE TO: Brice Environmental QUOTE #: 335662 P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: 6020 - As, Cr, Ni, Hg	REMARKS/ LOC ID
(11) A	16KRM-25(0.75)	09/14/16	16:45	S	1	G	X	
(12) A	16KRM-26(1.5)	09/14/16	14:45	S	1	G	X	
(13) A	16KRM-27(1.5)	09/14/16	15:30	S	1	G	X	
(14) A	16KRM-28(1)	09/14/16	16:00	S	1	G	X	
(15) A	16KRM-28(10)	09/14/16	16:15	S	1	G	X	

Section 5

	Date	Time	
Relinquished By: (1) Carl Benson	9/15/16	0730	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	9/15/16	16:54	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:
24-Hr TAT STANDARD TAT PER JUSTIN

Temp Blank °C: _____
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT
(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

AIRPORT OF DEPARTURE ANI 09/15/16 07:26 004548 **808 7139624** **Frgt**

SHIPPER'S NAME, ADDRESS & PHONE **CARL BENSON** **ANIAK AK**	SHIPPER'S ACCOUNT NUMBER B2822
NOT AIR WAYBILL (AIR CONSIGNMENT NOTE) Ravn ALASKA 4700 Old International Airport Road Anchorage, Alaska 99502	
CONSIGNEE'S NAME, ADDRESS & PHONE **SGS NORTH AMERCIA** **200 WEST POTER DRIVE** **ANCHOARGE AK 99518 9075622343**	CONSIGNEE'S ACCOUNT NUMBER
It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT AS LISTED IN THE COMPANIES TARIFFS. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS' LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required. Received In Good Condition Place Date TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER AS PER TARIFF RULE UNLESS SHIPPER GIVES OTHER INSTRUCTION HEREON	
ISSUING CARRIER'S AGENT NAME, CITY & PHONE	ALSO NOTIFY NAME & ADDRESS
AGENT'S IATA CODE / ACCOUNT NO.	ACCOUNTING INFORMATION 7146122 Acc#: B2822 Brice Environmental Services Corp Acc#: B2822 Brice Environmental Services Corp Acc#: B2822 Brice
AIRPORT OF DEPARTURE: Aniak / Declared Value: $ 0.00 / Insured Amount: $ 0.00	
BY FIRST AIRPORT OF DESTINATION: Anchorage	COMMENTS

No. Of Pieces Rcp	Gross Weight	kg lb	Rate Class	Commodity Item No.	Chargeable Weight	Rate/Charge	Total	Nature and Quantity of Goods
1	13	l..	M		1	$29.18	$29.18	SMALL RED COOLER
1	13						$29.18	

1165493

PREPAID: $29.18	WEIGHT CHARGE / COLLECT
VALUATION CHARGE: $0.00	
FEDERAL EXCISE TAX: $1.82	
TOTAL OTHER CHARGES DUE AGENT: $0.00	
TOTAL OTHER CHARGES DUE CARRIER: $0.00	
TOTAL PREPAID: $31.00	TOTAL COLLECT

OTHER CHARGES AND DESCRIPTION

AMOUNT	DESCRIPTION

HAZMAT: No

Shipper certifies that the particulars on the face hereof are correct, agrees to the CONDITIONS AS LISTED IN THE COMPANIES TARIFFS, accepts that carrier's liability is limited as stated in the companies tariffs and accepts such value unless a higher value for carriage is declared on the face hereof subject to an additional charge and that insofar as any part of the consignment contains restricted articles, such part is described by name and is in proper condition for carriage by air according to applicable national governmental regulations, and for international shipments, the current International Air Transport Association's Restricted Articles Regulations.

Paid By Shipper

Printed Name and Title

Signature

STATION NUMBERS
ANCHORAGE - (907) 243-2761
ANIAK - (907) 675-4572
BARROW - (907) 852-5300
BETHEL -(907) 543-3825
DEADHORSE - (907) 659-9222
FAIRBANKS - (907) 450-7250
GALENA -(907) 656-1875
KOTZEBUE - (907) 442-3020
NOME - (907) 443-7595
ST. MARYS - (907) 438-2247
UNALAKLEET - (907) 624-3595

Printed at 07:36:31 on 9/15/2016 at ANI-3 10.6.0.9

Consignee Copy

Alert Expeditors Inc. **#368849**

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 9 15 16

From Carl Benson

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job #	PO#	

1 cooler @ 13

1165493

7139624

Shipped Signature

Total Charge

SGS

e-SAMPLE RECEIPT FORM

1165493

Review Criteria	Y/N (yes/no)	Exceptions Noted below
		exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Y	1-F, 1-B
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)	Y	
Temperature blank compliant* (i.e., 0-6 °C after CF)?		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
*If >6°C, were samples collected <8 hours ago?	N	Ambient
If <0°C, were sample containers ice free?		
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Y	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?		
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		
Were all soil VOAs field extracted with MeOH+BFB?		
Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.		

Additional notes (if applicable):

WO is standard TAT per JAN.

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1165493001-A	No Preservative Required	OK			
1165493002-A	No Preservative Required	OK			
1165493003-A	No Preservative Required	OK			
1165493004-A	No Preservative Required	OK			
1165493005-A	No Preservative Required	OK			
1165493006-A	No Preservative Required	OK			
1165493007-A	No Preservative Required	OK			
1165493008-A	No Preservative Required	OK			
1165493009-A	No Preservative Required	OK			
1165493010-A	No Preservative Required	OK			
1165493011-A	No Preservative Required	OK			
1165493012-A	No Preservative Required	OK			
1165493013-A	No Preservative Required	OK			
1165493014-A	No Preservative Required	OK			
1165493015-A	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Brice Environmental Srv Co.
301 Cushman St., Suite 200
Fairbanks, AK 99701
(907)459-3052

Report Number: **1168620**

Client Project: **210101 Kolmakof Mine Character**

Dear Carl Benson,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

_____

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: **Brice Environmental Srv Co.**
SGS Project: **1168620**
Project Name/Site: **210101 Kolmakof Mine Character**
Project Contact: **Carl Benson**

Refer to sample receipt form for information on sample condition.

1168620001(1355482MS) (1355487) MS

6020A - Metals MS recoveries for chromium (129%) and mercury (2080%) do not meet QC criteria. The post digestion spike was successful.

1165696011(1355465MSD) (1355467) MSD

6020A - Metals MSD recoveries for and chromium (124%) does not meet QC criteria. The post digestion spike was successful.

1168620001(1355482MSD) (1355488) MSD

6020A - Metals MSD recovery for mercury (72.8%) does not meet QC criteria. The post digestion spike was successful.
6020A - Metals MS/MSD RPD for mercury (158) does not meet QC criteria. Refer to sample duplicate for RPD requirements.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
16KRM-M1(0.75)	1168620001	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M1(2)	1168620002	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M2(1)	1168620003	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M2(2.5)	1168620004	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M3(1)	1168620005	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M3(4)	1168620006	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M4(1)	1168620007	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M4(2)	1168620008	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M5(2)	1168620009	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M5(10)	1168620010	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M5(4)	1168620011	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M6(1)	1168620012	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M6(3)	1168620013	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M7(0.5)	1168620014	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M7(2)	1168620015	09/15/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M8(0.75)	1168620016	09/16/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M8(1.5)	1168620017	09/16/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M9(0.5)	1168620018	09/16/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M9(1.5)	1168620019	09/16/2016	09/23/2016	Soil/Solid (dry weight)
16KRM-M9(10)	1168620020	09/16/2016	09/23/2016	Soil/Solid (dry weight)
TCLP Mound North	1168620021	09/19/2016	09/23/2016	Solid/Soil (Wet Weight)
TCLP Mound South	1168620022	09/19/2016	09/23/2016	Solid/Soil (Wet Weight)
TCLP Comp North	1168620023	09/19/2016	09/23/2016	Solid/Soil (Wet Weight)
TCLP Comp South	1168620024	09/19/2016	09/23/2016	Solid/Soil (Wet Weight)

Method	Method Description
SW6020A TCLP	Metals by ICP-MS
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **16KRM-M1(0.75)**
Lab Sample ID: 1168620001
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.32	mg/Kg
Chromium	28.4	mg/Kg
Mercury	1.34	mg/Kg
Nickel	23.3	mg/Kg

Client Sample ID: **16KRM-M1(2)**
Lab Sample ID: 1168620002
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.34	mg/Kg
Chromium	30.5	mg/Kg
Mercury	0.832	mg/Kg
Nickel	31.9	mg/Kg

Client Sample ID: **16KRM-M2(1)**
Lab Sample ID: 1168620003
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.82	mg/Kg
Chromium	26.7	mg/Kg
Mercury	11.5	mg/Kg
Nickel	30.0	mg/Kg

Client Sample ID: **16KRM-M2(2.5)**
Lab Sample ID: 1168620004
Metals by ICP/MS

Parameter	Result	Units
Arsenic	7.77	mg/Kg
Chromium	28.1	mg/Kg
Mercury	28.1	mg/Kg
Nickel	18.4	mg/Kg

Client Sample ID: **16KRM-M3(1)**
Lab Sample ID: 1168620005
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.76	mg/Kg
Chromium	31.1	mg/Kg
Mercury	1.28	mg/Kg
Nickel	31.5	mg/Kg

Client Sample ID: **16KRM-M3(4)**
Lab Sample ID: 1168620006
Metals by ICP/MS

Parameter	Result	Units
Arsenic	11.9	mg/Kg
Chromium	29.7	mg/Kg
Mercury	0.492	mg/Kg
Nickel	32.1	mg/Kg

Client Sample ID: **16KRM-M4(1)**
Lab Sample ID: 1168620007
Metals by ICP/MS

Parameter	Result	Units
Arsenic	7.25	mg/Kg
Chromium	27.5	mg/Kg
Mercury	10.6	mg/Kg
Nickel	25.0	mg/Kg

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Detectable Results Summary

Client Sample ID: **16KRM-M4(2)**
Lab Sample ID: 1168620008
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.9	mg/Kg
Chromium	29.5	mg/Kg
Mercury	0.473	mg/Kg
Nickel	31.2	mg/Kg

Client Sample ID: **16KRM-M5(2)**
Lab Sample ID: 1168620009
Metals by ICP/MS

Parameter	Result	Units
Arsenic	11.7	mg/Kg
Chromium	30.9	mg/Kg
Mercury	0.724	mg/Kg
Nickel	35.9	mg/Kg

Client Sample ID: **16KRM-M5(10)**
Lab Sample ID: 1168620010
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.2	mg/Kg
Chromium	30.6	mg/Kg
Mercury	1.35	mg/Kg
Nickel	32.0	mg/Kg

Client Sample ID: **16KRM-M5(4)**
Lab Sample ID: 1168620011
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.75	mg/Kg
Chromium	30.2	mg/Kg
Mercury	16.6	mg/Kg
Nickel	33.4	mg/Kg

Client Sample ID: **16KRM-M6(1)**
Lab Sample ID: 1168620012
Metals by ICP/MS

Parameter	Result	Units
Arsenic	12.3	mg/Kg
Chromium	34.2	mg/Kg
Mercury	0.179	mg/Kg
Nickel	35.9	mg/Kg

Client Sample ID: **16KRM-M6(3)**
Lab Sample ID: 1168620013
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.5	mg/Kg
Chromium	33.3	mg/Kg
Mercury	0.236	mg/Kg
Nickel	30.9	mg/Kg

Client Sample ID: **16KRM-M7(0.5)**
Lab Sample ID: 1168620014
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.5	mg/Kg
Chromium	30.5	mg/Kg
Mercury	17.9	mg/Kg
Nickel	32.9	mg/Kg

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Detectable Results Summary

Client Sample ID: **16KRM-M7(2)**
Lab Sample ID: 1168620015
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.36	mg/Kg
Chromium	31.4	mg/Kg
Mercury	0.317	mg/Kg
Nickel	22.9	mg/Kg

Client Sample ID: **16KRM-M8(0.75)**
Lab Sample ID: 1168620016
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.06	mg/Kg
Chromium	30.6	mg/Kg
Mercury	4.91	mg/Kg
Nickel	36.7	mg/Kg

