C Data Validation Reports

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2012 Data Validation Reports

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1209359**
Sampling Dates: 09/09, 09/10, & 09/11/2012	**Sample Matrix: Tissue**
Analytical Method: Arsenic Speciation by EPA 1632	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/19/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	12UP04BF	1209359-01
2	12SM24BF	1209359-02
3	12UP02BF	1209359-03
4	12UP07BF	1209359-04
5	12UP08BF	1209359-05
6	12RD12BF	1209359-06
7	12RD18BF	1209359-07
8	12RD14BF	1209359-08
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- * Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	NO
6	Duplicate Analyses	NA
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	NO

Comments: N/A: Not Applicable. NA: Not Analyzed

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 12UP04BF was used for inorganic As MS/MSD analysis and sample 12RD18BF was used for arsenite MS/MSD analysis. The recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_____ **Acceptable**
__X__ **Detection Limits Adjusted**

The following blanks were analyzed:
__X__ **Method (preparation) Blanks**
_____ **Field Blanks**
_____ **Calibration Blanks**
__X__ **Rinsate Blanks**
_____ **Background Samples**

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount of arsenite was detected in the following blanks.

Method Blank in the batch F210257, analyzed on 10/5/12: 0.001 mg/kg of Arsenite
Rinsate Blank in the batch F210257, analyzed on 10/5/12, 0.0008 mg/kg of Arsenite
The detected Arsenite results in samples 12UP04BF, 12SM24BF, 12UP02BF, 12UP07BF, 12RD12BF, and 12RD14BF were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

Method blank in the batch F210074, analyzed on 10/8/12: 0.002 mg/kg of Arsenite
The detected Arsenite result in sample 12RD18BF was qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

6. DUPLICATE ANALYSES

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
__X__ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
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$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPD of MS & MSD was less than 35%.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$ug/L = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$mg/kg = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
The validator contacted the laboratory and verified followings: With the exception of CVAA Hg (7471B), all of the analyses were performed on dried sample (oven dried for ICP/ICP-MS/Se-Hydride, freeze dried for Me-Hg and As speciation) and the reported results were dry weight basis.
Sample 12UP08BF
Inorganic Arsenic: (0.477 ug/L) (0.01L/0.5872 g) = 0.0081 ug/g = 0.0081 mg/kg.
Lab reported 0.008 mg/kg.

Arsenite: (0.347 ug/L) (0.01L/0.5872 g) = 0.0059 ug/g = 0.0059 mg/kg.
Lab reported 0.006 mg/kg.

Arsenate: (0.008 mg/kg) – (0.006 mg/kg) = 0.002 mg/kg.
Lab reported ND<0.009 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

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GLOBAL SCIENCES

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ANALYTICAL RESULTS

12UP04BF

Matrix: Tissue **Laboratory ID:** 1209359-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.008	mg/kg	1	1209359-01	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.001 U	0.0005	0.004	mg/kg	10	1209359-01RE1	F210257	2J19008	10/05/12 11:10	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.008	mg/kg	10	1209359-01RE1	F209309	2J03006	10/02/12 11:53	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-01RE1	F210069	2J10024	10/10/12 11:45	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12SM24BF

Matrix: Tissue **Laboratory ID:** 1209359-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.009	mg/kg	1	1209359-02	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.002 U	0.0005	0.004	mg/kg	10	1209359-02RE1	F210257	2J19008	10/05/12 00:11	EPA 1632	J
Inorganic Arsenic	ND	0.005	0.009	mg/kg	10	1209359-02	F209309	2J03006	10/02/12 13:00	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-02RE1	F210069	2J10024	10/10/12 15:04	EPA 1630 Mod/FGS-070	U

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ANALYTICAL RESULTS

12UP02BF

Matrix: Tissue **Laboratory ID:** 1209359-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-03	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.002 U	0.0005	0.004	mg/kg	10	1209359-03RE1	F210257	2J19008	10/05/12 00:17	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.009	mg/kg	10	1209359-03	F209309	2J03006	10/02/12 13:08	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-03	F210069	2J10024	10/10/12 12:55	EPA 1630 Mod/FGS-070	U

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ANALYTICAL RESULTS

12UP07BF

Matrix: Tissue **Laboratory ID:** 1209359-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.009	mg/kg	1	1209359-04	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	**0.005**	U 0.0006	0.004	mg/kg	10	1209359-04RE1	F210257	2J19008	10/05/12 00:23	EPA 1632	
Inorganic Arsenic	**0.006**	0.005	0.009	mg/kg	10	1209359-04	F209309	2J03006	10/02/12 13:14	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-04	F210069	2J10024	10/10/12 13:07	EPA 1630 Mod/FGS-070	U

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ANALYTICAL RESULTS

12UP08BF

Matrix: Tissue **Laboratory ID:** 1209359-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-05	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	**0.006**	0.0005	0.004	mg/kg	10	1209359-05RE1	F210257	2J19008	10/05/12 00:30	EPA 1632	
Inorganic Arsenic	**0.008**	0.004	0.009	mg/kg	10	1209359-05	F209309	2J03006	10/02/12 13:20	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-05	F210069	2J10024	10/10/12 13:19	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12RD12BF

Matrix: Tissue **Laboratory ID:** 1209359-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.010	mg/kg	1	1209359-06	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.003 U	0.0006	0.005	mg/kg	10	1209359-06RE1	F210257	2J19008	10/05/12 00:40	EPA 1632	J
Inorganic Arsenic	ND	0.005	0.010	mg/kg	10	1209359-06	F209309	2J03006	10/02/12 13:30	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-06	F210069	2J10024	10/10/12 13:31	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12RD18BF

Matrix: Tissue **Laboratory ID:** 1209359-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.010	mg/kg	1	1209359-07	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.007 U	0.0006	0.005	mg/kg	10	1209359-07RE1	F210074	2J09006	10/08/12 00:38	EPA 1632	
Inorganic Arsenic	0.006	0.005	0.010	mg/kg	10	1209359-07RE1	F210064	2J08009	10/07/12 16:09	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-07RE1	F210069	2J10024	10/10/12 12:32	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12RD14BF

Matrix: Tissue **Laboratory ID:** 1209359-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-08	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.005 U	0.0005	0.004	mg/kg	10	1209359-08RE1	F210257	2J19008	10/05/12 00:45	EPA 1632	
Inorganic Arsenic	0.007	0.004	0.009	mg/kg	10	1209359-08	F209309	2J03006	10/02/12 13:38	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-08	F210069	2J10024	10/10/12 14:29	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

Rinse Blank - Prep Sink 1

Matrix: Tissue **Laboratory ID:** 1209359-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-09	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.0008	0.0005	0.004	mg/kg	10	1209359-09RE1	F210257	2J19008	10/05/12 00:50	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.009	mg/kg	10	1209359-09	F209309	2J03006	10/02/12 13:43	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.4	1.7	ng/g	500	1209359-09	F210069	2J10024	10/10/12 14:41	EPA 1630 Mod/FGS-070	U

11/19/12

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PREPARATION BLANKS

Matrix: Tissue
Sequence: 2J09006
Instrument: AAS-1
Preparation: Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210074-BLK1	Arsenite	0.002	0.0006	mg/kg	F210074	10/08/12 00:21	EPA 1632	J

11/19/12

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PREPARATION BLANKS

Matrix: Tissue
Sequence: 2J19008
Instrument: AAS-1
Preparation: Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210257-BLK1	Arsenite	0.001	0.0006	mg/kg	F210257	10/05/12 10:54	EPA 1632	J

11/19/12

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11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
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PREPARATION BLANKS

Matrix: Tissue
Sequence: 2J03006
Instrument: AAS-1
Preparation: Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F209309-BLK1	Inorganic Arsenic	0.00003	0.005	mg/kg	F209309	10/02/12 11:27	EPA 1632	U

11/19/12

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PREPARATION BLANKS

Matrix: Tissue **Sequence:** 2J08009

Instrument: AAS-1 **Preparation:** Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210064-BLK1	Inorganic Arsenic	0.0006	0.005	mg/kg	F210064	10/07/12 15:53	EPA 1632	U

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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record

1209359

TestAmerica — THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine	Carrier Tracking No(s):	COC No: 580-10281.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-35131-1
Address: 11720 North Creek Pkwy North, Suite 400,	Due Date Requested: 10/14/2012			Preservation Codes:
City: Bothell	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2S03, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: WA, 98011	PO #:			
Phone:	WO #:			
Email:				
Project Name: Red Devil Mine - Optional Tasks	Project #: 58006008			
Site:	SSOW#:			Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT/ 1632-Arsenic Speciation As III and As V	SUBCONTRACT/ 1630 Methyl Mercury	Total Number of containers	Special Instructions/Note:
12UP04BF	9/9/12	11:23 Alaskan		Tissue			X	X		
12SM24BF	9/9/12	12:17 Alaskan		Tissue			X	X		
12UP02BF	9/9/12	13:42 Alaskan		Tissue			X	X		
12UP07BF	9/9/12	15:08 Alaskan		Tissue			X	X		
12UP06BF	9/10/12	13:12 Alaskan		Tissue			X	X		
12RD12BF	9/10/12	15:40 Alaskan		Tissue			X	X		
12RD18BF	9/10/12	17:03 Alaskan		Tissue			X	X		
12RD14BF	9/11/12	12:33 Alaskan		Tissue			X	X		

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:
Empty Kit Relinquished by:	Date: Time: Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	9/27/12 1132	TA-SEA		9/27/12 1305	FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: 102481

Cooler Temperature(s) °C and Other Remarks: 4.3°C TID 3150

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1209359**
Sampling Dates: 09/09, 09/10, & 09/11/2012	**Sample Matrix: Tissue**
Analytical Method: Methyl Hg by EPA 1630M	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/19/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	12UP04BF	1209359-01
2	12SM24BF	1209359-02
3	12UP02BF	1209359-03
4	12UP07BF	1209359-04
5	12UP08BF	1209359-05
6	12RD12BF	1209359-06
7	12RD18BF	1209359-07
8	12RD14BF	1209359-08
9		
10		
11		
12		
13		
14		
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16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample with Lab ID 1209359-07 was used for matrix spike and matrix spike duplicate analysis of methyl Hg and the recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPD of LCS and LCSD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Not applicable since no detection of methyl Hg in the samples.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP)*.

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP)*.

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

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ANALYTICAL RESULTS

12UP04BF

Matrix: Tissue **Laboratory ID:** 1209359-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.008	mg/kg	1	1209359-01	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.001	0.0005	0.004	mg/kg	10	1209359-01RE1	F210257	2J19008	10/05/12 11:10	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.008	mg/kg	10	1209359-01RE1	F209309	2J03006	10/02/12 11:53	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-01RE1	F210069	2J10024	10/10/12 11:45	EPA 1630 Mod/FGS-070	U

11/19/12

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Kate Haney, Client Services Manager

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ANALYTICAL RESULTS

12SM24BF

Matrix: Tissue **Laboratory ID:** 1209359-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.009	mg/kg	1	1209359-02	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.002	0.0005	0.004	mg/kg	10	1209359-02RE1	F210257	2J19008	10/05/12 00:11	EPA 1632	J
Inorganic Arsenic	ND	0.005	0.009	mg/kg	10	1209359-02	F209309	2J03006	10/02/12 13:00	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-02RE1	F210069	2J10024	10/10/12 15:04	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12UP02BF

Matrix: Tissue **Laboratory ID:** 1209359-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-03	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.002	0.0005	0.004	mg/kg	10	1209359-03RE1	F210257	2J19008	10/05/12 00:17	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.009	mg/kg	10	1209359-03	F209309	2J03006	10/02/12 13:08	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-03	F210069	2J10024	10/10/12 12:55	EPA 1630 Mod/FGS-070	U

11/13/12

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ANALYTICAL RESULTS

12UP07BF

Matrix: Tissue **Laboratory ID:** 1209359-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.009	mg/kg	1	1209359-04	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.005	0.0006	0.004	mg/kg	10	1209359-04RE1	F210257	2J19008	10/05/12 00:23	EPA 1632	
Inorganic Arsenic	0.006	0.005	0.009	mg/kg	10	1209359-04	F209309	2J03006	10/02/12 13:14	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-04	F210069	2J10024	10/10/12 13:07	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12UP08BF

Matrix: Tissue

Laboratory ID: 1209359-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-05	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.006	0.0005	0.004	mg/kg	10	1209359-05RE1	F210257	2J19008	10/05/12 00:30	EPA 1632	
Inorganic Arsenic	0.008	0.004	0.009	mg/kg	10	1209359-05	F209309	2J03006	10/02/12 13:20	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-05	F210069	2J10024	10/10/12 13:19	EPA 1630 Mod/FGS-070	U

11/13/12

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ANALYTICAL RESULTS

12RD12BF

Matrix: Tissue **Laboratory ID:** 1209359-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.010	mg/kg	1	1209359-06	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.003	0.0006	0.005	mg/kg	10	1209359-06RE1	F210257	2J19008	10/05/12 00:40	EPA 1632	J
Inorganic Arsenic	ND	0.005	0.010	mg/kg	10	1209359-06	F209309	2J03006	10/02/12 13:30	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.8	ng/g	500	1209359-06	F210069	2J10024	10/10/12 13:31	EPA 1630 Mod/FGS-070	U

11/19/12

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ANALYTICAL RESULTS

12RD18BF

Matrix: Tissue **Laboratory ID:** 1209359-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.005	0.010	mg/kg	1	1209359-07	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.007	0.0006	0.005	mg/kg	10	1209359-07RE1	F210074	2J09006	10/08/12 00:38	EPA 1632	
Inorganic Arsenic	0.006	0.005	0.010	mg/kg	10	1209359-07RE1	F210064	2J08009	10/07/12 16:09	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-07RE1	F210069	2J10024	10/10/12 12:32	EPA 1630 Mod/FGS-070	U

11/19/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

12RD14BF

Matrix: Tissue **Laboratory ID:** 1209359-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-08	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.005	0.0005	0.004	mg/kg	10	1209359-08RE1	F210257	2J19008	10/05/12 00:45	EPA 1632	
Inorganic Arsenic	0.007	0.004	0.009	mg/kg	10	1209359-08	F209309	2J03006	10/02/12 13:38	EPA 1632	J

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.5	1.9	ng/g	500	1209359-08	F210069	2J10024	10/10/12 14:29	EPA 1630 Mod/FGS-070	U

11/13/12

Frontier Global Sciences, Inc.

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Fx: 425-686-3096

ANALYTICAL RESULTS

Rinse Blank - Prep Sink 1

Matrix: Tissue **Laboratory ID:** 1209359-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	0.004	0.009	mg/kg	1	1209359-09	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	0.0008	0.0005	0.004	mg/kg	10	1209359-09RE1	F210257	2J19008	10/05/12 00:50	EPA 1632	J
Inorganic Arsenic	ND	0.004	0.009	mg/kg	10	1209359-09	F209309	2J03006	10/02/12 13:43	EPA 1632	U

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	ND	0.4	1.7	ng/g	500	1209359-09	F210069	2J10024	10/10/12 14:41	EPA 1630 Mod/FGS-070	U

11/19/12

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Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

PREPARATION BLANKS

Matrix: Tissue
Sequence: 2J10024
Instrument: Hg-15
Preparation: KOH/Methanol Hg Digestion

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210069-BLK1	Methyl Mercury	-0.03	0.5	ng/g	F210069	10/10/12 09:25	1630 Mod/FGS	U
F210069-BLK2	Methyl Mercury	0.1	0.5	ng/g	F210069	10/10/12 09:36	1630 Mod/FGS	U
F210069-BLK3	Methyl Mercury	0.03	0.5	ng/g	F210069	10/10/12 09:48	1630 Mod/FGS	U

11/19/12

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FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
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Ph: 425-686-1996
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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record

1209359

TestAmerica — THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine	Carrier Tracking No(s):	COC No: 580-10281.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-35131-1
Address: 11720 North Creek Pkwy North, Suite 400,	Due Date Requested: 10/14/2012			Preservation Codes:
City: Bothell	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: WA, 98011				
Phone:	PO #:			Other:
Email:	WO #:			
Project Name: Red Devil Mine - Optional Tasks	Project #: 58006008			
Site:	SSOW#:			

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT/ 1632-Arsenic Speciation As III and As V	SUBCONTRACT/ 1630 Methyl Mercury	Total Number of containers	Special Instructions/Note:
12UP04BF	9/9/12	11:23 Alaskan		Tissue			X	X		
12SM24BF	9/9/12	12:17 Alaskan		Tissue			X	X		
12UP02BF	9/9/12	13:42 Alaskan		Tissue			X	X		
12UP07BF	9/9/12	15:08 Alaskan		Tissue			X	X		
12UP08BF	9/10/12	13:12 Alaskan		Tissue			X	X		
12RD12BF	9/10/12	15:40 Alaskan		Tissue			X	X		
12RD18BF	9/10/12	17:03 Alaskan		Tissue			X	X		
12RD14BF	9/11/12	12:33 Alaskan		Tissue			X	X		

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 9/27/12 1132	Company: TA-SEA	Received by:	Date/Time: 9/27/12 1320	Company: FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No | Custody Seal No.: 102480

Cooler Temperature(s) °C and Other Remarks: 4.3°C TID 3150

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1209358**
Sampling Dates: 09/16/2012	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630M	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song — **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	0912KR62SD	1209358-01
2	0912KR70SD	1209358-02
3		
4		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- NR — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- NR — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- NR — ICP Interelement Correction Factors
- NR — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Laboratory Control Samples Analyzed**

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Matrix Spikes Analyzed**

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample with Lab ID 1210018-01 was used for matrix spike and matrix spike duplicate analysis of methyl Hg and the recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

	1209360-02	1209360-02 DUP	RPD (%)
Methyl Mercury, ng/g	1.896	2.013	6

Comments: The RPD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 0912KR62SD:
Methyl Hg: (0.6628 ng/L) (0.288 L/0.525 g) (100/83.4) = 0.43596 ng/g.
Lab reported 0.436 ng/g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

FRONTIER
GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

0912KR62SD

Matrix: Soil/Sediment **Laboratory ID:** 1209358-01

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	0.436	0.010	0.063	ng/g dry	.950570	1209358-01RE1	F210111	2J11017	10/11/12 14:48	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	83.4	0.1	0.1	% by Weight	1	1209358-01	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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Ph: 425-686-1996
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ANALYTICAL RESULTS

0912KR70SD

Matrix: Soil/Sediment **Laboratory ID:** 1209358-02

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	0.676	0.096	0.620	ng/g dry	10	1209358-02	F210111	2J11017	10/11/12 12:33	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	84.7	0.1	0.1	% by Weight	1	1209358-02	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

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11720 North Creek Parkway North, Suite 400
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Ph: 425-686-1996
Fx: 425-686-3096

PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 2J11017

Instrument: Hg-15 **Preparation:** Methylene Chloride Extraction for Methyl Hg

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210111-BLK1	Methyl Mercury	0.006	0.008	ng/g wet	F210111	10/11/12 09:24	1630 Mod/FGS	U
F210111-BLK2	Methyl Mercury	0.008	0.008	ng/g wet	F210111	10/11/12 09:38	1630 Mod/FGS	J
F210111-BLK3	Methyl Mercury	0.004	0.008	ng/g wet	F210111	10/11/12 09:51	1630 Mod/FGS	U

11/21/12

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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record 1209358

TestAmerica — THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine	Carrier Tracking No(s):	COC No: 580-10282.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-35132-1
Address: 11720 North Creek Pkwy North, Suite 400,	Due Date Requested: 10/14/2012			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Bothell	TAT Requested (days):			
State, Zip: WA, 98011	PO #:			
Phone:	WO #:			Other:
Email:	Project #: 58006008			
Project Name: Red Devil Mine Project	SSOW#:			
Site:				

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	SUBCONTRACT / 1630 Methyl Mercury	Total Number of containers	Special Instructions/Note:
		Preservation Code:						
0912KR62SD	9/16/12	17:00 Alaskan		Solid		X		
0912KR70SD	9/16/12	15:30 Alaskan		Solid		X		

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 9/17/12 1132	Company: FA-SEA	Received by: Bar Dudley
Relinquished by:	Date/Time:	Company:	Received by: Date/Time: 9/18/12 1300 Company: FGS
Relinquished by:	Date/Time:	Company:	Received by: Date/Time: Company:

Custody Seals Intact: X Yes ☐ No | Custody Seal No.: 69480

Cooler Temperature(s) °C and Other Remarks: 4.3°C TID 3150

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1209357**
Sampling Dates: 09/16/2012	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630M	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	0912KR66SD	1209357-01
2	0912KR200SD	1209357-02
3		
4		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Laboratory Control Samples Analyzed**

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Matrix Spikes Analyzed**

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample with Lab ID 1210018-01 was used for matrix spike and matrix spike duplicate analysis of methyl Hg and the recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

	012KR66SD	012KR200SD	RPD (%)
Methyl Mercury, ng/g	2.45	2.81	14

Comments: The RPD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$ug/L = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$mg/kg = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 0912KR66SD:
Methyl Hg: (3.3757 ng/L) (0.288 L/0.528 g) (100/75.2) = 2.4485 ng/g.
Lab reported 2.45 ng/g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP)*.

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP)*.

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

FRONTIER
GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

0912KR66SD

Matrix: Soil/Sediment **Laboratory ID:** 1209357-01

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	2.45	0.113	0.730	ng/g dry	10	1209357-01	F210111	2J11017	10/11/12 10:59	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	75.2	0.1	0.1	% by Weight	1	1209357-01	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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

FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

0912KR200SD

Matrix: Soil/Sediment **Laboratory ID:** 1209357-02

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	2.81	0.109	0.701	ng/g dry	10	1209357-02	F210111	2J11017	10/11/12 11:12	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	74.3	0.1	0.1	% by Weight	1	1209357-02	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 2J11017

Instrument: Hg-15 **Preparation:** Methylene Chloride Extraction for Methyl Hg

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210111-BLK1	Methyl Mercury	0.006	0.008	ng/g wet	F210111	10/11/12 09:24	1630 Mod/FGS	U
F210111-BLK2	Methyl Mercury	0.008	0.008	ng/g wet	F210111	10/11/12 09:38	1630 Mod/FGS	J
F210111-BLK3	Methyl Mercury	0.004	0.008	ng/g wet	F210111	10/11/12 09:51	1630 Mod/FGS	U

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record 1209357

TestAmerica — THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine	Carrier Tracking No(s):	COC No: 580-10283.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc				Job #: 580-35136-1
Address: 11720 North Creek Pkwy North, Suite 400,	Due Date Requested: 10/14/2012			
City: Bothell	TAT Requested (days):			
State, Zip: WA, 98011				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine - Optional Tasks	Project #: 58006008			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wastewater, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes/No)	Perform MS/MSD (Yes/No)	SUBCONTRACT/1630 Methyl Mercury	Total Number of Containers	Special Instructions/Note:
0912KR66SD	9/16/12	16:36 Alaskan		Solid			X		
0912KR200SD	9/19/12	07:00 Alaskan		Solid			X		

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	9/27/12 1132	TA-SEA	[signature] Carr Dudley	9/27/12 1300	FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☑ Yes Δ No | Custody Seal No.: 62480 | Cooler Temperature(s) °C and Other Remarks: 4.5°C TID 3150

Frontier Global Sciences, Inc.

[signature]

Kate Haney, Client Services Manager

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

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1209357 Final Level IV Report
10/19/2012

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1209360**
Sampling Dates: 09/16/2012 & 09/17/2012	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630M	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	0912KR58SD	1209360-01
2	0912KR75SD	1209360-02
3	0912KR78SD	1209360-03
4		
5		
6		
7		
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18		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample with Lab ID 1210018-01 was used for matrix spike and matrix spike duplicate analysis of methyl Hg and the recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

	1209360-02	1209360-02 DUP	RPD (%)
Methyl Mercury, ng/g	1.896	2.013	6

Comments: The RPD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 0912KR58SD:
Methyl Hg: (5.8746 ng/L) (0.288 L/0.556 g) (100/81.5) = 3.7337 ng/g.
Lab reported 3.73 ng/g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP) .*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

FRONTIER
GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

0912KR58SD

Matrix: Soil/Sediment **Laboratory ID:** 1209360-01

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	**3.73**	0.099	0.640	ng/g dry	10	1209360-01	F210111	2J11017	10/11/12 13:41	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**81.5**	0.1	0.1	% by Weight	1	1209360-01	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

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

Kate Haney, Client Services Manager

FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
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ANALYTICAL RESULTS

0912KR75SD

Matrix: Soil/Sediment **Laboratory ID:** 1209360-02

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	1.90	0.106	0.680	ng/g dry	10	1209360-02	F210111	2J11017	10/11/12 10:32	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	74.9	0.1	0.1	% by Weight	1	1209360-02	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

ANALYTICAL RESULTS

0912KR78SD

Matrix: Soil/Sediment **Laboratory ID:** 1209360-03

Mercury Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Methyl Mercury	**0.308**	0.009	0.061	ng/g dry	.950570	1209360-03RE1	F210111	2J11017	10/11/12 15:02	EPA 1630 Mod/FGS-070	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	80.2	0.1	0.1	% by Weight	1	1209360-03	F210113		10/11/12 13:48	SM 2540B	O-04, O-09

11/21/12

Frontier Global Sciences, Inc.

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Kate Haney, Client Services Manager

FRONTIER
GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 2J11017

Instrument: Hg-15 **Preparation:** Methylene Chloride Extraction for Methyl Hg

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F210111-BLK1	Methyl Mercury	0.006	0.008	ng/g wet	F210111	10/11/12 09:24	1630 Mod/FGS	U
F210111-BLK2	Methyl Mercury	0.008	0.008	ng/g wet	F210111	10/11/12 09:38	1630 Mod/FGS	J
F210111-BLK3	Methyl Mercury	0.004	0.008	ng/g wet	F210111	10/11/12 09:51	1630 Mod/FGS	U

11/21/12

Frontier Global Sciences, Inc.

Kate Haney, Client Services Manager

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FRONTIER GLOBAL SCIENCES

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Ph: 425-686-1996
Fx: 425-686-3096

CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record 120 9360

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine	Carrier Tracking No(s):	COC No: 580-10284.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-35138-1
Address: 11720 North Creek Pkwy North, Suite 400,	Due Date Requested: 10/14/2012			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify), Other:
City: Bothell	TAT Requested (days):			
State, Zip: WA, 98011	PO #:			
Phone:	WO #:			
Email:	Project #: 56006008			
Project Name: Red David Mine Project	SSOW#:			
Site:				

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	SUBCONTRACT / 1630 Methyl Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:					
0912KR58SD	9/17/12	19:39 Alaskan		Solid		X		
0912KR75SD	9/16/12	14:26 Alaskan		Solid		X		
0912KR76SD	9/16/12	11:30 Alaskan		Solid		X		

Possible Hazard Identification
Unconfirmed
Deliverable Requested: I, II, III, IV, Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:	Date/Time: 9/27/12 1132	Company: TAT-SEA	Received by:	Date/Time: 9/27/12 1300	Company: FGS		
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:		
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:		
Custody Seal's Intact: ☒ Yes ☐ No	Custody Seal No.: 69480		Cooler Temperature(s) °C and Other Remarks: 4.3°C TID 3150				

Frontier Global Sciences, Inc.

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

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1209360 Final Level IV Report
10/19/2012

te Haney, Client Services Manager

10/19/2012

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Test America	**Lab Project Number: 580-35129-1**
Sampling Dates: 09/09, 09/10, & 09/16/2012	**Sample Matrix: Water**
Analytical Method: *PCBs by EPA 8082*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song — **Date:** 11/20/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	0912MW27GW	580-35129-1
2	0912MW54GW	580-35129-2
3	0912RI01DI	580-35129-3
4	0912MW04GW	580-35129-4
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
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17		
18		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Matrix Spike/Spike Duplicate Recoveries
- X Laboratory Control Sample Recoveries
- X Method Blank Summaries
- X Initial Calibration Data
- X Continuing Calibration Data
- X Surrogate Compound Recovery Summary
- NR DDT and Endrin Degradation Check Data
- NR Internal Standard Area Summary

Sample and Blank Data Package Section

- X Chromatograms
- X Quantitation Reports

Raw QC Data Package Section

- X Quantitation Reports for Standards, LCS, and MS/MSD
- X List of Instrument Detection Limits
- X Chain-of-Custody Records
- X Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were reviewed following procedures and limits specified in the EPA OSWER directive, *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures* (EPA/540/G-90/004, OSWER Directive 9360.4-01, dated April 1990).

