

US EPA ARCHIVE DOCUMENT

Kennecott Eagle Minerals

Jonathan C. Cherry, P.E.
General Manager
504 Spruce Street
Ishpeming, Michigan 49849
(906) 486-1257

December 19, 2008

Rebecca L. Harvey
United States Environmental Protection Agency
Underground Injection Control Branch
Region 5
Attention Mail Code WU-16J
77 West Jackson Boulevard
Chicago, Illinois, 60604-3590

Subject: **Response to EPA's Request for Additional Information, dated October 30, 2008**
Kennecott Eagle Minerals Company (KEMC), UIC Permit Application Number MI-103-5W20-0002

Dear Ms. Harvey:

A letter dated October 30, 2008 was received from the United States Protection Agency (EPA) to clarify and/or supplement information provided in KEMC's UIC permit application and an earlier letter from KEMC dated August 21, 2008. In summary EPA requested information related to three items:

1. Additional information to support the degree of discontinuity and permeability of the silty-sand layer within the TWIS.
2. Submittal of additional groundwater monitoring data within the TWIS area.
3. Additional analytical information for the TWIS area sediments.

KEMC submitted responses to items #1 and #2 in letters dated November 14, 2008 and November 21, 2008. Consistent with our correspondence dated November 14, 2008, and in complete fulfillment of EPA's request for data, please find attached a response to item #3.

Should you have any questions, please contact me at 906-486-1257.

Sincerely,



Jonathan C. Cherry, P.E.
General Manager

Ms. Rebecca Harvey
United States Environmental Protection Agency
December 19, 2008
Page 2

cc: Gene Smary, Warner, Norcross & Judd, LLP
Dennis Donohue, Warner, Norcross & Judd, LLP
Dan Wiitala, North Jackson Company
Steve Donohue, Foth Infrastructure & Environment, LLC
Mark Logsdon, Geochimica

File: EC-Eagle-UIC-Corres to EPA

TECHNICAL MEMORANDUM

DATE: 19 December 2008

TO: Victoria Peacey (Kennecott Eagle Mining)

FROM: Mark J. Logsdon (Geochemica)

SUBJECT: EPA Method 1312 Leaching of Alluvial Sediment and Baseline Water Quality: Additional Responses to EPA for Eagle Mine's Underground Injection Control Permit Application

BACKGROUND

Kennecott Eagle Mining Company (KEMC) has applied for state and federal permits to operate an underground mine. The U.S. Environmental Protection Agency (EPA) is completing its review of KEMC's submissions for an underground injection control (UIC) permit to dispose of treated mine water to the shallow alluvium adjacent to the mine site. Based on earlier submissions and discussions between KEMC and the EPA staff, there remains one question that requires further site-specific evaluation. EPA Staff and their contractors asked KEMC to evaluate directly the potential for leaching of metals from the Quaternary alluvium into which the treated water would be discharged.

Purpose and Objectives

The purpose of this memorandum is to document the analytical results of the supplemental test work and to describe further the existing baseline water quality of the alluvial sediment into which KEMC proposed to discharge its treated water.

TECHNICAL APPROACH

The chemistry of the TWIS Quaternary alluvial sediments is analyzed for four new samples from core hole QAL-041, which was previously analyzed for mineralogy and submitted to EPA in a letter dated August 21, 2008 (Mineralogy of Till Samples from Hole QAL-041 by Dr. Rodney C. Johnson). Splits of those samples were submitted for laboratory analysis by EPA Method 1312 leach procedure to assess how infiltrating water derived from natural precipitation would interact with representative samples of alluvial TWIS sediments. The results of those Method 1312 leaching tests are discussed in the context of systematic evaluation of the water quality of the injection zone, based on 6 months of water-quality data from fifteen (15) water-quality monitoring stations that are the database for KEMC's groundwater discharge permit application (GW1810162) with the State of Michigan. This 6-monthly groundwater data report (2008 Background Water Quality Report for groundwater

Discharge Permit GW1810162) was also submitted to the EPA in a letter dated November 14, 2008.

METHODS, PROCEDURES, AND RESULTS

To address the leachability question, KEMC geologists collected four samples of the Quaternary alluvium within core hole QAL-041 from the footprint of the zone into which discharge is proposed. The four samples were analyzed for total metals concentrations (using EPA 6000/7000 series methods) and also leach tested using EPA Method 1312, the Synthetic Precipitation Leaching Procedure, with extract solutions analyzed by the EPA 6000/7000 methods. A full copy of the analytical report for the work (conducted by Tri-Matrix Laboratories, Grand Rapids, MI) is provided at Attachment A.

The KEMC geologists chose the core hole to provide a representative sample of the TWIS area sediments to include both fine sands and fine sands/silts and clays and to address both shallow (14'-18'; 24'-28') and deep (52'-54'; 54'-58') sections of the alluvium. The shallow core samples are comprised of unsaturated outwash sands, with over 70% fine sand by weight, while the deep core samples are comprised of transitional fine sand and 22% silt and clay. The soil boring log and standard sieve analysis data for QAL-041 are contained in Attachment B and sourced from the Supplemental Hydrogeological Study Report (North Jackson Company, 2006).

When KEMC discussed this testing program with the EPA project officer on October 20, 2008, they agreed that any discharge water infiltrating through the alluvium must contact both finer and coarser fractions and thus whole sample total metals and SPLP analysis was completed for the TWIS core samples. The flow-weighting during infiltration will be associated with the actual permeability distribution that will exist across the entire discharge zone, a matter that cannot be described in significant detail from surface drilling. By leach-testing the entire soil sample in batch mode, it is likely that there is more contact with fines than would be the case in an in-situ soil, through which water flux is dominated by flow through higher permeability zones that would be associated with the coarser sediment fractions.

The existing water quality of the injection zone has now been systematically assessed using and additional 6 months (May through October, 2008) of water-quality data from fifteen (15) water-quality monitoring stations that are the database for KEMC's groundwater-discharge permit application (GW1810162) with the State of Michigan. The entire report, prepared by North Jackson Company (Marquette, MI), including all data and their statistical analysis, was submitted to EPA in a letter dated November 14, 2008.

Please note that the data for both the core hole soil samples and the groundwater evaluation include full quality assurance/quality control reports documenting the reliability of the data.

RESULTS

Table 1 summarizes the key results for the four samples of the Quaternary alluvial sediment, focusing on the ten “drinking-water metals”, as both total-metal and SPLP-leachable values.