Client Sample ID: **16KRM-M8(1.5)**
Lab Sample ID: 1168620017
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.30	mg/Kg
Chromium	31.6	mg/Kg
Mercury	0.394	mg/Kg
Nickel	24.1	mg/Kg

Client Sample ID: **16KRM-M9(0.5)**
Lab Sample ID: 1168620018
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.9	mg/Kg
Chromium	30.9	mg/Kg
Mercury	9.34	mg/Kg
Nickel	37.9	mg/Kg

Client Sample ID: **16KRM-M9(1.5)**
Lab Sample ID: 1168620019
Metals by ICP/MS

Parameter	Result	Units
Arsenic	7.70	mg/Kg
Chromium	29.9	mg/Kg
Mercury	0.258	mg/Kg
Nickel	21.2	mg/Kg

Client Sample ID: **16KRM-M9(10)**
Lab Sample ID: 1168620020
Metals by ICP/MS

Parameter	Result	Units
Arsenic	7.89	mg/Kg
Chromium	28.6	mg/Kg
Mercury	0.135	mg/Kg
Nickel	20.0	mg/Kg

Client Sample ID: **TCLP Mound North**
Lab Sample ID: 1168620021
TCLP Constituents Metals

Parameter	Result	Units
Chromium	0.0930J	mg/L

Client Sample ID: **TCLP Mound South**
Lab Sample ID: 1168620022
TCLP Constituents Metals

Parameter	Result	Units
Chromium	0.0922J	mg/L

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Detectable Results Summary

Client Sample ID: **TCLP Comp North**
Lab Sample ID: 1168620023
TCLP Constituents Metals

Parameter	Result	Units
Chromium	0.0989J	mg/L
Nickel	0.0328J	mg/L

Client Sample ID: **TCLP Comp South**
Lab Sample ID: 1168620024
TCLP Constituents Metals

Parameter	Result	Units
Chromium	0.129J	mg/L

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Results of **16KRM-M1(0.75)**

Client Sample ID: **16KRM-M1(0.75)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620001
Lab Project ID: 1168620

Collection Date: 09/15/16 10:50
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):71.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.32		1.30	0.403	mg/Kg	10		10/06/16 12:52
Chromium	28.4		0.520	0.169	mg/Kg	10		10/06/16 12:52
Mercury	1.34		0.0520	0.0156	mg/Kg	10		10/06/16 12:52
Nickel	23.3		0.260	0.0806	mg/Kg	10		10/06/16 12:52

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 12:52
Container ID: 1168620001-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.071 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M1(2)**

Client Sample ID: **16KRM-M1(2)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620002
Lab Project ID: 1168620

Collection Date: 09/15/16 10:55
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.34		1.14	0.354	mg/Kg	10		10/06/16 13:57
Chromium	30.5		0.456	0.148	mg/Kg	10		10/06/16 13:57
Mercury	0.832		0.0456	0.0137	mg/Kg	10		10/06/16 13:57
Nickel	31.9		0.228	0.0707	mg/Kg	10		10/06/16 13:57

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 13:57
Container ID: 1168620002-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.062 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M2(1)**

Client Sample ID: **16KRM-M2(1)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620003
Lab Project ID: 1168620

Collection Date: 09/15/16 11:40
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):76.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.82		1.11	0.345	mg/Kg	10		10/06/16 14:02
Chromium	26.7		0.446	0.145	mg/Kg	10		10/06/16 14:02
Mercury	11.5		0.111	0.0334	mg/Kg	25		10/07/16 11:04
Nickel	30.0		0.223	0.0691	mg/Kg	10		10/06/16 14:02

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 14:02
Container ID: 1168620003-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.172 g
Prep Extract Vol: 50 mL

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 11:04
Container ID: 1168620003-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.172 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M2(2.5)**

Client Sample ID: **16KRM-M2(2.5)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620004
Lab Project ID: 1168620

Collection Date: 09/15/16 11:45
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):66.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.77		1.28	0.397	mg/Kg	10		10/06/16 14:06
Chromium	28.1		0.513	0.167	mg/Kg	10		10/06/16 14:06
Mercury	28.1		0.256	0.0769	mg/Kg	50		10/07/16 11:35
Nickel	18.4		0.256	0.0795	mg/Kg	10		10/06/16 14:06

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 14:06
Container ID: 1168620004-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.172 g
Prep Extract Vol: 50 mL

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 11:35
Container ID: 1168620004-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.172 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M3(1)**

Client Sample ID: **16KRM-M3(1)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620005
Lab Project ID: 1168620

Collection Date: 09/15/16 13:10
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):76.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.76		1.28	0.397	mg/Kg	10		10/06/16 14:11
Chromium	31.1		0.512	0.166	mg/Kg	10		10/06/16 14:11
Mercury	1.28		0.0512	0.0154	mg/Kg	10		10/06/16 14:11
Nickel	31.5		0.256	0.0794	mg/Kg	10		10/06/16 14:11

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 14:11
Container ID: 1168620005-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.016 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M3(4)**

Client Sample ID: **16KRM-M3(4)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620006
Lab Project ID: 1168620

Collection Date: 09/15/16 13:15
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):81.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	11.9		1.17	0.364	mg/Kg	10		10/06/16 14:15
Chromium	29.7		0.470	0.153	mg/Kg	10		10/06/16 14:15
Mercury	0.492		0.0470	0.0141	mg/Kg	10		10/06/16 14:15
Nickel	32.1		0.235	0.0728	mg/Kg	10		10/06/16 14:15

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/06/16 14:15
Container ID: 1168620006-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.042 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M4(1)**

Client Sample ID: **16KRM-M4(1)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620007
Lab Project ID: 1168620

Collection Date: 09/15/16 14:00
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):71.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.25		1.30	0.404	mg/Kg	10		10/07/16 09:57
Chromium	27.5		0.521	0.169	mg/Kg	10		10/07/16 09:57
Mercury	10.6		0.130	0.0391	mg/Kg	25		10/07/16 11:13
Nickel	25.0		0.261	0.0808	mg/Kg	10		10/07/16 09:57

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 09:57
Container ID: 1168620007-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.069 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M4(2)**

Client Sample ID: **16KRM-M4(2)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620008
Lab Project ID: 1168620

Collection Date: 09/15/16 14:05
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):75.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.9		1.18	0.366	mg/Kg	10		10/07/16 10:01
Chromium	29.5		0.473	0.154	mg/Kg	10		10/07/16 10:01
Mercury	0.473		0.0473	0.0142	mg/Kg	10		10/07/16 10:01
Nickel	31.2		0.236	0.0733	mg/Kg	10		10/07/16 10:01

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:01
Container ID: 1168620008-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.117 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M5(2)**

Client Sample ID: **16KRM-M5(2)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620009
Lab Project ID: 1168620

Collection Date: 09/15/16 15:30
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):76.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	11.7		1.21	0.374	mg/Kg	10		10/07/16 10:06
Chromium	30.9		0.483	0.157	mg/Kg	10		10/07/16 10:06
Mercury	0.724		0.0483	0.0145	mg/Kg	10		10/07/16 10:06
Nickel	35.9		0.241	0.0748	mg/Kg	10		10/07/16 10:06

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:06
Container ID: 1168620009-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.091 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M5(10)**

Client Sample ID: **16KRM-M5(10)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620010
Lab Project ID: 1168620

Collection Date: 09/15/16 15:35
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):76.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.2		1.20	0.371	mg/Kg	10		10/07/16 10:10
Chromium	30.6		0.478	0.156	mg/Kg	10		10/07/16 10:10
Mercury	1.35		0.0478	0.0144	mg/Kg	10		10/07/16 10:10
Nickel	32.0		0.239	0.0742	mg/Kg	10		10/07/16 10:10

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:10
Container ID: 1168620010-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.096 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M5(4)**

Client Sample ID: **16KRM-M5(4)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620011
Lab Project ID: 1168620

Collection Date: 09/15/16 15:40
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):79.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.75		1.06	0.329	mg/Kg	10		10/07/16 10:14
Chromium	30.2		0.424	0.138	mg/Kg	10		10/07/16 10:14
Mercury	16.6		0.212	0.0636	mg/Kg	50		10/07/16 11:55
Nickel	33.4		0.212	0.0658	mg/Kg	10		10/07/16 10:14

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:14
Container ID: 1168620011-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.186 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M6(1)**

Client Sample ID: **16KRM-M6(1)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620012
Lab Project ID: 1168620

Collection Date: 09/15/16 16:20
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	12.3		1.10	0.341	mg/Kg	10		10/07/16 10:19
Chromium	34.2		0.440	0.143	mg/Kg	10		10/07/16 10:19
Mercury	0.179		0.0440	0.0132	mg/Kg	10		10/07/16 10:19
Nickel	35.9		0.220	0.0682	mg/Kg	10		10/07/16 10:19

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:19
Container ID: 1168620012-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.124 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M6(3)**

Client Sample ID: **16KRM-M6(3)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620013
Lab Project ID: 1168620

Collection Date: 09/15/16 16:25
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):79.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.5		1.19	0.368	mg/Kg	10		10/07/16 10:23
Chromium	33.3		0.474	0.154	mg/Kg	10		10/07/16 10:23
Mercury	0.236		0.0474	0.0142	mg/Kg	10		10/07/16 10:23
Nickel	30.9		0.237	0.0735	mg/Kg	10		10/07/16 10:23

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:23
Container ID: 1168620013-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.059 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M7(0.5)**

Client Sample ID: **16KRM-M7(0.5)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620014
Lab Project ID: 1168620

Collection Date: 09/15/16 16:50
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):77.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.5		1.09	0.338	mg/Kg	10		10/07/16 10:28
Chromium	30.5		0.436	0.142	mg/Kg	10		10/07/16 10:28
Mercury	17.9		0.218	0.0654	mg/Kg	50		10/07/16 11:59
Nickel	32.9		0.218	0.0676	mg/Kg	10		10/07/16 10:28

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:28
Container ID: 1168620014-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.178 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M7(2)**

Client Sample ID: **16KRM-M7(2)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620015
Lab Project ID: 1168620

Collection Date: 09/15/16 16:55
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):70.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.36		1.37	0.426	mg/Kg	10		10/07/16 10:32
Chromium	31.4		0.550	0.179	mg/Kg	10		10/07/16 10:32
Mercury	0.317		0.0550	0.0165	mg/Kg	10		10/07/16 10:32
Nickel	22.9		0.275	0.0852	mg/Kg	10		10/07/16 10:32

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:32
Container ID: 1168620015-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.032 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M8(0.75)**

Client Sample ID: **16KRM-M8(0.75)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620016
Lab Project ID: 1168620

Collection Date: 09/16/16 10:45
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):77.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.06		1.17	0.363	mg/Kg	10		10/07/16 10:37
Chromium	30.6		0.468	0.152	mg/Kg	10		10/07/16 10:37
Mercury	4.91		0.0468	0.0140	mg/Kg	10		10/07/16 10:37
Nickel	36.7		0.234	0.0726	mg/Kg	10		10/07/16 10:37

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:37
Container ID: 1168620016-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.097 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M8(1.5)**

Client Sample ID: **16KRM-M8(1.5)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620017
Lab Project ID: 1168620

Collection Date: 09/16/16 10:50
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):64.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.30		1.27	0.394	mg/Kg	10		10/07/16 10:50
Chromium	31.6		0.509	0.165	mg/Kg	10		10/07/16 10:50
Mercury	0.394		0.0509	0.0153	mg/Kg	10		10/07/16 10:50
Nickel	24.1		0.254	0.0789	mg/Kg	10		10/07/16 10:50

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:50
Container ID: 1168620017-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.223 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M9(0.5)**

Client Sample ID: **16KRM-M9(0.5)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620018
Lab Project ID: 1168620

Collection Date: 09/16/16 11:15
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):85.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.9		1.03	0.319	mg/Kg	10		10/07/16 10:55
Chromium	30.9		0.412	0.134	mg/Kg	10		10/07/16 10:55
Mercury	9.34		0.103	0.0309	mg/Kg	25		10/07/16 11:26
Nickel	37.9		0.206	0.0639	mg/Kg	10		10/07/16 10:55