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	NO
2	Instrument Performance Criteria	YES
3	Initial Calibrations	YES
4	Continuing Calibrations	YES
5	Laboratory Control Sample	YES
6	Matrix Spike/Matrix Spike Duplicate	YES
7	Blanks and Background Samples	YES
8	Surrogate Compounds	YES
9	Internal Standards	N/A
10	Duplicate Analyses	YES
11	Analyte Identification	YES
12	Analyte Quantitation	YES
13	Overall Assessment of Data	YES
14	Usability of Data	NO

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Extractable analyses: 14 days (from collection) to extraction; 40 days (from extraction) to analysis.

Comments: All water samples were received at 0.7°C but outside of holding time. No PCBs were detected in the samples and the non-detected results were qualified as estimated (UJ).

2. INSTRUMENT PERFORMANCE CRITERIA

__N/A__ **Raw data has been checked to verify that the DDT retention time is greater than 12 minutes and that there is adequate resolution (>25%) between peaks of the other standard compounds.**
__X__ **Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**
__N/A__ **Raw data has been checked to verify that the percent breakdown for DDT and endrin does not exceed 20% in the degradation check standard.**
__X__ **Raw data has been checked to verify that the percent difference in retention time for the surrogate in all standards and samples does not exceed 0.3% (capillary columns) or 1.5% (wide-bore capillary columns).**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the nondetected results are qualified (UJ).

Comments: PCB 1016/1260 was used for a 5-point initial calibration and percent relative standard deviation values were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated nondetected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgement of the reviewer.

Comments: Percent Difference (%D) values were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries for PCB 1016 and PCB 1260 were within control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Sample 0912MW27GW was designated for MS/MSD analysis and the recoveries of Aroclor 1016 and Aroclor 1260 were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the nondetected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: Surrogate recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: External standards were used.

10. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPDs of MS&MSD<20%.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match. When sample results are confirmed by a second column, the relative percent difference (RPD) between the two results is calculated. If the RPD is less than 40% and there is no evidence of chromatographic problems, the higher result is reported. If the RPD is greater than 40%, the chromatogram is checked for anomalies and results are selected based on the best professional judgment of the reviewer. If there is no evidence of any chromatographic problems, the higher result is reported.

Comments: Not applicable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Extractable analyses, water samples:

$$\text{ug/L} = \frac{(\text{analyte area})(\text{amount of external standard, ng})(\text{total volume of extract, uL})}{(\text{external standard area})(\text{volume of sample extracted, mL})(\text{injection volume, uL})}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{(\text{analyte area})(\text{amount of external standard, ng})(\text{total volume of extract, uL})}{(\text{external standard area})(\text{weight of sample extracted, g})(\text{fraction solids})(\text{injection volume, uL})}$$

Comments: Not applicable since no detection of PCBs in the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data (a qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology and Environment, Inc.

Job Number: 580-35129-1

Client Sample ID: 0912MW27GW

Lab Sample ID: 580-35129-1
Client Matrix: Water

Date Sampled: 09/09/2012 1334
Date Received: 09/25/2012 1540

8082 Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analysis Method:	8082	Analysis Batch:	580-121131	Instrument ID:	TAC042
Prep Method:	3510C	Prep Batch:	580-121124	Initial Weight/Volume:	1060 mL
Dilution:	1.0			Final Weight/Volume:	10 mL
Analysis Date:	09/28/2012 1621			Injection Volume:	1 uL
Prep Date:	09/27/2012 1818			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	ND UJ	H	0.042	0.47
PCB-1221	ND	H	0.058	0.47
PCB-1232	ND	H	0.039	0.47
PCB-1242	ND	H	0.039	0.47
PCB-1248	ND	H	0.067	0.47
PCB-1254	ND	H	0.042	0.47
PCB-1260	ND	H	0.037	0.47

Surrogate	%Rec	Qualifier	Acceptance Limits
Tetrachloro-m-xylene	92		60 - 150
DCB Decachlorobiphenyl	92		40 - 135

11/20/12

Client: Ecology and Environment, Inc.

Job Number: 580-35129-1

Client Sample ID: 0912MW54GW

Lab Sample ID: 580-35129-2
Client Matrix: Water

Date Sampled: 09/09/2012 0700
Date Received: 09/25/2012 1540

8082 Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analysis Method:	8082	Analysis Batch:	580-121131	Instrument ID:	TAC042
Prep Method:	3510C	Prep Batch:	580-121124	Initial Weight/Volume:	1060 mL
Dilution:	1.0			Final Weight/Volume:	10 mL
Analysis Date:	09/28/2012 1655			Injection Volume:	1 uL
Prep Date:	09/27/2012 1818			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	ND UJ	H	0.042	0.47
PCB-1221	ND	H	0.058	0.47
PCB-1232	ND	H	0.039	0.47
PCB-1242	ND	H	0.039	0.47
PCB-1248	ND	H	0.067	0.47
PCB-1254	ND	H	0.042	0.47
PCB-1260	ND	H	0.037	0.47

Surrogate	%Rec	Qualifier	Acceptance Limits
Tetrachloro-m-xylene	88		60 - 150
DCB Decachlorobiphenyl	91		40 - 135

11/20/12

Client: Ecology and Environment, Inc. Job Number: 580-35129-1

Client Sample ID: 0912RI01DI

Lab Sample ID: 580-35129-3 Date Sampled: 09/16/2012 1100
Client Matrix: Water Date Received: 09/25/2012 1540

8082 Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analysis Method:	8082	Analysis Batch:	580-121131	Instrument ID:	TAC042
Prep Method:	3510C	Prep Batch:	580-121124	Initial Weight/Volume:	1060 mL
Dilution:	1.0			Final Weight/Volume:	10 mL
Analysis Date:	09/28/2012 1707			Injection Volume:	1 uL
Prep Date:	09/27/2012 1818			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	ND UJ	H	0.042	0.47
PCB-1221	ND	H	0.058	0.47
PCB-1232	ND	H	0.039	0.47
PCB-1242	ND	H	0.039	0.47
PCB-1248	ND	H	0.067	0.47
PCB-1254	ND	H	0.042	0.47
PCB-1260	ND	H	0.037	0.47

Surrogate	%Rec	Qualifier	Acceptance Limits
Tetrachloro-m-xylene	85		60 - 150
DCB Decachlorobiphenyl	45		40 - 135

11/20/12

Client: Ecology and Environment, Inc. Job Number: 580-35129-1

Client Sample ID: 0912MW04GW

Lab Sample ID: 580-35129-4 Date Sampled: 09/10/2012 1441
Client Matrix: Water Date Received: 09/25/2012 1540

8082 Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analysis Method:	8082	Analysis Batch:	580-121131	Instrument ID:	TAC042
Prep Method:	3510C	Prep Batch:	580-121124	Initial Weight/Volume:	1060 mL
Dilution:	1.0			Final Weight/Volume:	10 mL
Analysis Date:	09/28/2012 1718			Injection Volume:	1 uL
Prep Date:	09/27/2012 1818			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	ND UJ	H	0.042	0.47
PCB-1221	ND	H	0.058	0.47
PCB-1232	ND	H	0.039	0.47
PCB-1242	ND	H	0.039	0.47
PCB-1248	ND	H	0.067	0.47
PCB-1254	ND	H	0.042	0.47
PCB-1260	ND	H	0.037	0.47

Surrogate	%Rec	Qualifier	Acceptance Limits
Tetrachloro-m-xylene	93		60 - 150
DCB Decachlorobiphenyl	93		40 - 135

11/20/12

Client: Ecology and Environment, Inc.

Job Number: 580-35129-1

Method Blank - Batch: 580-121124

Method: 8082
Preparation: 3510C

Lab Sample ID:	MB 580-121124/1-A	Analysis Batch:	580-121131	Instrument ID:	TAC042
Client Matrix:	Water	Prep Batch:	580-121124	Lab File ID:	OP005332.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1000 mL
Analysis Date:	09/28/2012 1502	Units:	ug/L	Final Weight/Volume:	10 mL
Prep Date:	09/27/2012 1818			Injection Volume:	1 uL
Leach Date:	N/A			Column ID:	PRIMARY

Analyte	Result	Qual	MDL	RL
PCB-1016	ND		0.045	0.50
PCB-1221	ND		0.062	0.50
PCB-1232	ND		0.041	0.50
PCB-1242	ND		0.041	0.50
PCB-1248	ND		0.071	0.50
PCB-1254	ND		0.044	0.50
PCB-1260	ND		0.039	0.50

Surrogate	% Rec	Acceptance Limits
Tetrachloro-m-xylene	89	60 - 150
DCB Decachlorobiphenyl	69	40 - 135

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121124

Method: 8082
Preparation: 3510C

LCS Lab Sample ID:	LCS 580-121124/20-A	Analysis Batch:	580-121131	Instrument ID:	TAC042
Client Matrix:	Water	Prep Batch:	580-121124	Lab File ID:	OP005333.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1000 mL
Analysis Date:	09/28/2012 1513	Units:	ug/L	Final Weight/Volume:	10 mL
Prep Date:	09/28/2012 0944			Injection Volume:	1 uL
Leach Date:	N/A			Column ID:	PRIMARY
LCSD Lab Sample ID:	LCSD 580-121124/21-A	Analysis Batch:	580-121131	Instrument ID:	TAC042
Client Matrix:	Water	Prep Batch:	580-121124	Lab File ID:	OP005334.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1000 mL
Analysis Date:	09/28/2012 1524	Units:	ug/L	Final Weight/Volume:	10 mL
Prep Date:	09/28/2012 0944			Injection Volume:	1 uL
Leach Date:	N/A			Column ID:	PRIMARY

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
PCB-1016	91	89	25 - 145	3	27		
PCB-1260	85	85	30 - 145	1	22		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tetrachloro-m-xylene	92	84	60 - 150
DCB Decachlorobiphenyl	79	62	40 - 135

11/20/12

35129

CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

Ecology and Environment, Inc

No: RDM-0912-002
Cooler #: 2
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Lab #	Location	Analyses	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912MW27GW	PCB's	9/9/2012	13:34	6	1 liter amber	None	Y 1
2	0912MW54GW	PCB's	9/9/2012	07:00	2	1 liter amber	None	2
3	0912RI01DI	PCB's	9/16/2012	11:00	2	1 liter amber	None	3
4	0912 MW04GW		9/10/12	14:41	2	" "	" "	4

Pl: 9/24

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9-23-12 12:30	[signature]	09/24/12	1340		[signature]	09/24/12 1450			
			Cathy Crumble	9/25/12	15:40						

Temp: 6.0°C

A2
Cooler/TB Dig/IR cor 0.7 und 0.8
Cooler Dsc [illegible] @ Lab —
Wet/Packs Packing bubble
w/a Goldstreak

10/16/2012

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: TestAmerica	Lab Project Number: 580-35132-1
Sampling Dates: 09/16, 09/17, & 09/19/2012	Sample Matrix: Sediment
Analytical Method: TOC by EPA 9060M	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/21/12
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR62SD	580-35132-1
2	0912KR63SD	580-35132-2
3	0912KR68SD	580-35132-3
4	0912KR70SD	580-35132-4
5	0912KR74SD	580-35132-5
6	0912KR76SD	580-35132-6
7	0912KR201SD	580-35132-7
8	0912KR202SD	580-35132-8
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Analyte Quantitation	YES
8	Overall Assessment of Data	YES
9	Usability of Data	YES

Comments

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: All samples were received at 4.1°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 0912KR62SD was used for MS/MSD analysis and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments:	0912KR62SD	0912KR202SD	RPD (%)
Total Organic Carbon, mg/kg	4000	4100	2
	0912KR67SD	0912KR201SD	RPD (%)
Total Organic Carbon, mg/kg	5400	5400	0

The RPDs were within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 0912KR62SD
TOC: (0.3252% + 0.4726%) /2 = 0.3989%
(0.3989%) (10,000 ppm) = 3989 ppm = 3989 mg/kg.
Lab reported 4000 mg/kg, wet weight basis.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

General Chemistry

Client Sample ID: **0912KR62SD**

Lab Sample ID: 580-35132-1 Date Sampled: 09/16/2012 1709
Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	4000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1704						DryWt Corrected: N
Percent Solids	89		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	11		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR63SD**

Lab Sample ID: 580-35132-2 Date Sampled: 09/17/2012 1017

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	5000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1744						DryWt Corrected: N
Percent Solids	85		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	15		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR68SD**

Lab Sample ID: 580-35132-3 Date Sampled: 09/17/2012 1506

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	4700		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1748						DryWt Corrected: N
Percent Solids	86		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	14		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR70SD**

Lab Sample ID: 580-35132-4 Date Sampled: 09/16/2012 1530

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	11000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1752						DryWt Corrected: N
Percent Solids	87		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	13		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR74SD

Lab Sample ID: 580-35132-5 Date Sampled: 09/16/2012 1510

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	8000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1756						DryWt Corrected: N
Percent Solids	88		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	12		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR76SD**

Lab Sample ID: 580-35132-6
Client Matrix: Solid

Date Sampled: 09/17/2012 1228
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	16000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1800						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	17		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR201SD

Lab Sample ID: 580-35132-7 Date Sampled: 09/19/2012 0700

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	5400		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1809						DryWt Corrected: N
Percent Solids	90		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	9.7		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR202SD

Lab Sample ID: 580-35132-8 Date Sampled: 09/19/2012 0700

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	4100		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1813						DryWt Corrected: N
Percent Solids	86		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N
Percent Moisture	14		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121420	Analysis Date: 10/02/2012 0925						DryWt Corrected: N

11/21/12

35132

Ecology and Environment, Inc

CHAIN OF CUSTODY RECORD
Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-015
Cooler #: 15
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR62SD	Total Inorganic Elements		9/16/2012	17:09	1	4 oz WM Amber Glass Jar	None	
	0912KR62SD	Total Organic Carbon		9/16/2012	17:09	1	4 oz WM Amber Glass Jar	None	
	0912KR62SD	Grain Size		9/16/2012	17:09	1	16 WM Clear Glass Jar	None	
	0912KR62SD	Methyl Mercury		9/16/2012	17:09	1	4 oz. Poly Jar	None	
2	0912KR63SD	Total Inorganic Elements		9/17/2012	10:17	1	4 oz WM Amber Glass Jar	None	
	0912KR63SD	Total Organic Carbon		9/17/2012	10:17	1	4 oz WM Amber Glass Jar	None	
	0912KR63SD	Grain Size		9/17/2012	10:17	1	16 WM Clear Glass Jar	None	
3	0912KR68SD	Total Inorganic Elements		9/17/2012	15:06	1	4 oz WM Amber Glass Jar	None	
	0912KR68SD	Total Organic Carbon		9/17/2012	15:06	1	4 oz WM Amber Glass Jar	None	
	0912KR68SD	Grain Size		9/17/2012	15:06	1	16 WM Clear Glass Jar	None	
4	0912KR70SD	Total Inorganic Elements		9/16/2012	15:30	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9/23/12 13:30	[signature]	09/24/12	1340		[signature]	1510 09/24/12			
			Cathy Gamble	9/25/12	15:40						

Temp: 3.9°C

AT
Cooler/TB Dig/IR cor 4.1 unc 4.2
Cooler Dsc Eggs blue @ Lab –
Wet/Packs Packing bubble
w/ Goldstreak

35132

CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-015

Cooler #: 15

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
4	0912KR70SD	Total Organic Carbon		9/16/2012	15:30	1	4 oz WM Amber Glass Jar	None	
	0912KR70SD	Grain Size		9/16/2012	15:30	1	16 WM Clear Glass Jar	None	
	0912KR70SD	Methyl Mercury		9/16/2012	15:30	1	4 oz. Poly Jar	None	
5	0912KR74SD	Total Inorganic Elements		9/16/2012	15:10	1	4 oz WM Amber Glass Jar	None	
	0912KR74SD	Total Organic Carbon		9/16/2012	15:10	1	4 oz WM Amber Glass Jar	None	
	0912KR74SD	Grain Size		9/16/2012	15:10	1	16 WM Clear Glass Jar	None	
6	0912KR76SD	Total Inorganic Elements		9/17/2012	12:28	1	4 oz WM Amber Glass Jar	None	
	0912KR76SD	Total Organic Carbon		9/17/2012	12:28	1	4 oz WM Amber Glass Jar	None	
	0912KR76SD	Grain Size		9/17/2012	12:28	1	16 WM Clear Glass Jar	None	
7	0912KR201SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR201SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 13:30	09/24/12		1340			1510 09/24/12			
			Cathy Crumbliss	9/25/12	15:40						

35132

CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-015
Cooler #: 15
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
7	0912KR201SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	
8	0912KR202SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR202SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR202SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 13:30		09/24/12	1340			1510 09/24/12			
			Cathy Coombs	9/19/12	15:40						

Client: Ecology and Environment, Inc.

Job Number: 580-35132-1

Method Blank - Batch: 580-121921

Method: 9060
Preparation: N/A

Lab Sample ID:	MB 580-121921/3	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1658	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Total Organic Carbon	ND		610	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121921

Method: 9060
Preparation: N/A

LCS Lab Sample ID:	LCS 580-121921/4	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1700	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121921/5	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1702	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Total Organic Carbon	122	114	80 - 166	7			

Laboratory Control/
Laboratory Duplicate Data Report - Batch: 580-121921

Method: 9060
Preparation: N/A

LCS Lab Sample ID:	LCS 580-121921/4	Units:	mg/Kg	LCSD Lab Sample ID:	LCSD 580-121921/5
Client Matrix:	Solid			Client Matrix:	Solid
Dilution:	1.0			Dilution:	1.0
Analysis Date:	10/08/2012 1700			Analysis Date:	10/08/2012 1702
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Total Organic Carbon	2720	2720	3310	3090

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: TestAmerica	**Lab Project Number: 580-35136-1**
Sampling Dates: 09/16, 09/18, & 09/19/2012	**Sample Matrix: Sediment**
Analytical Method: TOC by EPA 9060M	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR54SD	580-35136-1
2	0912KR55SD	580-35136-2
3	0912KR56SD	580-35136-3
4	0912KR61SD	580-35136-4
5	0912KR66SD	580-35136-5
6	0912KR67SD	580-35136-6
7	0912KR71SD	580-35136-7
8	0912KR77SD	580-35136-8
9	0912KR79SD	580-35136-9
10	0912KR80SD	580-35136-10
11	0912KR200SD	580-35136-11
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X Preparation Blank and Calibration Blank results
- NR Matrix Spike recoveries
- NR Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Instrument Detection Limits
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- NR Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- NR Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NA
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Analyte Quantitation	YES
8	Overall Assessment of Data	YES
9	Usability of Data	YES

Comments: NA: Not Analyzed

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: All samples were received at 3.8°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limits generated by the laboratory.

4. MATRIX SPIKE

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: No MS/MSD analysis was done but LCS and LCSD were analyzed instead.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments:	0912KR66SD	0912KR200SD	RPD (%)
Total Organic Carbon, mg/kg	14000	13000	7
	0912KR67SD	0912KR201SD	RPD (%)
Total Organic Carbon, mg/kg	5400	5400	0

The RPDs were within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 0912KR55SD
TOC: (0.6677% + 0.5883%) /2 = 0.6280%
(0.6280%) (10,000 ppm) = 6280 ppm = 6280 mg/kg.
Lab reported 6300 mg/kg, wet weight basis.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP) .*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

General Chemistry

Client Sample ID: **0912KR54SD**

Lab Sample ID: 580-35136-1 Date Sampled: 09/19/2012 1230
Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	2100		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1818						DryWt Corrected: N
Percent Solids	90		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	10		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR55SD

Lab Sample ID: 580-35136-2
Client Matrix: Solid

Date Sampled: 09/19/2012 1129
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	6300		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1822						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	17		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR56SD**

Lab Sample ID: 580-35136-3 Date Sampled: 09/19/2012 1105
Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	910	J	mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1827						DryWt Corrected: N
Percent Solids	82		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	18		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR61SD

Lab Sample ID: 580-35136-4 Date Sampled: 09/19/2012 0933

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	2100		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-121921	Analysis Date: 10/08/2012 1831						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	17		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR66SD**

Lab Sample ID: 580-35136-5 Date Sampled: 09/16/2012 1636

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	14000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1747						DryWt Corrected: N
Percent Solids	77		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	23		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR67SD**

Lab Sample ID: 580-35136-6 Date Sampled: 09/16/2012 1652

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	5400		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1751						DryWt Corrected: N
Percent Solids	80		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	20		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR71SD

Lab Sample ID: 580-35136-7
Client Matrix: Solid

Date Sampled: 09/16/2012 1549
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	2600		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1756						DryWt Corrected: N
Percent Solids	89		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	11		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR77SD

Lab Sample ID: 580-35136-8 Date Sampled: 09/18/2012 1256

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	1000	J	mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1801						DryWt Corrected: N
Percent Solids	80		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	20		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR79SD**

Lab Sample ID: 580-35136-9
Client Matrix: Solid

Date Sampled: 09/16/2012 1230
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	3400		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1806						DryWt Corrected: N
Percent Solids	90		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	10		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR80SD

Lab Sample ID: 580-35136-10 Date Sampled: 09/18/2012 1052

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	8600		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1810						DryWt Corrected: N
Percent Solids	75		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	25		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR200SD**

Lab Sample ID: 580-35136-11
Client Matrix: Solid

Date Sampled: 09/19/2012 0700
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	13000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1819						DryWt Corrected: N
Percent Solids	77		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N
Percent Moisture	23		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121574	Analysis Date: 10/03/2012 1632						DryWt Corrected: N

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35136-1

Method Blank - Batch: 580-121921

Method: 9060
Preparation: N/A

Lab Sample ID:	MB 580-121921/3	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1658	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Total Organic Carbon	ND		610	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121921

Method: 9060
Preparation: N/A

11/21/12

LCS Lab Sample ID:	LCS 580-121921/4	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1700	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121921/5	Analysis Batch:	580-121921	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/08/2012 1702	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Total Organic Carbon	122	114	80 - 166	7			

Laboratory Control/
Laboratory Duplicate Data Report - Batch: 580-121921

Method: 9060
Preparation: N/A

LCS Lab Sample ID:	LCS 580-121921/4	Units:	mg/Kg	LCSD Lab Sample ID:	LCSD 580-121921/5
Client Matrix:	Solid			Client Matrix:	Solid
Dilution:	1.0			Dilution:	1.0
Analysis Date:	10/08/2012 1700			Analysis Date:	10/08/2012 1702
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Total Organic Carbon	2720	2720	3310	3090

Client: Ecology and Environment, Inc.

Job Number: 580-35136-1

Method Blank - Batch: 580-122088

Method: 9060
Preparation: N/A

Lab Sample ID:	MB 580-122088/3	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1653	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Total Organic Carbon	ND		610	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-122088

Method: 9060
Preparation: N/A

11/21/12

LCS Lab Sample ID:	LCS 580-122088/4	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1655	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-122088/5	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1657	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Total Organic Carbon	111	118	80 - 166	6			

Laboratory Control/
Laboratory Duplicate Data Report - Batch: 580-122088

Method: 9060
Preparation: N/A

LCS Lab Sample ID:	LCS 580-122088/4	Units:	mg/Kg	LCSD Lab Sample ID:	LCSD 580-122088/5
Client Matrix:	Solid			Client Matrix:	Solid
Dilution:	1.0			Dilution:	1.0
Analysis Date:	10/09/2012 1655			Analysis Date:	10/09/2012 1657
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Total Organic Carbon	2720	2720	3020	3210

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Ecology and Environment, Inc

CHAIN OF CUSTODY RECORD
Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-013
Cooler #: 13
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR54SD	Total Inorganic Elements		9/19/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR54SD	Total Organic Carbon		9/19/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR54SD	Grain Size		9/19/2012	12:30	1	16 WM Clear Glass Jar	None	
2	0912KR55SD	Total Inorganic Elements		9/19/2012	11:29	1	4 oz WM Amber Glass Jar	None	
	0912KR55SD	Total Organic Carbon		9/19/2012	11:29	1	4 oz WM Amber Glass Jar	None	
	0912KR55SD	Grain Size		9/19/2012	11:29	1	16 WM Clear Glass Jar	None	
3	0912KR56SD	Total Inorganic Elements		9/19/2012	11:05	1	4 oz WM Amber Glass Jar	None	
	0912KR56SD	Total Organic Carbon		9/19/2012	11:05	1	4 oz WM Amber Glass Jar	None	
4	0912KR61SD	Total Inorganic Elements		9/19/2012	09:33	1	4 oz WM Amber Glass Jar	None	
	0912KR61SD	Total Organic Carbon		9/19/2012	09:33	1	4 oz WM Amber Glass Jar	None	
	0912KR61SD	Grain Size		9/19/2012	09:33	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9.23-12 13:30	[signature]	09/24/12 1340			[signature]	09/24/12 1555			
			Cathy Gamble	9/25/12	15:40						

A2
Cooler/TB Dig/IR cor 3.8 5.1 unc 3.9 4.7
Cooler Dsc [illegible] @ Lab —
Wet/Packs Packing bubble
Goldstreak

Temp: 4.2 °C

10/19/2012

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

Ecology and Environment, Inc

No: RDM-0912-013
Cooler #: 13
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
5	0912KR66SD	Total Inorganic Elements		9/16/2012	16:36	1	4 oz WM Amber Glass Jar	None	
	0912KR66SD	Total Organic Carbon		9/16/2012	16:36	1	4 oz WM Amber Glass Jar	None	
	0912KR66SD	Grain Size		9/16/2012	16:36	1	16 WM Clear Glass Jar	None	
	0912KR66SD	Methyl Mercury		9/16/2012	16:36	1	4 oz. Poly Jar	None	
6	0912KR67SD	Total Inorganic Elements		9/16/2012	16:52	1	4 oz WM Amber Glass Jar	None	
	0912KR67SD	Total Organic Carbon		9/16/2012	16:52	1	4 oz WM Amber Glass Jar	None	
	0912KR67SD	Grain Size		9/16/2012	16:52	1	16 WM Clear Glass Jar	None	
7	0912KR71SD	Total Inorganic Elements		9/16/2012	15:49	1	4 oz WM Amber Glass Jar	None	
	0912KR71SD	Total Organic Carbon		9/16/2012	15:49	1	4 oz WM Amber Glass Jar	None	
	0912KR71SD	Grain Size		9/16/2012	15:49	1	16 WM Clear Glass Jar	None	
8	0912KR77SD	Total Inorganic Elements		9/18/2012	12:56	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9.23.12 1320	[signature]	09/24/12	1340		[signature]	09/24/12 1555			
			Cathy Crambl	9/25/12	15:40						

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

Ecology and Environment, Inc

No: RDM-0912-013

Cooler #: 13

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
	0912KR77SD	Total Organic Carbon		9/18/2012	12:56	1	4 oz WM Amber Glass Jar	None	
	0912KR77SD	Grain Size		9/18/2012	12:56	1	16 WM Clear Glass Jar	None	
9	0912KR79SD	Total Inorganic Elements		9/16/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR79SD	Total Organic Carbon		9/16/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR79SD	Grain Size		9/16/2012	12:30	1	16 WM Clear Glass Jar	None	
10	0912KR80SD	Total Inorganic Elements		9/18/2012	10:52	1	4 oz WM Amber Glass Jar	None	
	0912KR80SD	Total Organic Carbon		9/18/2012	10:52	1	4 oz WM Amber Glass Jar	None	
	0912KR80SD	Grain Size		9/18/2012	10:52	1	16 WM Clear Glass Jar	None	
11	0912KR200SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR200SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR200SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	8/23/12 13:30	[signature]	09/24/12	1360		[signature]	1555 09/24/12			
			Cathy Crambe	9/25/12	15:40						

10/19/2012

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-013

Cooler #: 13

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
11	0912KR200SD	Methyl Mercury		9/19/2012	07:00	1	4 oz. Poly Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9/23/12 13:20		09/24/12	1320			1555			
				9/25/12	15:40			09/24/12			

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: TestAmerica	Lab Project Number: 580-35138-1
Sampling Dates: 09/16, 09/17, & 09/19/2012	Sample Matrix: Sediment
Analytical Method: TOC by EPA 9060M	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song _____ Date: 11/21/12
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards _____ Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR58SD	580-35138-1
2	0912KR59SD	580-35138-2
3	0912KR60SD	580-35138-3
4	0912KR64SD	580-35138-4
5	0912KR69SD	580-35138-5
6	0912KR72SD	580-35138-6
7	0912KR75SD	580-35138-7
8	0912KR78SD	580-35138-8
9	0912KR81SD	580-35138-9
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- NR — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NA
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Analyte Quantitation	YES
8	Overall Assessment of Data	YES
9	Usability of Data	YES

Comments: NA: Not Analyzed

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: All samples were received at 2.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limits generated by the laboratory.