Table 1 Summary of Total and Leachable Metals, Quaternary Alluvial Sediments

Sample	Metal	Total (mg/kg)	SPLP (mg/L)	Sample	Metal	Total (mg/kg)	SPLP (mg/L)
QAL-041-16 (14'-18')	<i>As</i>	0.62	<0.0010	QAL-041-52 (52'-54')	<i>As</i>	0.92	<0.0010
	<i>Ba</i>	9.6	0.0092		<i>Ba</i>	30	0.037
	<i>Cd</i>	<0.050	<0.00020		<i>Cd</i>	0.053	<0.00020
	<i>Cr</i>		<0.0010		<i>Cr</i>		0.0016
	<i>Cu</i>	3.2	0.0012		<i>Cu</i>	7.3	0.0027
	<i>Pb</i>	<1.0	<0.0010		<i>Pb</i>	2.4	<0.0010
	<i>Hg</i>		<0.00020		<i>Hg</i>		<0.00020
	<i>Ni</i>	2.4	<0.0010		<i>Ni</i>	8.6	0.0017
	<i>Se</i>		<0.0010		<i>Se</i>		<0.0010
	<i>Ag</i>	<0.050	<0.00020		<i>Ag</i>	0.066	<0.00020
QAL-041-26 (24'-28')	<i>As</i>	0.71	<0.0010	QAL-041-56 (54'-58')	<i>As</i>	0.67	<0.0010
	<i>Ba</i>	5.8	0.017		<i>Ba</i>	11	0.019
	<i>Cd</i>	<0.050	<0.00020		<i>Cd</i>	<0.050	<0.00020
	<i>Cr</i>		<0.0010		<i>Cr</i>		<0.0010
	<i>Cu</i>	3.2	0.0015		<i>Cu</i>	4.0	0.0015
	<i>Pb</i>	1.0	<0.0010		<i>Pb</i>	1.4	<0.0010
	<i>Hg</i>		<0.00020		<i>Hg</i>		<0.00020
	<i>Ni</i>	2.5	<0.0010		<i>Ni</i>	4.4	<0.0010
	<i>Se</i>		<0.0010		<i>Se</i>		<0.0010
	<i>Ag</i>	<0.050	<0.00020		<i>Ag</i>	<0.050	<0.00020

For the baseline water-quality study, North Jackson measured 15 monitoring wells, monthly for six months. Full data are in the report. To summarize a large and complex data set, we will follow North Jackson’s approach of using parametric indicators, the average, maximum, and 95th percentile upper confidence interval critical value. In Table 2, we present these for the ten “drinking-water metals”, as the maximum value (in each category) for any well in any of the six months tested. For example, consider copper (Cu) in Table 2. The highest average value for any well in any month was 1.0 ug/L; the highest reported value in any month for any well was 2.5 ug/L, and the highest computed 95th percentile Upper Confidence Interval value for any well was 2.3 ug/L. Note that in Table 1, the SPLP values are reported in mg/L; for direct comparison to Table 1’s SPLP results, divide each number in Table 2 by 1,000, except Hg by 1,000,000.

Table 2 Summary of Baseline Water Quality.

Metal	Highest Average	Highest Maximum	Highest 95% UCL
<i>As</i>	7.1	7.7	7.4
<i>Ba</i>	10.8	19	15
<i>Cd</i>	<0.20	<0.20	<0.20
<i>Cr</i>	1.9	5.9	5.2
<i>Cu</i>	1.0	2.5	2.3
<i>Pb</i>	<1.0	<1.0	<1.0
<i>Hg</i>	1.54	2.37	2.32
<i>Ni</i>	4.8	10.0	7.5
<i>Se</i>	0.7	1.6	1.4
<i>Ag</i>	<0.20	<0.20	<0.20

The posted values are the maximum ones reported in each category for any of the fifteen wells in any of the six months from May to October, 2008. Concentrations in ug/L, *except Hg in ng/L*. Please see 2008 Background Water Quality Report for groundwater Discharge Permit GW1810162, submitted to the EPA in a letter dated November 14, 2008 for full discussion of North Jackson's statistical analyses that go into Table 2.

DISUCSSION

Total metal concentrations, across the whole range of analytes, in the four samples of alluvial sediment obtained from QAL-041 are fully consistent with the values reported in the earlier KEMC submittals. All samples are very low in concentration, and are well within the range of normal rocks and sediments in the upper crust.

The SPLP tests were run on both outwash and transitional formation samples, where the shallow samples are dominantly fine sand outwash with low percentages of silt and clay and the deeper samples contain a much higher percentage of fines (22% for samples that correspond with SPLP samples QAL-041-52 and QAL-041-56). Regardless of the fines content, the Method 1312 leachates are extremely low in concentration for all ten "drinking water metals", below or near detection limits. Barium is consistently the highest, but even that reports to the leachate in the low part-per-billion range. Note that Arsenic, which was a particular concern to the EPA-contractor reviewers as potentially leachable, is below the detection limit of 0.0010 mg/L (1.0 part per billion) in all four core samples.

The SPLP results are consistent with the baseline water quality data obtained from the 6-monthly sampling and the combined dataset indicates that the TWIS sediments, including areas with a higher fines content are not a large reservoir of metals that will be mobilized during infiltration. The maximum values observed in six months of data collection from fifteen alluvial wells are low parts-per-billion concentrations (parts per trillion for Hg). Note that, as with the SPLP values, Ba is the highest of the ten metals.

The contractor-reviewers had expressed concern that the treated mine water might be out of equilibrium with buried sediments containing arsenic (As) adsorbed to or co-precipitated with hydrous ferric oxide. However, because the discharge waters, like the SPLP leachate, is oxidizing and because the system has sufficient available alkalinity to buffer groundwater pH in the neutral to slightly alkaline range, ferric minerals will remain stable, and will neither preferentially dissolve nor de-sorb As.

CONCLUSIONS

The expanded sampling and testing of shallow alluvial sediments produced results consistent with the more generalized geochemistry and mineralogy summarized by KEMC earlier (letter to EPA dated August 21, 2008). The new leach testing, using EPA Method 1312, the Synthetic Precipitation Leaching Procedure, shows that the alluvial sediment yields no reportable Arsenic and low to non-detect concentrations of the other drinking-water metals. These samples included representative proportions of both finer- and coarser-grained sediment, and therefore are the best possible sample for understanding how infiltration would react as it moves through native sediments in the discharge zone. The SPLP results are fully consistent with the new, greatly expanded compilation of water-quality data for the whole of the shallow zone near the discharge area.

All data collected and analyzed to date is consistent with KEMC's evaluation of the discharge process as one that would pose no threat to existing, shallow, alluvial water quality.