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:55
Container ID: 1168620018-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.13 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M9(1.5)**

Client Sample ID: **16KRM-M9(1.5)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620019
Lab Project ID: 1168620

Collection Date: 09/16/16 11:20
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):69.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.70		1.34	0.415	mg/Kg	10		10/07/16 10:59
Chromium	29.9		0.536	0.174	mg/Kg	10		10/07/16 10:59
Mercury	0.258		0.0536	0.0161	mg/Kg	10		10/07/16 10:59
Nickel	21.2		0.268	0.0830	mg/Kg	10		10/07/16 10:59

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/07/16 10:59
Container ID: 1168620019-A

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/03/16 08:41
Prep Initial Wt./Vol.: 1.075 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **16KRM-M9(10)**

Client Sample ID: **16KRM-M9(10)**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620020
Lab Project ID: 1168620

Collection Date: 09/16/16 11:25
Received Date: 09/23/16 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):69.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.89		1.37	0.425	mg/Kg	10		10/10/16 13:43
Chromium	28.6		0.549	0.178	mg/Kg	10		10/10/16 13:43
Mercury	0.135		0.0549	0.0165	mg/Kg	10		10/10/16 13:43
Nickel	20.0		0.275	0.0851	mg/Kg	10		10/10/16 13:43

Batch Information

Analytical Batch: MMS9571
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/10/16 13:43
Container ID: 1168620020-A

Prep Batch: MXX30235
Prep Method: SW3050B
Prep Date/Time: 09/30/16 09:50
Prep Initial Wt./Vol.: 1.049 g
Prep Extract Vol: 50 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **TCLP Mound North**

Client Sample ID: **TCLP Mound North**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620021
Lab Project ID: 1168620

Collection Date: 09/19/16 14:45
Received Date: 09/23/16 09:15
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	0.125	U	0.250	0.0750	mg/L	25	(<5)	10/13/16 11:28
Chromium	0.0930	J	0.200	0.0650	mg/L	25	(<5)	10/13/16 11:28
Mercury	0.00500	U	0.0100	0.00310	mg/L	25	(<0.2)	10/13/16 11:28
Nickel	0.0500	U	0.100	0.0310	mg/L	25		10/13/16 11:28

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Analyst: VDL
Analytical Date/Time: 10/13/16 11:28
Container ID: 1168620021-A

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/16 12:02
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **TCLP Mound South**

Client Sample ID: **TCLP Mound South**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620022
Lab Project ID: 1168620

Collection Date: 09/19/16 14:40
Received Date: 09/23/16 09:15
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	0.125	U	0.250	0.0750	mg/L	25	(<5)	10/13/16 11:33
Chromium	0.0922	J	0.200	0.0650	mg/L	25	(<5)	10/13/16 11:33
Mercury	0.00500	U	0.0100	0.00310	mg/L	25	(<0.2)	10/13/16 11:33
Nickel	0.0500	U	0.100	0.0310	mg/L	25		10/13/16 11:33

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Analyst: VDL
Analytical Date/Time: 10/13/16 11:33
Container ID: 1168620022-A

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/16 12:02
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **TCLP Comp North**

Client Sample ID: **TCLP Comp North**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620023
Lab Project ID: 1168620

Collection Date: 09/19/16 14:35
Received Date: 09/23/16 09:15
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	0.125	U	0.250	0.0750	mg/L	25	(<5)	10/13/16 11:37
Chromium	0.0989	J	0.200	0.0650	mg/L	25	(<5)	10/13/16 11:37
Mercury	0.00500	U	0.0100	0.00310	mg/L	25	(<0.2)	10/13/16 11:37
Nickel	0.0328	J	0.100	0.0310	mg/L	25		10/13/16 11:37

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Analyst: VDL
Analytical Date/Time: 10/13/16 11:37
Container ID: 1168620023-A

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/16 12:02
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Results of **TCLP Comp South**

Client Sample ID: **TCLP Comp South**
Client Project ID: **210101 Kolmakof Mine Character**
Lab Sample ID: 1168620024
Lab Project ID: 1168620

Collection Date: 09/19/16 14:30
Received Date: 09/23/16 09:15
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	0.125	U	0.250	0.0750	mg/L	25	(<5)	10/13/16 11:57
Chromium	0.129	J	0.200	0.0650	mg/L	25	(<5)	10/13/16 11:57
Mercury	0.00500	U	0.0100	0.00310	mg/L	25	(<0.2)	10/13/16 11:57
Nickel	0.0500	U	0.100	0.0310	mg/L	25		10/13/16 11:57

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Analyst: VDL
Analytical Date/Time: 10/13/16 11:57
Container ID: 1168620024-A

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/16 12:02
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 10/20/2016 4:42:08PM

J flagging is activated

Method Blank

Blank ID: LB1 for HBN 1745097 [TCLP/8562
Blank Lab ID: 1357653

Matrix: Solid/Soil (Wet Weight)

QC for Samples:
1168620021, 1168620022, 1168620023, 1168620024

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.0500U	0.100	0.0300	mg/L
Chromium	0.0632J	0.0800	0.0260	mg/L
Mercury	0.00200U	0.00400	0.00124	mg/L
Nickel	0.0200U	0.0400	0.0124	mg/L

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/13/2016 10:06:42AM

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/2016 12:02:00PM
Prep Initial Wt./Vol.: 6.25 mL
Prep Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1745350 [MXT/5446]
Blank Lab ID: 1357932

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1168620021, 1168620022, 1168620023, 1168620024

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.0125U	0.0250	0.00750	mg/L
Chromium	0.00832J	0.0200	0.00650	mg/L
Mercury	0.000500U	0.00100	0.000310	mg/L
Nickel	0.00500U	0.0100	0.00310	mg/L

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/13/2016 9:57:44AM

Prep Batch: MXT5446
Prep Method: SW3010A
Prep Date/Time: 10/12/2016 12:02:00PM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168620 [MXT5446]
Blank Spike Lab ID: 1357933
Date Analyzed: 10/13/2016 10:02

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168620021, 1168620022, 1168620023, 1168620024

Results by **SW6020A TCLP**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	1	1.01	101	(84-116)
Chromium	0.4	0.407	102	(85-116)
Mercury	0.01	0.00990	99	(70-124)
Nickel	1	1.05	105	(85-117)

Batch Information

Analytical Batch: **MMS9578**
Analytical Method: **SW6020A TCLP**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXT5446**
Prep Method: **SW3010A**
Prep Date/Time: **10/12/2016 12:02**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1357934
MS Sample ID: 1357936 MS
MSD Sample ID: 1357937 MSD

Analysis Date: 10/13/2016 10:11
Analysis Date: 10/13/2016 10:15
Analysis Date: 10/13/2016 10:20
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1168620021, 1168620022, 1168620023, 1168620024

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	0.125U	10.0	10.1	101	10.0	10.1	101	84-116	0.53	(< 20)
Chromium	0.104J	4.00	4.31	105	4.00	4.28	104	85-116	0.68	(< 20)
Mercury	0.00500U	0.100	.106	106	0.100	0.104	104	70-124	2.25	(< 20)
Nickel	0.0580J	10.0	10.6	105	10.0	10.7	107	85-117	1.30	(< 20)

Batch Information

Analytical Batch: MMS9578
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/13/2016 10:15:42AM

Prep Batch: MXT5446
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 10/12/2016 12:02:00PM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 20.00mL

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Method Blank

Blank ID: MB for HBN 1744272 [MXX/30235]
Blank Lab ID: 1355463

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168620020

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Chromium	0.200U	0.400	0.130	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Nickel	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/7/2016 2:35:25PM

Prep Batch: MXX30235
Prep Method: SW3050B
Prep Date/Time: 9/30/2016 9:50:19AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168620 [MXX30235]
Blank Spike Lab ID: 1355464
Date Analyzed: 10/07/2016 12:14

Matrix: Soil/Solid (dry weight)

QC for Samples: 1168620020

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	50	50.7	101	(82-118)
Chromium	20	21.6	108	(83-119)
Mercury	0.5	0.561	112	(74-126)
Nickel	50	52.3	105	(84-119)

Batch Information

Analytical Batch: **MMS9567**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXX30235**
Prep Method: **SW3050B**
Prep Date/Time: **09/30/2016 09:50**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

Print Date: 10/20/2016 4:43:50PM

Matrix Spike Summary

Original Sample ID: 1355465
MS Sample ID: 1355466 MS
MSD Sample ID: 1355467 MSD

QC for Samples: 1168620020

Analysis Date: 10/07/2016 12:19
Analysis Date: 10/07/2016 12:23
Analysis Date: 10/07/2016 12:28
Matrix: Solid/Soil (Wet Weight)

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	8.55	49.6	57.6	99	49.7	56.9	97	82-118	1.20	(< 20)
Chromium	19.0	19.8	41.1	111	19.9	43.7	124 *	83-119	6.19	(< 20)
Mercury	0.0730	0.496	.534	93	0.497	0.565	99	74-126	5.71	(< 20)
Nickel	21.7	49.6	69.5	96	49.7	72.9	103	84-119	4.87	(< 20)

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/7/2016 12:23:38PM

Prep Batch: MXX30235
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 9/30/2016 9:50:19AM
Prep Initial Wt./Vol.: 1.01g
Prep Extract Vol: 50.00mL

Print Date: 10/20/2016 4:43:51PM

Bench Spike Summary

Original Sample ID: 1355465
MS Sample ID: 1355468 BND
MSD Sample ID:

Analysis Date: 10/07/2016 12:19
Analysis Date: 10/07/2016 12:32
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1168620020

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chromium	19.0	120	150	109				80-120		

Batch Information

Analytical Batch: MMS9567
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/7/2016 12:32:38PM

Prep Batch: MXX30235
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 9/30/2016 9:50:19AM
Prep Initial Wt./Vol.: 1.04g
Prep Extract Vol: 50.00mL

Print Date: 10/20/2016 4:43:51PM

Method Blank

Blank ID: MB for HBN 1744275 [MXX/30236]
Blank Lab ID: 1355480

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016, 1168620017, 1168620018, 1168620019

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Chromium	0.246J	0.400	0.130	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Nickel	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/6/2016 1:32:24PM

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/3/2016 8:41:35AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Duplicate Sample Summary

Original Sample ID: 1355482
Duplicate Sample ID: 1355490

Analysis Date: 10/06/2016 14:39
Matrix: Solid/Soil (Wet Weight)

QC for Samples:

1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016,

Results by **SW6020A**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Mercury	0.951	0.797	mg/Kg	17.60	(< 20)

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Instrument: Perkin Elmer NexIon P5
Analyst: VDL

Prep Batch: MXX30236
Prep Method: SW3050B
Prep Date/Time: 10/3/2016 8:41:35AM

Print Date: 10/20/2016 4:43:54PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168620 [MXX30236]
Blank Spike Lab ID: 1355481
Date Analyzed: 10/06/2016 12:48

Matrix: Soil/Solid (dry weight)

QC for Samples: 1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016, 1168620017, 1168620018, 1168620019

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	50	46.9	94	(82-118)
Chromium	20	21.0	105	(83-119)
Mercury	0.5	0.517	103	(74-126)
Nickel	50	52.5	105	(84-119)

Batch Information

Analytical Batch: **MMS9565**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXX30236**
Prep Method: **SW3050B**
Prep Date/Time: **10/03/2016 08:41**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1355482
MS Sample ID: 1355487 MS
MSD Sample ID: 1355488 MSD

Analysis Date: 10/06/2016 12:52
Analysis Date: 10/06/2016 12:57
Analysis Date: 10/06/2016 13:01
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016, 1168620017, 1168620018, 1168620019

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	6.69	48.1	51.8	94	47.3	51.7	95	82-118	0.34	(< 20)
Chromium	20.4	19.2	45.2	129 *	18.9	41.9	114	83-119	7.54	(< 20)
Mercury	0.951	0.481	10.9	2080 *	0.473	1.29	73 *	74-126	158.00 *	(< 20)
Nickel	16.7	48.1	63.8	98	47.3	62.3	96	84-119	2.38	(< 20)