4. MATRIX SPIKE

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: No MS/MSD analysis was done but LCS and LCSD were analyzed instead.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPD of LCS and LCSD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 0912KR78SD
TOC: (0.4948% + 0.4763%) /2 = 0.4856%
(0.4856%) (10,000 ppm) = 4856 ppm = 4956 mg/kg.
Lab reported 4900 mg/kg, wet weight basis.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

General Chemistry

Client Sample ID: 0912KR58SD

Lab Sample ID: 580-35138-1 Date Sampled: 09/17/2012 1939

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	4300		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1823						DryWt Corrected: N
Percent Solids	82		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	18		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR59SD

Lab Sample ID: 580-35138-2
Client Matrix: Solid

Date Sampled: 09/17/2012 1054
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	2500		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/09/2012 1827						DryWt Corrected: N
Percent Solids	85		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	15		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR60SD

Lab Sample ID: 580-35138-3 Date Sampled: 09/17/2012 1745

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	11000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1049						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	17		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR64SD**

Lab Sample ID: 580-35138-4 Date Sampled: 09/17/2012 1635

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	6300		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1054						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	17		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR69SD

Lab Sample ID: 580-35138-5
Client Matrix: Solid

Date Sampled: 09/19/2012 1540
Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	1100	J	mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1058						DryWt Corrected: N
Percent Solids	82		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	18		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

10/21/12

General Chemistry

Client Sample ID: 0912KR72SD

Lab Sample ID: 580-35138-6 Date Sampled: 09/17/2012 1246

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	23000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1103						DryWt Corrected: N
Percent Solids	84		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	16		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

10/21/12

General Chemistry

Client Sample ID: 0912KR75SD

Lab Sample ID: 580-35138-7 Date Sampled: 09/16/2012 1426

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	13000		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1107						DryWt Corrected: N
Percent Solids	76		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	24		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: **0912KR78SD**

Lab Sample ID: 580-35138-8 Date Sampled: 09/16/2012 1130

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	4900		mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1111						DryWt Corrected: N
Percent Solids	78		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	22		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

General Chemistry

Client Sample ID: 0912KR81SD

Lab Sample ID: 580-35138-9 Date Sampled: 09/19/2012 1640

Client Matrix: Solid Date Received: 09/25/2012 1540

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Total Organic Carbon	860	J	mg/Kg	610	2000	1.0	9060
Analysis Batch: 580-122088	Analysis Date: 10/10/2012 1116						DryWt Corrected: N
Percent Solids	78		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N
Percent Moisture	22		%	0.10	0.10	1.0	D 2216
Analysis Batch: 580-121624	Analysis Date: 10/04/2012 0949						DryWt Corrected: N

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35138-1

Method Blank - Batch: 580-122088

Method: 9060
Preparation: N/A

Lab Sample ID:	MB 580-122088/3	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1653	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Total Organic Carbon	ND		610	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-122088

Method: 9060
Preparation: N/A

11/21/12

LCS Lab Sample ID:	LCS 580-122088/4	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1655	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-122088/5	Analysis Batch:	580-122088	Instrument ID:	No Equipment
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.0 mL
Analysis Date:	10/09/2012 1657	Units:	mg/Kg	Final Weight/Volume:	1.0 mL
Prep Date:	N/A				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Total Organic Carbon	111	118	80 - 166	6			

Laboratory Control/
Laboratory Duplicate Data Report - Batch: 580-122088

Method: 9060
Preparation: N/A

LCS Lab Sample ID:	LCS 580-122088/4	Units:	mg/Kg	LCSD Lab Sample ID:	LCSD 580-122088/5
Client Matrix:	Solid			Client Matrix:	Solid
Dilution:	1.0			Dilution:	1.0
Analysis Date:	10/09/2012 1655			Analysis Date:	10/09/2012 1657
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Total Organic Carbon	2720	2720	3020	3210

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-014

Cooler #: 14

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR58SD	Total Inorganic Elements		9/17/2012	19:39	1	4 oz WM Amber Glass Jar	None	
	0912KR58SD	Total Organic Carbon		9/17/2012	19:39	1	4 oz WM Amber Glass Jar	None	
	0912KR58SD	Grain Size		9/17/2012	19:39	1	16 WM Clear Glass Jar	None	
	0912KR58SD	Methyl Mercury		9/17/2012	19:39	1	4 oz Poly Jar	None	
2	0912KR59SD	Total Inorganic Elements		9/17/2012	10:54	1	4 oz WM Amber Glass Jar	None	
	0912KR59SD	Total Organic Carbon		9/17/2012	10:54	1	4 oz WM Amber Glass Jar	None	
	0912KR59SD	Grain Size		9/17/2012	10:54	1	16 WM Clear Glass Jar	None	
3	0912KR60SD	Total Inorganic Elements		9/17/2012	17:45	1	4 oz WM Amber Glass Jar	None	
	0912KR60SD	Total Organic Carbon		9/17/2012	17:45	1	4 oz WM Amber Glass Jar	None	
	0912KR60SD	Grain Size		9/17/2012	17:45	1	16 WM Clear Glass Jar	None	
4	0912KR64SD	Total Inorganic Elements		9/17/2012	16:35	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9/23/12 13:30		9/24/12	1340			09/24/12 15:30		9/25/12	1540

Temp: 3.0 °C

Cooler/(IR) Dig/IR cor 2.3 unc 2.4

Cooler Dsc Lg Blue/wht Ice @ Lab 1540

Wet/Packs Packing Bubble

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-014

Cooler #: 14

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
4	0912KR64SD	Total Organic Carbon		9/17/2012	16:35	1	4 oz WM Amber Glass Jar	None	
	0912KR64SD	Grain Size		9/17/2012	16:35	1	16 WM Clear Glass Jar	None	
5	0912KR69SD	Total Inorganic Elements		9/19/2012	15:40	1	4 oz WM Amber Glass Jar	None	
	0912KR69SD	Total Organic Carbon		9/19/2012	15:40	1	4 oz WM Amber Glass Jar	None	
	0912KR69SD	Grain Size		9/19/2012	15:40	1	16 WM Clear Glass Jar	None	
6	0912KR72SD	Total Inorganic Elements		9/17/2012	12:46	1	4 oz WM Amber Glass Jar	None	
	0912KR72SD	Total Organic Carbon		9/17/2012	12:46	1	4 oz WM Amber Glass Jar	None	
	0912KR72SD	Grain Size		9/17/2012	12:46	1	16 WM Clear Glass Jar	None	
7	0912KR75SD	Total Inorganic Elements		9/16/2012	14:26	1	4 oz WM Amber Glass Jar	None	
	0912KR75SD	Total Organic Carbon		9/16/2012	14:26	1	4 oz WM Amber Glass Jar	None	
	0912KR75SD	Grain Size		9/16/2012	14:26	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 1330		09/24/12	1340			1530 09/24/12		9/25/12	0940

35138

10/19/2012

CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-014
Cooler #: 14
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
7-8	0912KR75SD	Methyl Mercury		9/16/2012	14:26	1	4 oz. Poly Jar	None	
	0912KR78SD	Total Inorganic Elements		9/16/2012	11:30	1	4 oz WM Amber Glass Jar	None	
	0912KR78SD	Total Organic Carbon		9/16/2012	11:30	1	4 oz WM Amber Glass Jar	None	
	0912KR78SD	Grain Size		9/16/2012	11:30	1	16 WM Clear Glass Jar	None	
	0912KR78SD	Methyl Mercury		9/16/2012	11:30	1	4 oz. Poly Jar	None	
9-	0912KR81SD	Total Inorganic Elements		9/19/2012	16:40	1	4 oz WM Amber Glass Jar	None	
	0912KR81SD	Total Organic Carbon		9/19/2012	16:40	1	4 oz WM Amber Glass Jar	None	
	0912KR81SD	Grain Size		9/19/2012	16:40	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9.23.12	[signature]	9/24/12	1340		[signature]	1340 9/24/12	[signature]	9/25/12	1540

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: TestAmerica	**Lab Project Number: 580-35132-1**
Sampling Dates: 09/16, 09/17, & 09/19/2012	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6020/7471A)*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR62SD	580-35132-1
2	0912KR63SD	580-35132-2
3	0912KR68SD	580-35132-3
4	0912KR70SD	580-35132-4
5	0912KR74SD	580-35132-5
6	0912KR76SD	580-35132-6
7	0912KR201SD	580-35132-7
8	0912KR202SD	580-35132-8
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- * — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.0X70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	NO
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	NO

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.1°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 0912KR62SD was used for MS/MSD analysis and the recoveries of Cu, Fe, Mn, Zn, Al, and Mg were outside of control limits. Qualification was not necessary for Fe, Mn, and Al because the amount of these metals present in the parent sample was greater than four times the amount spiked. The detected results of Cu, Zn, and Mg were qualified as estimated (J). Also, sample 0912KR68SD was used for Hg MS/MSD analysis and the recoveries were outside of control limits. Qualification was not required since the amount of Hg present in the parent sample was greater than four times the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount of Al (3.6 mg/kg) was detected in the method blank: Finding does not require qualification since the concentrations of Al present in the samples were a lot more than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, Total (mg/kg)	0912KR62SD	0912KR202SD	RPD (%)
Aluminum	4200	4900	15
Antimony	18	46	88*
Arsenic	40	200	500*
Barium	67	120	57*
Beryllium	0.34	0.48	34
Cadmium	0.24	0.35	37*
Calcium	1400	2000	35
Chromium	15	21	33
Cobalt	10	14	33
Copper	28	38	30
Iron	24000	34000	34
Lead	5.9	7.8	28
Magnesium	1900	2400	23
Manganese	550	900	48*
Nickel	29	38	27
Potassium	630	810	25
Selenium	0.54	0.79	38*
Silver	0.043	0.071	49*
Sodium	72	79	9
Thallium	<0.56	<0.53	0
Vanadium	25	32	25
Zinc	76	94	21
Mercury	1.7	0.97	55*

*: RPD>35%

Comments: Sample 0912KR202SD was a field duplicate of 0912KR62SD and the detected Sb, As, Ba, Cd, Mn, Se, Ag, and Hg results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, Total (mg/kg)	0912KR67SD	0912KR201SD	RPD (%)
Aluminum	7200	3400	72*
Antimony	9.8	7.9	21
Arsenic	49	22	76*
Barium	160	63	87*
Beryllium	0.39	0.24	48*
Cadmium	0.26	0.28	7
Calcium	2700	2100	20
Chromium	18	8.8	69*
Cobalt	11	7.9	33
Copper	29	19	42*
Iron	30000	21000	35
Lead	7.6	4.6	49*
Magnesium	3400	1700	67*
Manganese	960	750	25
Nickel	31	33	6
Potassium	1200	480	86*
Selenium	0.79	0.46	53*
Silver	0.075	0.041	59*
Sodium	100	43	80*
Thallium	<0.55	<0.55	0
Vanadium	30	17	55*
Zinc	80	57	34
Mercury	7.6	2.6	98*

*: RPD>35%

Comments: Sample 0912KR201SD was a field duplicate of 0912KR67SD. Most of RPD were outside of control limits (>35%). Based on Grain Size and % moisture results, these two sediment samples were not homogeneous. Therefore, the detected results of metals with a RPD greater than 35% were qualified as estimated (J) in samples 0912KR67SD and 0912 KR201SD only.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample 0912KR62SD was and the percent differences (%D) were within the range.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).
Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Sample 0912KR62SD
Sb: (32.560 ug/L) (0.05 L/ 1.00 g) (10) (100/88.8) = 18.33 ug/g = 18.33 mg/kg.
Lab reported 18 mg/kg.
As: (71.160 ug/L) (0.05 L/ 1.00 g) (10) (100/88.8) = 40.067 ug/g = 40.067 mg/kg.
Lab reported 40 mg/kg.
Mg: (3398 ug/L) (0.05 L/ 1.00 g) (10) (100/88.8) = 1913 ug/g = 1913 mg/kg.
Lab reported 1900 mg/kg.
Pb: (10.490 ug/L) (0.05 L/ 1.00 g) (10) (100/88.8) = 5.9065 ug/g = 5.9065 mg/kg.
Lab reported 5.90 mg/kg.
Hg: (2.514 ug/L) (0.05L/0.8306 g) (10) (100/88.8) = 1.704 ug/g= 1.704 mg/kg.
Lab reported 1.7 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments

on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR62SD

Lab Sample ID: 580-35132-1 Date Sampled: 09/16/2012 1709
Client Matrix: Solid % Moisture: 11.2 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	030S
Dilution:	10			Initial Weight/Volume:	1.0002 g
Analysis Date:	10/11/2012 1317			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		40 J		0.20	0.56
Antimony		18 J		0.047	0.23
Barium		67 J		0.034	0.23
Beryllium		0.34		0.025	0.23
Cadmium		0.24 J		0.0090	0.23
Chromium		15		0.13	0.23
Lead		5.9		0.015	0.23
Cobalt		10		0.021	0.23
Copper		28 J		0.11	0.45
Iron		24000		12	23
Manganese		550 J		0.19	0.56
Nickel		29		0.080	0.56
Selenium		0.54 J	J	0.23	0.79
Silver		0.043 J	J	0.014	0.23
Thallium		ND		0.15	0.56
Vanadium		25		0.53	0.79
Zinc		76 J		1.3	2.3
Aluminum		4200	B	3.4	34
Magnesium		1900 J		3.0	110
Potassium		630		3.7	110
Sodium		72	J	44	110
Calcium		1400		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.8306 g
Analysis Date:	10/04/2012 1507			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		1.7 J		0.043	0.14

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR63SD

Lab Sample ID: 580-35132-2 Date Sampled: 09/17/2012 1017
Client Matrix: Solid % Moisture: 14.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	037
Dilution:	1.0			Initial Weight/Volume:	1.0692 g
Analysis Date:	10/11/2012 1343			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		3.8		0.020	0.055
Antimony		1.1		0.0046	0.022
Barium		7.1		0.0033	0.022
Beryllium		0.046		0.0024	0.022
Cadmium		0.030		0.00088	0.022
Chromium		1.7		0.012	0.022
Lead		0.84		0.0014	0.022
Cobalt		0.95		0.0021	0.022
Copper		4.2 J		0.011	0.044
Iron		4000		1.2	2.2
Manganese		53		0.019	0.055
Nickel		4.0		0.0078	0.055
Selenium		0.075	J	0.022	0.077
Silver		0.0072	J	0.0013	0.022
Thallium		ND		0.014	0.055
Vanadium		3.0		0.052	0.077
Zinc		10 J		0.12	0.22
Aluminum		340	B	0.33	3.3
Magnesium		180 J		0.29	11
Potassium		61		0.36	11
Sodium		5.8	J	4.3	11
Calcium		160		1.2	11

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6365 g
Analysis Date:	10/04/2012 1509			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		1.2		0.058	0.18

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: **0912KR68SD**

Lab Sample ID: 580-35132-3 Date Sampled: 09/17/2012 1506
Client Matrix: Solid % Moisture: 13.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	038S
Dilution:	10			Initial Weight/Volume:	1.0247 g
Analysis Date:	10/11/2012 1347			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		75		0.20	0.57
Antimony		42		0.048	0.23
Barium		73		0.034	0.23
Beryllium		0.32		0.025	0.23
Cadmium		0.21	J	0.0091	0.23
Chromium		16		0.13	0.23
Lead		5.6		0.015	0.23
Cobalt		8.7		0.022	0.23
Copper		20 J		0.11	0.45
Iron		21000		12	23
Manganese		800		0.19	0.57
Nickel		26		0.080	0.57
Selenium		0.50	J	0.23	0.79
Silver		0.064	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		23		0.54	0.79
Zinc		59 J		1.3	2.3
Aluminum		5900	B	3.4	34
Magnesium		3100 J		3.0	110
Potassium		720		3.8	110
Sodium		76	J	44	110
Calcium		2200		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6457 g
Analysis Date:	10/05/2012 0834			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		3.1		0.057	0.18

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR70SD

Lab Sample ID: 580-35132-4 Date Sampled: 09/16/2012 1530
Client Matrix: Solid % Moisture: 12.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	039S
Dilution:	10			Initial Weight/Volume:	1.1100 g
Analysis Date:	10/11/2012 1351			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		26		0.19	0.52
Antimony		1.9		0.043	0.21
Barium		97		0.031	0.21
Beryllium		0.74		0.023	0.21
Cadmium		0.68		0.0083	0.21
Chromium		18		0.12	0.21
Lead		11		0.013	0.21
Cobalt		8.2		0.020	0.21
Copper		38	J	0.10	0.41
Iron		42000		11	21
Manganese		1200		0.18	0.52
Nickel		33		0.073	0.52
Selenium		1.1		0.21	0.72
Silver		0.15	J	0.012	0.21
Thallium		ND		0.13	0.52
Vanadium		38		0.49	0.72
Zinc		86	J	1.2	2.1
Aluminum		3900	B	3.1	31
Magnesium		2000	J	2.7	100
Potassium		940		3.4	100
Sodium		140		41	100
Calcium		11000		11	100

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.7087 g
Analysis Date:	10/05/2012 0843			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.98		0.051	0.16

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR74SD

Lab Sample ID: 580-35132-5 Date Sampled: 09/16/2012 1510
Client Matrix: Solid % Moisture: 12.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	040S
Dilution:	10			Initial Weight/Volume:	1.0014 g
Analysis Date:	10/11/2012 1354			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		17		0.21	0.57
Antimony		11		0.048	0.23
Barium		74		0.034	0.23
Beryllium		0.22	J	0.025	0.23
Cadmium		0.17	J	0.0091	0.23
Chromium		16		0.13	0.23
Lead		4.1		0.015	0.23
Cobalt		6.2		0.022	0.23
Copper		14 J		0.11	0.46
Iron		15000		12	23
Manganese		240		0.19	0.57
Nickel		19		0.081	0.57
Selenium		0.40	J	0.23	0.80
Silver		0.055	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		23		0.54	0.80
Zinc		45 J		1.3	2.3
Aluminum		5800	B	3.4	34
Magnesium		2900 J		3.0	110
Potassium		670		3.8	110
Sodium		120		45	110
Calcium		1900		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6504 g
Analysis Date:	10/05/2012 0845			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		7.1		0.055	0.18

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR76SD

Lab Sample ID: 580-35132-6 Date Sampled: 09/17/2012 1228
Client Matrix: Solid % Moisture: 16.5 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	041S
Dilution:	10			Initial Weight/Volume:	1.0538 g
Analysis Date:	10/11/2012 1358			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		14		0.20	0.57
Antimony		11		0.048	0.23
Barium		70		0.034	0.23
Beryllium		0.43		0.025	0.23
Cadmium		0.25		0.0091	0.23
Chromium		18		0.13	0.23
Lead		5.0		0.015	0.23
Cobalt		9.3		0.022	0.23
Copper		38 J		0.11	0.45
Iron		48000		12	23
Manganese		2200		0.19	0.57
Nickel		26		0.081	0.57
Selenium		0.78	J	0.23	0.80
Silver		0.085	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		30		0.54	0.80
Zinc		67 J		1.3	2.3
Aluminum		3400	B	3.4	34
Magnesium		5200 J		3.0	110
Potassium		820		3.8	110
Sodium		75	J	45	110
Calcium		3500		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6111 g
Analysis Date:	10/05/2012 0929			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.066		0.0062	0.020

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: **0912KR201SD**

Lab Sample ID: 580-35132-7 Date Sampled: 09/19/2012 0700
Client Matrix: Solid % Moisture: 9.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	042S
Dilution:	10			Initial Weight/Volume:	1.0086 g
Analysis Date:	10/11/2012 1402			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		22 J		0.20	0.55
Antimony		7.9		0.046	0.22
Barium		63 J		0.033	0.22
Beryllium		0.24 J		0.024	0.22
Cadmium		0.28		0.0088	0.22
Chromium		8.8 J		0.12	0.22
Lead		4.6 J		0.014	0.22
Cobalt		7.9		0.021	0.22
Copper		19 J		0.11	0.44
Iron		21000		12	22
Manganese		750		0.19	0.55
Nickel		33		0.078	0.55
Selenium		0.46 J	J	0.22	0.77
Silver		0.041 J	J	0.013	0.22
Thallium		ND		0.14	0.55
Vanadium		17 J		0.52	0.77
Zinc		57 J		1.2	2.2
Aluminum		3400 J	B	3.3	33
Magnesium		1700 J		2.9	110
Potassium		480 J		3.6	110
Sodium		43 J	J	43	110
Calcium		2100		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.8843 g
Analysis Date:	10/05/2012 0854			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		2.6 J		0.039	0.13

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Client Sample ID: 0912KR202SD

Lab Sample ID: 580-35132-8 Date Sampled: 09/19/2012 0700

Client Matrix: Solid % Moisture: 13.6 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	043S
Dilution:	10			Initial Weight/Volume:	1.0881 g
Analysis Date:	10/11/2012 1406			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		200 J		0.19	0.53
Antimony		46 J		0.045	0.21
Barium		120 J		0.032	0.21
Beryllium		0.48		0.023	0.21
Cadmium		0.35 J		0.0085	0.21
Chromium		21		0.12	0.21
Lead		7.8		0.014	0.21
Cobalt		14		0.020	0.21
Copper		38 J		0.10	0.43
Iron		34000		11	21
Manganese		900 J		0.18	0.53
Nickel		38		0.075	0.53
Selenium		0.79 J		0.21	0.74
Silver		0.071 J	J	0.013	0.21
Thallium		ND		0.14	0.53
Vanadium		32		0.50	0.74
Zinc		94 J		1.2	2.1
Aluminum		4900	B	3.2	32
Magnesium		2400 J		2.8	110
Potassium		810		3.5	110
Sodium		79	J	42	110
Calcium		2000		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.8058 g
Analysis Date:	10/05/2012 0857			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.97 J		0.045	0.14

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35132-1

Method Blank - Batch: 580-122117

Method: 6020
Preparation: 3050B

Lab Sample ID:	MB 580-122117/21-A	Analysis Batch:	580-122252	Instrument ID:	SEA044
Client Matrix:	Solid	Prep Batch:	580-122117	Lab File ID:	0
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	1.0 g
Analysis Date:	10/11/2012 1258	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Arsenic	ND		0.18	0.50
Antimony	ND		0.042	0.20
Barium	ND		0.030	0.20
Beryllium	ND		0.022	0.20
Cadmium	ND		0.0080	0.20
Chromium	ND		0.11	0.20
Lead	ND		0.013	0.20
Cobalt	ND		0.019	0.20
Copper	ND		0.098	0.40
Iron	ND		11	20
Manganese	ND		0.17	0.50
Nickel	ND		0.071	0.50
Selenium	ND		0.20	0.70
Silver	ND		0.012	0.20
Thallium	ND		0.13	0.50
Vanadium	ND		0.47	0.70
Zinc	ND		1.1	2.0
Aluminum	3.60	J	3.0	30
Magnesium	ND		2.6	100
Potassium	ND		3.3	100
Sodium	ND		39	100
Calcium	ND		11	100

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35132-1

Method Blank - Batch: 580-121639

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 580-121639/21-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1250	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	ND		0.0053	0.017

LCS-Certified Reference Material - Batch: 580-121639

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCSSRM	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	0.1012 g
Analysis Date:	10/04/2012 1256	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	12.4	13.3	107.3	51.3 - 148.4	

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121639

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 580-121639/22-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1252	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121639/23-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1254	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	108	107	80 - 120	1	20		

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35132-1

Method Blank - Batch: 580-121658

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 580-121658/21-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0825	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	ND		0.0053	0.017

LCS-Certified Reference Material - Batch: 580-121658

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCSSRM	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	0.1046 g
Analysis Date:	10/05/2012 0832	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	12.4	13.0	104.6	51.3 - 148.4	

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121658

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 580-121658/22-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0827	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121658/23-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0829	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	98	99	80 - 120	1	20		

11/21/12

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Ecology and Environment, Inc

CHAIN OF CUSTODY RECORD
Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-015
Cooler #: 15
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR62SD	Total Inorganic Elements		9/16/2012	17:09	1	4 oz WM Amber Glass Jar	None	
	0912KR62SD	Total Organic Carbon		9/16/2012	17:09	1	4 oz WM Amber Glass Jar	None	
	0912KR62SD	Grain Size		9/16/2012	17:09	1	16 WM Clear Glass Jar	None	
	0912KR62SD	Methyl Mercury		9/16/2012	17:09	1	4 oz. Poly Jar	None	
2	0912KR63SD	Total Inorganic Elements		9/17/2012	10:17	1	4 oz WM Amber Glass Jar	None	
	0912KR63SD	Total Organic Carbon		9/17/2012	10:17	1	4 oz WM Amber Glass Jar	None	
	0912KR63SD	Grain Size		9/17/2012	10:17	1	16 WM Clear Glass Jar	None	
3	0912KR68SD	Total Inorganic Elements		9/17/2012	15:06	1	4 oz WM Amber Glass Jar	None	
	0912KR68SD	Total Organic Carbon		9/17/2012	15:06	1	4 oz WM Amber Glass Jar	None	
	0912KR68SD	Grain Size		9/17/2012	15:06	1	16 WM Clear Glass Jar	None	
4	0912KR70SD	Total Inorganic Elements		9/16/2012	15:30	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9/23/12 13:30	[signature]	09/24/12	1340		[signature]	1510 09/24/12			
			Cathy Gamble	9/25/12	15:40						

Temp: 3.9°C

Cooler/TB Dig/IR cor 4.1 unc 4.2
Cooler Dsc Lg gr blue @ Lab –
Wet/Packs Packing bubble
w/ Goldstreak

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10/19/2012

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-015

Cooler #: 15

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
4-	0912KR70SD	Total Organic Carbon		9/16/2012	15:30	1	4 oz WM Amber Glass Jar	None	
	0912KR70SD	Grain Size		9/16/2012	15:30	1	16 WM Clear Glass Jar	None	
	0912KR70SD	Methyl Mercury		9/16/2012	15:30	1	4 oz. Poly Jar	None	
5-	0912KR74SD	Total Inorganic Elements		9/16/2012	15:10	1	4 oz WM Amber Glass Jar	None	
	0912KR74SD	Total Organic Carbon		9/16/2012	15:10	1	4 oz WM Amber Glass Jar	None	
	0912KR74SD	Grain Size		9/16/2012	15:10	1	16 WM Clear Glass Jar	None	
6-	0912KR76SD	Total Inorganic Elements		9/17/2012	12:28	1	4 oz WM Amber Glass Jar	None	
	0912KR76SD	Total Organic Carbon		9/17/2012	12:28	1	4 oz WM Amber Glass Jar	None	
	0912KR76SD	Grain Size		9/17/2012	12:28	1	16 WM Clear Glass Jar	None	
7-	0912KR201SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR201SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 13:30	09/24/12		1340			1510 09/24/12			
			Cathy Crumbliss	9/25/12	15:40						

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-015

Cooler #: 15

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
7	0912KR201SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	
8	0912KR202SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR202SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR202SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9.23.12 13:30	[signature]	09/24/12	1340		[signature]	1310 09/24/12			
			Cathy Crumb	9/24/12	15:40						

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: TestAmerica	**Lab Project Number: 580-35136-1**
Sampling Dates: 09/16, 09/18, & 09/19/2012	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6020/7471A)*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR54SD	580-35136-1
2	0912KR55SD	580-35136-2
3	0912KR56SD	580-35136-3
4	0912KR61SD	580-35136-4
5	0912KR66SD	580-35136-5
6	0912KR67SD	580-35136-6
7	0912KR71SD	580-35136-7
8	0912KR77SD	580-35136-8
9	0912KR79SD	580-35136-9
10	0912KR80SD	580-35136-10
11	0912KR200SD	580-35136-11
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- * — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	NO
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	NO