ATTACHMENT A

TRIMATRIX ANALYTICAL REPORT

December 02, 2008

Kennecott Eagle Mineral Company
Attn: Mr. Andrew Ware
200 Echelon Drive, Suite A&B
Negaunee, MI 49866

Project: Waste Characterization

Dear Mr. Andrew Ware,

Enclosed is a copy of the laboratory report, comprised of the following work order(s), for test samples received by TriMatrix Laboratories:

Work Order	Received	Description
0811218	11/01/2008	Laboratory Services

This report relates only to the sample(s), as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Any qualifications of results, including sample acceptance requirements, are explained in the Statement of Data Qualifications.

Estimates of analytical uncertainties for the test results contained within this report are available upon request.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,



Jennifer L. Rice
Project Chemist

Enclosures(s)

ANALYTICAL REPORT

Client: **Kennecott Eagle Mineral Company**
 Project: Waste Characterization
 Client Sample ID: **QAL-041-16 14-18'**
 Lab Sample ID: **0811218-01**
 Matrix: Soil
 Percent Solids: n/a

Work Order: **0811218**
 Description: Laboratory Services
 Sampled: 10/31/08 00:00
 Sampled By: Kennecott
 Received: 11/01/08 08:45

Total Metals by EPA 6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
*Aluminum	1500	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Antimony	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/17/08	DWJ	0813462
*Arsenic	0.62	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Barium	9.6	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Beryllium	<1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
*Boron	1.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Cadmium	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Calcium	450	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Cobalt	0.94	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Copper	3.2	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
*Iron	4400	500	mg/kg dry wt.	100	USEPA-6010B	11/19/08	JMF	0813386
Lead	<1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Lithium	1.8	1.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Magnesium	750	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
*Manganese	50	2.0	mg/kg dry wt.	2	USEPA-6020A	11/19/08	KLV	0813388
Molybdenum	<10	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
*Nickel	2.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Potassium	200	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Silver	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
*Silicon	370	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Sodium	<50	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Strontium	<5.0	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Thallium	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Tin	<100	100	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813465
*Titanium	100	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Vanadium	7.6	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
*Zinc	6.2	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388

*See Statement of Data Qualifications

ANALYTICAL REPORT

Client: Kennecott Eagle Mineral Company	Work Order: 0811218
Project: Waste Characterization	Description: Laboratory Services
Client Sample ID: QAL-041-16 14-18'	Sampled: 10/31/08 00:00
Lab Sample ID: 0811218-01	Sampled By: Kennecott
Matrix: Soil	Received: 11/01/08 08:45
Percent Solids: n/a	

SPLP Metals by EPA 1312/6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Arsenic	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Barium	0.0092	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Cadmium	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Chromium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Copper	0.0012	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Lead	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Mercury	<0.00020	0.00020	mg/L	1	USEPA-7470A	11/18/08	JMF	0813486
Nickel	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Selenium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Silver	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409

*See Statement of Data Qualifications

ANALYTICAL REPORT

 Client: **Kennecott Eagle Mineral Company**
 Project: Waste Characterization
 Client Sample ID: **QAL-041-26 24-28'**
 Lab Sample ID: **0811218-02**
 Matrix: Soil
 Percent Solids: n/a

 Work Order: **0811218**
 Description: Laboratory Services
 Sampled: 10/31/08 00:00
 Sampled By: Kennecott
 Received: 11/01/08 08:45

Total Metals by EPA 6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Aluminum	1500	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Antimony	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/17/08	DWJ	0813462
Arsenic	0.71	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Barium	5.8	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Beryllium	<1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Boron	1.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Cadmium	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Calcium	630	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Cobalt	1.0	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Copper	3.2	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Iron	4600	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Lead	1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Lithium	2.0	1.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Magnesium	840	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Manganese	50	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Molybdenum	<10	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Nickel	2.5	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Potassium	240	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Silicon	370	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Silver	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Sodium	<50	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Strontium	<5.0	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Thallium	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Tin	<100	100	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813465
Titanium	130	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Vanadium	7.8	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Zinc	6.2	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388

ANALYTICAL REPORT

Client:	Kennecott Eagle Mineral Company	Work Order:	0811218
Project:	Waste Characterization	Description:	Laboratory Services
Client Sample ID:	QAL-041-26 24-28'	Sampled:	10/31/08 00:00
Lab Sample ID:	0811218-02	Sampled By:	Kennecott
Matrix:	Soil	Received:	11/01/08 08:45
Percent Solids:	n/a		

SPLP Metals by EPA 1312/6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Arsenic	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Barium	0.017	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Cadmium	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Chromium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Copper	0.0015	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Lead	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Mercury	<0.00020	0.00020	mg/L	1	USEPA-7470A	11/18/08	JMF	0813486
Nickel	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Selenium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Silver	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409

*See Statement of Data Qualifications

ANALYTICAL REPORT

Client:	Kennecott Eagle Mineral Company	Work Order:	0811218
Project:	Waste Characterization	Description:	Laboratory Services
Client Sample ID:	QAL-041-52 52-54'	Sampled:	10/31/08 00:00
Lab Sample ID:	0811218-03	Sampled By:	Kennecott
Matrix:	Soil	Received:	11/01/08 08:45
Percent Solids:	n/a		

Total Metals by EPA 6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Aluminum	6200	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Antimony	0.16	0.10	mg/kg dry wt.	1	USEPA-6020A	11/17/08	DWJ	0813462
Arsenic	0.92	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Barium	30	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Beryllium	<1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Boron	5.6	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Cadmium	0.053	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Calcium	29000	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Cobalt	3.1	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Copper	7.3	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Iron	10000	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Lead	2.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Lithium	7.5	1.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Magnesium	10000	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Manganese	150	5.0	mg/kg dry wt.	5	USEPA-6020A	11/19/08	KLV	0813388
Molybdenum	<10	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Nickel	8.6	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Potassium	900	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Silver	0.066	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Silicon	1200	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Sodium	110	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Strontium	21	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Thallium	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Tin	<100	100	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813465
Titanium	320	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Vanadium	14	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Zinc	18	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388

ANALYTICAL REPORT

Client:	Kennecott Eagle Mineral Company	Work Order:	0811218
Project:	Waste Characterization	Description:	Laboratory Services
Client Sample ID:	QAL-041-52 52-54'	Sampled:	10/31/08 00:00
Lab Sample ID:	0811218-03	Sampled By:	Kennecott
Matrix:	Soil	Received:	11/01/08 08:45
Percent Solids:	n/a		

SPLP Metals by EPA 1312/6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Arsenic	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Barium	0.037	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Cadmium	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Chromium	0.0016	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Copper	0.0027	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Lead	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Mercury	<0.00020	0.00020	mg/L	1	USEPA-7470A	11/18/08	JMF	0813486
Nickel	0.0017	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Selenium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Silver	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409