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/6/2016 12:57:02PM

Prep Batch: MXX30236
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 10/3/2016 8:41:35AM
Prep Initial Wt./Vol.: 1.04g
Prep Extract Vol: 50.00mL

Print Date: 10/20/2016 4:43:57PM

Bench Spike Summary

Original Sample ID: 1355482
MS Sample ID: 1355489 BND
MSD Sample ID:

Analysis Date: 10/06/2016 12:52
Analysis Date: 10/06/2016 13:05
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016, 1168620017, 1168620018, 1168620019

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chromium	20.4	117	135	98				80-120		
Mercury	0.951	11.7	12.1	96				80-120		

Batch Information

Analytical Batch: MMS9565
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/6/2016 1:05:59PM

Prep Batch: MXX30236
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 10/3/2016 8:41:35AM
Prep Initial Wt./Vol.: 1.07g
Prep Extract Vol: 50.00mL

Print Date: 10/20/2016 4:43:57PM

Method Blank

Blank ID: MB for HBN 1744170 [SPT/10008]
Blank Lab ID: 1355003

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016, 1168620017, 1168620018, 1168620019, 1168620020

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10008
Analytical Method: SM21 2540G
Instrument:
Analyst: IAS
Analytical Date/Time: 9/27/2016 5:46:00PM

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Duplicate Sample Summary

Original Sample ID: 1168609031
Duplicate Sample ID: 1355006
QC for Samples:

Analysis Date: 09/27/2016 17:46
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	74.5	75.0	%	0.72	(< 15)

Batch Information

Analytical Batch: SPT10008
Analytical Method: SM21 2540G
Instrument:
Analyst: IAS

Print Date: 10/20/2016 4:44:00PM

Duplicate Sample Summary

Original Sample ID: 1168617002
Duplicate Sample ID: 1355007

Analysis Date: 09/27/2016 17:46
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168620001, 1168620002, 1168620003, 1168620004, 1168620005, 1168620006, 1168620007, 1168620008, 1168620009, 1168620010, 1168620011, 1168620012, 1168620013, 1168620014, 1168620015, 1168620016,

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	87.4	88.2	%	0.97	(< 15)

Batch Information

Analytical Batch: SPT10008
Analytical Method: SM21 2540G
Instrument:
Analyst: IAS

Print Date: 10/20/2016 4:44:00PM

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Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 388-5481

PROJECT NAME: Kolmalof Mine Characterization PROJECT/ PWSID/ PERMIT#: 210101

REPORTS TO: E-MAIL: Carl Benson Carlbenson@briceenvironmental.com

INVOICE TO: Brice Environmental QUOTE #: P.O. #: 335662

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: SW6020-Mg, As, Cr, U								REMARKS/ LOC ID
1 A	16KRM-M1(0.75)	9/15/16	1050	S	1	G		X							
2 A	16KRM-M1(2)	9/15/16	1055	S	1	G		X							
3 A	16KRM-M2(1)	9/15/16	1140	S	1	G		X							
4 A	16KRM-M2(2.5)	9/15/16	1145	S	1	G		X							
5 A	16KRM-M3(1)	9/15/16	1310	S	1	G		X							
6 A	16KRM-M3(4)	9/15/16	1315	S	1	G		X							
7 A	16KRM-M4(1)	9/15/16	1400	S	1	G		X							
8 A	16KRM-M4(2)	9/15/16	1405	S	1	G		X							
9 A	16KRM-M5(2)	9/15/16	1530	S	1	G		X							
10 A	16KRM-M5(10)	9/15/16	1535	S	1	G		X							

Section 5

	Date	Time	
Relinquished By: (1) Carl Benson	9/22/16	1000	Received By:
Relinquished By: (2)	9/22/16	1200	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	9/23/16	9:15	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: Level II EDD

Requested Turnaround Time and/or Special Instructions: Standard

Temp Blank °C: 0

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

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Locations Nationwide
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North Carolina Indiana
West Virgina Kentucky
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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 388-5481

PROJECT NAME: Kolmeks of Minc Characterization PROJECT/ PWSID/ PERMIT#: 210101

REPORTS TO: Carl Benson E-MAIL: Carl@bricenvironmental.com

INVOICE TO: Brice Environmental QUOTE #:

P.O. #: 335662

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: SW6020 - Hg, As, Cr, Ni	REMARKS/ LOC ID
(11) A	16kRM - M5(4)	9/15/16	1540	S	1	G	X	
(12) A	16kRM - M6(1)	9/15/16	1620	S	1	G	X	
(13) A	16kRM - M6(3)	9/15/16	1625	S	1	G	X	
(14) A	16kRM - M7(0.5)	9/15/16	1650	S	1	G	X	
(15) A	16kRM - M7(2)	9/15/16	1655	S	1	G	X	
(16) A	16kRM - M8(0.75)	9/16/16	1045	S	1	G	X	
(17) A	16kRM - M8(1.5)	9/16/16	1050	S	1	G	X	
(18) A	16kRM - M9(0.5)	9/16/16	1115	S	1	G	X	
(19) A	16kRM - M9(1.5)	9/16/16	1120	S	1	G	X	
(20) A	16kRM - M9(10)	9/16/16	1125	S	1	G	X	

Section 5

	Date	Time	
Relinquished By: (1)	9/22/16	1000	Received By:
Relinquished By: (2)	9/22/16	1200	Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	9/23/16	9:15	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: Level II EDD

Requested Turnaround Time and/or Special Instructions: Standard

Temp Blank °C:

or Ambient (N)

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

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Locations Nationwide
Alaska Maryland
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North Carolina Indiana
West Virgina Kentucky
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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 388-5481

PROJECT NAME: Colmelot Mine Characterization PROJECT/PWSID/PERMIT#: 21010 1

REPORTS TO: Carl Benson E-MAIL: Carlb@briceenvironmental.com

INVOICE TO: Brice Environmental QUOTE #: 335662 P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: TCLP Metals - Hg, As, Cr, Ni	REMARKS/ LOC ID
(21) A	TCLP Mound North	9/19/16	1445	S	1	Comp	X	
(22) A	TCLP Mound South	9/19/16	1440	S	1	Comp	X	
(23) A	TCLP Comp North	9/19/16	1435	S	1	Comp	X	
(24) A	TCLP Comp South	9/19/16	1430	S	1	Comp	X	

Section 5

	Date	Time	
Relinquished By: (1)	9/22/16	1000	Received By:
Relinquished By: (2)	9/22/16	1200	Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	9/23/16	9:15	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Data Deliverable Requirements: Level II EDD

Cooler ID:

Requested Turnaround Time and/or Special Instructions: Standard

Temp Blank °C: _____ or Ambient (N)

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

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200 W. Potter Drive, Anchorage, AK 99518
phone (907) 562-2343, fax (907) 561-5301

Characterization of TCLP Samples for LIMS Login

Date Characterized: 9/23/16 **Analyst:** NCW

Sample Container ID:	Matrix	%	Is sufficient volume/mass available?	Notes:
(21) A (22) A (23) A (24) A	Xylene miscible (Top layer * = matrix 3 **)		(Yes) / No	If multiple jars were received, were they consistent? Yes / No / (NA) If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / (NA) Sample description/other observations: Soil
	Water miscible (Middle layer = matrix 6)			
	(Solid) (Bottom layer = matrix 7 or 2 if % solids required)	100%		
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA Sample description/other observations:
	Water miscible (Middle layer = matrix 6)			
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA Sample description/other observations:
	Water miscible (Middle layer = matrix 6)			
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA Sample description/other observations:
	Water miscible (Middle layer = matrix 6)			
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA Sample description/other observations:
	Water miscible (Middle layer = matrix 6)			
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			

Remember: ** = Chlorinated oils will be heavier than water and present as the bottom later.*
*** = Oils must be filterable to be logged in as matrix 3. Nonfilterable oils must be logged in as matrix 7.*
**** = Refer to F078 'Characterization of TCLP Samples for LIMS' to determine if there's sufficent volume/mass.*

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1168620

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No ~~N/A~~ ~~Yes~~ No N/A	□*Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.	Yes No Yes No ~~N/A~~ Yes No ~~N/A~~	□*Exemption permitted if chilled & collected <8hrs ago* *Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.*
Delivery Method: ~~Client~~ (hand carried) Other:_____	Tracking/AB# : Or see attached ~~Or N/A~~	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): ~~Bubble Wrap~~ Separate plastic bags Vermiculite Other:_____	~~Yes~~ No N/A	*Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.*
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	Yes No ~~N/A~~	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No ~~N/A~~ Yes No ~~N/A~~	

Additional notes (if applicable):

Profile #:

Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

e-SAMPLE RECEIPT FORM

1168620

Review Criteria	Y/N (yes/no)	Exceptions Noted below
		exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Y	1-F, 1-B
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Y	Cooler ID: 1 @ 1.7 °C Therm ID: D6
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
*If >6°C, were samples collected <8 hours ago?		
If <0°C, were sample containers ice free?		
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Y	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?		
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		
Were all soil VOAs field extracted with MeOH+BFB?		
Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.		

Additional notes (if applicable):

The container for Sample 24A was broken at the lab. The samples was moved to a new container and analysis will proceed. The sample was unharmed

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1168620001-A	No Preservative Required	OK			
1168620002-A	No Preservative Required	OK			
1168620003-A	No Preservative Required	OK			
1168620004-A	No Preservative Required	OK			
1168620005-A	No Preservative Required	OK			
1168620006-A	No Preservative Required	OK			
1168620007-A	No Preservative Required	OK			
1168620008-A	No Preservative Required	OK			
1168620009-A	No Preservative Required	OK			
1168620010-A	No Preservative Required	OK			
1168620011-A	No Preservative Required	OK			
1168620012-A	No Preservative Required	OK			
1168620013-A	No Preservative Required	OK			
1168620014-A	No Preservative Required	OK			
1168620015-A	No Preservative Required	OK			
1168620016-A	No Preservative Required	OK			
1168620017-A	No Preservative Required	OK			
1168620018-A	No Preservative Required	OK			
1168620019-A	No Preservative Required	OK			
1168620020-A	No Preservative Required	OK			
1168620021-A	No Preservative Required	OK			
1168620022-A	No Preservative Required	OK			
1168620023-A	No Preservative Required	OK			
1168620024-A	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Brice Environmental Srv Co.
301 Cushman St., Suite 200
Fairbanks, AK 99701
(907)459-3052

Report Number: **1168646**

Client Project: **Kolmakof Mine Characterization**

Dear Carl Benson,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: **Brice Environmental Srv Co.**
SGS Project: **1168646**
Project Name/Site: **Kolmakof Mine Characterization**
Project Contact: **Carl Benson**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
16KRM-29(0.75)	1168646001	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-29(1.5)	1168646002	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-30(1)	1168646003	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-30(2)	1168646004	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-31(1)	1168646005	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-31(2)	1168646006	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-33(1)	1168646007	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-33(2)	1168646008	09/16/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-34(1)	1168646009	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-34(10)	1168646010	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-34(2.5)	1168646011	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-35(1)	1168646012	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-35(2)	1168646013	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-36(1)	1168646014	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-37(1.5)	1168646015	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-37(2.5)	1168646016	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-38(1)	1168646017	09/17/2016	09/29/2016	Soil/Solid (dry weight)
16KRM-38(2.5)	1168646018	09/17/2016	09/29/2016	Soil/Solid (dry weight)

Method	Method Description
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **16KRM-29(0.75)**
Lab Sample ID: 1168646001
Metals by ICP/MS

Parameter	Result	Units
Arsenic	3.78	mg/Kg
Chromium	22.1	mg/Kg
Mercury	3.66	mg/Kg
Nickel	20.3	mg/Kg

Client Sample ID: **16KRM-29(1.5)**
Lab Sample ID: 1168646002
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.73	mg/Kg
Chromium	34.1	mg/Kg
Mercury	2.49	mg/Kg
Nickel	41.4	mg/Kg

Client Sample ID: **16KRM-30(1)**
Lab Sample ID: 1168646003
Metals by ICP/MS

Parameter	Result	Units
Arsenic	3.99	mg/Kg
Chromium	22.9	mg/Kg
Mercury	1.73	mg/Kg
Nickel	20.0	mg/Kg