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 3.8°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 0912KR55SD was used for MS/MSD analysis and the recoveries of Ba, Cr, Cu, fe, Mn, Zn, Al, and Mg were outside of control limits. Qualification was not necessary for Fe, Mn, and Al because the amount of these metals present in the parent sample was greater than four times the amount spiked. The detected results of Ba, Cr, Cu, Zn, and Mg were qualified as estimated (J). Also, sample 0912KR54SD was used for Hg MS/MSD analysis and the recoveries were outside of control limits. Qualification was not required since the amount of Hg present in the parent sample was greater than four times the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount of Al (3.6 mg/kg) was detected in the method blank: Finding does not require qualification since the concentrations of Al present in the samples were a lot more than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, Total (mg/kg)	0912KR66SD	0912KR200SD	RPD (%)
Aluminum	6100	5900	3
Antimony	4.8	19	119*
Arsenic	34	28	19
Barium	110	110	0
Beryllium	0.54	0.48	12
Cadmium	0.38	0.32	17
Calcium	3000	2900	3
Chromium	18	16	12
Cobalt	9.9	9.7	2
Copper	46	43	7
Iron	38000	34000	11
Lead	11	10	10
Magnesium	3400	3200	6
Manganese	740	770	4
Nickel	35	31	12
Potassium	1400	1200	15
Selenium	1.0	1.0	0
Silver	0.14	0.15	7
Sodium	120	110	9
Thallium	<0.56	<0.63	0
Vanadium	33	31	6
Zinc	110	94	16
Mercury	3.1	1.9	48*

*: RPD>35%

Comments: Sample 0912KR200SD was a field duplicate of 0912KR66SD and the detected Sb and Hg results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, Total (mg/kg)	0912KR67SD	0912KR201SD	RPD (%)
Aluminum	7200	3400	72*
Antimony	9.8	7.9	21
Arsenic	49	22	76*
Barium	160	63	87*
Beryllium	0.39	0.24	48*
Cadmium	0.26	0.28	7
Calcium	2700	2100	20
Chromium	18	8.8	69*
Cobalt	11	7.9	33
Copper	29	19	42*
Iron	30000	21000	35
Lead	7.6	4.6	49*
Magnesium	3400	1700	67*
Manganese	960	750	25
Nickel	31	33	6
Potassium	1200	480	86*
Selenium	0.79	0.46	53*
Silver	0.075	0.041	59*
Sodium	100	43	80*
Thallium	<0.55	<0.55	0
Vanadium	30	17	55*
Zinc	80	57	34
Mercury	7.6	2.6	98*

*: RPD>35%

Comments: Sample 0912KR201SD was a field duplicate of 0912KR67SD. Most of RPD were outside of control limits (>35%). Based on Grain Size and % moisture results, these two sediment samples were not homogeneous. Therefore, the detected results of metals with a RPD greater than 35% were qualified as estimated in samples 0912KR67SD and 0912 KR201SD only.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample 0912KR55SD was and the percent differences (%D) were within the range.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).
Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.0X70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Sample 0912KR66SD
Sb: (8.602 ug/L) (0.05 L/ 1.1537 g) (10) (100/77.5) = 4.81 ug/g = 4.81 mg/kg.
Lab reported 4.8 mg/kg.
As: (60.660 ug/L) (0.05 L/ 1.1537 g) (10) (100/77.5) = 33.92 ug/g = 33.92 mg/kg.
Lab reported 34 mg/kg.
Mg: (6004 ug/L) (0.05 L/ 1.1537 g) (10) (100/77.5) = 3357.5 ug/g = 3357.5 mg/kg.
Lab reported 3400 mg/kg.
Pb: (20.280 ug/L) (0.05 L/ 1.1537 g) (10) (100/77.5) = 11.34 ug/g = 11.34 mg/kg.
Lab reported 11 mg/kg.
Hg: (3.078 ug/L) (0.05L/0.6471 g) (10) (100/77.5) = 3.069 ug/g= 3.069 mg/kg.
Lab reported 3.1 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments

on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR54SD

Lab Sample ID: 580-35136-1 Date Sampled: 09/19/2012 1230
Client Matrix: Solid % Moisture: 10.0 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	044S
Dilution:	10			Initial Weight/Volume:	1.0099 g
Analysis Date:	10/11/2012 1409			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		17		0.20	0.55
Antimony		4.4		0.046	0.22
Barium		57 J		0.033	0.22
Beryllium		0.18	J	0.024	0.22
Cadmium		0.10	J	0.0088	0.22
Chromium		12 J		0.12	0.22
Lead		2.2		0.014	0.22
Cobalt		5.5		0.021	0.22
Copper		8.5 J		0.11	0.44
Iron		14000		12	22
Manganese		560		0.19	0.55
Nickel		15		0.078	0.55
Selenium		0.27	J	0.22	0.77
Silver		0.020	J	0.013	0.22
Thallium		ND		0.14	0.55
Vanadium		16		0.52	0.77
Zinc		32 J		1.2	2.2
Aluminum		4000	B	3.3	33
Magnesium		2500 J		2.9	110
Potassium		480		3.6	110
Sodium		59	J	43	110
Calcium		1600		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6097 g
Analysis Date:	10/04/2012 0912			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.20		0.0057	0.018

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR55SD

Lab Sample ID: 580-35136-2 Date Sampled: 09/19/2012 1129
Client Matrix: Solid % Moisture: 16.6 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	094S
Dilution:	10			Initial Weight/Volume:	1.0202 g
Analysis Date:	10/11/2012 1718			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		8.5		0.21	0.59
Antimony		0.18	J	0.049	0.23
Barium		94 J		0.035	0.23
Beryllium		0.35		0.026	0.23
Cadmium		0.22	J	0.0094	0.23
Chromium		17 J		0.13	0.23
Lead		7.2		0.015	0.23
Cobalt		9.1		0.022	0.23
Copper		23 J		0.12	0.47
Iron		23000		13	23
Manganese		670		0.20	0.59
Nickel		29		0.083	0.59
Selenium		0.65	J	0.24	0.82
Silver		0.088	J	0.014	0.23
Thallium		ND		0.15	0.59
Vanadium		24		0.56	0.82
Zinc		62 J		1.3	2.3
Aluminum		5900		3.5	35
Magnesium		4000 J		3.1	120
Potassium		1100		3.9	120
Sodium		120		46	120
Calcium		2900		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6475 g
Analysis Date:	10/04/2012 0921			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.16		0.0058	0.019

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR56SD

Lab Sample ID: 580-35136-3 Date Sampled: 09/19/2012 1105
Client Matrix: Solid % Moisture: 18.5 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	101S
Dilution:	10			Initial Weight/Volume:	1.0093 g
Analysis Date:	10/11/2012 1744			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		6.6		0.22	0.61
Antimony		0.19	J	0.051	0.24
Barium		66 J		0.036	0.24
Beryllium		0.18	J	0.027	0.24
Cadmium		0.11	J	0.0097	0.24
Chromium		14 J		0.14	0.24
Lead		2.4		0.016	0.24
Cobalt		4.9		0.023	0.24
Copper		7.7 J		0.12	0.49
Iron		11000		13	24
Manganese		400		0.21	0.61
Nickel		15		0.086	0.61
Selenium		0.29	J	0.25	0.85
Silver		0.032	J	0.015	0.24
Thallium		ND		0.16	0.61
Vanadium		18		0.57	0.85
Zinc		31 J		1.4	2.4
Aluminum		4600		3.6	36
Magnesium		2500 J		3.2	120
Potassium		590		4.0	120
Sodium		59	J	48	120
Calcium		1700		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6082 g
Analysis Date:	10/04/2012 0924			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.030		0.0064	0.020

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35136-1

Client Sample ID: 0912KR61SD

Lab Sample ID: 580-35136-4
Client Matrix: Solid
% Moisture: 16.7

Date Sampled: 09/19/2012 0933
Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	102S
Dilution:	10			Initial Weight/Volume:	1.1047 g
Analysis Date:	10/11/2012 1748			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		7.0		0.20	0.54
Antimony		0.49		0.046	0.22
Barium		66 J		0.033	0.22
Beryllium		0.16	J	0.024	0.22
Cadmium		0.14	J	0.0087	0.22
Chromium		14 J		0.12	0.22
Lead		5.5		0.014	0.22
Cobalt		5.6		0.021	0.22
Copper		10 J		0.11	0.43
Iron		13000		12	22
Manganese		450		0.18	0.54
Nickel		18		0.077	0.54
Selenium		0.35	J	0.22	0.76
Silver		0.037	J	0.013	0.22
Thallium		ND		0.14	0.54
Vanadium		17		0.51	0.76
Zinc		40 J		1.2	2.2
Aluminum		5300		3.3	33
Magnesium		2600 J		2.9	110
Potassium		700		3.6	110
Sodium		100	J	43	110
Calcium		1600		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6638 g
Analysis Date:	10/04/2012 0931			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.027		0.0057	0.018

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR66SD

Lab Sample ID: 580-35136-5 Date Sampled: 09/16/2012 1636
Client Matrix: Solid % Moisture: 22.5 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	103S
Dilution:	10			Initial Weight/Volume:	1.1537 g
Analysis Date:	10/11/2012 1752			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		34		0.20	0.56
Antimony		4.8 J		0.047	0.22
Barium		110 J		0.034	0.22
Beryllium		0.54		0.025	0.22
Cadmium		0.38		0.0090	0.22
Chromium		18 J		0.13	0.22
Lead		11		0.015	0.22
Cobalt		9.9		0.021	0.22
Copper		46 J		0.11	0.45
Iron		38000		12	22
Manganese		740		0.19	0.56
Nickel		35		0.079	0.56
Selenium		1.0		0.23	0.78
Silver		0.14	J	0.013	0.22
Thallium		ND		0.15	0.56
Vanadium		33		0.53	0.78
Zinc		110 J		1.3	2.2
Aluminum		6100		3.4	34
Magnesium		3400 J		3.0	110
Potassium		1400		3.7	110
Sodium		120		44	110
Calcium		3000		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6471 g
Analysis Date:	10/04/2012 1120			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		3.1 J		0.063	0.20

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR67SD

Lab Sample ID: 580-35136-6 Date Sampled: 09/16/2012 1652
Client Matrix: Solid % Moisture: 20.0 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	104S
Dilution:	10			Initial Weight/Volume:	1.1463 g
Analysis Date:	10/11/2012 1756			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		49 J		0.20	0.55
Antimony		9.8		0.046	0.22
Barium		160 J		0.033	0.22
Beryllium		0.39 J		0.024	0.22
Cadmium		0.26		0.0087	0.22
Chromium		18 J		0.12	0.22
Lead		7.6 J		0.014	0.22
Cobalt		11		0.021	0.22
Copper		29 J		0.11	0.44
Iron		30000		12	22
Manganese		960		0.19	0.55
Nickel		31		0.077	0.55
Selenium		0.79 J		0.22	0.76
Silver		0.075 J	J	0.013	0.22
Thallium		ND		0.14	0.55
Vanadium		30 J		0.52	0.76
Zinc		80 J		1.2	2.2
Aluminum		7200 J		3.3	33
Magnesium		3400 J		2.9	110
Potassium		1200 J		3.6	110
Sodium		100 J	J	43	110
Calcium		2700		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	50			Initial Weight/Volume:	0.6482 g
Analysis Date:	10/04/2012 1115			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		7.6 J		0.30	0.96

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR71SD

Lab Sample ID: 580-35136-7 Date Sampled: 09/16/2012 1549
Client Matrix: Solid % Moisture: 10.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	105S
Dilution:	10			Initial Weight/Volume:	1.0841 g
Analysis Date:	10/11/2012 1800			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		35		0.19	0.52
Antimony		8.3		0.043	0.21
Barium		100 J		0.031	0.21
Beryllium		0.31		0.023	0.21
Cadmium		0.28		0.0083	0.21
Chromium		15 J		0.12	0.21
Lead		5.5		0.013	0.21
Cobalt		8.2		0.020	0.21
Copper		20 J		0.10	0.41
Iron		21000		11	21
Manganese		1000		0.18	0.52
Nickel		22		0.073	0.52
Selenium		0.58	J	0.21	0.72
Silver		0.079	J	0.012	0.21
Thallium		ND		0.13	0.52
Vanadium		22		0.49	0.72
Zinc		61 J		1.2	2.1
Aluminum		5600		3.1	31
Magnesium		2700 J		2.7	100
Potassium		750		3.4	100
Sodium		110		40	100
Calcium		2500		11	100

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6338 g
Analysis Date:	10/04/2012 1122			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.99		0.056	0.18

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR77SD

Lab Sample ID: 580-35136-8 Date Sampled: 09/18/2012 1256
Client Matrix: Solid % Moisture: 20.1 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	106S
Dilution:	10			Initial Weight/Volume:	1.0976 g
Analysis Date:	10/11/2012 1804			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		9.0		0.21	0.57
Antimony		0.62		0.048	0.23
Barium		200 J		0.034	0.23
Beryllium		0.19	J	0.025	0.23
Cadmium		0.11	J	0.0091	0.23
Chromium		25 J		0.13	0.23
Lead		3.1		0.015	0.23
Cobalt		4.9		0.022	0.23
Copper		11 J		0.11	0.46
Iron		10000		12	23
Manganese		340		0.19	0.57
Nickel		18		0.081	0.57
Selenium		0.34	J	0.23	0.80
Silver		0.049	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		22		0.54	0.80
Zinc		37 J		1.3	2.3
Aluminum		4900		3.4	34
Magnesium		2600 J		3.0	110
Potassium		840		3.8	110
Sodium		150		45	110
Calcium		1900		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6377 g
Analysis Date:	10/04/2012 0940			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.0062	0.020

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR79SD

Lab Sample ID: 580-35136-9 Date Sampled: 09/16/2012 1230
Client Matrix: Solid % Moisture: 10.1 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	107S
Dilution:	10			Initial Weight/Volume:	1.2065 g
Analysis Date:	10/11/2012 1808			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		27		0.17	0.46
Antimony		4.3		0.039	0.18
Barium		90 J		0.028	0.18
Beryllium		0.23		0.020	0.18
Cadmium		0.17	J	0.0074	0.18
Chromium		17 J		0.10	0.18
Lead		4.1		0.012	0.18
Cobalt		7.5		0.018	0.18
Copper		12 J		0.090	0.37
Iron		18000		9.9	18
Manganese		680		0.16	0.46
Nickel		20		0.065	0.46
Selenium		0.47	J	0.19	0.65
Silver		0.048	J	0.011	0.18
Thallium		ND		0.12	0.46
Vanadium		24		0.44	0.65
Zinc		47 J		1.0	1.8
Aluminum		6200		2.8	28
Magnesium		3000 J		2.4	92
Potassium		760		3.1	92
Sodium		83	J	36	92
Calcium		2000		10	92

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	50			Initial Weight/Volume:	0.6404 g
Analysis Date:	10/04/2012 1118			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		20		0.27	0.87

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR80SD

Lab Sample ID: 580-35136-10 Date Sampled: 09/18/2012 1052
Client Matrix: Solid % Moisture: 24.8 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	108
Dilution:	10			Initial Weight/Volume:	1.1376 g
Analysis Date:	10/11/2012 1812			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		12		0.21	0.58
Antimony		12		0.049	0.23
Barium		84 J		0.035	0.23
Beryllium		0.25		0.026	0.23
Cadmium		0.21	J	0.0094	0.23
Chromium		21 J		0.13	0.23
Lead		3.5		0.015	0.23
Cobalt		8.0		0.022	0.23
Copper		15 J		0.11	0.47
Iron		14000		13	23
Manganese		480		0.20	0.58
Nickel		23		0.083	0.58
Selenium		0.67	J	0.24	0.82
Silver		0.055	J	0.014	0.23
Thallium		ND		0.15	0.58
Vanadium		29		0.55	0.82
Zinc		46 J		1.3	2.3
Aluminum		7200		3.5	35
Magnesium		3600 J		3.1	120
Potassium		880		3.9	120
Sodium		150		46	120
Calcium		3000		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6103 g
Analysis Date:	10/04/2012 1124			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		2.5		0.069	0.22

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Client Sample ID: 0912KR200SD

Lab Sample ID: 580-35136-11 Date Sampled: 09/19/2012 0700
Client Matrix: Solid % Moisture: 23.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	109
Dilution:	10			Initial Weight/Volume:	1.0405 g
Analysis Date:	10/11/2012 1815			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		28		0.23	0.63
Antimony		19 J		0.053	0.25
Barium		110 J		0.038	0.25
Beryllium		0.48		0.028	0.25
Cadmium		0.32		0.010	0.25
Chromium		16 J		0.14	0.25
Lead		10		0.016	0.25
Cobalt		9.7		0.024	0.25
Copper		43 J		0.12	0.50
Iron		34000		13	25
Manganese		770		0.21	0.63
Nickel		31		0.089	0.63
Selenium		1.0		0.25	0.88
Silver		0.15	J	0.015	0.25
Thallium		ND		0.16	0.63
Vanadium		31		0.59	0.88
Zinc		94 J		1.4	2.5
Aluminum		5900		3.8	38
Magnesium		3200 J		3.3	130
Potassium		1200		4.2	130
Sodium		110	J	49	130
Calcium		2900		14	130

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW
Dilution:	10			Initial Weight/Volume:	0.6231 g
Analysis Date:	10/04/2012 1127			Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		1.9 J		0.066	0.21

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35136-1

Method Blank - Batch: 580-122117

Method: 6020
Preparation: 3050B

Lab Sample ID:	MB 580-122117/21-A	Analysis Batch:	580-122252	Instrument ID:	SEA044
Client Matrix:	Solid	Prep Batch:	580-122117	Lab File ID:	0
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	1.0 g
Analysis Date:	10/11/2012 1258	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Arsenic	ND		0.18	0.50
Antimony	ND		0.042	0.20
Barium	ND		0.030	0.20
Beryllium	ND		0.022	0.20
Cadmium	ND		0.0080	0.20
Chromium	ND		0.11	0.20
Lead	ND		0.013	0.20
Cobalt	ND		0.019	0.20
Copper	ND		0.098	0.40
Iron	ND		11	20
Manganese	ND		0.17	0.50
Nickel	ND		0.071	0.50
Selenium	ND		0.20	0.70
Silver	ND		0.012	0.20
Thallium	ND		0.13	0.50
Vanadium	ND		0.47	0.70
Zinc	ND		1.1	2.0
Aluminum	3.60	J	3.0	30
Magnesium	ND		2.6	100
Potassium	ND		3.3	100
Sodium	ND		39	100
Calcium	ND		11	100

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35136-1

Method Blank - Batch: 580-121573

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 580-121573/21-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 0903	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	ND		0.0053	0.017

LCS-Certified Reference Material - Batch: 580-121573

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCSSRM	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW.
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	0.1001 g
Analysis Date:	10/04/2012 0910	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	12.4	12.9	103.6	51.3 - 148.4	

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121573

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 580-121573/22-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 0906	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121573/23-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121573	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 0908	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/03/2012 1547				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	101	98	80 - 120	4	20		

11/21/12

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Ecology and Environment, Inc

CHAIN OF CUSTODY RECORD
Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-013
Cooler #: 13
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR54SD	Total Inorganic Elements		9/19/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR54SD	Total Organic Carbon		9/19/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR54SD	Grain Size		9/19/2012	12:30	1	16 WM Clear Glass Jar	None	
2	0912KR55SD	Total Inorganic Elements		9/19/2012	11:29	1	4 oz WM Amber Glass Jar	None	
	0912KR55SD	Total Organic Carbon		9/19/2012	11:29	1	4 oz WM Amber Glass Jar	None	
	0912KR55SD	Grain Size		9/19/2012	11:29	1	16 WM Clear Glass Jar	None	
3	0912KR56SD	Total Inorganic Elements		9/19/2012	11:05	1	4 oz WM Amber Glass Jar	None	
	0912KR56SD	Total Organic Carbon		9/19/2012	11:05	1	4 oz WM Amber Glass Jar	None	
4	0912KR61SD	Total Inorganic Elements		9/19/2012	09:33	1	4 oz WM Amber Glass Jar	None	
	0912KR61SD	Total Organic Carbon		9/19/2012	09:33	1	4 oz WM Amber Glass Jar	None	
	0912KR61SD	Grain Size		9/19/2012	09:33	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9-23-12 13:30	[signature]	09/24/12 1340			[signature]	09/24/12 1355			
			Cathy Gamble	9/25/12	15:40						

#2
Cooler/TB Dig IR cor 3.8 5.1 unc 3.9 4.7
Cooler Dsc [illegible] @ Lab —
Wet Packs Packing bubble
Goldstreak

Temp: 4.2 °C

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-013

Cooler #: 13

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
5	0912KR66SD	Total Inorganic Elements		9/16/2012	16:36	1	4 oz WM Amber Glass Jar	None	
	0912KR66SD	Total Organic Carbon		9/16/2012	16:36	1	4 oz WM Amber Glass Jar	None	
	0912KR66SD	Grain Size		9/16/2012	16:36	1	16 WM Clear Glass Jar	None	
	0912KR66SD	Methyl Mercury		9/16/2012	16:36	1	4 oz. Poly Jar	None	
6	0912KR67SD	Total Inorganic Elements		9/16/2012	16:52	1	4 oz WM Amber Glass Jar	None	
	0912KR67SD	Total Organic Carbon		9/16/2012	16:52	1	4 oz WM Amber Glass Jar	None	
	0912KR67SD	Grain Size		9/16/2012	16:52	1	16 WM Clear Glass Jar	None	
7	0912KR71SD	Total Inorganic Elements		9/16/2012	15:49	1	4 oz WM Amber Glass Jar	None	
	0912KR71SD	Total Organic Carbon		9/16/2012	15:49	1	4 oz WM Amber Glass Jar	None	
	0912KR71SD	Grain Size		9/16/2012	15:49	1	16 WM Clear Glass Jar	None	
8	0912KR77SD	Total Inorganic Elements		9/18/2012	12:56	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 1320		9/19/12	1340			9/24/12			
			Cathy Trimble	9/15/12	15:40			555			

10/19/2012

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

Ecology and Environment, Inc

No: RDM-0912-013
Cooler #: 13
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
	0912KR77SD	Total Organic Carbon		9/18/2012	12:56	1	4 oz WM Amber Glass Jar	None	
	0912KR77SD	Grain Size		9/18/2012	12:56	1	16 WM Clear Glass Jar	None	
9	0912KR79SD	Total Inorganic Elements		9/16/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR79SD	Total Organic Carbon		9/16/2012	12:30	1	4 oz WM Amber Glass Jar	None	
	0912KR79SD	Grain Size		9/16/2012	12:30	1	16 WM Clear Glass Jar	None	
10	0912KR80SD	Total Inorganic Elements		9/18/2012	10:52	1	4 oz WM Amber Glass Jar	None	
	0912KR80SD	Total Organic Carbon		9/18/2012	10:52	1	4 oz WM Amber Glass Jar	None	
	0912KR80SD	Grain Size		9/18/2012	10:52	1	16 WM Clear Glass Jar	None	
11	0912KR200SD	Total Inorganic Elements		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR200SD	Total Organic Carbon		9/19/2012	07:00	1	4 oz WM Amber Glass Jar	None	
	0912KR200SD	Grain Size		9/19/2012	07:00	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	8/23/12 13:30	[signature] Cathy Crambe	09/24/12 9/25/12	1340 15:40		[signature]	1555 09/24/12			

10/19/2012

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CHAIN OF CUSTODY RECORD

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-013
Cooler #: 13
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
11	0912KR200SD	Methyl Mercury		9/19/2012	07:00	1	4 oz. Poly Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9/23/12 13:20		09/24/12	1340			1555 09/24/12			
				9/25/12	15:40						

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: TestAmerica	**Lab Project Number: 580-35138-1**
Sampling Dates: 09/16, 09/17, & 09/19/2012	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6020/7471A)*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/21/12
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	0912KR58SD	580-35138-1
2	0912KR59SD	580-35138-2
3	0912KR60SD	580-35138-3
4	0912KR64SD	580-35138-4
5	0912KR69SD	580-35138-5
6	0912KR72SD	580-35138-6
7	0912KR75SD	580-35138-7
8	0912KR78SD	580-35138-8
9	0912KR81SD	580-35138-9
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- NR — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NA
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: NA: Not Analyzed N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 2.3°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: No MS/MSD analysis was performed from this SDG but LCS and LCSD were analyzed instead.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was detected in the method blank at reporting limit levels.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPDs of LCS and LCSD were within the control limits. (<35%)

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).
Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Sample 0912KR72SD
Sb: (1.175 ug/L) (0.05 L/ 1.0087 g) (10) (100/83.8) = 0.695 ug/g = 0.695 mg/kg.
Lab reported 0.70 mg/kg.
As: (74.930 ug/L) (0.05 L/ 1.0087 g) (10) (100/83.8) = 44.32 ug/g = 44.32 mg/kg.
Lab reported 44 mg/kg.
Mg: (14690 ug/L) (0.05 L/ 1.0087 g) (10) (100/83.8) = 8689.3 ug/g = 8689.3 mg/kg.
Lab reported 8700 mg/kg.
Pb: (22.330 ug/L) (0.05 L/ 1.0087 g) (10) (100/83.8) = 13.208 ug/g = 13.208 mg/kg.
Lab reported 13 mg/kg.
Hg: (0.303 ug/L) (0.05L/0.7095 g) (100) (100/83.8) = 2.548 ug/g= 2.548 mg/kg.
Lab reported 2.5 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP).*

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR58SD

Lab Sample ID: 580-35138-1 Date Sampled: 09/17/2012 1939
Client Matrix: Solid % Moisture: 17.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	110S
Dilution:	10			Initial Weight/Volume:	1.3010 g
Analysis Date:	10/11/2012 1819			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		180		0.17	0.47
Antimony		44		0.039	0.19
Barium		130		0.028	0.19
Beryllium		0.79		0.021	0.19
Cadmium		0.50		0.0075	0.19
Chromium		20		0.11	0.19
Lead		16		0.012	0.19
Cobalt		27		0.018	0.19
Copper		63		0.092	0.37
Iron		47000		10	19
Manganese		1200		0.16	0.47
Nickel		67		0.066	0.47
Selenium		1.0		0.19	0.66
Silver		0.13	J	0.011	0.19
Thallium		0.12	J	0.12	0.47
Vanadium		33		0.44	0.66
Zinc		140		1.0	1.9
Aluminum		4700		2.8	28
Magnesium		1600		2.5	94
Potassium		1000		3.1	94
Sodium		70	J	37	94
Calcium		2400		10	94

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	10000			Initial Weight/Volume:	0.7387 g
Analysis Date:	10/05/2012 0903			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		260		52	160

11/01/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR59SD

Lab Sample ID: 580-35138-2 Date Sampled: 09/17/2012 1054
Client Matrix: Solid % Moisture: 14.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	114S
Dilution:	10			Initial Weight/Volume:	1.2497 g
Analysis Date:	10/11/2012 1834			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		210		0.17	0.47
Antimony		13		0.039	0.19
Barium		110		0.028	0.19
Beryllium		0.45		0.021	0.19
Cadmium		0.36		0.0075	0.19
Chromium		18		0.11	0.19
Lead		8.6		0.012	0.19
Cobalt		13		0.018	0.19
Copper		33		0.092	0.38
Iron		29000		10	19
Manganese		1200		0.16	0.47
Nickel		31		0.067	0.47
Selenium		0.81		0.19	0.66
Silver		0.078	J	0.011	0.19
Thallium		ND		0.12	0.47
Vanadium		21		0.44	0.66
Zinc		77		1.1	1.9
Aluminum		4300		2.8	28
Magnesium		1700		2.5	94
Potassium		700		3.1	94
Sodium		54	J	37	94
Calcium		2000		10	94

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	100			Initial Weight/Volume:	0.8556 g
Analysis Date:	10/05/2012 0931			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		8.4		0.43	1.4

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR60SD

Lab Sample ID: 580-35138-3 Date Sampled: 09/17/2012 1745
Client Matrix: Solid % Moisture: 16.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	113S
Dilution:	10			Initial Weight/Volume:	1.0579 g
Analysis Date:	10/11/2012 1831			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		66		0.20	0.57
Antimony		26		0.048	0.23
Barium		120		0.034	0.23
Beryllium		0.56		0.025	0.23
Cadmium		1.1		0.0091	0.23
Chromium		19		0.13	0.23
Lead		18		0.015	0.23
Cobalt		17		0.022	0.23
Copper		83		0.11	0.46
Iron		23000		12	23
Manganese		700		0.19	0.57
Nickel		54		0.081	0.57
Selenium		2.5		0.23	0.80
Silver		0.57		0.014	0.23
Thallium		0.32	J	0.15	0.57
Vanadium		30		0.54	0.80
Zinc		270		1.3	2.3
Aluminum		6900		3.4	34
Magnesium		3500		3.0	110
Potassium		1900		3.8	110
Sodium		110		45	110
Calcium		3100		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	100000			Initial Weight/Volume:	0.6726 g
Analysis Date:	10/05/2012 0933			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		29000		560	1800