*See Statement of Data Qualifications

ANALYTICAL REPORT

Client: Kennecott Eagle Mineral Company	Work Order: 0811218
Project: Waste Characterization	Description: Laboratory Services
Client Sample ID: QAL-041-56 54-58'	Sampled: 10/31/08 00:00
Lab Sample ID: 0811218-04	Sampled By: Kennecott
Matrix: Soil	Received: 11/01/08 08:45
Percent Solids: n/a	

Total Metals by EPA 6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Aluminum	2900	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Antimony	0.12	0.10	mg/kg dry wt.	1	USEPA-6020A	11/17/08	DWJ	0813462
Arsenic	0.67	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Barium	11	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Beryllium	<1.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Boron	2.9	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	DWJ	0813388
Cadmium	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Calcium	11000	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Cobalt	1.7	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Copper	4.0	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Iron	6000	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Lead	1.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Lithium	3.6	1.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Magnesium	3800	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Manganese	81	2.0	mg/kg dry wt.	2	USEPA-6020A	11/19/08	KLV	0813388
Molybdenum	<10	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Nickel	4.4	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Potassium	450	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Silver	<0.050	0.050	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Silicon	660	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Sodium	67	50	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Strontium	8.9	5.0	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Thallium	<0.10	0.10	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Tin	<100	100	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813465
Titanium	180	10	mg/kg dry wt.	1	USEPA-6010B	11/19/08	JMF	0813386
Vanadium	7.9	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388
Zinc	10	1.0	mg/kg dry wt.	1	USEPA-6020A	11/19/08	KLV	0813388

ANALYTICAL REPORT

Client:	Kennecott Eagle Mineral Company	Work Order:	0811218
Project:	Waste Characterization	Description:	Laboratory Services
Client Sample ID:	QAL-041-56 54-58'	Sampled:	10/31/08 00:00
Lab Sample ID:	0811218-04	Sampled By:	Kennecott
Matrix:	Soil	Received:	11/01/08 08:45
Percent Solids:	n/a		

SPLP Metals by EPA 1312/6000/7000 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Analyzed	By	QC Batch
Arsenic	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Barium	0.019	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Cadmium	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
*Chromium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Copper	0.0015	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Lead	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Mercury	<0.00020	0.00020	mg/L	1	USEPA-7470A	11/18/08	JMF	0813486
Nickel	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Selenium	<0.0010	0.0010	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409
Silver	<0.00020	0.00020	mg/L	1	USEPA-6020A	11/14/08	DWJ	0813409

*See Statement of Data Qualifications

QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Aluminum/USEPA-6010B

QC Batch: 0813386 (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Method Blank			<10	mg/kg dry wt.					10
Laboratory Control Sample		125	123	mg/kg dry wt.	98	80-120			10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	1490	125	2060	mg/kg dry wt.	453	75-125			10
Matrix Spike Duplicate	1490	125	1940	mg/kg dry wt.	356	75-125	6	20	10

Analyte: Antimony/USEPA-6020A

QC Batch: 0813462 (3050B Digestion) Analyzed: 11/17/2008 By: DWJ

Method Blank			<0.10	mg/kg dry wt.					0.10
Laboratory Control Sample		20.0	19.2	mg/kg dry wt.	96	80-120			0.10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.0935	20.0	19.7	mg/kg dry wt.	98	75-125			0.10
Matrix Spike Duplicate	0.0935	20.0	19.7	mg/kg dry wt.	98	75-125	0.3	20	0.10

Analyte: Arsenic/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<0.10	mg/kg dry wt.					0.10
Laboratory Control Sample		20.0	20.1	mg/kg dry wt.	101	80-120			0.10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.624	20.0	19.6	mg/kg dry wt.	95	75-125			0.10
Matrix Spike Duplicate	0.624	20.0	20.0	mg/kg dry wt.	97	75-125	2	20	0.10

Analyte: Barium/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	20.4	mg/kg dry wt.	102	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	9.60	20.0	28.2	mg/kg dry wt.	93	75-125			0.10
Matrix Spike Duplicate	9.60	20.0	29.2	mg/kg dry wt.	98	75-125	3	20	0.10

Analyte: Beryllium/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: DWJ

Method Blank			<0.10	mg/kg dry wt.					0.10
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QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Beryllium/USEPA-6020A (Continued)

QC Batch: 0813388 (Continued) (3050B Digestion)						Analyzed: 11/19/2008	By: DWJ		
Laboratory Control Sample		20.0	19.2	mg/kg dry wt.	96	80-120			0.10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.120	20.0	19.4	mg/kg dry wt.	96	75-125			0.10
Matrix Spike Duplicate	0.120	20.0	19.9	mg/kg dry wt.	99	75-125	3	20	0.10

Analyte: Boron/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)						Analyzed: 11/19/2008	By: DWJ		
Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	19.1	mg/kg dry wt.	96	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	1.40	20.0	20.2	mg/kg dry wt.	94	75-125			1.0
Matrix Spike Duplicate	1.40	20.0	20.6	mg/kg dry wt.	96	75-125	2	20	1.0

Analyte: Cadmium/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)						Analyzed: 11/19/2008	By: KLV		
Method Blank			<0.050	mg/kg dry wt.					0.050
Laboratory Control Sample		20.0	20.4	mg/kg dry wt.	102	80-120			0.050
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.0175	20.0	20.6	mg/kg dry wt.	103	75-125			0.050
Matrix Spike Duplicate	0.0175	20.0	21.2	mg/kg dry wt.	106	75-125	3	20	0.050

Analyte: Calcium/USEPA-6010B

QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008	By: JMF		
Method Blank			<50	mg/kg dry wt.					50
Laboratory Control Sample		1250	1300	mg/kg dry wt.	104	80-120			50
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	455	1250	1870	mg/kg dry wt.	113	75-125			50
Matrix Spike Duplicate	455	1250	1830	mg/kg dry wt.	110	75-125	2	20	50

Analyte: Cobalt/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)						Analyzed: 11/19/2008	By: KLV		
Method Blank			<0.10	mg/kg dry wt.					0.10

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QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Cobalt/USEPA-6020A (Continued)

QC Batch: 0813388 (Continued) (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Laboratory Control Sample		20.0	20.2	mg/kg dry wt.	101	80-120			0.10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.941	20.0	21.2	mg/kg dry wt.	101	75-125			0.10
Matrix Spike Duplicate	0.941	20.0	21.2	mg/kg dry wt.	101	75-125	0.08	20	0.10

Analyte: Copper/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	21.1	mg/kg dry wt.	105	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	3.15	20.0	23.7	mg/kg dry wt.	103	75-125			0.10
Matrix Spike Duplicate	3.15	20.0	23.8	mg/kg dry wt.	103	75-125	0.4	20	0.10