Client Sample ID: **16KRM-30(2)**
Lab Sample ID: 1168646004
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.48	mg/Kg
Chromium	33.4	mg/Kg
Mercury	9.05	mg/Kg
Nickel	46.3	mg/Kg

Client Sample ID: **16KRM-31(1)**
Lab Sample ID: 1168646005
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.52	mg/Kg
Chromium	31.5	mg/Kg
Mercury	3.39	mg/Kg
Nickel	41.3	mg/Kg

Client Sample ID: **16KRM-31(2)**
Lab Sample ID: 1168646006
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.5	mg/Kg
Chromium	35.5	mg/Kg
Mercury	1.46	mg/Kg
Nickel	41.9	mg/Kg

Client Sample ID: **16KRM-33(1)**
Lab Sample ID: 1168646007
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.5	mg/Kg
Chromium	36.3	mg/Kg
Mercury	1.47	mg/Kg
Nickel	49.3	mg/Kg

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Detectable Results Summary

Client Sample ID: **16KRM-33(2)**
Lab Sample ID: 1168646008
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.77	mg/Kg
Chromium	27.9	mg/Kg
Mercury	0.239	mg/Kg
Nickel	22.9	mg/Kg

Client Sample ID: **16KRM-34(1)**
Lab Sample ID: 1168646009
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.30	mg/Kg
Chromium	34.1	mg/Kg
Mercury	2.89	mg/Kg
Nickel	42.2	mg/Kg

Client Sample ID: **16KRM-34(10)**
Lab Sample ID: 1168646010
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.19	mg/Kg
Chromium	34.7	mg/Kg
Mercury	2.82	mg/Kg
Nickel	43.5	mg/Kg

Client Sample ID: **16KRM-34(2.5)**
Lab Sample ID: 1168646011
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.63	mg/Kg
Chromium	31.8	mg/Kg
Mercury	2.13	mg/Kg
Nickel	34.4	mg/Kg

Client Sample ID: **16KRM-35(1)**
Lab Sample ID: 1168646012
Metals by ICP/MS

Parameter	Result	Units
Arsenic	8.14	mg/Kg
Chromium	32.7	mg/Kg
Mercury	0.754	mg/Kg
Nickel	45.0	mg/Kg

Client Sample ID: **16KRM-35(2)**
Lab Sample ID: 1168646013
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.78	mg/Kg
Chromium	32.5	mg/Kg
Mercury	0.425	mg/Kg
Nickel	33.3	mg/Kg

Client Sample ID: **16KRM-36(1)**
Lab Sample ID: 1168646014
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.02	mg/Kg
Chromium	33.8	mg/Kg
Mercury	1.55	mg/Kg
Nickel	47.5	mg/Kg

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Detectable Results Summary

Client Sample ID: **16KRM-37(1.5)**
Lab Sample ID: 1168646015
Metals by ICP/MS

Parameter	Result	Units
Arsenic	9.31	mg/Kg
Chromium	33.0	mg/Kg
Mercury	3.14	mg/Kg
Nickel	45.6	mg/Kg

Client Sample ID: **16KRM-37(2.5)**
Lab Sample ID: 1168646016
Metals by ICP/MS

Parameter	Result	Units
Arsenic	7.57	mg/Kg
Chromium	31.6	mg/Kg
Mercury	1.77	mg/Kg
Nickel	21.6	mg/Kg

Client Sample ID: **16KRM-38(1)**
Lab Sample ID: 1168646017
Metals by ICP/MS

Parameter	Result	Units
Arsenic	10.4	mg/Kg
Chromium	33.2	mg/Kg
Mercury	3.09	mg/Kg
Nickel	39.9	mg/Kg

Client Sample ID: **16KRM-38(2.5)**
Lab Sample ID: 1168646018
Metals by ICP/MS

Parameter	Result	Units
Arsenic	13.1	mg/Kg
Chromium	35.1	mg/Kg
Mercury	0.328	mg/Kg
Nickel	37.1	mg/Kg

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Results of **16KRM-29(0.75)**

Client Sample ID: **16KRM-29(0.75)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646001
Lab Project ID: 1168646

Collection Date: 09/16/16 13:20
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):77.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	3.78		1.22	0.379	mg/Kg	10		10/14/16 09:16
Chromium	22.1		0.488	0.159	mg/Kg	10		10/14/16 09:16
Mercury	3.66		0.0488	0.0147	mg/Kg	10		10/14/16 09:16
Nickel	20.3		0.244	0.0757	mg/Kg	10		10/14/16 09:16

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:16
Container ID: 1168646001-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.063 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-29(1.5)**

Client Sample ID: **16KRM-29(1.5)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646002
Lab Project ID: 1168646

Collection Date: 09/16/16 13:25
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):84.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.73		1.17	0.363	mg/Kg	10		10/14/16 09:20
Chromium	34.1		0.468	0.152	mg/Kg	10		10/14/16 09:20
Mercury	2.49		0.0468	0.0141	mg/Kg	10		10/14/16 09:20
Nickel	41.4		0.234	0.0726	mg/Kg	10		10/14/16 09:20

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:20
Container ID: 1168646002-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.008 g
Prep Extract Vol: 50 mL

Results of **16KRM-30(1)**

Client Sample ID: **16KRM-30(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646003
Lab Project ID: 1168646

Collection Date: 09/16/16 13:40
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):72.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	3.99		1.31	0.406	mg/Kg	10		10/14/16 09:43
Chromium	22.9		0.523	0.170	mg/Kg	10		10/14/16 09:43
Mercury	1.73		0.0523	0.0157	mg/Kg	10		10/14/16 09:43
Nickel	20.0		0.262	0.0811	mg/Kg	10		10/14/16 09:43

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:43
Container ID: 1168646003-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.062 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-30(2)**

Client Sample ID: **16KRM-30(2)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646004
Lab Project ID: 1168646

Collection Date: 09/16/16 13:45
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.48		1.10	0.340	mg/Kg	10		10/14/16 09:47
Chromium	33.4		0.438	0.142	mg/Kg	10		10/14/16 09:47
Mercury	9.05		0.110	0.0329	mg/Kg	25		10/14/16 11:05
Nickel	46.3		0.219	0.0679	mg/Kg	10		10/14/16 09:47

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:47
Container ID: 1168646004-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.067 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-31(1)**

Client Sample ID: **16KRM-31(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646005
Lab Project ID: 1168646

Collection Date: 09/16/16 14:20
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.52		1.13	0.351	mg/Kg	10		10/14/16 09:52
Chromium	31.5		0.453	0.147	mg/Kg	10		10/14/16 09:52
Mercury	3.39		0.0453	0.0136	mg/Kg	10		10/14/16 09:52
Nickel	41.3		0.227	0.0703	mg/Kg	10		10/14/16 09:52

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:52
Container ID: 1168646005-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.028 g
Prep Extract Vol: 50 mL

Results of **16KRM-31(2)**

Client Sample ID: **16KRM-31(2)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646006
Lab Project ID: 1168646

Collection Date: 09/16/16 14:25
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.5		1.08	0.336	mg/Kg	10		10/14/16 09:56
Chromium	35.5		0.434	0.141	mg/Kg	10		10/14/16 09:56
Mercury	1.46		0.0434	0.0130	mg/Kg	10		10/14/16 09:56
Nickel	41.9		0.217	0.0672	mg/Kg	10		10/14/16 09:56

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 09:56
Container ID: 1168646006-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.078 g
Prep Extract Vol: 50 mL

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Results of **16KRM-33(1)**

Client Sample ID: **16KRM-33(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646007
Lab Project ID: 1168646

Collection Date: 09/16/16 15:15
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):86.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.5		1.14	0.352	mg/Kg	10		10/14/16 10:01
Chromium	36.3		0.455	0.148	mg/Kg	10		10/14/16 10:01
Mercury	1.47		0.0455	0.0136	mg/Kg	10		10/14/16 10:01
Nickel	49.3		0.227	0.0705	mg/Kg	10		10/14/16 10:01

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:01
Container ID: 1168646007-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.022 g
Prep Extract Vol: 50 mL

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Results of **16KRM-33(2)**

Client Sample ID: **16KRM-33(2)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646008
Lab Project ID: 1168646

Collection Date: 09/16/16 15:20
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):74.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.77		1.32	0.409	mg/Kg	10		10/14/16 10:05
Chromium	27.9		0.528	0.172	mg/Kg	10		10/14/16 10:05
Mercury	0.239		0.0528	0.0158	mg/Kg	10		10/14/16 10:05
Nickel	22.9		0.264	0.0819	mg/Kg	10		10/14/16 10:05

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:05
Container ID: 1168646008-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.023 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-34(1)**

Client Sample ID: **16KRM-34(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646009
Lab Project ID: 1168646

Collection Date: 09/17/16 10:25
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):84.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.30		1.16	0.361	mg/Kg	10		10/14/16 10:10
Chromium	34.1		0.465	0.151	mg/Kg	10		10/14/16 10:10
Mercury	2.89		0.0465	0.0140	mg/Kg	10		10/14/16 10:10
Nickel	42.2		0.233	0.0721	mg/Kg	10		10/14/16 10:10

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:10
Container ID: 1168646009-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.015 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-34(10)**

Client Sample ID: **16KRM-34(10)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646010
Lab Project ID: 1168646

Collection Date: 09/17/16 08:00
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.19		1.10	0.342	mg/Kg	10		10/14/16 10:14
Chromium	34.7		0.442	0.144	mg/Kg	10		10/14/16 10:14
Mercury	2.82		0.0442	0.0133	mg/Kg	10		10/14/16 10:14
Nickel	43.5		0.221	0.0685	mg/Kg	10		10/14/16 10:14

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:14
Container ID: 1168646010-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.06 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-34(2.5)**

Client Sample ID: **16KRM-34(2.5)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646011
Lab Project ID: 1168646

Collection Date: 09/17/16 10:30
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):81.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.63		1.19	0.370	mg/Kg	10		10/14/16 10:19
Chromium	31.8		0.477	0.155	mg/Kg	10		10/14/16 10:19
Mercury	2.13		0.0477	0.0143	mg/Kg	10		10/14/16 10:19
Nickel	34.4		0.238	0.0739	mg/Kg	10		10/14/16 10:19

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:19
Container ID: 1168646011-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.027 g
Prep Extract Vol: 50 mL

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Results of **16KRM-35(1)**

Client Sample ID: **16KRM-35(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646012
Lab Project ID: 1168646

Collection Date: 09/17/16 11:30
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	8.14		1.08	0.334	mg/Kg	10		10/14/16 10:34
Chromium	32.7		0.431	0.140	mg/Kg	10		10/14/16 10:34
Mercury	0.754		0.0431	0.0129	mg/Kg	10		10/14/16 10:34
Nickel	45.0		0.215	0.0667	mg/Kg	10		10/14/16 10:34

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:34
Container ID: 1168646012-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.088 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-35(2)**

Client Sample ID: **16KRM-35(2)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646013
Lab Project ID: 1168646

Collection Date: 09/17/16 11:35
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):81.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.78		1.20	0.371	mg/Kg	10		10/14/16 10:38
Chromium	32.5		0.478	0.155	mg/Kg	10		10/14/16 10:38
Mercury	0.425		0.0478	0.0143	mg/Kg	10		10/14/16 10:38
Nickel	33.3		0.239	0.0741	mg/Kg	10		10/14/16 10:38

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:38
Container ID: 1168646013-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.031 g
Prep Extract Vol: 50 mL

Results of **16KRM-36(1)**

Client Sample ID: **16KRM-36(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646014
Lab Project ID: 1168646

Collection Date: 09/17/16 12:00
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.02		1.13	0.351	mg/Kg	10		10/14/16 10:43
Chromium	33.8		0.453	0.147	mg/Kg	10		10/14/16 10:43
Mercury	1.55		0.0453	0.0136	mg/Kg	10		10/14/16 10:43
Nickel	47.5		0.227	0.0702	mg/Kg	10		10/14/16 10:43