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR64SD

Lab Sample ID: 580-35138-4 Date Sampled: 09/17/2012 1635
Client Matrix: Solid % Moisture: 17.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	115S
Dilution:	10			Initial Weight/Volume:	1.0805 g
Analysis Date:	10/11/2012 1838			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		18		0.20	0.56
Antimony		4.7		0.047	0.22
Barium		50		0.034	0.22
Beryllium		0.37		0.025	0.22
Cadmium		0.47		0.0090	0.22
Chromium		18		0.13	0.22
Lead		8.7		0.015	0.22
Cobalt		11		0.021	0.22
Copper		47		0.11	0.45
Iron		29000		12	22
Manganese		210		0.19	0.56
Nickel		36		0.080	0.56
Selenium		1.3		0.23	0.78
Silver		0.12	J	0.013	0.22
Thallium		ND		0.15	0.56
Vanadium		24		0.53	0.78
Zinc		110		1.3	2.2
Aluminum		6300		3.4	34
Magnesium		3100		3.0	110
Potassium		750		3.7	110
Sodium		51	J	44	110
Calcium		1900		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.7241 g
Analysis Date:	10/05/2012 0935			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.22		0.0053	0.017

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR69SD

Lab Sample ID: 580-35138-5 Date Sampled: 09/19/2012 1540
Client Matrix: Solid % Moisture: 18.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	116S
Dilution:	10			Initial Weight/Volume:	1.0837 g
Analysis Date:	10/11/2012 1842			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		7.6		0.20	0.57
Antimony		0.17	J	0.047	0.23
Barium		81		0.034	0.23
Beryllium		0.19	J	0.025	0.23
Cadmium		0.13	J	0.0090	0.23
Chromium		15		0.13	0.23
Lead		2.8		0.015	0.23
Cobalt		6.4		0.021	0.23
Copper		8.3		0.11	0.45
Iron		14000		12	23
Manganese		510		0.19	0.57
Nickel		19		0.080	0.57
Selenium		0.36	J	0.23	0.79
Silver		0.033	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		22		0.53	0.79
Zinc		42		1.3	2.3
Aluminum		5900		3.4	34
Magnesium		3300		3.0	110
Potassium		630		3.7	110
Sodium		83	J	44	110
Calcium		2100		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6192 g
Analysis Date:	10/05/2012 0937			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.011	J	0.0062	0.020

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR72SD

Lab Sample ID: 580-35138-6 Date Sampled: 09/17/2012 1246
Client Matrix: Solid % Moisture: 16.2 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	117S
Dilution:	10			Initial Weight/Volume:	1.0087 g
Analysis Date:	10/11/2012 1845			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		44		0.21	0.59
Antimony		0.70		0.050	0.24
Barium		93		0.036	0.24
Beryllium		0.44		0.026	0.24
Cadmium		0.46		0.0095	0.24
Chromium		19		0.13	0.24
Lead		13		0.015	0.24
Cobalt		23		0.022	0.24
Copper		66		0.12	0.47
Iron		64000		13	24
Manganese		2800		0.20	0.59
Nickel		64		0.084	0.59
Selenium		1.5		0.24	0.83
Silver		0.23	J	0.014	0.24
Thallium		ND		0.15	0.59
Vanadium		34		0.56	0.83
Zinc		99		1.3	2.4
Aluminum		4800		3.6	36
Magnesium		8700		3.1	120
Potassium		1800		3.9	120
Sodium		67	J	46	120
Calcium		4100		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	100			Initial Weight/Volume:	0.7095 g
Analysis Date:	10/05/2012 0920			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		2.5		0.53	1.7

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35138-1

Client Sample ID: 0912KR75SD

Lab Sample ID: 580-35138-7
Client Matrix: Solid
% Moisture: 24.3

Date Sampled: 09/16/2012 1426
Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	118S
Dilution:	10			Initial Weight/Volume:	1.1560 g
Analysis Date:	10/11/2012 1849			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		22		0.21	0.57
Antimony		18		0.048	0.23
Barium		120		0.034	0.23
Beryllium		0.36		0.025	0.23
Cadmium		0.33		0.0091	0.23
Chromium		23		0.13	0.23
Lead		6.4		0.015	0.23
Cobalt		10		0.022	0.23
Copper		23		0.11	0.46
Iron		21000		12	23
Manganese		380		0.19	0.57
Nickel		28		0.081	0.57
Selenium		0.83		0.23	0.80
Silver		0.090	J	0.014	0.23
Thallium		ND		0.15	0.57
Vanadium		35		0.54	0.80
Zinc		72		1.3	2.3
Aluminum		9300		3.4	34
Magnesium		4400		3.0	110
Potassium		1100		3.8	110
Sodium		150		45	110
Calcium		3400		12	110

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	100			Initial Weight/Volume:	0.8048 g
Analysis Date:	10/05/2012 0922			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		1.9		0.52	1.6

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR78SD

Lab Sample ID: 580-35138-8 Date Sampled: 09/16/2012 1130
Client Matrix: Solid % Moisture: 22.3 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	119S
Dilution:	10			Initial Weight/Volume:	1.0460 g
Analysis Date:	10/11/2012 1853			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		19		0.22	0.62
Antimony		2.0		0.052	0.25
Barium		80		0.037	0.25
Beryllium		0.28		0.027	0.25
Cadmium		0.16	J	0.0098	0.25
Chromium		21		0.14	0.25
Lead		5.3		0.016	0.25
Cobalt		7.6		0.023	0.25
Copper		23		0.12	0.49
Iron		19000		13	25
Manganese		250		0.21	0.62
Nickel		21		0.087	0.62
Selenium		0.56	J	0.25	0.86
Silver		0.056	J	0.015	0.25
Thallium		ND		0.16	0.62
Vanadium		29		0.58	0.86
Zinc		54		1.4	2.5
Aluminum		6900		3.7	37
Magnesium		3800		3.2	120
Potassium		820		4.1	120
Sodium		97	J	48	120
Calcium		2000		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	100			Initial Weight/Volume:	0.6094 g
Analysis Date:	10/05/2012 0924			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		2.4		0.67	2.1

11/21/12

Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Client Sample ID: 0912KR81SD

Lab Sample ID: 580-35138-9 Date Sampled: 09/19/2012 1640
Client Matrix: Solid % Moisture: 21.5 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122215	Lab File ID:	120S
Dilution:	10			Initial Weight/Volume:	1.0665 g
Analysis Date:	10/11/2012 1857			Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		6.2		0.22	0.60
Antimony		0.17	J	0.050	0.24
Barium		55		0.036	0.24
Beryllium		0.16	J	0.026	0.24
Cadmium		0.11	J	0.0096	0.24
Chromium		12		0.13	0.24
Lead		2.4		0.016	0.24
Cobalt		4.6		0.023	0.24
Copper		6.4		0.12	0.48
Iron		11000		13	24
Manganese		410		0.20	0.60
Nickel		13		0.085	0.60
Selenium		0.35	J	0.24	0.84
Silver		0.026	J	0.014	0.24
Thallium		ND		0.16	0.60
Vanadium		16		0.56	0.84
Zinc		31		1.3	2.4
Aluminum		4300		3.6	36
Magnesium		2300		3.2	120
Potassium		470		4.0	120
Sodium		59	J	47	120
Calcium		1700		13	120

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.7530 g
Analysis Date:	10/05/2012 0940			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.035		0.0053	0.017

11/21/12

Client: Ecology and Environment, Inc.

Job Number: 580-35138-1

Method Blank - Batch: 580-122215

Method: 6020
Preparation: 3050B

Lab Sample ID:	MB 580-122215/23-A	Analysis Batch:	580-122252	Instrument ID:	SEA044
Client Matrix:	Solid	Prep Batch:	580-122215	Lab File ID:	0
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	1 g
Analysis Date:	10/11/2012 1659	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/11/2012 1319				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Arsenic	ND		0.18	0.50
Antimony	ND		0.042	0.20
Barium	ND		0.030	0.20
Beryllium	ND		0.022	0.20
Cadmium	ND		0.0080	0.20
Chromium	ND		0.11	0.20
Lead	ND		0.013	0.20
Cobalt	ND		0.019	0.20
Copper	ND		0.098	0.40
Iron	ND		11	20
Manganese	ND		0.17	0.50
Nickel	ND		0.071	0.50
Selenium	ND		0.20	0.70
Silver	ND		0.012	0.20
Thallium	ND		0.13	0.50
Vanadium	ND		0.47	0.70
Zinc	ND		1.1	2.0
Aluminum	ND		3.0	30
Magnesium	ND		2.6	100
Potassium	ND		3.3	100
Sodium	ND		39	100
Calcium	ND		11	100

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Client: Ecology and Environment, Inc. Job Number: 580-35138-1

Method Blank - Batch: 580-121658

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 580-121658/21-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0825	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	ND		0.0053	0.017

LCS-Certified Reference Material - Batch: 580-121658

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCSSRM	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	0.1046 g
Analysis Date:	10/05/2012 0832	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	12.4	13.0	104.6	51.3 - 148.4	

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121658

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 580-121658/22-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0827	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121658/23-A	Analysis Batch:	580-121749	Instrument ID:	TAC103
Client Matrix:	Solid	Prep Batch:	580-121658	Lab File ID:	100512-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/05/2012 0829	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1201				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	98	99	80 - 120	1	20		

11/21/12

35138

10/19/2012

Ecology and Environment, Inc

CHAIN OF CUSTODY RECORD
Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

No: RDM-0912-014
Cooler #: 14
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	0912KR58SD	Total Inorganic Elements		9/17/2012	19:39	1	4 oz WM Amber Glass Jar	None	
	0912KR58SD	Total Organic Carbon		9/17/2012	19:39	1	4 oz WM Amber Glass Jar	None	
	0912KR58SD	Grain Size		9/17/2012	19:39	1	16 WM Clear Glass Jar	None	
	0912KR58SD	Methyl Mercury		9/17/2012	19:39	1	4 oz Poly Jar	None	
2	0912KR59SD	Total Inorganic Elements		9/17/2012	10:54	1	4 oz WM Amber Glass Jar	None	
	0912KR59SD	Total Organic Carbon		9/17/2012	10:54	1	4 oz WM Amber Glass Jar	None	
	0912KR59SD	Grain Size		9/17/2012	10:54	1	16 WM Clear Glass Jar	None	
3	0912KR60SD	Total Inorganic Elements		9/17/2012	17:45	1	4 oz WM Amber Glass Jar	None	
	0912KR60SD	Total Organic Carbon		9/17/2012	17:45	1	4 oz WM Amber Glass Jar	None	
	0912KR60SD	Grain Size		9/17/2012	17:45	1	16 WM Clear Glass Jar	None	
4	0912KR64SD	Total Inorganic Elements		9/17/2012	16:35	1	4 oz WM Amber Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9/25/12 13:30	[signature]	09/24/12	1340		[signature]	09/24/12 1530	[signature]	9/25/12	1540

Temp: 3.0 °C

Cooler/TB Dig/IR cor 2.3 unc 2.4
Cooler Dsc Lg Blue/White @ Lab 1540
Wet/Packs Packing Bubble

35138

CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-014

Cooler #: 14

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
4	0912KR64SD	Total Organic Carbon		9/17/2012	16:35	1	4 oz WM Amber Glass Jar	None	
	0912KR64SD	Grain Size		9/17/2012	16:35	1	16 WM Clear Glass Jar	None	
5	0912KR69SD	Total Inorganic Elements		9/19/2012	15:40	1	4 oz WM Amber Glass Jar	None	
	0912KR69SD	Total Organic Carbon		9/19/2012	15:40	1	4 oz WM Amber Glass Jar	None	
	0912KR69SD	Grain Size		9/19/2012	15:40	1	16 WM Clear Glass Jar	None	
6	0912KR72SD	Total Inorganic Elements		9/17/2012	12:46	1	4 oz WM Amber Glass Jar	None	
	0912KR72SD	Total Organic Carbon		9/17/2012	12:46	1	4 oz WM Amber Glass Jar	None	
	0912KR72SD	Grain Size		9/17/2012	12:46	1	16 WM Clear Glass Jar	None	
7	0912KR75SD	Total Inorganic Elements		9/16/2012	14:26	1	4 oz WM Amber Glass Jar	None	
	0912KR75SD	Total Organic Carbon		9/16/2012	14:26	1	4 oz WM Amber Glass Jar	None	
	0912KR75SD	Grain Size		9/16/2012	14:26	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 1320		09/24/12	1340			1530 09/24/12		9/25/12	0940

CHAIN OF CUSTODY RECORD

Red Devil Mine Project

Contact Name: Bill Richards

Contact Phone: 206-624-9537

No: RDM-0912-014

Cooler #: 14

Lab: TestAmerica Laboratories Inc.

Lab Phone: 253-922-2310

Ecology and Environment, Inc

10/19/2012

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
7-	0912KR75SD	Methyl Mercury		9/16/2012	14:26	1	4 oz. Poly Jar	None	
8-	0912KR78SD	Total Inorganic Elements		9/16/2012	11:30	1	4 oz WM Amber Glass Jar	None	
	0912KR78SD	Total Organic Carbon		9/16/2012	11:30	1	4 oz WM Amber Glass Jar	None	
	0912KR78SD	Grain Size		9/16/2012	11:30	1	16 WM Clear Glass Jar	None	
	0912KR78SD	Methyl Mercury		9/16/2012	11:30	1	4 oz. Poly Jar	None	
9-	0912KR81SD	Total Inorganic Elements		9/19/2012	16:40	1	4 oz WM Amber Glass Jar	None	
	0912KR81SD	Total Organic Carbon		9/19/2012	16:40	1	4 oz WM Amber Glass Jar	None	
	0912KR81SD	Grain Size		9/19/2012	16:40	1	16 WM Clear Glass Jar	None	

Special Instructions:

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	9.23.12	[signature]	9/24/12	1340		[signature]	1340 9/24/12	[signature]	9/25/12	1540

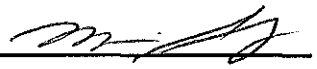
ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: TestAmerica	**Lab Project Number: 580-35131-1**
Sampling Dates: 09/09, 09/10, & 09/11/2012	**Sample Matrix: Tissue**
Analytical Method: TAL Metals *(EPA 6020/7471A)*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song  **Date:** 11/19/12

Technical QA Reviewer: _____ **Date:** _____

Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	12UP04BF	580-35131-1
2	12SM24BF	580-35131-2
3	12UP02BF	580-35131-3
4	12UP07BF	580-35131-4
5	12UP08BF	580-35131-5
6	12RD12BF	580-35131-6
7	12RD18BF	580-35131-7
8	12RD14BF	580-35131-8
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: NA: Not Analyzed N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 4.4°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits generated by the laboratorty.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: No MS/MSD analysis was performed from this SDG but LCS and LCSD were analyzed for total metals except mercury. Sample 12UP04BF was used for Hg MS/MSD analysis and the recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount of Al (3.6 mg/kg) was detected in the method blank: Finding does not require qualification since the concentrations of Al present in the samples were a lot more than 5x the blank concentration.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPDs of LCS and LCSD were within the control limits. (<35%)

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).
Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 12UP04BF
As: (1.085 ug/L) (0.05 L/ 1.0055 g) (10) (100/12.2) = 4.422 ug/g = 4.422 mg/kg.
Lab reported 4.4 mg/kg.
Fe: (513.5 ug/L) (0.05 L/ 1.0055 g) (10) (100/12.2) = 2093 ug/g = 2093 mg/kg.
Lab reported 2100 mg/kg.
Mn: (66.00 ug/L) (0.05 L/ 1.0055 g) (10) (100/12.2) = 269.0 ug/g = 269.0 mg/kg.
Lab reported 270 mg/kg.
Al: (205.5 ug/L) (0.05L/ 1.0055 g) (10) (100/12.2) = 837.6 ug/g= 837.6 mg/kg.
Lab reported 840 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL WORK PLAN ADDENDUM FOR KUSKOKWIM RIVER OFF-SHORE SEDIMENT SAMPLING REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, AUGUST 2011 (FSP)*.

The following data use objective was indicated in the *FSP:*

TO ASSESS METALS AND METHYL MERCURY CONCENTRATIONS TRENDS IN THE KUSKOKWIM RIVER SEDIMENT IN THE VICINITY OF RED DEVIL MINE.

TO ASSESS THE MAGNITUDE OF POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS FROM SITE-RELATED CONTAMINANTS.

TO SUPPORT EVALUATION OF MINE SITE REMEDIAL ALTERNATIVES IN THE FEASIBILITY STUDY.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP)*.

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology and Environment, Inc.

Job Number: 580-35131-1

Client Sample ID: 12UP04BF

Lab Sample ID: 580-35131-1
Client Matrix: Tissue % Moisture: 87.8

Date Sampled: 09/09/2012 1123
Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	045S
Dilution:	10			Initial Weight/Volume:	1.0055 g
Analysis Date:	10/11/2012 1413			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1643				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		4.4		1.5	4.1
Antimony		1.4	J	0.34	1.6
Barium		16		0.25	1.6
Beryllium		ND		0.18	1.6
Cadmium		ND		0.065	1.6
Chromium		1.8		0.92	1.6
Cobalt		0.84	J	0.16	1.6
Copper		3.5		0.80	3.3
Iron		2100		87	160
Lead		0.32	J	0.11	1.6
Manganese		270		1.4	4.1
Nickel		2.8	J	0.58	4.1
Selenium		ND		1.6	5.7
Silver		ND		0.098	1.6
Thallium		ND		1.1	4.1
Vanadium		ND		3.9	5.7
Zinc		18		9.1	16
Aluminum		840	B	25	250
Magnesium		820		22	820
Potassium		6000		27	820
Sodium		ND		320	820
Calcium		1600		89	820

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6355 g
Analysis Date:	10/04/2012 1259			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.041	0.13

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12SM24BF

Lab Sample ID: 580-35131-2 Date Sampled: 09/09/2012 1217
Client Matrix: Tissue % Moisture: 88.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	046S
Dilution:	10			Initial Weight/Volume:	1.1091 g
Analysis Date:	10/11/2012 1417			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.4	4.0
Antimony		ND		0.33	1.6
Barium		10		0.24	1.6
Beryllium		ND		0.18	1.6
Cadmium		ND		0.064	1.6
Chromium		ND		0.90	1.6
Cobalt		ND		0.15	1.6
Copper		4.1		0.78	3.2
Iron		410		85	160
Lead		ND		0.10	1.6
Manganese		170		1.4	4.0
Nickel		0.98	J	0.57	4.0
Selenium		ND		1.6	5.6
Silver		ND		0.096	1.6
Thallium		ND		1.0	4.0
Vanadium		ND		3.8	5.6
Zinc		14	J	8.9	16
Aluminum		410	B	24	240
Magnesium		650	J	21	800
Potassium		6600		26	800
Sodium		ND		310	800
Calcium		1200		87	800

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.7421 g
Analysis Date:	10/04/2012 1308			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.038	0.12

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12UP02BF

Lab Sample ID: 580-35131-3 Date Sampled: 09/09/2012 1342
Client Matrix: Tissue % Moisture: 89.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	049S
Dilution:	10			Initial Weight/Volume:	1.1000 g
Analysis Date:	10/11/2012 1428			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.5	4.3
Antimony		ND		0.36	1.7
Barium		10		0.26	1.7
Beryllium		ND		0.19	1.7
Cadmium		ND		0.068	1.7
Chromium		ND		0.97	1.7
Cobalt		ND		0.16	1.7
Copper		4.0		0.84	3.4
Iron		160	J	92	170
Lead		ND		0.11	1.7
Manganese		330		1.5	4.3
Nickel		0.90	J	0.61	4.3
Selenium		ND		1.7	6.0
Silver		ND		0.10	1.7
Thallium		ND		1.1	4.3
Vanadium		ND		4.1	6.0
Zinc		22		9.6	17
Aluminum		390	B	26	260
Magnesium		650	J	23	860
Potassium		7300		28	860
Sodium		ND		340	860
Calcium		1200		93	860

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.7865 g
Analysis Date:	10/04/2012 1310			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.038	0.12

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12UP07BF

Lab Sample ID: 580-35131-4 Date Sampled: 09/09/2012 1508
Client Matrix: Tissue % Moisture: 87.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	050S
Dilution:	10			Initial Weight/Volume:	1.0149 g
Analysis Date:	10/11/2012 1432			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.4	3.9
Antimony		ND		0.33	1.6
Barium		8.3		0.23	1.6
Beryllium		ND		0.17	1.6
Cadmium		ND		0.062	1.6
Chromium		ND		0.88	1.6
Cobalt		ND		0.15	1.6
Copper		2.9	J	0.76	3.1
Iron		ND		83	160
Lead		ND		0.10	1.6
Manganese		160		1.3	3.9
Nickel		0.63	J	0.55	3.9
Selenium		ND		1.6	5.5
Silver		ND		0.094	1.6
Thallium		ND		1.0	3.9
Vanadium		ND		3.7	5.5
Zinc		13	J	8.7	16
Aluminum		310	B	23	230
Magnesium		540	J	21	780
Potassium		6400		26	780
Sodium		ND		310	780
Calcium		990		85	780

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6659 g
Analysis Date:	10/04/2012 1317			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.037	0.12

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12UP08BF

Lab Sample ID: 580-35131-5 Date Sampled: 09/10/2012 1312
Client Matrix: Tissue % Moisture: 89.4 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	051S
Dilution:	10			Initial Weight/Volume:	1.0066 g
Analysis Date:	10/11/2012 1436			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.7	4.7
Antimony		ND		0.39	1.9
Barium		9.4		0.28	1.9
Beryllium		ND		0.21	1.9
Cadmium		ND		0.075	1.9
Chromium		ND		1.1	1.9
Cobalt		ND		0.18	1.9
Copper		5.7		0.92	3.7
Iron		ND		100	190
Lead		ND		0.12	1.9
Manganese		260		1.6	4.7
Nickel		0.72	J	0.67	4.7
Selenium		ND		1.9	6.6
Silver		ND		0.11	1.9
Thallium		ND		1.2	4.7
Vanadium		ND		4.4	6.6
Zinc		19		10	19
Aluminum		370	B	28	280
Magnesium		630	J	25	940
Potassium		7600		31	940
Sodium		ND		370	940
Calcium		1100		100	940

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.7730 g
Analysis Date:	10/04/2012 1319			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.038	0.12

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12RD12BF

Lab Sample ID: 580-35131-6 Date Sampled: 09/10/2012 1540
Client Matrix: Tissue % Moisture: 91.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	052S
Dilution:	10			Initial Weight/Volume:	1.0768 g
Analysis Date:	10/11/2012 1440			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		2.0	5.6
Antimony		ND		0.47	2.2
Barium		17		0.33	2.2
Beryllium		ND		0.24	2.2
Cadmium		0.14	J	0.089	2.2
Chromium		ND		1.3	2.2
Cobalt		ND		0.21	2.2
Copper		5.1		1.1	4.5
Iron		ND		120	220
Lead		ND		0.14	2.2
Manganese		310		1.9	5.6
Nickel		ND		0.79	5.6
Selenium		ND		2.2	7.8
Silver		ND		0.13	2.2
Thallium		ND		1.4	5.6
Vanadium		ND		5.3	7.8
Zinc		28		12	22
Aluminum		440	B	33	330
Magnesium		810	J	29	1100
Potassium		9300		37	1100
Sodium		ND		440	1100
Calcium		1900		120	1100

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6153 g
Analysis Date:	10/04/2012 1321			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.061	0.19

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12RD18BF

Lab Sample ID: 580-35131-7 Date Sampled: 09/10/2012 1703
Client Matrix: Tissue % Moisture: 88.9 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	053S
Dilution:	10			Initial Weight/Volume:	1.0164 g
Analysis Date:	10/11/2012 1443			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.6	4.4
Antimony		ND		0.37	1.8
Barium		17		0.26	1.8
Beryllium		ND		0.19	1.8
Cadmium		ND		0.071	1.8
Chromium		ND		1.0	1.8
Cobalt		ND		0.17	1.8
Copper		4.1		0.86	3.5
Iron		ND		94	180
Lead		ND		0.11	1.8
Manganese		200		1.5	4.4
Nickel		ND		0.63	4.4
Selenium		ND		1.8	6.2
Silver		ND		0.11	1.8
Thallium		ND		1.1	4.4
Vanadium		ND		4.2	6.2
Zinc		31		9.9	18
Aluminum		350	B	26	260
Magnesium		970		23	880
Potassium		9200		29	880
Sodium		ND		350	880
Calcium		2100		96	880

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6678 g
Analysis Date:	10/04/2012 1323			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.042	0.13

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Client Sample ID: 12RD14BF

Lab Sample ID: 580-35131-8 Date Sampled: 09/11/2012 1233
Client Matrix: Tissue % Moisture: 90.7 Date Received: 09/25/2012 1540

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	580-122252	Instrument ID:	SEA044
Prep Method:	3050B	Prep Batch:	580-122117	Lab File ID:	054S
Dilution:	10			Initial Weight/Volume:	1.0382 g
Analysis Date:	10/11/2012 1447			Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Arsenic		ND		1.9	5.2
Antimony		ND		0.43	2.1
Barium		20		0.31	2.1
Beryllium		ND		0.23	2.1
Cadmium		ND		0.083	2.1
Chromium		ND		1.2	2.1
Cobalt		ND		0.20	2.1
Copper		7.2		1.0	4.1
Iron		ND		110	210
Lead		ND		0.13	2.1
Manganese		160		1.8	5.2
Nickel		ND		0.73	5.2
Selenium		ND		2.1	7.2
Silver		ND		0.12	2.1
Thallium		ND		1.3	5.2
Vanadium		ND		4.9	7.2
Zinc		37		12	21
Aluminum		400	B	31	310
Magnesium		1100		27	1000
Potassium		10000		34	1000
Sodium		ND		410	1000
Calcium		2000		110	1000

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Prep Method:	7471A	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW
Dilution:	1.0			Initial Weight/Volume:	0.6878 g
Analysis Date:	10/04/2012 1326			Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.053	J	0.049	0.16

11/19/12

Client: Ecology and Environment, Inc.