Analyte: Iron/USEPA-6010B

QC Batch: 0813386 (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Method Blank			<5.0	mg/kg dry wt.					5.0
Laboratory Control Sample		25.0	26.4	mg/kg dry wt.	106	80-120			5.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	4410	25.0	4260	mg/kg dry wt.	0	75-125			5.0
Matrix Spike Duplicate	4410	25.0	4070	mg/kg dry wt.	0	75-125	5	20	5.0

Analyte: Lead/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	20.3	mg/kg dry wt.	101	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.932	20.0	20.7	mg/kg dry wt.	99	75-125			0.10
Matrix Spike Duplicate	0.932	20.0	21.5	mg/kg dry wt.	103	75-125	4	20	0.10

Analyte: Lithium/USEPA-6010B

QC Batch: 0813386 (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Method Blank			<1.0	mg/kg dry wt.					1.0
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QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Lithium/USEPA-6010B (Continued)

QC Batch: 0813386 (Continued) (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Laboratory Control Sample		25.0	24.6	mg/kg dry wt.	98	80-120		1.0	
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	1.84	25.0	26.1	mg/kg dry wt.	97	75-125		1.0	
Matrix Spike Duplicate	1.84	25.0	26.6	mg/kg dry wt.	99	75-125	2	20	1.0

Analyte: Magnesium/USEPA-6010B

QC Batch: 0813386 (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Method Blank			<50	mg/kg dry wt.				50	
Laboratory Control Sample		1250	1260	mg/kg dry wt.	101	80-120		50	
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	753	1250	2130	mg/kg dry wt.	110	75-125		50	
Matrix Spike Duplicate	753	1250	2120	mg/kg dry wt.	109	75-125	0.7	20	50

Analyte: Manganese/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.				1.0	
Laboratory Control Sample		20.0	20.6	mg/kg dry wt.	103	80-120		1.0	
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	50.3	20.0	75.4	mg/kg dry wt.	126	75-125		0.20	
Matrix Spike Duplicate	50.3	20.0	69.4	mg/kg dry wt.	96	75-125	8	20	0.20

Analyte: Molybdenum/USEPA-6010B

QC Batch: 0813386 (3050B Digestion) Analyzed: 11/19/2008 By: JMF

Method Blank			<10	mg/kg dry wt.				10	
Laboratory Control Sample		25.0	26.4	mg/kg dry wt.	106	80-120		10	
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<10	25.0	24.5	mg/kg dry wt.	98	75-125		10	
Matrix Spike Duplicate	<10	25.0	25.7	mg/kg dry wt.	103	75-125	5	20	10

Analyte: Nickel/USEPA-6020A

QC Batch: 0813388 (3050B Digestion) Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.				1.0
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QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Nickel/USEPA-6020A (Continued)									
QC Batch: 0813388 (Continued) (3050B Digestion)						Analyzed: 11/19/2008		By: KLV	
Laboratory Control Sample		20.0	20.1	mg/kg dry wt.	100	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	2.36	20.0	22.3	mg/kg dry wt.	100	75-125			0.10
Matrix Spike Duplicate	2.36	20.0	22.6	mg/kg dry wt.	101	75-125	1	20	0.10
Analyte: Potassium/USEPA-6010B									
QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008		By: JMF	
Method Blank			<50	mg/kg dry wt.					50
Laboratory Control Sample		1250	1270	mg/kg dry wt.	102	80-120			50
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	203	1250	1500	mg/kg dry wt.	104	75-125			50
Matrix Spike Duplicate	203	1250	1520	mg/kg dry wt.	106	75-125	2	20	50
Analyte: Silicon/USEPA-6010B									
QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008		By: JMF	
Method Blank			<50	mg/kg dry wt.					50
Laboratory Control Sample		125	108	mg/kg dry wt.	87	80-120			50
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	372	125	464	mg/kg dry wt.	74	75-125			50
Matrix Spike Duplicate	372	125	446	mg/kg dry wt.	59	75-125	4	20	50
Analyte: Silver/USEPA-6020A									
QC Batch: 0813388 (3050B Digestion)						Analyzed: 11/19/2008		By: KLV	
Method Blank			<0.050	mg/kg dry wt.					0.050
Laboratory Control Sample		20.0	21.3	mg/kg dry wt.	106	80-120			0.050
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.0225	20.0	20.5	mg/kg dry wt.	102	75-125			0.050
Matrix Spike Duplicate	0.0225	20.0	20.7	mg/kg dry wt.	104	75-125	1	20	0.050
Analyte: Sodium/USEPA-6010B									
QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008		By: JMF	
Method Blank			<50	mg/kg dry wt.					50

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QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Sodium/USEPA-6010B (Continued)

QC Batch: 0813386 (Continued) (3050B Digestion)						Analyzed: 11/19/2008	By: JMF		
Laboratory Control Sample		1250	1260	mg/kg dry wt.	101	80-120			50
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	20.3	1250	1270	mg/kg dry wt.	100	75-125			50
Matrix Spike Duplicate	20.3	1250	1290	mg/kg dry wt.	102	75-125	2	20	50

Analyte: Strontium/USEPA-6010B

QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008	By: JMF		
Method Blank			<5.0	mg/kg dry wt.					5.0
Laboratory Control Sample		25.0	25.6	mg/kg dry wt.	103	80-120			5.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	2.15	25.0	28.1	mg/kg dry wt.	104	75-125			5.0
Matrix Spike Duplicate	2.15	25.0	28.4	mg/kg dry wt.	105	75-125	0.8	20	5.0

Analyte: Thallium/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)						Analyzed: 11/19/2008	By: KLV		
Method Blank			<0.10	mg/kg dry wt.					0.10
Laboratory Control Sample		20.0	20.9	mg/kg dry wt.	104	80-120			0.10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.0125	20.0	20.6	mg/kg dry wt.	103	75-125			0.10
Matrix Spike Duplicate	0.0125	20.0	21.2	mg/kg dry wt.	106	75-125	3	20	0.10

Analyte: Tin/USEPA-6010B

QC Batch: 0813465 (3050B Digestion)						Analyzed: 11/19/2008	By: JMF		
Method Blank			<100	mg/kg dry wt.					100
Laboratory Control Sample		125	142	mg/kg dry wt.	114	80-120			100
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	4.07	125	143	mg/kg dry wt.	111	75-125			100
Matrix Spike Duplicate	4.07	125	144	mg/kg dry wt.	112	75-125	0.4	20	100