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:43
Container ID: 1168646014-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.018 g
Prep Extract Vol: 50 mL

Results of **16KRM-37(1.5)**

Client Sample ID: **16KRM-37(1.5)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646015
Lab Project ID: 1168646

Collection Date: 09/17/16 13:30
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):84.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	9.31		1.12	0.346	mg/Kg	10		10/14/16 10:47
Chromium	33.0		0.447	0.145	mg/Kg	10		10/14/16 10:47
Mercury	3.14		0.0447	0.0134	mg/Kg	10		10/14/16 10:47
Nickel	45.6		0.224	0.0693	mg/Kg	10		10/14/16 10:47

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:47
Container ID: 1168646015-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.059 g
Prep Extract Vol: 50 mL

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Results of **16KRM-37(2.5)**

Client Sample ID: **16KRM-37(2.5)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646016
Lab Project ID: 1168646

Collection Date: 09/17/16 13:35
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):73.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.57		1.28	0.396	mg/Kg	10		10/14/16 10:52
Chromium	31.6		0.511	0.166	mg/Kg	10		10/14/16 10:52
Mercury	1.77		0.0511	0.0153	mg/Kg	10		10/14/16 10:52
Nickel	21.6		0.255	0.0792	mg/Kg	10		10/14/16 10:52

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:52
Container ID: 1168646016-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.064 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Results of **16KRM-38(1)**

Client Sample ID: **16KRM-38(1)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646017
Lab Project ID: 1168646

Collection Date: 09/17/16 14:20
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):84.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	10.4		1.16	0.360	mg/Kg	10		10/14/16 10:56
Chromium	33.2		0.465	0.151	mg/Kg	10		10/14/16 10:56
Mercury	3.09		0.0465	0.0140	mg/Kg	10		10/14/16 10:56
Nickel	39.9		0.233	0.0721	mg/Kg	10		10/14/16 10:56

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 10:56
Container ID: 1168646017-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.02 g
Prep Extract Vol: 50 mL

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Results of **16KRM-38(2.5)**

Client Sample ID: **16KRM-38(2.5)**
Client Project ID: **Kolmakof Mine Characterization**
Lab Sample ID: 1168646018
Lab Project ID: 1168646

Collection Date: 09/17/16 14:25
Received Date: 09/29/16 09:22
Matrix: Soil/Solid (dry weight)
Solids (%):72.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	13.1		1.35	0.417	mg/Kg	10		10/14/16 11:01
Chromium	35.1		0.538	0.175	mg/Kg	10		10/14/16 11:01
Mercury	0.328		0.0538	0.0161	mg/Kg	10		10/14/16 11:01
Nickel	37.1		0.269	0.0834	mg/Kg	10		10/14/16 11:01

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 10/14/16 11:01
Container ID: 1168646018-A

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/05/16 10:03
Prep Initial Wt./Vol.: 1.033 g
Prep Extract Vol: 50 mL

Print Date: 10/14/2016 4:46:17PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1744632 [MXX/30253]
Blank Lab ID: 1356409

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016, 1168646017, 1168646018

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Chromium	0.200U	0.400	0.130	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Nickel	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/14/2016 9:38:47AM

Prep Batch: MXX30253
Prep Method: SW3050B
Prep Date/Time: 10/5/2016 10:03:44AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168646 [MXX30253]
Blank Spike Lab ID: 1356410
Date Analyzed: 10/14/2016 08:44

Matrix: Soil/Solid (dry weight)

QC for Samples: 1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016, 1168646017, 1168646018

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	50	48.7	97	(82-118)
Chromium	20	20.7	103	(83-119)
Mercury	0.5	0.532	106	(74-126)
Nickel	50	51.5	103	(84-119)

Batch Information

Analytical Batch: **MMS9580**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXX30253**
Prep Method: **SW3050B**
Prep Date/Time: **10/05/2016 10:03**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1356411
MS Sample ID: 1356412 MS
MSD Sample ID: 1356413 MSD

Analysis Date: 10/14/2016 8:49
Analysis Date: 10/14/2016 8:53
Analysis Date: 10/14/2016 8:58
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016, 1168646017, 1168646018

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	4.19	46.0	47.4	94	46.6	48.5	95	82-118	2.46	(< 20)
Chromium	11.2	18.4	30	102	18.7	31.2	107	83-119	3.91	(< 20)
Mercury	0.0463	0.460	.498	98	0.466	0.526	103	74-126	5.38	(< 20)
Nickel	12.4	46.0	56.2	95	46.6	57.4	96	84-119	2.05	(< 20)

Batch Information

Analytical Batch: MMS9580
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 10/14/2016 8:53:38AM

Prep Batch: MXX30253
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 10/5/2016 10:03:44AM
Prep Initial Wt./Vol.: 1.09g
Prep Extract Vol: 50.00mL

Print Date: 10/14/2016 4:46:23PM

Method Blank

Blank ID: MB for HBN 1744699 [SPT/10014]
Blank Lab ID: 1356584

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016, 1168646017, 1168646018

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10014
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA
Analytical Date/Time: 10/4/2016 5:54:00PM

Duplicate Sample Summary

Original Sample ID: 1165773001
Duplicate Sample ID: 1356588
QC for Samples:

Analysis Date: 10/04/2016 17:54
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	91.4	91.3	%	0.13	(< 15)

Batch Information

Analytical Batch: SPT10014
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/14/2016 4:46:24PM

Duplicate Sample Summary

Original Sample ID: 1165779015
Duplicate Sample ID: 1356589

Analysis Date: 10/04/2016 17:54
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016,

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	86.4	86.5	%	0.14	(< 15)

Batch Information

Analytical Batch: SPT10014
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/14/2016 4:46:24PM

Duplicate Sample Summary

Original Sample ID: 1168648002
Duplicate Sample ID: 1356590

Analysis Date: 10/04/2016 17:54
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168646001, 1168646002, 1168646003, 1168646004, 1168646005, 1168646006, 1168646007, 1168646008, 1168646009, 1168646010, 1168646011, 1168646012, 1168646013, 1168646014, 1168646015, 1168646016,

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	78.4	79.5	%	1.40	(< 15)

Batch Information

Analytical Batch: SPT10014
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/14/2016 4:46:24PM

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1168646

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Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 388-5481

PROJECT NAME: Kolmetof Mine Characterization PROJECT/ PWSID/ PERMIT#: 210101

REPORTS TO: Carl Benson Carl@briceenvironmental.com E-MAIL:

INVOICE TO: Brice Environmental QUOTE #:

P.O. #: 335662

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: 6020 - Hg, As, Cr, Ni	REMARKS/ LOC ID
1 A	16KRM-29(0.75)	09/16/16	1320	S	1	G	X	
2 A	16KRM-29(1.5)	09/16/16	1325	S	1	G	X	
3 A	16KRM-30(1)	09/16/16	1340	S	1	G	X	
4 A	16KRM-30(2)	09/16/16	1345	S	1	G	X	
5 A	16KRM-31(1)	09/16/16	1420	S	1	G	X	
6 A	16KRM-31(2)	09/16/16	1425	S	1	G	X	
7 A	16KRM-33(1)	09/16/16	1515	S	1	G	X	
8 A	16KRM-33(2)	09/16/16	1520	S	1	G	X	
9 A	16KRM-34(1)	09/17/16	1025	S	1	G	X	
10 A	16KRM-34(10)	09/17/16	0800	S	1	G	X	

Section 5

	Date	Time		
Relinquished By: (1)	9/28/16	1200	Received By:	9/28/16 1255
Relinquished By: (2)	9/28/16	1530	Received By:	
Relinquished By: (3)			Received By:	
Relinquished By: (4)	9/29/16	09:22	Received For Laboratory By:	

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: LEVEL II EDD

Requested Turnaround Time and/or Special Instructions: Standard TAT

Temp Blank °C:

or Ambient [X]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

ANC:1.4 #200

ANC:IF,IB

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Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Carl Benson PHONE NO: 398-5481

PROJECT NAME: Kelmoloff Mine Characterization PROJECT/ PWSID/ PERMIT#: 210101

REPORTS TO: E-MAIL:
Carl Benson Carl@briceenvironmental.com

INVOICE TO: QUOTE #:
Brice Environmental P.O. #: 335662

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: 6020-Hg, As, Cr, Ni	REMARKS/ LOC ID
11 A	16KRM-34(2.5)	09/17/16	1030	S	1	G		
12 A	16KRM-35(1)	09/17/16	1130	S	1	G		
13 A	16KRM-35(2)	09/17/16	1135	S	1	G		
14 A	16KRM-36(1)	09/17/16	1200	S	1	G		
15 A	16KRM-37(1.5)	09/17/16	1330	S	1	G		
16 A	16KRM-37(2.5)	09/17/16	1335	S	1	G		
17 A	16KRM-38(1)	09/17/16	1420	S	1	G		
18 A	16KRM-38(2.5)	09/17/16	1425	S	1	G		
19								

Section 5

	Date	Time		
Relinquished By: (1) Carl Benson	9/28/16	1200	Received By:	9/28/16 1255
Relinquished By: (2)	9/28/16	1830	Received By:	
Relinquished By: (3)	Date	Time	Received By:	
Relinquished By: (4)	9/29/16	09:22	Received For Laboratory By:	

Section 4

DOD Project? Yes No

Cooler ID:

Data Deliverable Requirements: Level II EDD

Requested Turnaround Time and/or Special Instructions:
Standard TAT

Temp Blank °C:
or Ambient [X]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT
(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

SGS

1168646

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No N/A Yes No N/A	□*Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ Cooler ID:_____@_____w/Therm. ID:_____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.	Yes No Yes No N/A Yes No N/A	□*Exemption permitted if chilled & collected <8hrs ago* *Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.*
Delivery Method: Client (hand carried) Other:_____	Tracking/AB# : Or see attached Or N/A	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other: box	Yes No N/A	*Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.*
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	Yes No N/A	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No N/A Yes No N/A	
Additional notes (if applicable):		

Profile #:

Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

SGS

e-SAMPLE RECEIPT FORM

1168646

Review Criteria	Y/N (yes/no)	Exceptions Noted below
		exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Y	1F, 1B
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Y	Cooler ID: 1 @ 1.4 °C Therm ID: 200
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
		Cooler ID: @ °C Therm ID:
*If >6°C, were samples collected <8 hours ago?		
If <0°C, were sample containers ice free?		
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Y	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?		
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		
Were all soil VOAs field extracted with MeOH+BFB?		
Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.		

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1168646001-A	No Preservative Required	OK			
1168646002-A	No Preservative Required	OK			
1168646003-A	No Preservative Required	OK			
1168646004-A	No Preservative Required	OK			
1168646005-A	No Preservative Required	OK			
1168646006-A	No Preservative Required	OK			
1168646007-A	No Preservative Required	OK			
1168646008-A	No Preservative Required	OK			
1168646009-A	No Preservative Required	OK			
1168646010-A	No Preservative Required	OK			
1168646011-A	No Preservative Required	OK			
1168646012-A	No Preservative Required	OK			
1168646013-A	No Preservative Required	OK			
1168646014-A	No Preservative Required	OK			
1168646015-A	No Preservative Required	OK			
1168646016-A	No Preservative Required	OK			
1168646017-A	No Preservative Required	OK			
1168646018-A	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

APPENDIX D

ADEC CHECKLISTS AND DATA QUALITY REVIEW

Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

Bureau of Land Management Alaska State Office

4700 BLM Road

Anchorage, AK 99507-2591

January 2017

Laboratory Data Review Checklist

Completed by:	Carl Benson		
Title:	Environmental Scientist	Date:	10/27/2016
CS Report Name:	Kolmakof Mine Site Characterization	Report Date:	09/26/2016
Consultant Firm:	Brice Environmental Services Corporation		
Laboratory Name:	SGS Anchorage	Laboratory Report Number:	1165493
ADEC File Number:	2404.383.014	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:

Samples were not transferred

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:

Metals analysis only, cool preservation conditions not required.

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:

Conditions were reviewed, but no discrepancies were noted.

e. Data quality or usability affected? (Please explain)

Comments:

No.

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:

All QC goals were met for target analytes. Non target metals had MS/MSD issues resolved through post digestion spike.