Job Number: 580-35131-1

Method Blank - Batch: 580-122117

Method: 6020
Preparation: 3050B

Lab Sample ID:	MB 580-122117/21-A	Analysis Batch:	580-122252	Instrument ID:	SEA044
Client Matrix:	Tissue	Prep Batch:	580-122117	Lab File ID:	0
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	1.0 g
Analysis Date:	10/11/2012 1258	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/10/2012 1645				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Arsenic	ND		0.18	0.50
Antimony	ND		0.042	0.20
Barium	ND		0.030	0.20
Beryllium	ND		0.022	0.20
Cadmium	ND		0.0080	0.20
Chromium	ND		0.11	0.20
Cobalt	ND		0.019	0.20
Copper	ND		0.098	0.40
Iron	ND		11	20
Lead	ND		0.013	0.20
Manganese	ND		0.17	0.50
Nickel	ND		0.071	0.50
Selenium	ND		0.20	0.70
Silver	ND		0.012	0.20
Thallium	ND		0.13	0.50
Vanadium	ND		0.47	0.70
Zinc	ND		1.1	2.0
Aluminum	3.60	J	3.0	30
Magnesium	ND		2.6	100
Potassium	ND		3.3	100
Sodium	ND		39	100
Calcium	ND		11	100

11/19/12

Client: Ecology and Environment, Inc. Job Number: 580-35131-1

Method Blank - Batch: 580-121639

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 580-121639/21-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Tissue	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1250	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	ND		0.0053	0.017

LCS-Certified Reference Material - Batch: 580-121639

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCSSRM	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Tissue	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	10	Leach Batch:	N/A	Initial Weight/Volume:	0.1012 g
Analysis Date:	10/04/2012 1256	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	12.4	13.3	107.3	51.3 - 148.4	

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 580-121639

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 580-121639/22-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Tissue	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1252	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 580-121639/23-A	Analysis Batch:	580-121688	Instrument ID:	TAC103
Client Matrix:	Tissue	Prep Batch:	580-121639	Lab File ID:	100412-TAC103-FCW.
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.6 g
Analysis Date:	10/04/2012 1254	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	10/04/2012 1035				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	108	107	80 - 120	1	20		

11/19/12

35131

CHAIN OF CUSTODY RECORD

No: RDM-0912-012

Red Devil Mine Project
Contact Name: Bill Richards
Contact Phone: 206-624-9537

Cooler #: 12
Lab: TestAmerica Laboratories Inc.
Lab Phone: 253-922-2310

Ecology and Environment, Inc

Lab #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
1	12UP04BF	Total Inorg. Elem., Moisture, MeHg, and As Spec.		9/9/2012	11:23	1	Bag	None	
2	12SM24BF	Total Inorg. Elem., Moisture, MeHg, and As Spec.		9/9/2012	12:17	1	Bag	None	
3	12UP02BF	Total Inorg. Elem., Moisture, MeHg, and As Spec.		9/9/2012	13:42	1	Bag	None	
4	12UP07BF	Total Inorganic Elements and Moisture Content		9/9/2012	15:08	1	Bag	None	
5	12UP08BF	Total Inorganic Elements and Moisture Content		9/10/2012	13:12	1	Bag	None	
6	12RD12BF	Total Inorganic Elements and Moisture Content		9/10/2012	15:40	1	Bag	None	
7	12RD18BF	Total Inorganic Elements and Moisture Content		9/10/2012	17:03	1	Bag	None	
8	12RD14BF	Total Inorg. Elem., Moisture, MeHg, and As Spec.		9/11/2012	12:33	1	Bag	None	

Special Instructions:

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
		9.23.12 12:20		09/24/12	1340			09/24/12 1605		9/25/12	1540

Cooler/TB Dig/IR cor 4.4 unc 4.5°C
Cooler Dsc 5m Red/wht @ Lab
Wet/Packs Packing Bubble 15:40
w/cs A2

Temp: 3.4 °C

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Test America	**Lab Project Number: 35196-1**
Sampling Dates: 9/14/2012 to 9/16/2012	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 10/24/2012**
Technical QA Reviewer: **Date:**
Project Manager: Bill Richards **Date:**

SAMPLE IDENTIFICATION:

Sample No.	Sample ID	ARI ID/ ARI LIMS ID Lab ID
1	12SM60SB07	580-35196-1
2	12SM63SB01	580-35196-10
3	12SM63SB06	580-35196-11
4	12SM65SB12	580-35196-12
5	12SM55SB07	580-35196-13
6	12SM55SB04	580-35196-14
7	12SM56SB05	580-35196-15
8	12SM57SB05	580-35196-16
9	12SM58SB02	580-35196-17
10	12SM51SB06	580-35196-18
11	12SM52SB02	580-35196-19
12	12SM62SB06	580-35196-2
13	12SM52SB10	580-35196-20
14	12SM52SB11	580-35196-21
15	12SM53SB10	580-35196-22
16	12SM54SB11	580-35196-23
17	12SM90SB01	580-35196-24
18	12SM91SB01	580-35196-25
19	12SM92SB01	580-35196-26
20	12SM62SB08	580-35196-3
21	12SM60SB06	580-35196-4
22	12SM61SB01	580-35196-5
23	12SM61SB05	580-35196-6

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

24	12SM59SB01	580-35196-7
25	12SM59SB05	580-35196-8
26	12SM62SB01	580-35196-9

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- **X** Included: no problems
- ***** Included: problems noted in review
- **O** Not Included and/or Not Available
- **NR** Not Required
- **RS** Provided As Re-submission

Case Narrative:

- _____ Case Narrative present

Quality Control Summary Package:

- **X** Data Summary sheets
- _____ Initial and Continuing Calibration results
- _____ CRDL Standard results
- _____ Preparation Blank and Calibration Blank results
- _____ ICP Interference Check Sample results
- **X** Matrix Spike recoveries
- **X** Matrix Duplicate results
- **X** Laboratory Control Sample recoveries
- _____ Method of Standard Additions results
- _____ ICP Serial Dilution results
- _____ Instrument Detection Limits
- _____ ICP Interelement Correction Factors
- _____ ICP Linear Ranges
- **X** Preparation Log
- **X** Analysis Run Log

Raw QC Data Package Section

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

X Chain-of-Custody Records
X Instrument Printouts
X Sample Preparation Notebook Pages
X Logbook and Worksheet Pages
X Percent Solids Determination

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	NO
8	Post Digestion Spike and Standard Addition Analysis	NO
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV

and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits. CCV analysis was performed properly with each batch.

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 12SM60SB07, 12SM56SB05, and 12SM52SB11 were designated as matrix spikes.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Sample 12SM60SB07 had several analytes out of QC criteria, Antimony, Barium, Chromium, Nickel, Zinc, and Magnesium positive sample results are qualified "J" as estimated in this batch. Mercury had an RPD greater than QC criteria in the MS/MSD pair, no qualification of the data is necessary due to the 4x rule being applied to the mercury results.

Sample 12SM52SB11 had several analytes out of QC criteria, Antimony, Barium, Chromium, Copper, Nickel, Vanadium, Zinc, and Magnesium, positive sample results are qualified as "J" as estimated in this batch. Mercury's RPD in the MS/MSD pair is greater than the QC criteria, due to the 4x rule being applied in the MS no qualification of the data is necessary.

Sample 12SM56SB05 was used as a MS for Mercury only, the 4x rule is applied to Mercury in this sample, no qualification of the data is necessary. Mercury's RPD in the MS/MSD pair is greater than the QC criteria, due to the 4x rule being applied in the MS no qualification of the data is necessary.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level, low level contamination was detected in the method blanks, no data was qualified due to this

contamination. Continuing Calibration Blanks also had low level contamination in them, no data was qualified due to this contamination.

6. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
__X__ **Field Duplicates**
__X__ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Analyte, Total (mg/kg)	12SM59SB01	Lab Duplicate of 12SM59SB01	RPD (%)
Aluminum	4500	4710	4.5
Arsenic	47	49.9	5.9
Antimony	1.1	1.17	6.2
Barium	240	253	5.3
Beryllium	0.88	0.899	2.1
Cadmium	0.77	0.822	6.5
Calcium	1400	1440	2.8
Chromium	22	23.3	5.7
Cobalt	27	29.1	7.5
	100	108	7.7

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Copper			
Iron	57000	61100	6.9
Lead	22	23.3	5.7
Magnesium	910	956	4.9
Manganese	1000	1080	7.7
Nickel	120	130	8
Potassium	1400	1450	3.5
Selenium	1.6	1.66	3.7
Silver	0.31	0.32	3.2
Sodium	57	51.2	10.7
Thallium	0.16	0.177	10.1
Vanadium	42	44.5	5.8
Zinc	190	203	6.6
Mercury	4	4.17	4.2

*: RPD>35%

Comments: Sample 12SM59SB01 was used as a laboratory duplicate, all RPDs are within acceptable range, no qualification of the data is necessary.

Analyte, Total (mg/kg)	12SM63SB06	Laboratory Duplicated of 12SM63SB06	RPD (%)
Aluminum	3300	3050	7.9
Antimony	87	83.8	3.7
Arsenic	2100	1930	8.4
Barium	260	247	5.1
Beryllium	0.75	0.705	6.2
Cadmium	0.68	0.652	4.2
Calcium	1600	1510	5.8
Chromium	16	14.9	7.1
Cobalt	21	20.2	3.9
Copper	69	65.1	5.8

Iron	51000	48200	5.6
Lead	15	13.9	7.6
Magnesium	650	596	8.7
Manganese	1000	962	3.9
Nickel	70	66.4	5.3
Potassium	990	935	5.7
Selenium	1.4	1.28	8.9
Silver	0.23	0.223	3.1
Sodium	45	41.6	7.9
Thallium	0.53	0.509	4.0
Vanadium	27	25.1	7.3
Zinc	120	114	5.1
Mercury	58	119	68.9*

*: RPD>35%

Comments: Sample 12SM63SB06 was used as a laboratory duplicate, all analytes were within acceptable range except for Mercury. Mercury results in all field samples are qualified “J” as estimated.

Analyte, Total (mg/kg)	12SM55SB04	12SM92SB01	RPD (%)
Aluminum	7400	11000	39.1*
Antimony	0.56	0.66	16.4
Arsenic	15	19	23.5
Barium	150	210	33.3
Beryllium	0.55	0.67	19.7
Cadmium	0.40	0.55	31.6
Calcium	1000	1200	18.2
Chromium	20	25	22.2
Cobalt	9.3	20	73.0*
Copper	54	55	1.8
	26000	33000	23.7

Iron			
Lead	10	14	33.3
Magnesium	1900	2600	31.1
Manganese	340	970	96.2*
Nickel	37	44	17.3
Potassium	1100	1300	16.7
Selenium	1.2	1.4	15.4
Silver	0.14	0.17	19.4
Sodium	53	86	47.5*
Thallium	<0.54	0.14	NA
Vanadium	37	46	21.7
Zinc	100	120	18.2
Mercury	2.1	2.6	21.3

*: RPD>35%

Comments: Sample 12SM92SB01 was collected as a field duplicate of 12SM55SB04, several analytes had RPD greater than project limits. Aluminum, Cobalt, Manganese, and Sodium are qualified "J" as estimated in both the parent and duplicate samples.

Analyte, Total (mg/kg)	12SM60SB07	12SM91SB01	RPD (%)
Aluminum	4500	5400	18.2
Antimony	1.1	1.2	8.7
Arsenic	4.7	45	4.3
Barium	240	270	11.8
Beryllium	0.88	0.88	0
Cadmium	0.77	0.69	10.9
Calcium	1400	1400	0
Chromium	22	21	4.7
Cobalt	27	23	16
Copper	100	110	9.5
Iron	57000	51000	11.1
	22	21	4.7

Lead			
Magnesium	910	1000	9.4
Manganese	1000	1000	0
Nickel	120	94	24.3
Potassium	1400	1700	19.4
Selenium	1.6	1.7	6.1
Silver	0.31	0.35	12.1
Sodium	57	50	13.1
Thallium	0.16	0.19	17.1
Vanadium	42	41	2.4
Zinc	190	200	5.1
Mercury	4	5.5	31.6

*: RPD>35%

Comments: Sample 12SM91SB01 was collected as a field duplicate of 12SM60SB07, all analytes were within acceptable range, no qualification of the data is necessary.

Analyte, Total (mg/kg)	12SM52SB11	12SM90SB01	RPD (%)
Aluminum	3300	3600	8.7
Antimony	87	72	18.9
Arsenic	2100	2000	4.9
Barium	260	240	8
Beryllium	0.75	0.86	13.7
Cadmium	0.68	0.65	4.5
Calcium	1600	1500	6.5
Chromium	16	20	22.2
Cobalt	21	25	17.4
Copper	69	64	7.5
Iron	51000	62000	19.5
Lead	15	14	6.9
Magnesium	650	720	10.2
	1000	1100	9.5

Manganese			
Nickel	70	77	9.5
Potassium	990	1100	10.5
Selenium	1.4	1.3	7.4
Silver	0.23	0.22	4.4
Sodium	45	50	10.5
Thallium	0.53	0.54	1.9
Vanadium	27	35	25.8
Zinc	120	130	8
Mercury	58	120	69.7

*: RPD>35%

Comments: Sample 12SM90SB01 was collected as a field duplicate of 12SM52SB11, Mercury had an RPD greater than acceptable limits, results in parent and duplicate samples are qualified "J" as estimated.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Serial Dilution of 12SM60SB07 had percent difference of Potassium greater than 10%, all samples in this SDG are qualified "J" as estimated for this analyte. Serial Dilution of

12SM52SB11 had percent differences of Cadmium and Potassium, all samples in this SDG are qualified "J" as estimated for these analytes.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was performed on samples 12SM60SB07, and 12SM63SB06. Several results had recoveries below QC critiera. Analytes recovered low in 12SM60SB07 are Copper, Nickel, and Zinc, positive results are qualified "J" as estimated and non-detects are qualified "UJ" as estimated at the reporting limit in the analysis batch. Analytes recovered low in 12SM63SB06 are Arsenic, Copper, and Zinc, positive results are qualified "J" as estimated and non-detects are qualified "UJ" as estimated at the reporting limit in the analysis batch.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Sample: 12SM60SB07

Al: $\frac{85.86\frac{mg}{L}\ x\ 0.05\ L}{0.0010744\ kg\ x\ 0.89} = 4489.6465\ mg/kg$

Laboratory reported 4500 mg/kg

Cd: $\frac{0.01484\frac{mg}{L} x\ 0.05\ L}{0.0010744\ kg\ x\ 0.89} = 0.775\ mg/kg$

Laboratory reported: 0.77 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Test America	**Lab Project Number: 580-35196-1**
Sampling Dates: 9/14/2012 to 9/16/2012	**Sample Matrix: Soil**
Analytical Method: TOC by EPA 9060M	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 10/24/2012**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	12SM60SB07	580-35196-1
2	12SM63SB01	580-35196-10
3	12SM63SB06	580-35196-11
4	12SM65SB12	580-35196-12
5	12SM55SB07	580-35196-13
6	12SM55SB04	580-35196-14
7	12SM56SB05	580-35196-15
8	12SM57SB05	580-35196-16
9	12SM58SB02	580-35196-17
10	12SM51SB06	580-35196-18
11	12SM52SB02	580-35196-19
12	12SM62SB06	580-35196-2
13	12SM52SB10	580-35196-20
14	12SM52SB11	580-35196-21
15	12SM53SB10	580-35196-22
16	12SM54SB11	580-35196-23
17	12SM90SB01	580-35196-24
18	12SM91SB01	580-35196-25
19	12SM92SB01	580-35196-26
20	12SM62SB08	580-35196-3
21	12SM60SB06	580-35196-4
22	12SM61SB01	580-35196-5
23	12SM61SB05	580-35196-6

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limit.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 10RD01SD was used matrix spike analysis. The matrix spike recovery was within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Comments:	12SM52SB11	12SM52SB11 DUP	RPD (%)
Total Organic Carbon, %	6700	6360	5.2

The RPD was within the control limit (<35%).

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

TOC: A=(B*100000)/(C*D)
A= TOC mg/kg
B= TOC measured
C= sample size in grams
D= % Solids

Comments: Analyte quantitation was acceptable.
Sample 12SM60SB07
A=(0.6316*100000)/(0.1030*89)= 6889.93 mg/kg
Lab Reported 6700 mg/kg

Sample 12SM52SB02
A=(1.004*100000)/(0.1252*80)= 10023.96
Lab Reported 10000 mg/kg

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

2011 Data Validation Reports

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107694**
Sampling Dates: 8/9/2011 to 8/15/2011	**Sample Matrix: Soil**
Analytical Method: ***TPHD by AK102/AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/23/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP70SS	K1107694-001
2	11MP36SB18	K1107694-007
3	11MP37SB16	K1107694-013
4		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as diesel and motor oil standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Diesel and motor oil standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Sample 11MP37SB16 was used for MS/MSD analysis and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
__X__No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

__X__Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
__X__Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory Duplicate analysis was within QC criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP70SS

((76.46*10mL*1.0)/(30.40g*64.5))*1 =

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated **Service Request:** K1107694
Project: Red Devil Mine

Cover Page - Organic Analysis Data Package
Diesel Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP70SS	K1107694-001	08/15/2011	08/18/2011
11MP36SB18	K1107694-007	08/09/2011	08/18/2011
11MP37SB16	K1107694-013	08/09/2011	08/18/2011
11MP37SB16	KWG1109323-1	08/09/2011	08/18/2011
11MP37SB16MS	KWG1109323-2	08/09/2011	08/18/2011
11MP37SB16DMS	KWG1109323-3	08/09/2011	08/18/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Loren E Portwood Name: Loren Portwood

Date: 9/28/11 Title: Scientist

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Diesel Range Organics

Sample Name:	11MP70SS	**Units:**	mg/Kg
Lab Code:	K1107694-001	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	39	Z	31	2.0	1	08/23/11	09/03/11	KWG1108291	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	97	50-150	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Diesel Range Organics

Sample Name:	11MP36SB18	**Units:**	mg/Kg
Lab Code:	K1107694-007	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	2700	Y	25	1.7	1	08/23/11	09/03/11	KWG1108291	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	101	50-150	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Diesel Range Organics

Sample Name:	11MP37SB16	**Units:**	mg/Kg
Lab Code:	K1107694-013	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	21	J	24	1.6	1	08/23/11	09/03/11	KWG1108291	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	89	50-150	09/03/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107694**
Sampling Dates: 8/4/2011 – 8/15/2011	**Sample Matrix: Soil**
Analytical Method: General Chemistry	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 11/11/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MP70SS	K117694-001
2	11MP74SS	K117694-002
3	11MP72SS	K117694-003
4	11DS02SB16	K117694-004
5	11MP34SB22	K117694-005
6	11MP37SB24	K1107694-006
7	11MP36SB18	K1107694-007
8	11MP76SS	K1107694-008
9	11MP91SS	K1107694-009
10	11SM11SB20	K1107694-010
11	11MP78SS	K1107694-011
12	11MP77SS	K1107694-012
13	11MP37SB16	K1107694-013
14	11MP79SS	K1107694-014
15	11MP73SS	K1107694-015
16	11DS01SB18	K1107694-016
17	11MP83SS	K1107694-017
18	11MP85SS	K1107694-018
19	11MP75SS	K1107694-019
20	11MP92SS	K1107694-020
21	11RD04SB16	K1107694-021
22	11MP84SS	K1107694-022

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- NR — Initial and Continuing Calibration results
- NR — Preparation Blank and Calibration Blank results
- NR — Matrix Spike recoveries
- NR — Matrix Duplicate results
- NR — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Nitrate + Nitrite by EPA 353.2, Chloride, Fluoride, and Sulfate by EPA 300.0, Alkalinity, Carbonate, Bicarbonate, & Hydroxide by SM 2320, TDS by EPA 160.1 and TSS by EPA 160.2.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: Not required.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Not required.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Not Required.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Not required.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory duplicates were performed at the required frequency, all duplicates had RPDs less than 20%.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW
Fluoride: 0.131 mg/L. Lab reported 0.1 mg/L.
Chloride: 0.460 mg/L. Lab reported 0.5 mg/L.
Sulfate: 180.281 mg/L. Lab reported 180 mg/L.
Nitrate+Nitrite: 0.0113 mg/L. Lab reported 0.011 mg/L.
Alkalinity: 92.8 mg/L $CaCO_3$. Lab reported 92.8 mg/L $CaCO_3$.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC

criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine		
Sample Matrix:	Soil		

Total Solids

Prep Method:	NONE	**Units:**	PERCENT
Analysis Method:	160.3M	**Basis:**	Wet
Test Notes:			

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
11MP70SS	K1107694-001	08/15/2011	08/18/2011	08/23/2011	64.5	
11MP74SS	K1107694-002	08/15/2011	08/18/2011	08/23/2011	77.3	
11MP72SS	K1107694-003	08/15/2011	08/18/2011	08/23/2011	87.2	
11DS02SB16	K1107694-004	08/08/2011	08/18/2011	08/23/2011	87.0	
11MP34SB22	K1107694-005	08/09/2011	08/18/2011	08/23/2011	83.0	
11MP37SB24	K1107694-006	08/09/2011	08/18/2011	08/23/2011	80.4	
11MP36SB18	K1107694-007	08/09/2011	08/18/2011	08/23/2011	80.2	
11MP76SS	K1107694-008	08/15/2011	08/18/2011	08/23/2011	91.9	
11MP91SS	K1107694-009	08/15/2011	08/18/2011	08/23/2011	91.6	
11SM11SB20	K1107694-010	08/06/2011	08/18/2011	08/23/2011	84.8	
11MP78SS	K1107694-011	08/15/2011	08/18/2011	08/23/2011	89.1	
11MP77SS	K1107694-012	08/15/2011	08/18/2011	08/23/2011	92.7	
11MP37SB16	K1107694-013	08/09/2011	08/18/2011	08/23/2011	84.6	
11MP79SS	K1107694-014	08/15/2011	08/18/2011	08/23/2011	91.7	
11MP73SS	K1107694-015	08/15/2011	08/18/2011	08/23/2011	84.1	
11DS01SB18	K1107694-016	08/08/2011	08/18/2011	08/23/2011	86.9	
11MP83SS	K1107694-017	08/15/2011	08/18/2011	08/23/2011	79.2	
11MP85SS	K1107694-018	08/15/2011	08/18/2011	08/23/2011	88.7	
11MP75SS	K1107694-019	08/15/2011	08/18/2011	08/23/2011	87.0	
11MP92SS	K1107694-020	08/15/2011	08/18/2011	08/23/2011	89.5	
11RD04SB16	K1107694-021	08/04/2011	08/18/2011	08/23/2011	75.6	
11MP84SS	K1107694-022	08/15/2011	08/18/2011	08/23/2011	88.8	

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number:**
Sampling Dates: 8/4/2011 to 8/15/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/23/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP70SS	K1107694-001
2	11DS02SB16	K1107694-004
3	11MP34SB22	K1107694-005
4	11MP37SB24	K1107694-006
5	11SM11SB20	K1107694-010
6	11DS01SB18	K1107694-016
7	11RD04SB16	K1107694-021
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- X — Method of Standard Additions results
- X — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- _____ Chain-of-Custody Records
- _____ Instrument Printouts
- _____ Sample Preparation Notebook Pages
- _____ Logbook and Worksheet Pages
- _____ Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP70SS was used as a matrix spike for Mercury, recovery was high, detected results in the batch are qualified "J" as estimated. 11MP37SB24 was used as a matrix spike for all other analytes, recovery of Arsenic, Calcium, and Magnesium were outside control limits, detected results for these analytes are qualified "J" in the batch.

5. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory Duplicate analysis was out of QC criteria for Aluminum, Antimony, Arsenic, Calcium, and Magnesium, results for these analytes are qualified "J" as estimated at the concentration reported.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Post spike analysis was acceptable.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP79SS
Al: (9990 mg/kg)(1000 ug/mg)(100ml/100ml) = 9990000 ug/kg = 9990 mg/kg
Lab reported 9990 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1107694

Sample Name:	Lab Code:
11MP70SS	K1107694-001
11MP70SSD	K1107694-001D
11MP70SSS	K1107694-001S
11MP70SSSD	K1107694-001SD
11DS02SB16	K1107694-004
11MP34SB22	K1107694-005
11MP34SB22D	K1107694-005D
11MP34SB22S	K1107694-005S
11MP34SB22SD	K1107694-005SD
11MP37SB24	K1107694-006
11MP37SB24D	K1107694-006D
11MP37SB24S	K1107694-006S
11MP37SB24SD	K1107694-006SD
11SM11SB20	K1107694-010
11DS01SB18	K1107694-016
11RD04SB16	K1107694-021
Method Blank	K1107694-MB

Comments:

Approved By: _____ **Date:** 10/21/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1107694
Date Collected: 08/15/11
Date Received: 08/18/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP70SS
Lab Code: K1107694-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.9	6.6	2.0	09/02/11	09/02/11	9990		*	J
Antimony	6020A	0.055	0.010	5.0	09/02/11	10/05/11	4.600			
Arsenic	6020A	0.42	0.05	5.0	09/02/11	09/22/11	33.9		N*	J
Barium	6020A	0.042	0.004	5.0	09/02/11	09/22/11	144			
Beryllium	6020A	0.017	0.003	5.0	09/02/11	09/22/11	0.360			
Cadmium	6020A	0.017	0.003	5.0	09/02/11	09/22/11	0.180			
Calcium	6010B	10.9	2.2	2.0	09/02/11	09/02/11	2400		N*	J
Chromium	6020A	0.17	0.03	5.0	09/02/11	09/22/11	18.7			
Cobalt	6020A	0.017	0.003	5.0	09/02/11	09/22/11	11.4			
Copper	6020A	0.09	0.04	5.0	09/02/11	09/22/11	17.0			
Iron	6010B	4.4	0.3	2.0	09/02/11	09/02/11	30700			
Lead	6020A	0.042	0.008	5.0	09/02/11	09/22/11	6.960			
Magnesium	6010B	4.37	0.04	2.0	09/02/11	09/02/11	3220		N*	J
Manganese	6010B	2.18	0.04	2.0	09/02/11	09/02/11	738			
Mercury	7471A	0.099	0.010	5.0	09/01/11	09/01/11	0.807		N*	J
Nickel	6020A	0.17	0.03	5.0	09/02/11	09/22/11	29.3			
Potassium	6010B	87	5.5	2.0	09/02/11	09/02/11	685			
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.42			
Silver	6020A	0.022	0.009	5.0	09/02/11	09/20/11	0.068			
Sodium	6010B	21.8	4.4	2.0	09/02/11	09/02/11	42.3			
Thallium	6020A	0.017	0.002	5.0	09/02/11	09/22/11	0.065			
Vanadium	6020A	0.17	0.02	5.0	09/02/11	09/22/11	30.9			
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/22/11	64.9			

% Solids: 64.5

Comments:

Metals

-1-

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1107694
Project No.: NA
Date Collected: 08/08/11
Project Name: Red Devil Mine
Date Received: 08/18/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11DS02SB16
Lab Code: K1107694-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.9	4.7	2.0	09/02/11	09/02/11	4720		*	J
Antimony	6020A	0.039	0.007	5.0	09/02/11	10/05/11	30.2			
Arsenic	6020A	0.31	0.04	5.0	09/02/11	09/22/11	134		N*	J
Barium	6020A	0.031	0.003	5.0	09/02/11	09/22/11	124			
Beryllium	6020A	0.012	0.002	5.0	09/02/11	09/22/11	0.592			
Cadmium	6020A	0.012	0.002	5.0	09/02/11	09/22/11	0.427			
Calcium	6010B	7.9	1.6	2.0	09/02/11	09/02/11	1030			
Chromium	6020A	0.12	0.02	5.0	09/02/11	09/22/11	11.0			
Cobalt	6020A	0.012	0.002	5.0	09/02/11	09/22/11	12.7			
Copper	6020A	0.06	0.03	5.0	09/02/11	09/22/11	61.2			
Iron	6010B	3.2	0.2	2.0	09/02/11	09/02/11	49300			
Lead	6020A	0.031	0.006	5.0	09/02/11	09/22/11	9.000			
Magnesium	6010B	3.15	0.03	2.0	09/02/11	09/02/11	1180			
Manganese	6010B	1.57	0.03	2.0	09/02/11	09/02/11	727			
Mercury	7471A	1.64	0.164	100.0	09/01/11	09/01/11	78.8		N*	J
Nickel	6020A	0.12	0.02	5.0	09/02/11	09/22/11	36.4			
Potassium	6010B	63	3.9	2.0	09/02/11	09/02/11	904			
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.89			
Silver	6020A	0.016	0.006	5.0	09/02/11	09/20/11	0.155			
Sodium	6010B	15.7	3.2	2.0	09/02/11	09/02/11	32.6			
Thallium	6020A	0.012	0.001	5.0	09/02/11	09/22/11	0.085			
Vanadium	6020A	0.12	0.01	5.0	09/02/11	09/22/11	20.5			
Zinc	6020A	0.3	0.1	5.0	09/02/11	09/22/11	88.4			

% Solids: 87.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107694
Project No.:	NA	Date Collected:	08/09/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP34SB22 Lab Code: K1107694-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.1	5.5	2.0	09/02/11	09/02/11	8250		*	J
Antimony	6010B	9.1	2.7	2.0	09/02/11	09/02/11	165		*	J
Arsenic	6020A	7.35	0.88	100.0	09/02/11	10/19/11	1580		N*	J
Barium	6020A	0.037	0.004	5.0	09/02/11	09/22/11	111			
Beryllium	6020A	0.015	0.002	5.0	09/02/11	09/22/11	0.517			
Cadmium	6020A	0.015	0.002	5.0	09/02/11	09/22/11	0.391			
Calcium	6010B	9.1	1.8	2.0	09/02/11	09/02/11	3360		N*	J
Chromium	6020A	0.15	0.02	5.0	09/02/11	09/22/11	23.6			
Cobalt	6020A	0.015	0.002	5.0	09/02/11	09/22/11	18.3			
Copper	6020A	0.07	0.04	5.0	09/02/11	09/22/11	30.6			
Iron	6010B	3.7	0.3	2.0	09/02/11	09/02/11	32100			
Lead	6020A	0.037	0.007	5.0	09/02/11	09/22/11	72.8			
Magnesium	6010B	3.65	0.04	2.0	09/02/11	09/02/11	4870		N*	J
Manganese	6010B	1.83	0.04	2.0	09/02/11	09/02/11	387			
Mercury	7471A	1.78	0.178	100.0	09/01/11	09/01/11	16.2		N*	J
Nickel	6020A	0.15	0.02	5.0	09/02/11	09/22/11	45.8			
Potassium	6010B	73	4.6	2.0	09/02/11	09/02/11	924			
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	1.99			
Silver	6020A	0.018	0.007	5.0	09/02/11	09/20/11	0.096			
Sodium	6010B	18.3	3.7	2.0	09/02/11	09/02/11	51.4			
Thallium	6020A	0.015	0.001	5.0	09/02/11	09/22/11	0.130			
Vanadium	6020A	0.15	0.02	5.0	09/02/11	09/22/11	37.6			
Zinc	6020A	0.4	0.1	5.0	09/02/11	09/22/11	77.7			