Analyte: Titanium/USEPA-6010B

QC Batch: 0813386 (3050B Digestion)						Analyzed: 11/19/2008	By: JMF		
Method Blank			<10	mg/kg dry wt.					10

Continued on next page

QUALITY CONTROL REPORT

Total Metals by EPA 6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Titanium/USEPA-6010B (Continued)

QC Batch: 0813386 (Continued) (3050B Digestion)

Analyzed: 11/19/2008 By: JMF

Laboratory Control Sample		25.0	26.0	mg/kg dry wt.	104	80-120			10
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	102	25.0	137	mg/kg dry wt.	140	75-125			10
Matrix Spike Duplicate	102	25.0	145	mg/kg dry wt.	171	75-125	6	20	10

Analyte: Vanadium/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)

Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	21.3	mg/kg dry wt.	107	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	7.64	20.0	28.1	mg/kg dry wt.	102	75-125			0.10
Matrix Spike Duplicate	7.64	20.0	27.7	mg/kg dry wt.	100	75-125	1	20	0.10

Analyte: Zinc/USEPA-6020A

QC Batch: 0813388 (3050B Digestion)

Analyzed: 11/19/2008 By: KLV

Method Blank			<1.0	mg/kg dry wt.					1.0
Laboratory Control Sample		20.0	20.7	mg/kg dry wt.	104	80-120			1.0
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	6.16	20.0	26.5	mg/kg dry wt.	102	75-125			1.0
Matrix Spike Duplicate	6.16	20.0	26.0	mg/kg dry wt.	99	75-125	2	20	1.0

QUALITY CONTROL REPORT

SPLP Metals by EPA 1312/6000/7000 Series Methods

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Arsenic/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
Laboratory Control Sample		0.100	0.0901	mg/L	90	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.000592	0.100	0.0933	mg/L	93	75-125			0.0010
Matrix Spike Duplicate	0.000592	0.100	0.0936	mg/L	93	75-125	0.2	20	0.0010

Analyte: Barium/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			0.011	mg/L					0.0010
*Laboratory Control Sample		0.100	0.102	mg/L	102	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
*Matrix Spike	0.00919	0.100	0.117	mg/L	108	75-125			0.0010
*Matrix Spike Duplicate	0.00919	0.100	0.105	mg/L	96	75-125	11	20	0.0010

Analyte: Cadmium/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.00020	mg/L					0.00020
Laboratory Control Sample		0.100	0.0907	mg/L	91	80-120			0.00020
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<0.00020	0.100	0.0942	mg/L	94	75-125			0.00020
Matrix Spike Duplicate	<0.00020	0.100	0.0947	mg/L	95	75-125	0.4	20	0.00020

Analyte: Chromium/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
Laboratory Control Sample		0.100	0.100	mg/L	100	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.000697	0.100	0.106	mg/L	105	75-125			0.0010
Matrix Spike Duplicate	0.000697	0.100	0.108	mg/L	107	75-125	2	20	0.0010

Analyte: Copper/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
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Continued on next page

QUALITY CONTROL REPORT

SPLP Metals by EPA 1312/6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Copper/USEPA-6020A (Continued)

QC Batch: 0813409 (Continued) (3010A SPLP Digestion)

Analyzed: 11/14/2008 By: DWJ

Laboratory Control Sample		0.100	0.0939	mg/L	94	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.00120	0.100	0.0998	mg/L	99	75-125			0.0010
Matrix Spike Duplicate	0.00120	0.100	0.100	mg/L	99	75-125	0.3	20	0.0010

Analyte: Lead/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion)

Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
Laboratory Control Sample		0.100	0.0926	mg/L	93	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<0.0010	0.100	0.0957	mg/L	96	75-125			0.0010
Matrix Spike Duplicate	<0.0010	0.100	0.0987	mg/L	99	75-125	3	20	0.0010

Analyte: Mercury/USEPA-7470A

QC Batch: 0813486 (7470A SPLP Digestion)

Analyzed: 11/18/2008 By: JMF

Method Blank			<0.00020	mg/L					0.00020
Laboratory Control Sample		0.00200	0.00202	mg/L	101	80-120			0.00020
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<0.00020	0.00400	0.00386	mg/L	96	80-120			0.00020
Matrix Spike Duplicate	<0.00020	0.00400	0.00383	mg/L	96	80-120	0.7	20	0.00020

Analyte: Nickel/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion)

Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
Laboratory Control Sample		0.100	0.0910	mg/L	91	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	0.000382	0.100	0.0968	mg/L	96	75-125			0.0010
Matrix Spike Duplicate	0.000382	0.100	0.0974	mg/L	97	75-125	0.6	20	0.0010

Analyte: Selenium/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion)

Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.0010	mg/L					0.0010
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QUALITY CONTROL REPORT

SPLP Metals by EPA 1312/6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
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Analyte: Selenium/USEPA-6020A (Continued)

QC Batch: 0813409 (Continued) (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Laboratory Control Sample		0.100	0.0831	mg/L	83	80-120			0.0010
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<0.0010	0.100	0.0857	mg/L	86	75-125			0.0010
Matrix Spike Duplicate	<0.0010	0.100	0.0857	mg/L	86	75-125	0.02	20	0.0010

Analyte: Silver/USEPA-6020A

QC Batch: 0813409 (3010A SPLP Digestion) Analyzed: 11/14/2008 By: DWJ

Method Blank			<0.00020	mg/L					0.00020
Laboratory Control Sample		0.100	0.0929	mg/L	93	80-120			0.00020
0811218-01 [QAL-041-16 14-18']									
Matrix Spike	<0.00020	0.100	0.0953	mg/L	95	75-125			0.00020
Matrix Spike Duplicate	<0.00020	0.100	0.0963	mg/L	96	75-125	1	20	0.00020

STATEMENT OF DATA QUALIFICATIONS
Total Metals by EPA 6000/7000 Series Methods

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:	0811218-01	QAL-041-16	14-18'	Arsenic
	0811218-01	QAL-041-16	14-18'	Boron
	0811218-01	QAL-041-16	14-18'	Nickel
	0811218-01	QAL-041-16	14-18'	Zinc

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.

Analysis: USEPA-6010B

Sample/Analyte:	0811218-01	QAL-041-16	14-18'	Silicon
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Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6010B

Sample/Analyte:	0811218-01	QAL-041-16	14-18'	Aluminum
	0811218-01	QAL-041-16	14-18'	Iron
	0811218-01	QAL-041-16	14-18'	Titanium

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is not qualified.