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Not required for target analytes, but reported for non-target analytes.

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

Comments:

None.

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:

No.

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:

N/A

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No flags/qualifiers necessary

v. Data quality or usability affected? (Please explain) Comments:

No.

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:

Inorganic analyses only in Work Order 1165493.

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:

N/A

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:

No

c. Surrogates - Organics Only

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Inorganic analyses only in Work Order 1165493.

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:

N/A

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:

Inorganic analyses only in Work Order 1165493.

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:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

No

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:

16KRM-20(10) was a duplicate of sample 16KRM-10(2), and 16KRM-28(10) was a duplicate of sample 16KRM-28(1).

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

$$\text{RPD (\%)} = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

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:

Disposable sampling equipment used to collect all soil samples.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

○ Yes ◉ No ○ NA (Please explain) Comments:

Reset Form

Laboratory Data Review Checklist

Completed by:	Carl Benson		
Title:	Environmental Scientist	Date:	10/27/2016
CS Report Name:	Kolmakof Mine Site Characterization	Report Date:	10/20/2016
Consultant Firm:	Brice Environmental Services Corporation		
Laboratory Name:	SGS Anchorage	Laboratory Report Number:	1168620
ADEC File Number:	2404.383.014	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:

Samples were not transferred

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:

Metals analysis only, cool preservation conditions not required.

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:

Conditions were reviewed, but no discrepancies were noted.

e. Data quality or usability affected? (Please explain)

Comments:

No.

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:

All QC goals were met for target analytes, except some target metals had MS/MSD issues resolved through post digestion spikes. QC failures due to soil heterogeneity instead of systematic analytical issues.

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Yes, post digestion spikes met QC goals.

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

Comments:

None.

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:

No.

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:

N/A

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No flags/qualifiers necessary

v. Data quality or usability affected? (Please explain) Comments:

No.

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:

Inorganic analyses only in Work Order 1168620.

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:

MS/MSD recovery issues for chromium and mercury were resolved with post-digestion spikes.

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:

MS/MSD RPD for mercury did not meet QC limit. A duplicate sample was analyzed for mercury which met precision RPD goal.

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

Comments:

N/A

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

○ Yes ○ No ◉ NA (Please explain) Comments:

N/A

vii. Data quality or usability affected? (Please explain) Comments:

No

c. Surrogates - Organics Only

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Inorganic analyses only in Work Order 1168620.

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:

N/A

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:

Inorganic analyses only in Work Order 1168620.

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:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

No

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:

16KRM-M5(10) was a duplicate of sample 16KRM-M5(2), and 16KRM-M9(10) was a duplicate of sample 16KRM-M9(1.5).

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

$$\text{RPD (\%)} = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain) Comments:

Mercury exceeded the upper QC limit of 50% in both sample/duplicate pairs. Mercury RPD for 16KRM-M5(10)/16KRM-M5(2) was 60%, and 63% for 16KRM-M9(10)/16KRM-M9(1.5).

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

○ Yes ◉ No ○ NA (Please explain) Comments:

Mercury results for samples 16KRM-M5(10), 16KRM-M5(2), 16KRM-M9(10) and 16KRM-M9(1.5) were qualified "J" to indicate estimated concentrations.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Disposable sampling equipment used to collect all soil samples.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

○ Yes ◉ No ○ NA (Please explain) Comments:

Reset Form

Laboratory Data Review Checklist

Completed by:	Carl Benson		
Title:	Environmental Scientist	Date:	10/27/2016
CS Report Name:	Kolmakof Mine Site Characterization	Report Date:	10/14/2016
Consultant Firm:	Brice Environmental Services Corporation		
Laboratory Name:	SGS Anchorage	Laboratory Report Number:	1168646
ADEC File Number:	2404.383.014	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:

Samples were not transferred

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:

Metals analysis only, cool preservation conditions not required.

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:

Conditions were reviewed, but no discrepancies were noted.

e. Data quality or usability affected? (Please explain)

Comments:

No.

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:

None noted during review.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

None required.

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

Comments:

None.

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:

No.

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:

N/A

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No flags/qualifiers necessary

v. Data quality or usability affected? (Please explain) Comments:

No.

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:

Inorganic analyses only in Work Order 1168646.

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:

N/A

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

○ Yes ○ No ◉ NA (Please explain) Comments:

N/A - none required data flags.

vii. Data quality or usability affected? (Please explain) Comments:

No

c. Surrogates - Organics Only

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Inorganic analyses only in Work Order 1168646.

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:

N/A

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:

Inorganic analyses only in Work Order 1168646.

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:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

No

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:

16KRM-34(10) was a duplicate of sample 16KRM-34(1).

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

$$\text{RPD (\%)} = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

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:

No qualification necessary

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Disposable sampling equipment used to collect all soil samples.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

○ Yes ◉ No ○ NA (Please explain) Comments:

Reset Form

Date: 10/27/2016

Project: Kolmakof Mine Site Characterization
Laboratory: SGS North America, Inc. (SGS) - Anchorage
SDG#s: 1165493, 1168620, 1168646
Receipt Dates: 09/26/2016, 10/20/2016, 10/14/2016
Analyses: Total and TCLP arsenic, chromium, mercury, and nickel
Reviewer Name: Carl Benson
Reviewer Title: Environmental Scientist

INTRODUCTION

Table 1 lists the field sample numbers, corresponding laboratory sample identification numbers, requested analyses, and identifies quality control (QC) samples.

TABLE 1: FIELD SAMPLE PLAN OVERVIEW

Field Sample ID	Lab Sample ID	Analyses Requested	QC
Work Order 1165493			
16KRM-16(1)	1165493001	Total Metals	
16KRM-17(2)	1165493002	Total Metals	
16KRM-18(3)	1165493003	Total Metals	
16KRM-19(2)	1165493004	Total Metals	
16KRM-20(2)	1165493005	Total Metals	
16KRM-20(10)	1165493006	Total Metals	Field duplicate of sample 16KRM-20(2)
16KRM-21(3)	1165493007	Total Metals	
16KRM-22(2)	1165493008	Total Metals	
16KRM-23(2)	1165493009	Total Metals	
16KRM-24(1.25)	1165493010	Total Metals	
16KRM-25(0.75)	1165493011	Total Metals	
16KRM-26(1.5)	1165493012	Total Metals	
16KRM-27(1.5)	1165493013	Total Metals	
16KRM-28(1)	1165493014	Total Metals	
16KRM-28(10)	1165493015	Total Metals	Field duplicate of sample 16KRM-28(1)
Work Order 1168620			
16KRM-M1(0.75)	1168620001	Total Metals	
16KRM-M1(2)	1168620002	Total Metals	
16KRM-M2(1)	1168620003	Total Metals	
16KRM-M2(2.5)	1168620004	Total Metals	
16KRM-M3(1)	1168620005	Total Metals	
16KRM-M3(4)	1168620006	Total Metals	
16KRM-M4(1)	1168620007	Total Metals	
16KRM-M4(2)	1168620008	Total Metals	
16KRM-M5(2)	1168620009	Total Metals	

Field Sample ID	Lab Sample ID	Analyses Requested	QC
Work Order 1168620 (Continued)			
16KRM-M5(10)	1168620010	Total Metals	Field duplicate of sample 16KRM-M5(2)
16KRM-M5(4)	1168620011	Total Metals	
16KRM-M6(1)	1168620012	Total Metals	
16KRM-M6(3)	1168620013	Total Metals	
16KRM-M7(0.5)	1168620014	Total Metals	
16KRM-M7(2)	1168620015	Total Metals	
16KRM-M8(0.75)	1168620016	Total Metals	
16KRM-M8(1.5)	1168620017	Total Metals	
16KRM-M9(0.5)	1168620018	Total Metals	
16KRM-M9(1.5)	1168620019	Total Metals	
16KRM-M9(10)	1168620020	Total Metals	Field duplicate of sample 16KRM-M9(1.5)
TCLP Mound North	1168620021	TCLP Metals	
TCLP Mound South	1168620022	TCLP Metals	
TCLP Comp North	1168620023	TCLP Metals	
TCLP Comp South	1168620024	TCLP Metals	
Work Order 1168646			
16KRM-29(0.75)	1168646001	Total Metals	
16KRM-29(1.5)	1168646002	Total Metals	
16KRM-30(1)	1168646003	Total Metals	
16KRM-30(2)	1168646004	Total Metals	
16KRM-31(1)	1168646005	Total Metals	
16KRM-31(2)	1168646006	Total Metals	
16KRM-33(1)	1168646007	Total Metals	
16KRM-33(2)	1168646008	Total Metals	
16KRM-34(1)	1168646009	Total Metals	
16KRM-34(10)	1168646010	Total Metals	Field duplicate of sample 16KRM-34(1)
16KRM-34(2.5)	1168646011	Total Metals	
16KRM-35(1)	1168646012	Total Metals	
16KRM-35(2)	1168646013	Total Metals	
16KRM-36(1)	1168646014	Total Metals	
16KRM-37(1.5)	1168646015	Total Metals	
16KRM-37(2.5)	1168646016	Total Metals	
16KRM-38(1)	1168646017	Total Metals	
16KRM-38(2.5)	1168646018	Total Metals	

Key:
TCLP Toxicity Characteristic Leaching Procedure

DATA QUALIFIER DEFINITIONS

For the purpose of data validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality.

R Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J The associated numerical value is an estimated quantity because the Quality Control criteria were not met. "J+" is used when the quantity is biased high, and "J-" is used when the quantity is biased low.

UJ The reported quantitation limit is estimated because Quality Control criteria were not met. Element or compound was not detected.

U The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

NR Result was not used from a particular sample analysis. This typically occurs when more than one result for an element is reported due to dilutions and reanalysis.

DATA REVIEW

Data quality review is a process for evaluating the completeness, correctness, consistency, compliance with method procedures and quality control requirements, and identification of anomalous data. This quality assurance (QA) summary includes a review, where appropriate, of the following parameters.

- Sample receipt conditions
  - Sample preservation
  - Cooler receipt forms
  - Chan of Custody condition
- Extraction and analytical procedures
  - Holding times
  - Analytical reporting limits
  - Method blanks
  - Laboratory control samples and duplicates
  - Matrix spike samples and duplicates
  - Laboratory duplicate samples (when reported)
  - Surrogate recoveries (organics only)
- Sampling procedures
  - Field blanks (where applicable)
  - Trip blanks (where applicable)
  - Equipment blanks (where applicable)
  - Field duplicate samples
- Correspondence to method criteria and project data quality objectives (DQOs)

Each analysis that was performed is evaluated in the following subsections of this report, and only the criteria exceedances that impact data qualification or require assessment beyond laboratory documentation are discussed.

This project did not have a project-specific quality assurance plan with specified data quality objectives. Validation was conducted in accordance with the following documents.

- USEPA document "Test Methods for Evaluating Solid Wastes, SW-846, revision 6" (February, 2007 and updates),
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic (October, 1994) and Organic (October, 1999) Review,
- ADEC Environmental Laboratory Data and Quality Assurance Requirements Technical Memorandum (March, 2009),
- Department of Defense Quality Systems Manual for Environmental Laboratories, Version 3 (DoD QSM) (January, 2006), where and when applicable.

This review document summarizes the precision, accuracy, representativeness, comparability, completeness, and sensitivity as required by ADEC guidelines. An ADEC Laboratory Data Review Checklist is included for the three Sample Delivery Groups (SDGs).

Sample Receipt Conditions

Fifty-seven (57) soil samples, including five blind field duplicates and four waste characterization samples, were submitted to SGS in Anchorage in three coolers in three laboratory batches. Samples for SGS Work Orders 1165493, 1168620, and 1168646 were submitted on September 15, 2016, September 22, 2016, and September 28, 2016 respectively. All soil samples were analyzed at SGS's laboratory in Anchorage, Alaska. The samples were received by SGS on the same day they were submitted. All samples were received with proper preservation and in good condition.

All holding time criteria specified by the individual methods were met.

Precision

Precision was assessed by calculating the relative percent difference (RPD) between the primary and duplicate of field samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and laboratory duplicate samples.