% Solids: 83.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1107694
Date Collected: 08/09/11
Date Received: 08/18/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP37SB24
Lab Code: K1107694-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.6	5.8	2.0	09/02/11	09/02/11	9700		*	J
Antimony	6010B	9.6	2.9	2.0	09/02/11	09/02/11	123		*	J
Arsenic	6020A	0.43	0.05	5.0	09/02/11	09/22/11	171		N*	J
Barium	6020A	0.043	0.004	5.0	09/02/11	09/22/11	127			
Beryllium	6020A	0.017	0.003	5.0	09/02/11	09/22/11	0.424			
Cadmium	6020A	0.017	0.003	5.0	09/02/11	09/22/11	0.304			
Calcium	6010B	9.6	1.9	2.0	09/02/11	09/02/11	1710		N*	J
Chromium	6020A	0.17	0.03	5.0	09/02/11	09/22/11	20.7			
Cobalt	6020A	0.017	0.003	5.0	09/02/11	09/22/11	15.5			
Copper	6020A	0.09	0.04	5.0	09/02/11	09/22/11	39.3			
Iron	6010B	3.9	0.3	2.0	09/02/11	09/02/11	34700			
Lead	6020A	0.043	0.008	5.0	09/02/11	09/22/11	12.9			
Magnesium	6010B	3.86	0.04	2.0	09/02/11	09/02/11	2840		N*	J
Manganese	6010B	1.93	0.04	2.0	09/02/11	09/02/11	633			
Mercury	7471A	1.93	0.193	100.0	09/01/11	09/01/11	45.6		N*	J
Nickel	6020A	0.17	0.03	5.0	09/02/11	09/22/11	32.8			
Potassium	6010B	77	4.8	2.0	09/02/11	09/02/11	767			
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.77			
Silver	6020A	0.019	0.008	5.0	09/02/11	09/20/11	0.124			
Sodium	6010B	19.3	3.9	2.0	09/02/11	09/02/11	53.6			
Thallium	6020A	0.017	0.002	5.0	09/02/11	09/22/11	0.094			
Vanadium	6020A	0.17	0.02	5.0	09/02/11	09/22/11	37.9			
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/22/11	73.1			

% Solids: 80.4

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1107694
Project No.: NA
Date Collected: 08/06/11
Project Name: Red Devil Mine
Date Received: 08/18/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11SM11SB20
Lab Code: K1107694-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.1	4.2	2.0	09/02/11	09/02/11	7250		*	J
Antimony	6020A	0.035	0.006	5.0	09/02/11	10/05/11	0.755			
Arsenic	6020A	0.35	0.04	5.0	09/02/11	09/22/11	88.3		N*	J
Barium	6020A	0.035	0.003	5.0	09/02/11	09/22/11	165			
Beryllium	6020A	0.014	0.002	5.0	09/02/11	09/22/11	0.489			
Cadmium	6020A	0.014	0.002	5.0	09/02/11	09/22/11	0.793			
Calcium	6010B	7.1	1.4	2.0	09/02/11	09/02/11	1110		N*	J
Chromium	6020A	0.14	0.02	5.0	09/02/11	09/22/11	20.3			
Cobalt	6020A	0.014	0.002	5.0	09/02/11	09/22/11	23.2			
Copper	6020A	0.07	0.04	5.0	09/02/11	09/22/11	45.3			
Iron	6010B	2.8	0.2	2.0	09/02/11	09/02/11	51900			
Lead	6020A	0.035	0.006	5.0	09/02/11	09/22/11	10.8			
Magnesium	6010B	2.82	0.03	2.0	09/02/11	09/02/11	1720		N*	J
Manganese	6010B	1.41	0.03	2.0	09/02/11	09/02/11	820			
Mercury	7471A	0.336	0.034	20.0	09/01/11	09/01/11	3.04		N*	J
Nickel	6020A	0.14	0.02	5.0	09/02/11	09/22/11	49.3			
Potassium	6010B	57	3.5	2.0	09/02/11	09/02/11	797			
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.38			
Silver	6020A	0.014	0.006	5.0	09/02/11	09/20/11	0.263			
Sodium	6010B	14.1	2.8	2.0	09/02/11	09/02/11	51.3			
Thallium	6020A	0.014	0.001	5.0	09/02/11	09/22/11	0.092			
Vanadium	6020A	0.14	0.01	5.0	09/02/11	09/22/11	31.3			
Zinc	6020A	0.3	0.1	5.0	09/02/11	09/22/11	90.9			

% Solids: 84.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1107694
Date Collected: 08/08/11
Date Received: 08/18/11
Units: mg/Kg
Basis: DRY

Sample Name: 11DS01SB18
Lab Code: K1107694-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	8.3	5.0	2.0	09/02/11	09/02/11	4370		*
Antimony	6020A	0.042	0.008	5.0	09/02/11	10/05/11	8.260		
Arsenic	6020A	0.47	0.06	5.0	09/02/11	09/22/11	209		N*
Barium	6020A	0.047	0.005	5.0	09/02/11	09/22/11	128		
Beryllium	6020A	0.019	0.003	5.0	09/02/11	09/22/11	0.587		
Cadmium	6020A	0.019	0.003	5.0	09/02/11	09/22/11	0.521		
Calcium	6010B	8.3	1.7	2.0	09/02/11	09/02/11	1350		
Chromium	6020A	0.19	0.03	5.0	09/02/11	09/22/11	15.7		
Cobalt	6020A	0.019	0.003	5.0	09/02/11	09/22/11	14.8		
Copper	6020A	0.09	0.05	5.0	09/02/11	09/22/11	44.1		
Iron	6010B	3.3	0.3	2.0	09/02/11	09/02/11	37700		
Lead	6020A	0.047	0.008	5.0	09/02/11	09/22/11	9.740		
Magnesium	6010B	3.34	0.03	2.0	09/02/11	09/02/11	1080		
Manganese	6010B	1.67	0.03	2.0	09/02/11	09/02/11	676		
Mercury	7471A	1.69	0.169	100.0	09/01/11	09/01/11	30.4		N*
Nickel	6020A	0.19	0.03	5.0	09/02/11	09/22/11	39.1		
Potassium	6010B	67	4.2	2.0	09/02/11	09/02/11	800		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.53		
Silver	6020A	0.017	0.007	5.0	09/02/11	09/20/11	0.154		
Sodium	6010B	16.7	3.3	2.0	09/02/11	09/02/11	31.3		
Thallium	6020A	0.019	0.002	5.0	09/02/11	09/22/11	0.122		
Vanadium	6020A	0.19	0.02	5.0	09/02/11	09/22/11	25.2		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/22/11	87.4		

% Solids: 86.9

Comments:

Metals

-1-

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107694
Project No.:	NA	Date Collected:	08/04/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD04SB16 Lab Code: K1107694-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.5	6.3	2.0	09/02/11	09/02/11	12900		*
Antimony	6010B	10.5	3.2	2.0	09/02/11	09/02/11	112		*
Arsenic	6020A	0.49	0.06	5.0	09/02/11	09/22/11	450		N*
Barium	6020A	0.049	0.005	5.0	09/02/11	09/22/11	285		
Beryllium	6020A	0.020	0.003	5.0	09/02/11	09/22/11	0.547		
Cadmium	6020A	0.020	0.003	5.0	09/02/11	09/22/11	0.322		
Calcium	6010B	10.5	2.1	2.0	09/02/11	09/02/11	2910		N*
Chromium	6020A	0.20	0.03	5.0	09/02/11	09/22/11	23.8		
Cobalt	6020A	0.020	0.003	5.0	09/02/11	09/22/11	8.980		
Copper	6020A	0.10	0.05	5.0	09/02/11	09/22/11	26.7		
Iron	6010B	4.2	0.3	2.0	09/02/11	09/02/11	27900		
Lead	6020A	0.049	0.009	5.0	09/02/11	09/22/11	7.910		
Magnesium	6010B	4.20	0.04	2.0	09/02/11	09/02/11	6120		N*
Manganese	6010B	2.10	0.04	2.0	09/02/11	09/02/11	331		
Mercury	7471A	1.86	0.186	100.0	09/01/11	09/01/11	34.0		N*
Nickel	6020A	0.20	0.03	5.0	09/02/11	09/22/11	29.4		
Potassium	6010B	84	5.3	2.0	09/02/11	09/02/11	1010		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.49		
Silver	6020A	0.021	0.008	5.0	09/02/11	09/20/11	0.170		
Sodium	6010B	21.0	4.2	2.0	09/02/11	09/02/11	128		
Thallium	6020A	0.020	0.002	5.0	09/02/11	09/22/11	0.146		
Vanadium	6020A	0.20	0.02	5.0	09/02/11	09/22/11	31.8		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/22/11	74.5		

% Solids: 75.6

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107694**
Sampling Dates: 8/15/2011	**Sample Matrix: Soil**
Analytical Method: PCBs (*EPA 8082)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/18/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP74SS	K1107694-002
2	11MP72SS	K1107694-003
3	11MP76SS	K1107694-008
4	11MP91SS	K1107694-009
5	11MP78SS	K1107694-011
6	11MP77SS	K1107694-012
7	11MP79SS	K1107694-014
8	11MP73SS	K1107694-015
9	11MP83SS	K1107694-017
10	11MP85SS	K1107694-018
11	11MP75SS	K1107694-019
12	11MP92SS	K1107694-020
13	11MP84SS	K1107694-022
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration DaXta
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Sample 11MP76SS was used for MS/MSD. The recoveries were within the control limits generated by the laboratory.

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X____ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No Aroclors were detected in the method blank at the reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

__X__ Acceptable

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable with qualification
_____ Unacceptable

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within quality control limits.

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: No analytes were detected in these samples.

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1107694

Cover Page - Organic Analysis Data Package
Polychlorinated Biphenyls (PCBs)

Sample Name	Lab Code	Date Collected	Date Received
11MP74SS	K1107694-002	08/15/2011	08/18/2011
11MP72SS	K1107694-003	08/15/2011	08/18/2011
11MP76SS	K1107694-008	08/15/2011	08/18/2011
11MP91SS	K1107694-009	08/15/2011	08/18/2011
11MP78SS	K1107694-011	08/15/2011	08/18/2011
11MP77SS	K1107694-012	08/15/2011	08/18/2011
11MP79SS	K1107694-014	08/15/2011	08/18/2011
11MP73SS	K1107694-015	08/15/2011	08/18/2011
11MP83SS	K1107694-017	08/15/2011	08/18/2011
11MP85SS	K1107694-018	08/15/2011	08/18/2011
11MP75SS	K1107694-019	08/15/2011	08/18/2011
11MP92SS	K1107694-020	08/15/2011	08/18/2011
11MP84SS	K1107694-022	08/15/2011	08/18/2011
11MP76SS	KWG1108615-1	08/15/2011	08/18/2011
11MP76SSMS	KWG1108615-2	08/15/2011	08/18/2011
11MP76SSDMS	KWG1108615-3	08/15/2011	08/18/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: 9/9/11 Title: _____

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP74SS	**Units:**	mg/Kg
Lab Code:	K1107694-002	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	87	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP72SS	**Units:**	mg/Kg
Lab Code:	K1107694-003	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.19	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.095	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	89	35-133	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP76SS	**Units:**	mg/Kg
Lab Code:	K1107694-008	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	91	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP91SS	**Units:**	mg/Kg
Lab Code:	K1107694-009	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	92	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP78SS	**Units:**	mg/Kg
Lab Code:	K1107694-011	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.097	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	83	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP77SS	**Units:**	mg/Kg
Lab Code:	K1107694-012	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	90	35-133	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP79SS	**Units:**	mg/Kg
Lab Code:	K1107694-014	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	90	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP73SS	**Units:**	mg/Kg
Lab Code:	K1107694-015	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.19	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.092	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	80	35-133	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP83SS	**Units:**	mg/Kg
Lab Code:	K1107694-017	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	86	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP85SS	**Units:**	mg/Kg
Lab Code:	K1107694-018	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.096	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	82	35-133	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP75SS	**Units:**	mg/Kg
Lab Code:	K1107694-019	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.10	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	81	35-133	09/03/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP92SS	**Units:**	mg/Kg
Lab Code:	K1107694-020	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.099	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	83	35-133	09/03/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP84SS	**Units:**	mg/Kg
Lab Code:	K1107694-022	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1221	ND	U	0.20	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1232	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1242	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1248	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1254	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	
Aroclor 1260	ND	U	0.098	0.019	1	08/28/11	09/03/11	KWG1108615	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	86	35-133	09/03/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: RO72**
Sampling Dates: 9/20/10	**Sample Matrix: Soil**
Analytical Method: ***TPHD by AK102/AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/18/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP70SS	K1107694-001
2	11MP36SB18	K1107694-007
3	11MP37SB16	K1107694-013
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as diesel and motor oil standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Diesel and motor oil standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Sample 11MP37SB16 was used for MS/MSD analysis and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level, however due to the contamination of the method blank KWG1108292-3 below the reporting limit, sample 11MP37SB16 results qualified “U”.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
__X__No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

__X__Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
__X__Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25 and TPH as motor oil was in the range of C25 to C36.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP70SS

((824.05x10mLx1.0)/(30.40gx64.5))x1 = 4.2026 g/kg = 420.26 mg/kg
Lab reported 420 mg/kg

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1107694

Cover Page - Organic Analysis Data Package
Residual Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP70SS	K1107694-001	08/15/2011	08/18/2011
11MP36SB18	K1107694-007	08/09/2011	08/18/2011
11MP37SB16	K1107694-013	08/09/2011	08/18/2011
11MP37SB16	KWG1109321-1	08/09/2011	08/18/2011
11MP37SB16MS	KWG1109321-2	08/09/2011	08/18/2011
11MP37SB16DMS	KWG1109321-3	08/09/2011	08/18/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Lorna E. Portwood Name: Lorna Portwood

Date: 9/26/11 Title: Scientist

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Residual Range Organics

Sample Name:	11MP70SS	**Units:**	mg/Kg
Lab Code:	K1107694-001	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	420	Z	160	4.5	1	08/23/11	09/07/11	KWG1108292	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	101	50-150	09/07/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Residual Range Organics

Sample Name:	11MP36SB18	**Units:**	mg/Kg
Lab Code:	K1107694-007	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	72	J	130	3.6	1	08/23/11	09/07/11	KWG1108292	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	91	50-150	09/07/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Residual Range Organics

Sample Name:	11MP37SB16	**Units:**	mg/Kg
Lab Code:	K1107694-013	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	19	J	U	120	3.4	1	08/23/11	09/07/11	KWG1108292	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	86	50-150	09/07/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107694**
Sampling Dates: 8/8/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/21/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11DS01SB18	K1107694-016
2		
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10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Batch QC was used for the matrix spike. All SPLP metals recoveries except Antimony in the matrix spike and Iron in the duplicate, were within the control limits. The detected results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level with the exception of iron. The concentration of iron in the field sample was greater than 5x the blank concentration so no qualification of the data is required. Calibration blanks were free of contamination at the reporting limit level, no qualification of the data is required.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Duplicate analysis of laboratory duplicates were within control limits of less than

20% where both analytes were detected in the sample.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11DS01SB18
AL: (1184 ug/L)*(20mL/20mL) = 1184 ug/L
Lab reported 1180 ug/L
Ba: (26.35 ug/L)*(20mL/20mL) = 26.35 ug/L
Lab reported 26.4 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1107694

Sample Name:	Lab Code:
11DS01SB18	K1107694-016
11DS01SB18D	K1107694-016D
11DS01SB18S	K1107694-016S
Method Blank	K1107694-MB
Batch QC1D	K1107697-022D
Batch QC1S	K1107697-022S
Batch QC1SD	K1107697-022SD

Comments:

Approved By: _____ Date: 10/21/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107694
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11DS01SB18 Lab Code: K1107694-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/18/11	10/19/11	1180		
Antimony	6010B	50.0	20.0	1.0	10/18/11	10/19/11	20.0	U	N
Arsenic	6010B	100	20	1.0	10/18/11	10/19/11	20	U	
Barium	6010B	1000	1.0	1.0	10/18/11	10/19/11	26.4	J	
Beryllium	6010B	5.0	0.20	1.0	10/18/11	10/19/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/18/11	10/19/11	1.1	J	
Calcium	6010B	1000	10.0	1.0	10/18/11	10/19/11	440	J	
Chromium	6010B	10.0	3.0	1.0	10/18/11	10/19/11	26.7		
Cobalt	6010B	10	2.0	1.0	10/18/11	10/19/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/18/11	10/19/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/18/11	10/19/11	3110		N
Lead	6010B	50.0	8.0	1.0	10/18/11	10/19/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/18/11	10/19/11	209		
Manganese	6010B	5.0	0.4	1.0	10/18/11	10/19/11	50.2		
Mercury	7470A	1.00	0.40	1.0	09/01/11	09/07/11	2.05		
Nickel	6010B	20.0	2.0	1.0	10/18/11	10/19/11	4.3	J	
Potassium	6010B	400	50	1.0	10/18/11	10/19/11	543		
Selenium	6010B	100	30	1.0	10/18/11	10/19/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/18/11	10/19/11	5.0	U	
Sodium	6010B	10000	5.0	1.0	10/18/11	10/19/11	2830	J	
Thallium	6010B	100	30	1.0	10/18/11	10/19/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/18/11	10/19/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/18/11	10/19/11	19.6	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107694**
Sampling Dates: 8/9/2011 to 8/15/2011	**Sample Matrix: Soil**
Analytical Method: SVOCs + TICs (*EPA 8270D)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/18/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP70SS	K1107694-001
2	11MP36SB18	K1107694-007
3	11MP37SB16	K1107694-013
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Batch QC was used for MS/MSD. All compounds were within the control limits generated by the laboratory.

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No compounds were detected in the method blank at the reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits, with the exception of sample 11MP36SB18. Since only one surrogate of each type was out of control limits there is no qualification of the data necessary.

9. INTERNAL STANDARDS

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicates were within control limits.

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP70SS
Acenapthene: ((29.43 x 2ml x 1)/(40.004 x 64.5) x 1 = 2.28 ug/kg
Lab reported 2.3 ug/kg

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1107694

Cover Page - Organic Analysis Data Package
Semi-Volatile Organic Compounds by GC/MS

Sample Name	Lab Code	Date Collected	Date Received
11MP70SS	K1107694-001	08/15/2011	08/18/2011
11MP36SB18	K1107694-007	08/09/2011	08/18/2011
11MP37SB16	K1107694-013	08/09/2011	08/18/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Carl Degen

Date: 9/21/11 Title: Senior Chemist

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP70SS	**Units:**	ug/Kg
Lab Code:	K1107694-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	7.8	1.9	1	08/23/11	08/29/11	KWG1108223	
Phenol	**4.6**	J	24	2.0	1	08/23/11	08/29/11	KWG1108223	
2-Chlorophenol	ND	U	7.8	2.0	1	08/23/11	08/29/11	KWG1108223	
1,3-Dichlorobenzene	ND	U	7.8	3.0	1	08/23/11	08/29/11	KWG1108223	
1,4-Dichlorobenzene	ND	U	7.8	2.9	1	08/23/11	08/29/11	KWG1108223	
1,2-Dichlorobenzene	ND	U	7.8	2.9	1	08/23/11	08/29/11	KWG1108223	
Benzyl Alcohol	**12**	J	16	2.1	1	08/23/11	08/29/11	KWG1108223	
Bis(2-chloroisopropyl) Ether	ND	U	7.8	2.6	1	08/23/11	08/29/11	KWG1108223	
2-Methylphenol	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Hexachloroethane	ND	U	7.8	3.1	1	08/23/11	08/29/11	KWG1108223	
N-Nitrosodi-n-propylamine	ND	U	7.8	2.4	1	08/23/11	08/29/11	KWG1108223	
4-Methylphenol†	**4.9**	J	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Nitrobenzene	ND	U	7.8	2.2	1	08/23/11	08/29/11	KWG1108223	
Isophorone	ND	U	7.8	1.0	1	08/23/11	08/29/11	KWG1108223	
2-Nitrophenol	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dimethylphenol	ND	U	39	5.5	1	08/23/11	08/29/11	KWG1108223	
Bis(2-chloroethoxy)methane	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dichlorophenol	ND	U	7.8	1.0	1	08/23/11	08/29/11	KWG1108223	
Benzoic Acid	**120**	J	160	96	1	08/23/11	08/29/11	KWG1108223	
1,2,4-Trichlorobenzene	ND	U	7.8	2.6	1	08/23/11	08/29/11	KWG1108223	
Naphthalene	ND	U	7.8	2.3	1	08/23/11	08/29/11	KWG1108223	
4-Chloroaniline	ND	U	7.8	1.9	1	08/23/11	08/29/11	KWG1108223	
Hexachlorobutadiene	ND	U	7.8	2.5	1	08/23/11	08/29/11	KWG1108223	
4-Chloro-3-methylphenol	ND	U	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
2-Methylnaphthalene	ND	U	7.8	2.2	1	08/23/11	08/29/11	KWG1108223	
Hexachlorocyclopentadiene	ND	U	39	29	1	08/23/11	08/29/11	KWG1108223	
2,4,6-Trichlorophenol	ND	U	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
2,4,5-Trichlorophenol	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
2-Chloronaphthalene	ND	U	7.8	1.6	1	08/23/11	08/29/11	KWG1108223	
2-Nitroaniline	ND	U	16	3.2	1	08/23/11	08/29/11	KWG1108223	
Acenaphthylene	**1.3**	J	7.8	1.2	1	08/23/11	08/29/11	KWG1108223	
Dimethyl Phthalate	**160**		7.8	1.0	1	08/23/11	08/29/11	KWG1108223	
2,6-Dinitrotoluene	ND	U	7.8	2.0	1	08/23/11	08/29/11	KWG1108223	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP70SS	**Units:**	ug/Kg
Lab Code:	K1107694-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Acenaphthene	**2.3**	J	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
3-Nitroaniline	ND	U	16	2.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrophenol	ND	U	160	17	1	08/23/11	08/29/11	KWG1108223	
Dibenzofuran	**2.4**	J	7.8	1.2	1	08/23/11	08/29/11	KWG1108223	
4-Nitrophenol	ND	U	78	18	1	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrotoluene	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Fluorene	**2.5**	J	7.8	1.1	1	08/23/11	08/29/11	KWG1108223	
4-Chlorophenyl Phenyl Ether	ND	U	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
Diethyl Phthalate	**8.0**		7.8	1.3	1	08/23/11	08/29/11	KWG1108223	
4-Nitroaniline	ND	U	16	1.8	1	08/23/11	08/29/11	KWG1108223	
2-Methyl-4,6-dinitrophenol	ND	U	78	1.4	1	08/23/11	08/29/11	KWG1108223	
N-Nitrosodiphenylamine	ND	U	7.8	1.6	1	08/23/11	08/29/11	KWG1108223	
4-Bromophenyl Phenyl Ether	**1.9**	J	7.8	1.6	1	08/23/11	08/29/11	KWG1108223	
Hexachlorobenzene	**1.3**	J	7.8	1.2	1	08/23/11	08/29/11	KWG1108223	*
Pentachlorophenol	ND	U	78	20	1	08/23/11	08/29/11	KWG1108223	
Phenanthrene	**4.2**	J	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
Anthracene	**2.0**	J	7.8	1.6	1	08/23/11	08/29/11	KWG1108223	
Di-n-butyl Phthalate	ND	U	16	7.9	1	08/23/11	08/29/11	KWG1108223	
Fluoranthene	ND	U	7.8	1.6	1	08/23/11	08/29/11	KWG1108223	
Pyrene	**2.8**	J	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Butyl Benzyl Phthalate	ND	U	7.8	3.2	1	08/23/11	08/29/11	KWG1108223	
3,3'-Dichlorobenzidine	ND	U	78	3.7	1	08/23/11	08/29/11	KWG1108223	
Benz(a)anthracene	ND	U	7.8	1.7	1	08/23/11	08/29/11	KWG1108223	
Chrysene	**2.6**	J	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Bis(2-ethylhexyl) Phthalate	ND	U	78	7.0	1	08/23/11	08/29/11	KWG1108223	
Di-n-octyl Phthalate	ND	U	7.8	1.7	1	08/23/11	08/29/11	KWG1108223	
Benzo(b)fluoranthene	ND	U	7.8	1.2	1	08/23/11	08/29/11	KWG1108223	
Benzo(k)fluoranthene	ND	U	7.8	1.4	1	08/23/11	08/29/11	KWG1108223	
Benzo(a)pyrene	ND	U	7.8	1.7	1	08/23/11	08/29/11	KWG1108223	
Indeno(1,2,3-cd)pyrene	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Dibenz(a,h)anthracene	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	
Benzo(g,h,i)perylene	ND	U	7.8	1.5	1	08/23/11	08/29/11	KWG1108223	

* See Case Narrative

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP70SS	**Units:**	ug/Kg
Lab Code:	K1107694-001	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	53	11-80	08/29/11	Acceptable
Phenol-d6	56	20-86	08/29/11	Acceptable
Nitrobenzene-d5	61	27-91	08/29/11	Acceptable
2-Fluorobiphenyl	71	25-97	08/29/11	Acceptable
2,4,6-Tribromophenol	83	10-119	08/29/11	Acceptable
Terphenyl-d14	88	33-129	08/29/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/15/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011
		Date Extracted:	08/23/2011
		Date Analyzed:	09/14/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP70SS	**Units:**	ug/Kg
Lab Code:	K1107694-001	**Basis:**	Dry
File ID:	J:\MS06\DATA\091311\0913F024.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108223
Analysis Method:	8270C		
Sample Amount:	40.004 g		
% Solids:	64.5		
Dilution Factor:	10		

CAS No.	Analyte Name	RT	Result	Q	Note
-	Unknown Alkene	20.40	2000	J	
-	Unknown Branched Alkane	20.43	1500	J	
112-85-6	Docosanoic acid	20.96	1300	JN	
-	Unknown Alkane	22.19	4000	J	
-	Unknown	23.53	2700	J	
-	Unknown	25.27	2900	J	
-	Unknown Sterol	27.34	3200	J	
-	Unknown	27.45	1300	J	
-	Unknown	27.80	5300	J	
-	Unknown	29.10	2700	J	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP36SB18	**Units:**	ug/Kg
Lab Code:	K1107694-007	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	63	19	10	08/23/11	08/29/11	KWG1108223	
Phenol	ND	U	190	20	10	08/23/11	08/29/11	KWG1108223	
2-Chlorophenol	ND	U	63	20	10	08/23/11	08/29/11	KWG1108223	
1,3-Dichlorobenzene	ND	U	63	30	10	08/23/11	08/29/11	KWG1108223	
1,4-Dichlorobenzene	ND	U	63	29	10	08/23/11	08/29/11	KWG1108223	
1,2-Dichlorobenzene	ND	U	63	29	10	08/23/11	08/29/11	KWG1108223	
Benzyl Alcohol	ND	U	130	21	10	08/23/11	08/29/11	KWG1108223	
Bis(2-chloroisopropyl) Ether	ND	U	63	26	10	08/23/11	08/29/11	KWG1108223	
2-Methylphenol	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Hexachloroethane	ND	U	63	31	10	08/23/11	08/29/11	KWG1108223	
N-Nitrosodi-n-propylamine	ND	U	63	24	10	08/23/11	08/29/11	KWG1108223	
4-Methylphenol†	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Nitrobenzene	ND	U	63	22	10	08/23/11	08/29/11	KWG1108223	
Isophorone	ND	U	160	25	25	08/23/11	08/30/11	KWG1108223	
2-Nitrophenol	ND	U	160	38	25	08/23/11	08/30/11	KWG1108223	
2,4-Dimethylphenol	ND	U	780	140	25	08/23/11	08/30/11	KWG1108223	
Bis(2-chloroethoxy)methane	ND	U	160	38	25	08/23/11	08/30/11	KWG1108223	
2,4-Dichlorophenol	ND	U	160	25	25	08/23/11	08/30/11	KWG1108223	
Benzoic Acid	ND	U	3200	2400	25	08/23/11	08/30/11	KWG1108223	
1,2,4-Trichlorobenzene	ND	U	160	65	25	08/23/11	08/30/11	KWG1108223	
Naphthalene	ND	Ui	180	180	25	08/23/11	08/30/11	KWG1108223	
4-Chloroaniline	ND	U	160	48	25	08/23/11	08/30/11	KWG1108223	
Hexachlorobutadiene	ND	U	160	63	25	08/23/11	08/30/11	KWG1108223	
4-Chloro-3-methylphenol	ND	U	160	35	25	08/23/11	08/30/11	KWG1108223	
2-Methylnaphthalene	ND	Ui	160	140	25	08/23/11	08/30/11	KWG1108223	
Hexachlorocyclopentadiene	ND	U	320	290	10	08/23/11	08/29/11	KWG1108223	
2,4,6-Trichlorophenol	ND	U	63	14	10	08/23/11	08/29/11	KWG1108223	
2,4,5-Trichlorophenol	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
2-Chloronaphthalene	ND	U	63	16	10	08/23/11	08/29/11	KWG1108223	
2-Nitroaniline	ND	U	130	32	10	08/23/11	08/29/11	KWG1108223	
Acenaphthylene	ND	U	63	12	10	08/23/11	08/29/11	KWG1108223	
Dimethyl Phthalate	ND	U	63	10	10	08/23/11	08/29/11	KWG1108223	
2,6-Dinitrotoluene	ND	U	63	20	10	08/23/11	08/29/11	KWG1108223	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Soil