Analysis: USEPA-6020A

Sample/Analyte:	0811218-01	QAL-041-16	14-18'	Manganese
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STATEMENT OF DATA QUALIFICATIONS**SPLP Metals by EPA 1312/6000/7000 Series Methods**

Qualification: The analyte concentration in the associated MB was greater than or equal to the RL. The positive sample result, which was less than 5 times the MB value, is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:	0811218-01	QAL-041-16 14-18'	Barium
	0811218-02	QAL-041-26 24-28'	Barium
	0811218-03	QAL-041-52 52-54'	Barium
	0811218-04	QAL-041-56 54-58'	Barium

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:	0811218-02	QAL-041-26 24-28'	Selenium
	0811218-03	QAL-041-52 52-54'	Chromium
	0811218-04	QAL-041-56 54-58'	Chromium



5560 Corporate Exchange Court SE Grand Rapids, MI 49512
 Phone (616) 975-4500 Fax (616) 942-7463
 www.trimatrixlabs.com

Chain of Custody Record

COC No. **126696**

For Lab Use Only

Cart: Heed
 VOA Rack/Tray: 3-8
 Receipt Log No.: 3-8
 Project Chemist: [Signature]
 Laboratory Project No.: 0811218

Client Name: Kennecott Exploration
 Address: _____
 Project Name: _____
 Client Project No./P.O. No.: _____
 Invoice No.: _____
 Client
 Other (comments)
 Contact/Report To: _____
 Phone: _____
 Fax: _____

Analyses Requested

Container Type (corresponds to Container Packing List)

24 (800) Number of Containers Submitted

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	C O M P	G R A B	Matrix	Total	Sample Comments
04		01	QAL-041-110		10-31					1	
		02	20	24-28						1	
		03	52	52-54						1	
		04	50	51-58						1	

Sampled By (print)

How Shipped? Hand Carrier _____
 Tracking No. _____

Comments

1. Relinquished By _____ Date _____ Time _____

2. Relinquished By _____ Date _____ Time _____

3. Relinquished By _____ Date _____ Time _____

1. Received By _____ Date _____ Time _____

2. Received By _____ Date _____ Time _____

3. Received For Lab By _____ Date _____ Time _____

Company: _____

11-10-08 0845

- ← PRESERVATIVES
- A NONE pH~7
- B HNO₃ pH<2
- C H₂SO₄ pH<2
- D 1+1 HCl pH<2
- E NaOH pH>12
- F ZnAc²/NaOH pH>9
- G MeOH
- H Other (note below)

ATTACHMENT B

QAL-041 BORING/WELL CONSTRUCTION LOG AND GRAIN SIZE
DISTRIBUTION (North Jackson Company, 2006)

Table 2
Grain Size Distribution for Quaternary Deposits
Eagle Project

Location	Depth (ft)	Geologic Description	Zone Designation	USCS Classification	Percentage Retained by Weight (%)						
					Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Fines (Silt + Clay)
QAL038	0	Unsaturated outwash sand	A+	SP	3.5	3.2	21	70			2.4
QAL038	2		A+	SP	3.2	2.3	22	72			0.3
QAL038	4		A+	SP	0.2	0.3	14	85			0.6
QAL031	5		A+	SP	0.7	1.1	13	84			0.9
QAL041	5		A+	SP	1.5	2.1	15	79			1.8
QAL037	6		A+	SP	1.7	1.5	17	79			0.8
QAL038	6		A+	SP	1.8	1.2	12	84			1.5
QAL036	7		A+	SP	1.0	1.2	17	81			0.5
QAL039	7		A+	SP	0.8	0.5	8.1	89			1.8
QAL040	7		A+	SP	0.3	1.1	12	85			1.3
QAL042	7		A+	SP	2.4	0.6	8.3	86			2.6
QAL038	8		A+	SP	1.0	0.6	8.0	89			1.2
QAL008	10		A+	SP	3.7	0.9	12	83			0.7
QAL004*	15		A+	SP-SM	15	11	44	24			6.5
QAL041	18		A+	SP	1.7	3.0	21	72			2.7
QAL008	30		A+	SP/SP-SM	6.4	1.5	24	64			4.4
QAL009*	37		A+	SP	0.1	0.7	11	85			3.5
QAL041	37		A+	SP-SM	0.1	0.5	6.4	83			10
QAL031	44		A+	SM/SP-SM	0.0	0.0	0.2	86			14
QAL036	60		A+	SP	0.0	0.0	2.9	96			1.1
Average			A+		2.3	1.6	14	79			3.0
QAL006*	23	Saturated outwash sand (upper zone)	A	SP	0.0	0.3	19	79			1.4
QAL004*	52		A/B	SM	0.1	0.9	3.1	80			16
QAL036	80		A	SM	0.0	0.0	0.3	51	46	2.8	49
QAL009*	102		A	SP/SP-SM	0.0	0.0	1.4	94			4.3
Average			A		0.0	0.3	6.9	77			16
QAL041	55	Transitional fine sand, silt and clay	B	SM	0.0	0.0	0.2	78	20	1.8	22
QAL029	55		B	CH	0.0	0.0	0.3	3.1	69	28	97
QAL006*	71		B	SP	0.0	0.0	0.2	96			3.8
QAL005*	75		B	SM	0.0	0.0	0.0	74	25	0.5	26
QAL008*	84		B	ML	0.0	0.0	0.1	16	77	7.0	84
QAL036	87		B	ML	0.0	0.0	0.3	21	73	5.5	79
QAL008*	88		B	SP-SM	0.0	0.0	0.7	90			9.6
QAL031	61		B	ML/CL-ML	0.0	0.0	0.4	8.9	85	5.7	91
QAL031	79		B	SM	1.5	0.4	4.0	66	23	5.0	28
Average			B		0.2	0.1	0.8	49			50
QAL036	91	Lacustrine lean clay	C	CL-ML	0.0	0.1	0.3	4.3	68	27	95
QAL004*	98-100		C	CL-ML	0.0	0.0	0.0	0.2	93	7.0	100
QAL008*	107-109		C	CL	0.0	0.0	0.2	2.7	59	38	97
Average			C		0.0	0.0	0.2	2.4			97
QAL041	80	Lower outwash sand (lower zone)	D**	SP	17	6.3	25	50			2.4
QAL036	103		D	SP	16	3.5	18	59			2.5
QAL041	105		D	SP	0.0	0.0	1.3	94			4.4
QAL031	106		D	SP-SM	0.0	0.3	11	80	7.7	1.5	9.2
QAL031	111		D	SM	0.2	0.4	1.6	41	51	6.5	57
QAL008*	117		D	SP	0.4	0.2	22	75			3.4
QAL005*	121		D	SP	26	12	28	33			2.3
QAL004*	142		D	SM	2.6	7.1	18	55			18
QAL009*	145		D	SP/SP-SM	0.3	4.5	32	58			5.2
Average			D		6.9	3.8	17	60			12
QAL036	120	Clayey glacial till	E	SC	33	11	15	9.8	12	19	31
QAL031	123		E	SM-SC	42	11	14	7.6	11	15	26
QAL009*	157		E	CH	1.2	0.1	1.0	5.3	14	78	92
QAL009*	163		E	SM	0.0	0.2	17	58			26
QAL009*	185		E	SM	0.0	0.0	0.2	71	22	6.2	28
QAL009*	238		E	ML	0.0	0.0	0.6	11	83	6.4	89
QAL009*	254		E	SC	29	8.5	12	27	15	9.2	24
Average			E		15	4.5	8.4	27			45