As shown in Table 1, forty-eight (48) primary soil samples were collected for total metals analysis along with five (5) blind field duplicates. This represents a duplicate soil sample collection rate for total metals analysis of 10 %. The duplicate sample collection rate met or exceeded the DQO of a 10% duplicate sample collection rate for all combined total metals analyses in Work Orders 1165493, 1168620, and 1168646. Duplicate samples were not collected with the four waste characterization soil samples analyzed for TCLP metals.

RPDs were calculated for all analytes detected at or above their respective limit of quantitation (LOQ) for the primary and duplicate field sample pairs using the following equation. Results are shown in Table 2 below.

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Table 2: Primary and Duplicate Sample RPD Results

Analyte	Units	16KRM-20(2) (1165493005) Primary	16KRM020(10) (1165493006) Duplicate	RPD ≤ 50%	Flag
Arsenic	mg/Kg	10.3	9.72	6%	
Chromium	mg/Kg	29.7	29.4	1%	
Mercury	mg/Kg	4.19	3.36	22%	
Nickel	mg/Kg	35.8	36.1	1%	
		16KRM-28(1) (1165493014) Primary	**16KRM-28(10) (1165493015) Duplicate**		
Arsenic	mg/Kg	8.99	9.72	8%	
Chromium	mg/Kg	29.6	30.7	4%	
Mercury	mg/Kg	2.38	1.62	38%	
Nickel	mg/Kg	39.1	41.6	6%	
		16KRM-M5(2) (1168620009) Primary	**16KRM-M5(10) (1168620010) Duplicate**		
Arsenic	mg/Kg	11.7	10.2	14%	
Chromium	mg/Kg	30.9	30.6	1%	
Mercury	mg/Kg	0.724	1.35	60%	J
Nickel	mg/Kg	35.9	32	11%	
		16KRM-M9(1.5) (1168620019)	**16KRM-M9(10) (1168620020)**		
Arsenic	mg/Kg	7.7	7.98	4%	
Chromium	mg/Kg	29.9	28.6	4%	
Mercury	mg/Kg	0.258	0.135	63%	J
Nickel	mg/Kg	21.2	20	6%	
		16KRM-34(1) (1168646010) Primary	**16KRM-34(10) (1168646010) Duplicate**		
Arsenic	mg/Kg	9.3	9.19	1%	
Chromium	mg/Kg	34.1	34.1	0%	
Mercury	mg/Kg	2.89	2.82	2%	
Nickel	mg/Kg	42.2	43.5	3%	

Notes:
mg/Kg milligrams per kilogram
RPD relative percent difference

The calculated RPDs were less than 50% for all analytes detected at or above their respective LOQ with the exception of mercury in primary/duplicate pairs 16KRM-M5(2)/16KRM-M5(10), and 16KRM-M9(1.5)/16KRM-M9(10). Detections of mercury in these samples were considered estimated values and assigned a "J" qualifier.

RPDs for LCS/LCSD pairs were not calculable since the laboratory only performed LCS spikes on method blank samples. Laboratory precision was measured using MS/MSD analyses and laboratory duplicate samples.

Calculated RPDs for the MS/MSD pairs were within the recommended RPD limit of 20% with the exception of mercury in SGS Work Order No. 1168620. The sample duplicate pair for this parent sample had an RPD% meeting the laboratory QC limit of 20% and no qualification was necessary.

Accuracy

Accuracy was assessed by calculating the percent recovery for LCS, MS, and MSD analyses.

The LCS recoveries associated with all samples and analytes were within QC control limits and no data qualification was necessary.

Recovery of MS/MSD spike compounds were within QC control limits for all compounds except chromium and mercury in SGS Work Order No. 1168620. Post digestions spikes were successful for these metals and no data qualification was necessary. Successful post-digestion spikes indicate sample heterogeneity was the likely cause of percent recovery variations for chromium and mercury in the MS/MSD samples, and that the recovery issues were not related to systematic problems with laboratory measurement.

Representativeness

Soil samples were collected from multiple locations at the site in accordance with the approved work plan. Results are considered representative of site conditions.

Comparability

To ensure comparability to field conditions, X-Ray fluorescence field screening was conducted during the collection of soil samples. In addition, visual observations were noted on the test pit logs and profile photographs were taken of each test pit. Only one laboratory was used, and only one SDG was created for each distinct phase of sampling conducted during the field effort; Work Order No. 1165493 comprised samples collected from the first full set of step-out test pits, Work Order No. 1168620 comprised all retort mound and waste characterization samples, and Work Order No. 1168646 comprised all samples submitted in association with the second set of step-out site characterization test pits.

Completeness

All data necessary to complete a level II data validation on these SDGs were provided. No data were rejected, so 100% of results are usable.

Sensitivity

All results were evaluated to the reporting limit. These limits were comparable to the project-specific cleanup levels specified in Tables B1 and B2 of Chapter 75 of Title 18 of the Alaska Administrative Code (18 AAC 75), *Oil and Other Hazardous Substances Pollution Control*, as updated on May 8, 2016. The most conservative (i.e., lowest) cleanup level values associated with the ADEC Method three soil cleanup levels for the ingestion/direct contact, outdoor inhalation, and migration to groundwater exposure pathways were applicable.

No trip blank was submitted with these SDGs since all analyses were performed to evaluate metal concentrations.

The method blanks (MBs) were analyzed at the required frequencies of one per matrix, analysis, and 20 samples. No analytes were detected in the MB at quantities over the LOQ.

No equipment blanks or field blanks were submitted for these SDGs.

OVERALL ASSESSMENT

Based on the review completed on the three SDG's data, no data were rejected. Data qualifications for analytical data in SGS Work Orders 1165493, 1168620, and 1168646 are as summarized above. All sample results are considered to be valid with data qualifiers assigned.

APPENDIX E

SAMPLE LOCATION SURVEY DATA

Site Characterization and Contamination Assessment Report
Kolmakof Mine Site, Alaska

Bureau of Land Management Alaska State Office

4700 BLM Road

Anchorage, AK 99507-2591

January 2017

KMS Survey Data

Horizontal Datum: *0.0 at C - arbitrary*
Coodinate System: *feet local*
Vertical Datum: *100 at C - arbitrary*
Units: *U.S. Survey Feet*

Data Collection Equipment: tape (horizontal) and laser level (vertical)

Test Pit	TD (feet)	Sample Deph	Ground Elevation	Datum	Instrument Height	Measured Elevation	North	East	West	South
C	--	--	100.0	100.00	3.54	3.54	0.00	0.00	0.00	0.00
16	1.0	1.0	100.9	100.00	3.54	2.69	45.20	28.75		
17	2.5	2.0	100.2	100.00	3.54	3.38	45.20	15.00		
18	4.0	3.0	99.2	100.00	3.54	4.33	45.20	2.00		
19	3.5	2.0	97.9	100.00	3.54	5.63	29.20		15.50	
20	3.5	2.0	96.8	100.00	3.54	6.75	9.50		24.30	
20	3.5	2.0								
21	4.3	3.0	96.4	100.00	3.54	7.17	10.50		30.10	
22	4.5	2.0	95.9	100.00	3.54	7.6			26.00	3.00
23	5.5	2.0	95.4	100.00	3.54	8.19			32.40	4.00
23	5.5	4.0								
24	4.0	1.3	94.7	100.00	3.54	8.85			32.40	16.50
24	4.0	4.0								
25	4.0	0.8	93.1	100.00	3.54	10.44			38.30	16.50
25	4.0	2.5								
26	4.5	1.5	94.8	100.00	3.54	8.75			23.00	25.80
27	5.0	1.5	97.7	100.00	3.54	5.88			5.50	33.60
28	1.0	1.0	99.0	100.00	3.54	4.5		21.00		20.50
28	1.0	1.0								
29	2.0	0.8	99.6	100.00	3.54	3.99		20.50		4.50
29	2.0	1.5								
30	2.0	1.0	99.9	100.00	3.54	3.67		26.80		5.75

KMS Survey Data

Horizontal Datum: *0.0 at C - arbitrary*
Coodinate System: *feet local*
Vertical Datum: *100 at C - arbitrary*
Units: *U.S. Survey Feet*

Data Collection Equipment: tape (horizontal) and laser level (vertical)

Test Pit	TD (feet)	Sample Deph	Ground Elevation	Datum	Instrument Height	Measured Elevation	North	East	West	South
30	2.0	2.0								
31	2.0	1.0	99.2	100.00	3.54	4.31		13.50		28.50
31	2.0	2.0								
32	1.0	0.8	98.0	100.00	3.54	5.5			5.25	40.50
33	5.0	1.0	95.0	100.00	3.54	8.58			25.00	30.20
33	5.0	2.0								
34	3.0	1.0	99.6	100.00	3.54	3.92	49.50	1.75		
34	3.0	1.0								
34	3.0	2.5								
35	4.0	1.0	98.1	100.00	3.54	5.42	32.20		20.75	
35	4.0	2.0								
36	1.0	1.0	99.6	100.00	3.54	3.98	59.90		5.00	
37	3.8	1.5	96.4	100.00	3.54	7.17	11.50		33.20	
37	3.8	2.5								
38	2.8	1.0	94.6	100.00	3.54	8.96			37.90	5.25
38	2.8	2.5								
M1	3.0	0.8	99.8	100.00	3.54	3.71	0.75	4.60		
M1	3.0	2.0								
M2	3.5	1.0	100.4	100.00	3.54	3.19	2.60		0.75	
M2	3.5	2.5								
M3	4.0	1.0	99.8	100.00	3.54	3.79	24.20		4.00	
M3	4.0	4.0								
M4	4.0	1.0	98.9	100.00	3.54	4.63	11.10		5.75	

KMS Survey Data

Horizontal Datum: *0.0 at C - arbitrary*
Coodinate System: *feet local*
Vertical Datum: *100 at C - arbitrary*
Units: *U.S. Survey Feet*

Data Collection Equipment: tape (horizontal) and laser level (vertical)

Test Pit	TD (feet)	Sample Deph	Ground Elevation	Datum	Instrument Height	Measured Elevation	North	East	West	South
M4	4.0	2.0								
M5	5.0	2.0	102.0	100.00	3.54	1.58	2.75	12.50		
M5	5.0	2.0								
M6	5.0	1.0	99.8	100.00	3.54	3.75		4.50		13.30
M6	5.0	3.0								
M7	5.0	0.5	98.8	100.00	3.54	4.71			6.25	24.50
M7	5.0	2.0								
M8	3.5	0.8	96.5	100.00	3.54	7.06			14.00	20.20
M8	3.5	1.5								
M9	3.3	0.5	97.6	100.00	3.54	5.98			11.00	3.50
M9	3.3	1.5								
TP-7			99.2	100.00	3.54	4.4		17.00		8.75
TP-14			99.0	100.00	3.54	4.5		18.60		15.00
TP-6			97.9	100.00	3.54	5.67		3.00		22.50
TP-13			96.4	100.00	3.54	7.17			12.75	30.20
TP-12			94.7	100.00	3.54	8.8			27.50	16.00
TP-5			95.0	100.00	3.54	8.5			22.20	16.00
TP-11			97.3	100.00	3.54	6.29	22.50		24.10	
TP-4			97.3	100.00	3.54	6.21	21.50		19.60	
TP-3			98.1	100.00	3.54	5.42	34.30		6.25	
TP-9			98.9	100.00	3.54	4.63	35.80	3.50		
TP-2			99.7	100.00	3.54	3.88	34.80	11.50		
TP-15			100.5	100.00	3.54	3.02	39.80	25.50		
TP-1			99.8	100.00	3.54	3.75	32.40	24.00		

KMS Survey Data

Horizontal Datum: *0.0 at C - arbitrary*
Coodinate System: *feet local*
Vertical Datum: *100 at C - arbitrary*
Units: *U.S. Survey Feet*

Data Collection Equipment: tape (horizontal) and laser level (vertical)

Test Pit	TD (feet)	Sample Deph	Ground Elevation	Datum	Instrument Height	Measured Elevation	North	East	West	South
TP-8			99.7	100.00	3.54	3.86	7.50	27.20		