*Data from EBS (NJC 2005a)

**Zone unsaturated at this location

Table 2: Grain Size Distribution

North Jackson Company **Boring/Well Construction Report**

Bore Hole: **QAL041**
Project: **Eagle**

1004 Harbor Hills Drive, Suite 102 PO Box 218 Marquette, MI 49855 phone: 906.225.6787 fax: 906.225.6769

Owner: Kennecott Minerals Co.
Contractor: Prosonic
Geologist: DWW, North Jackson Co.
Sampling method: Sonic 4" continuous core

Surface Elevation (ft MSL): 1463
Started: 7/29/2005 **Total Depth (ft):** 114
Completed: 7/29/2005 **Easting (UTM):** 432930.46
Northing (UTM): 5177637.78

Depth (ft)	Core Intervals	Sample Location	Sample Number	Sample Type	Color	Blow Counts	Moisture Content	Lithologic Description	Well Construction (Sonic Rig Installation)
0							↑	SP Unsaturated Outwash: sand, poorly graded, mostly fine-medium grained, loose, yellowish red	0-2: Cement
					5YR 5/8		moist		2-88: Cement-Bentonite Slurry
10							↑	SP sand, poorly graded, mostly fine-medium grained, trace gravel, loose, reddish brown	
					5YR 5/4		moist		
20		EAG-1001505		grain size bag			↑	SP sand, poorly graded, mostly fine-medium grained, 5-10% coarse mafic grains, 5% gravel, loose, light reddish brown	0-95: PVC Casing, 2 inch diameter.
					5YR 6/4		moist		

1004 Harbor Hills Drive, Suite 102 PO Box 218 Marquette, MI 49855 phone: 906.225.6787 fax: 906.225.6769

Owner: Kennecott Minerals Co.
Contractor: Prosonic
Geologist: DWW, North Jackson Co.
Sampling method: Sonic 4" continuous core

Surface Elevation (ft MSL): 1463
Started: 7/29/2005 **Total Depth (ft):** 114
Completed: 7/29/2005 **Easting (UTM):** 432930.46
Northing (UTM): 5177637.78

Depth (ft)	Core Intervals Sample Location	Sample Number	Sample Type	Color	Blow Counts	Moisture Content	Lithologic Description	Well Construction (Sonic Rig Installation)
30							SP-SM silty sand, light reddish brown	
	EAG-1001506	grain size bag	5YR 6/4			moist		
40							SP sand, poorly sorted, mostly fine grained, light reddish brown	
			5YR 6/4			moist		
50							ML Transitional Deposit: silt, medium stiff, non plastic, brown	
			7.5YR 4/3			moist		

1004 Harbor Hills Drive, Suite 102 PO Box 218 Marquette, MI 49855 phone: 906.225.6787 fax: 906.225.6769

Owner: Kennecott Minerals Co.
Contractor: Prosonic
Geologist: DWW, North Jackson Co.
Sampling method: Sonic 4" continuous core

Surface Elevation (ft MSL): 1463
Started: 7/29/2005 **Total Depth (ft):** 114
Completed: 7/29/2005 **Easting (UTM):** 432930.46
Northing (UTM): 5177637.78

Depth (ft)	Core Intervals Sample Location	Sample Number	Sample Type	Color	Blow Counts	Moisture Content	Lithologic Description	Well Construction (Sonic Rig Installation)	
60	EAG-1001507	grain size bag	5YR 5/4	5YR 5/4	moist	SM-ML	sandy silt, reddish brown		
							ML		clayey silt, reddish brown
70							5YR 5/4		SP
80			5YR 5/4		moist				

1004 Harbor Hills Drive, Suite 102 PO Box 218 Marquette, MI 49855 phone: 906.225.6787 fax: 906.225.6769

Owner: Kennecott Minerals Co.
Contractor: Prosonic
Geologist: DWW, North Jackson Co.
Sampling method: Sonic 4" continuous core

Surface Elevation (ft MSL): 1463
Started: 7/29/2005 **Total Depth (ft):** 114
Completed: 7/29/2005 **Easting (UTM):** 432930.46
Northing (UTM): 5177637.78

Depth (ft)	Core Intervals Sample Location	Sample Number	Sample Type	Color	Blow Counts	Moisture Content	Lithologic Description	Well Construction (Sonic Rig Installation)
80	EAG-1001508	grain size bag	7.5YR 4/3	7.5YR 4/3		↑ wet	SP sand, poorly sorted, mostly fine-medium grained with gravel and cobbles, brown	
						↓	SP sand, poorly sorted, mostly fine grained, brown	
						↑ wet	SP sand, poorly sorted, mostly fine grained, reddish brown	
						↓	SP Saturated Outwash: sand, poorly sorted, mostly fine grained, reddish brown	
90	EAG-1001509	grain size bag	7.5YR 4/3	5YR 5/4		↑ wet	SP sand, poorly sorted, mostly fine grained, loose, brown	88-92.5: Bentonite
						↓	SP	92.5-105: Sand
100						↑ saturated	SP	95-105: PVC Screen. 2 inch diameter.
								105-107: Sand

North Jackson Company **Boring/Well Construction Report**

Bore Hole: **QAL041**
 Project: **Eagle**

1004 Harbor Hills Drive, Suite 102 PO Box 218 Marquette, MI 49855 phone: 906.225.6787 fax: 906.225.6769

Owner: Kennecott Minerals Co.
Contractor: Prosonic
Geologist: DWW, North Jackson Co.
Sampling method: Sonic 4" continuous core

Surface Elevation (ft MSL): 1463
Started: 7/29/2005 **Total Depth (ft):** 114
Completed: 7/29/2005 **Easting (UTM):** 432930.46
Northing (UTM): 5177637.78

Depth (ft)	Core Intervals Sample Location	Sample Number	Sample Type	Color	Blow Counts	Moisture Content	Lithologic Description	Well Construction (Sonic Rig Installation)
110						↓	GC Glacial Till: gravelly clay, brown	
				7.5YR 4/3	saturated			