Service Request: K1107694
Date Collected: 08/09/2011
Date Received: 08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MP36SB18
Lab Code: K1107694-007

Extraction Method: EPA 3541
Analysis Method: 8270C

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Acenaphthene	ND	Ui	200	200	10	08/23/11	08/29/11	KWG1108223	
3-Nitroaniline	ND	U	130	25	10	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrophenol	ND	U	1300	170	10	08/23/11	08/29/11	KWG1108223	
Dibenzofuran	**18**	JD	63	12	10	08/23/11	08/29/11	KWG1108223	
4-Nitrophenol	ND	U	630	180	10	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrotoluene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Fluorene	**150**	D	63	11	10	08/23/11	08/29/11	KWG1108223	
4-Chlorophenyl Phenyl Ether	ND	U	63	14	10	08/23/11	08/29/11	KWG1108223	
Diethyl Phthalate	ND	U	63	13	10	08/23/11	08/29/11	KWG1108223	
4-Nitroaniline	ND	U	130	18	10	08/23/11	08/29/11	KWG1108223	
2-Methyl-4,6-dinitrophenol	ND	U	630	14	10	08/23/11	08/29/11	KWG1108223	
N-Nitrosodiphenylamine	ND	U	63	16	10	08/23/11	08/29/11	KWG1108223	
4-Bromophenyl Phenyl Ether	ND	U	63	16	10	08/23/11	08/29/11	KWG1108223	
Hexachlorobenzene	ND	U	63	12	10	08/23/11	08/29/11	KWG1108223	*
Pentachlorophenol	ND	U	630	200	10	08/23/11	08/29/11	KWG1108223	
Phenanthrene	**96**	D	63	14	10	08/23/11	08/29/11	KWG1108223	
Anthracene	ND	U	63	16	10	08/23/11	08/29/11	KWG1108223	
Di-n-butyl Phthalate	ND	U	130	79	10	08/23/11	08/29/11	KWG1108223	
Fluoranthene	ND	U	63	16	10	08/23/11	08/29/11	KWG1108223	
Pyrene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Butyl Benzyl Phthalate	ND	U	63	32	10	08/23/11	08/29/11	KWG1108223	
3,3'-Dichlorobenzidine	ND	U	630	37	10	08/23/11	08/29/11	KWG1108223	
Benz(a)anthracene	ND	U	63	17	10	08/23/11	08/29/11	KWG1108223	
Chrysene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Bis(2-ethylhexyl) Phthalate	ND	U	630	70	10	08/23/11	08/29/11	KWG1108223	
Di-n-octyl Phthalate	ND	U	63	17	10	08/23/11	08/29/11	KWG1108223	
Benzo(b)fluoranthene	ND	U	63	12	10	08/23/11	08/29/11	KWG1108223	
Benzo(k)fluoranthene	ND	U	63	14	10	08/23/11	08/29/11	KWG1108223	
Benzo(a)pyrene	ND	U	63	17	10	08/23/11	08/29/11	KWG1108223	
Indeno(1,2,3-cd)pyrene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Dibenz(a,h)anthracene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	
Benzo(g,h,i)perylene	ND	U	63	15	10	08/23/11	08/29/11	KWG1108223	

* See Case Narrative

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP36SB18	**Units:**	ug/Kg
Lab Code:	K1107694-007	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	66	11-80	08/29/11	Acceptable
Phenol-d6	68	20-86	08/29/11	Acceptable
Nitrobenzene-d5	678	27-91	08/29/11	Outside Control Limits
2-Fluorobiphenyl	79	25-97	08/29/11	Acceptable
2,4,6-Tribromophenol	80	10-119	08/29/11	Acceptable
Terphenyl-d14	102	33-129	08/29/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011
		Date Extracted:	08/23/2011
		Date Analyzed:	08/30/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP36SB18	**Units:**	ug/Kg
Lab Code:	K1107694-007	**Basis:**	Dry
File ID:	J:\MS06\DATA\083011\0830F009.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108223
Analysis Method:	8270C		
Sample Amount:	40.182 g		
% Solids:	80.2		
Dilution Factor:	25		

CAS No.	Analyte Name	RT	Result	Q	Note
-	Unknown	8.58	6100	J	
-	Unknown	9.08	6800	J	
-	Unknown	9.32	12000	J	
17301-23-4	Undecane, 2,6-dimethyl-	10.65	50000	JN	
-	Unknown Branched Alkane	11.24	77000	J	
-	Unknown Alkane	11.49	24000	J	
-	Unknown Alkane	12.43	45000	J	
-	Unknown Alkane	12.96	69000	J	
-	Unknown Branched Alkane	14.45	13000	J	
1921-70-6	Pentadecane, 2,6,10,14-tetramethyl	14.90	23000	JN	

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Soil

Service Request: K1107694
Date Collected: 08/09/2011
Date Received: 08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MP37SB16
Lab Code: K1107694-013

Extraction Method: EPA 3541
Analysis Method: 8270C

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	5.9	1.9	1	08/23/11	08/29/11	KWG1108223	
Phenol	ND	U	18	2.0	1	08/23/11	08/29/11	KWG1108223	
2-Chlorophenol	ND	U	5.9	2.0	1	08/23/11	08/29/11	KWG1108223	
1,3-Dichlorobenzene	ND	U	5.9	3.0	1	08/23/11	08/29/11	KWG1108223	
1,4-Dichlorobenzene-	ND	U	5.9	2.9	1	08/23/11	08/29/11	KWG1108223	
1,2-Dichlorobenzene	ND	U	5.9	2.9	1	08/23/11	08/29/11	KWG1108223	
Benzyl Alcohol	ND	U	12	2.1	1	08/23/11	08/29/11	KWG1108223	
Bis(2-chloroisopropyl) Ether	ND	U	5.9	2.6	1	08/23/11	08/29/11	KWG1108223	
2-Methylphenol	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Hexachloroethane	ND	U	5.9	3.1	1	08/23/11	08/29/11	KWG1108223	
N-Nitrosodi-n-propylamine	ND	U	5.9	2.4	1	08/23/11	08/29/11	KWG1108223	
4-Methylphenol†	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Nitrobenzene	ND	U	5.9	2.2	1	08/23/11	08/29/11	KWG1108223	
Isophorone	ND	U	5.9	1.0	1	08/23/11	08/29/11	KWG1108223	
2-Nitrophenol	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dimethylphenol	ND	U	30	5.5	1	08/23/11	08/29/11	KWG1108223	
Bis(2-chloroethoxy)methane	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dichlorophenol	ND	U	5.9	1.0	1	08/23/11	08/29/11	KWG1108223	
Benzoic Acid	ND	U	120	96	1	08/23/11	08/29/11	KWG1108223	
1,2,4-Trichlorobenzene	ND	U	5.9	2.6	1	08/23/11	08/29/11	KWG1108223	
Naphthalene	ND	U	5.9	2.3	1	08/23/11	08/29/11	KWG1108223	
4-Chloroaniline	ND	U	5.9	1.9	1	08/23/11	08/29/11	KWG1108223	
Hexachlorobutadiene	ND	U	5.9	2.5	1	08/23/11	08/29/11	KWG1108223	
4-Chloro-3-methylphenol	ND	U	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
2-Methylnaphthalene	ND	U	5.9	2.2	1	08/23/11	08/29/11	KWG1108223	
Hexachlorocyclopentadiene	ND	U	30	29	1	08/23/11	08/29/11	KWG1108223	
2,4,6-Trichlorophenol	ND	U	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
2,4,5-Trichlorophenol	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
2-Chloronaphthalene	ND	U	5.9	1.6	1	08/23/11	08/29/11	KWG1108223	
2-Nitroaniline	ND	U	12	3.2	1	08/23/11	08/29/11	KWG1108223	
Acenaphthylene	ND	U	5.9	1.2	1	08/23/11	08/29/11	KWG1108223	
Dimethyl Phthalate	ND	U	5.9	1.0	1	08/23/11	08/29/11	KWG1108223	
2,6-Dinitrotoluene	ND	U	5.9	2.0	1	08/23/11	08/29/11	KWG1108223	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Soil

Service Request: K1107694
Date Collected: 08/09/2011
Date Received: 08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MP37SB16
Lab Code: K1107694-013

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8270C

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Acenaphthene	ND	U	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
3-Nitroaniline	ND	U	12	2.5	1	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrophenol	ND	U	120	17	1	08/23/11	08/29/11	KWG1108223	
Dibenzofuran	ND	U	5.9	1.2	1	08/23/11	08/29/11	KWG1108223	
4-Nitrophenol	ND	U	59	18	1	08/23/11	08/29/11	KWG1108223	
2,4-Dinitrotoluene	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Fluorene	ND	U	5.9	1.1	1	08/23/11	08/29/11	KWG1108223	
4-Chlorophenyl Phenyl Ether	ND	U	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
Diethyl Phthalate	ND	U	5.9	1.3	1	08/23/11	08/29/11	KWG1108223	
4-Nitroaniline	ND	U	12	1.8	1	08/23/11	08/29/11	KWG1108223	
2-Methyl-4,6-dinitrophenol	ND	U	59	1.4	1	08/23/11	08/29/11	KWG1108223	
N-Nitrosodiphenylamine	ND	U	5.9	1.6	1	08/23/11	08/29/11	KWG1108223	
4-Bromophenyl Phenyl Ether	ND	U	5.9	1.6	1	08/23/11	08/29/11	KWG1108223	
Hexachlorobenzene	ND	U	5.9	1.2	1	08/23/11	08/29/11	KWG1108223	*
Pentachlorophenol	ND	U	59	20	1	08/23/11	08/29/11	KWG1108223	
Phenanthrene	**3.4**	J	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
Anthracene	ND	U	5.9	1.6	1	08/23/11	08/29/11	KWG1108223	
Di-n-butyl Phthalate	ND	U	12	7.9	1	08/23/11	08/29/11	KWG1108223	
Fluoranthene	ND	U	5.9	1.6	1	08/23/11	08/29/11	KWG1108223	
Pyrene	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Butyl Benzyl Phthalate	ND	U	5.9	3.2	1	08/23/11	08/29/11	KWG1108223	
3,3'-Dichlorobenzidine	ND	U	59	3.7	1	08/23/11	08/29/11	KWG1108223	
Benz(a)anthracene	ND	U	5.9	1.7	1	08/23/11	08/29/11	KWG1108223	
Chrysene	**3.1**	J	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Bis(2-ethylhexyl) Phthalate	ND	U	59	7.0	1	08/23/11	08/29/11	KWG1108223	
Di-n-octyl Phthalate	ND	U	5.9	1.7	1	08/23/11	08/29/11	KWG1108223	
Benzo(b)fluoranthene	**1.3**	J	5.9	1.2	1	08/23/11	08/29/11	KWG1108223	
Benzo(k)fluoranthene	ND	U	5.9	1.4	1	08/23/11	08/29/11	KWG1108223	
Benzo(a)pyrene	ND	U	5.9	1.7	1	08/23/11	08/29/11	KWG1108223	
Indeno(1,2,3-cd)pyrene	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Dibenz(a,h)anthracene	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	
Benzo(g,h,i)perylene	ND	U	5.9	1.5	1	08/23/11	08/29/11	KWG1108223	

* See Case Narrative

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP37SB16	**Units:**	ug/Kg
Lab Code:	K1107694-013	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	69	11-80	08/29/11	Acceptable
Phenol-d6	64	20-86	08/29/11	Acceptable
Nitrobenzene-d5	67	27-91	08/29/11	Acceptable
2-Fluorobiphenyl	66	25-97	08/29/11	Acceptable
2,4,6-Tribromophenol	78	10-119	08/29/11	Acceptable
Terphenyl-d14	93	33-129	08/29/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1107694
Project:	Red Devil Mine	**Date Collected:**	08/09/2011
Sample Matrix:	Soil	**Date Received:**	08/18/2011
		Date Extracted:	08/23/2011
		Date Analyzed:	09/14/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP37SB16	**Units:**	ug/Kg
Lab Code:	K1107694-013	**Basis:**	Dry
File ID:	J:\MS06\DATA\091311\0913F025.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108223
Analysis Method:	8270C		
Sample Amount:	40.080 g		
% Solids:	84.6		
Dilution Factor:	10		

CAS No.	Analyte Name	RT	Result	Q	-	Note
-	Unknown	11.49	140	J		
-	Unknown Branched Alkane	15.18	190	J		
111-06-8	Hexadecanoic acid, butyl ester	18.45	110	JN		
123-95-5	Octadecanoic acid, butyl ester	19.65	92	JN		
-	Unknown Alkane	22.17	130	J		
-	Unknown Alkane	23.14	110	J		
-	Unknown Alkane	24.90	130	J		
-	Unknown Alkane	25.69	180	J		
-	Unknown	27.32	110	J		
-	Unknown	27.76	150	J		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: K1108008**
Sampling Dates: 9/17/2011 – 9/24/2011	**Sample Matrix: Water**
Analytical Method: ***TPHD by AK102/AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/10/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MW04GW	K1108008-007
2	11MW01GW	K1108008-016
3	11GW01EQ	K1108008-017
4	11SB01RS	K1108008-021
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**NO**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as diesel were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Diesel standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Matrix Spike and Duplicate were within control limits.

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level, low level detections were found in two of the Method Blanks, these blanks were not associated with any field samples, no qualification of the data necessary.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
___X___No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
___X___Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicates show good precision, with the exception of 11MW04GW, which had an RPD greater than 30%, results for this sample qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MW04GW

((Soln Conc*Prep Final Vol* DF)/Prep Amount)*Unit Factor
((101.29*2*1)/1020)*1000 = 198.6 ug/L
Lab reported 200 ug/L

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine

Service Request: K1108008

Cover Page - Organic Analysis Data Package
Diesel Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MW04GW	K1108008-007	08/22/2011	08/30/2011
11MW01GW	K1108008-016	08/24/2011	08/30/2011
11GW01EQ	K1108008-017	08/24/2011	08/30/2011
11SB01RS	K1108008-021	08/17/2011	08/30/2011
11MW04GW	KWG1109598-3	08/22/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Shane Murray

Date: 11/3/11 Title: _____

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/22/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11MW04GW	**Units:**	ug/L
Lab Code:	K1108008-007	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	200	J	790	11	1	08/30/11	09/12/11	KWG1108808	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	96	50-150	09/12/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11MW01GW	**Units:**	ug/L
Lab Code:	K1108008-016	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	22	J	770	11	1	08/30/11	09/13/11	KWG1108808	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	87	50-150	09/13/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11GW01EQ	**Units:**	ug/L
Lab Code:	K1108008-017	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	**33**	J	780	11	1	08/30/11	09/13/11	KWG1108808	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	87	50-150	09/13/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11SB01RS	**Units:**	ug/L
Lab Code:	K1108008-021	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	35	J	770	11	1	08/30/11	09/13/11	KWG1108808	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	86	50-150	09/13/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: K1108008**
Sampling Dates: 8/22/2011 – 8/27/2011	**Sample Matrix: Water**
Analytical Method: General Chemistry	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/10/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11RD09SW	K1108008-002
2	11RD07SW	K1108008-003
3	11RD05SW	K1108008-004
4	11RD08SW	K1108008-005
5	11MW03GW	K1108008-006
6	11MW04GW	K1108008-007
7	11RD03SW	K1108008-008
8	11RD06SW	K1108008-009
9	11RD20SW	K1108008-010
10	11MW06GW	K1108008-011
11	11RD10SW	K1108008-012
12	11RD02SW	K1108008-013
13	11RD01SW	K1108008-014
14	11RD12SW	K1108008-015
15	11MW01GW	K1108008-016
16	11RD04SW	K1108008-018
17	11RD21SW	K1108008-019
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- * — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Nitrate + Nitrite by EPA 353.2, Chloride, Fluoride, and Sulfate by EPA 300.0, Alkalinity, Carbonate, Bicarbonate, & Hydroxide by SM 2320, TDS by EPA 160.1 and TSS by EPA 160.2.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limit.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Fluoride was detected at low levels in CCB13, 14, and 15, no results qualified based on these detections. Bicarbonate was detected in Method Blanks at low levels, no results qualified based on these detections..

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory replicates of Floride in 11RD09SW and 11RD03SW were greater than 20%, result qualified "J" as estimated.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW
Fluoride: 0.131 mg/L. Lab reported 0.1 mg/L.
Chloride: 0.460 mg/L. Lab reported 0.5 mg/L.
Sulfate: 180.281 mg/L. Lab reported 180 mg/L.
Nitrate+Nitrite: 0.0113 mg/L. Lab reported 0.011 mg/L.
Alkalinity: 92.8 mg/L CaCO3. Lab reported 92.8 mg/L CaCO3.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/22/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	300.0	**Basis:**	NA

Chloride

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	**0.36**	J	0.40	0.06	2	NA	8/31/11 21:33	
11RD07SW	K1108008-003	**0.45**		0.40	0.06	2	NA	9/1/11 01:26	
11RD05SW	K1108008-004	**0.46**		0.40	0.06	2	NA	9/1/11 01:40	
11RD08SW	K1108008-005	**0.37**	J	0.40	0.06	2	NA	9/1/11 01:53	
11MW03GW	K1108008-006	**0.41**		0.40	0.06	2	NA	9/1/11 02:07	
11MW04GW	K1108008-007	**0.34**	J	0.40	0.06	2	NA	9/1/11 02:35	
11RD03SW	K1108008-008	**0.39**	J	0.40	0.06	2	NA	9/6/11 13:00	
11RD06SW	K1108008-009	**0.37**	J	0.40	0.06	2	NA	9/1/11 02:48	
11RD20SW	K1108008-010	**0.36**	J	0.40	0.06	2	NA	8/31/11 16:58	
11MW06GW	K1108008-011	**0.56**		0.40	0.06	2	NA	8/31/11 17:12	
11RD10SW	K1108008-012	**0.38**	J	0.40	0.06	2	NA	8/31/11 17:26	
11RD02SW	K1108008-013	**0.36**	J	0.40	0.06	2	NA	8/31/11 17:40	
11RD01SW	K1108008-014	**0.35**	J	0.40	0.06	2	NA	8/31/11 17:53	
11RD12SW	K1108008-015	**0.35**	J	0.40	0.06	2	NA	8/31/11 18:07	
11MW01GW	K1108008-016	**0.51**		0.40	0.06	2	NA	8/31/11 18:21	
11RD04SW	K1108008-018	**0.38**	J	0.40	0.06	2	NA	8/31/11 20:38	
11RD21SW	K1108008-019	**0.35**	J	0.40	0.06	2	NA	8/31/11 18:35	
Method Blank	K1108008-MB1	ND	U	0.20	0.03	1	NA	8/31/11 09:53	
Method Blank	K1108008-MB2	ND	U	0.20	0.03	1	NA	8/31/11 22:28	
Method Blank	K1108008-MB3	**0.06**	J	0.20	0.03	1	NA	9/6/11 10:49	

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/22/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	300.0	**Basis:**	NA

Fluoride

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	**0.05**	J J	0.40	0.006	2	NA	8/31/11 21:33	
11RD07SW	K1108008-003	**0.09**	J	0.40	0.006	2	NA	9/1/11 01:26	
11RD05SW	K1108008-004	**0.13**	J	0.40	0.006	2	NA	9/1/11 01:40	
11RD08SW	K1108008-005	**0.06**	J	0.40	0.006	2	NA	9/1/11 01:53	
11MW03GW	K1108008-006	**0.05**	J	0.40	0.006	2	NA	9/1/11 02:07	
11MW04GW	K1108008-007	**0.13**	J	0.40	0.006	2	NA	9/1/11 02:35	
11RD03SW	K1108008-008	**0.08**	J	0.40	0.006	2	NA	9/6/11 13:00	
11RD06SW	K1108008-009	**0.04**	J	0.40	0.006	2	NA	9/1/11 02:48	
11RD20SW	K1108008-010	**0.05**	J	0.40	0.006	2	NA	8/31/11 16:58	
11MW06GW	K1108008-011	**0.14**	J	0.40	0.006	2	NA	8/31/11 17:12	
11RD10SW	K1108008-012	**0.06**	J	0.40	0.006	2	NA	8/31/11 17:26	
11RD02SW	K1108008-013	**0.05**	J	0.40	0.006	2	NA	8/31/11 17:40	
11RD01SW	K1108008-014	**0.05**	J	0.40	0.006	2	NA	8/31/11 17:53	
11RD12SW	K1108008-015	**0.07**	J	0.40	0.006	2	NA	8/31/11 18:07	
11MW01GW	K1108008-016	**0.11**	J	0.40	0.006	2	NA	8/31/11 18:21	
11RD04SW	K1108008-018	**0.07**	J	0.40	0.006	2	NA	8/31/11 20:38	
11RD21SW	K1108008-019	**0.05**	J	0.40	0.006	2	NA	8/31/11 18:35	
Method Blank	K1108008-MB1	ND	U	0.20	0.003	1	NA	8/31/11 09:53	
Method Blank	K1108008-MB2	ND	U	0.20	0.003	1	NA	8/31/11 22:28	
Method Blank	K1108008-MB3	ND	U	0.20	0.003	1	NA	9/6/11 10:49	

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/22/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	300.0	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	**11.9**		0.40	0.02	2	NA	8/31/11 21:33	
11RD07SW	K1108008-003	**11.9**		0.40	0.02	2	NA	9/1/11 01:26	
11RD05SW	K1108008-004	**27.7**		2.0	0.1	10	NA	9/1/11 01:40	
11RD08SW	K1108008-005	**12.1**		0.40	0.02	2	NA	9/1/11 01:53	
11MW03GW	K1108008-006	**53.5**		2.0	0.1	10	NA	9/1/11 02:07	
11MW04GW	K1108008-007	**183**		10	0.5	50	NA	9/1/11 02:21	
11RD03SW	K1108008-008	**8.63**		0.40	0.02	2	NA	9/6/11 13:00	
11RD06SW	K1108008-009	**12.2**		0.40	0.02	2	NA	9/1/11 02:48	
11RD20SW	K1108008-010	**11.9**		0.40	0.02	2	NA	8/31/11 16:58	
11MW06GW	K1108008-011	**25.5**		1.0	0.05	5	NA	9/2/11 11:24	
11RD10SW	K1108008-012	**8.69**		0.40	0.02	2	NA	8/31/11 17:26	
11RD02SW	K1108008-013	**9.55**		0.40	0.02	2	NA	8/31/11 17:40	
11RD01SW	K1108008-014	**9.58**		0.40	0.02	2	NA	8/31/11 17:53	
11RD12SW	K1108008-015	**9.07**		0.40	0.02	2	NA	8/31/11 18:07	
11MW01GW	K1108008-016	**21.3**		1.0	0.05	5	NA	9/2/11 11:35	
11RD04SW	K1108008-018	**9.10**		0.40	0.02	2	NA	8/31/11 20:38	
11RD21SW	K1108008-019	**8.65**		0.40	0.02	2	NA	8/31/11 18:35	
Method Blank	K1108008-MB1	ND	U	0.20	0.01	1	NA	8/31/11 09:53	
Method Blank	K1108008-MB2	ND	U	0.20	0.01	1	NA	8/31/11 22:28	
Method Blank	K1108008-MB3	ND	U	0.20	0.01	1	NA	9/2/11 08:19	
Method Blank	K1108008-MB4	ND	U	0.20	0.01	1	NA	9/6/11 10:49	

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 8/24/11 - 8/27/11
Date Received: 8/30/11

Analysis Method: SM 2320 B

Units: mg/L
Basis: NA

Bicarbonate as CaCO3

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	**80.3**		9.0	3.0	1	NA	9/1/11 15:51	
11RD07SW	K1108008-003	**81.3**		9.0	3.0	1	NA	9/1/11 15:51	
11RD05SW	K1108008-004	**243**		9.0	3.0	1	NA	9/1/11 15:51	
11RD08SW	K1108008-005	**81.9**		9.0	3.0	1	NA	9/1/11 15:51	
11MW03GW	K1108008-006	**118**		9.0	3.0	1	NA	9/1/11 15:51	
11RD03SW	K1108008-008	**74.0**		2.0	1.0	1	NA	9/6/11 09:54	
11RD06SW	K1108008-009	**81.2**		9.0	3.0	1	NA	9/1/11 15:51	
11RD20SW	K1108008-010	**82.5**		9.0	3.0	1	NA	9/1/11 15:51	
11MW06GW	K1108008-011	**183**		9.0	3.0	1	NA	9/1/11 15:51	
11RD10SW	K1108008-012	**73.1**		9.0	3.0	1	NA	9/1/11 15:51	
11RD02SW	K1108008-013	**74.2**		9.0	3.0	1	NA	9/1/11 15:51	
11RD01SW	K1108008-014	**74.1**		9.0	3.0	1	NA	9/1/11 15:51	
11RD12SW	K1108008-015	**73.3**		9.0	3.0	1	NA	9/1/11 15:51	
11MW01GW	K1108008-016	**81.3**		9.0	3.0	1	NA	9/1/11 15:51	
11RD04SW	K1108008-018	**72.4**		9.0	3.0	1	NA	9/1/11 15:51	
11RD21SW	K1108008-019	**73.3**		9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB1	**5.7**	J	9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB2	**6.5**	J	9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB3	**2.0**	X	2.0	1.0	1	NA	9/6/11 09:54	

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/24/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	SM 2320 B	**Basis:**	NA

Carbonate as CaCO3

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD07SW	K1108008-003	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD05SW	K1108008-004	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD08SW	K1108008-005	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11MW03GW	K1108008-006	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD03SW	K1108008-008	ND	U	2.0	1.0	1	NA	9/6/11 09:54	
11RD06SW	K1108008-009	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD20SW	K1108008-010	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11MW06GW	K1108008-011	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD10SW	K1108008-012	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD02SW	K1108008-013	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD01SW	K1108008-014	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD12SW	K1108008-015	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11MW01GW	K1108008-016	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD04SW	K1108008-018	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
11RD21SW	K1108008-019	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB1	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB2	ND	U	9.0	3.0	1	NA	9/1/11 15:51	
Method Blank	K1108008-MB3	ND	U	2.0	1.0	1	NA	9/6/11 09:54	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/22/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	SM 2540 C	**Basis:**	NA

Solids, Total Dissolved

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	81		10	10	1	NA	8/31/11 15:10	
11RD07SW	K1108008-003	84		10	10	1	NA	8/31/11 15:10	
11RD05SW	K1108008-004	244		10	10	1	NA	8/31/11 15:10	
11RD08SW	K1108008-005	89		10	10	1	NA	8/31/11 15:10	
11MW03GW	K1108008-006	182		10	10	1	NA	8/31/11 15:10	
11MW04GW	K1108008-007	351	J	10	10	1	NA	8/31/11 15:10	*
11RD03SW	K1108008-008	51		10	10	1	NA	9/2/11 10:30	
11RD06SW	K1108008-009	78		10	10	1	NA	8/31/11 15:10	
11RD20SW	K1108008-010	88		10	10	1	NA	8/31/11 15:10	
11MW06GW	K1108008-011	195		10	10	1	NA	8/31/11 15:10	
11RD10SW	K1108008-012	71		10	10	1	NA	8/31/11 15:10	
11RD02SW	K1108008-013	76		10	10	1	NA	8/31/11 15:10	
11RD01SW	K1108008-014	74		10	10	1	NA	8/31/11 15:10	
11RD12SW	K1108008-015	72		10	10	1	NA	8/31/11 15:10	
11MW01GW	K1108008-016	115		10	10	1	NA	8/31/11 15:10	
11RD04SW	K1108008-018	82		10	10	1	NA	8/31/11 15:10	
11RD21SW	K1108008-019	80		10	10	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB1	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB2	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB3	ND	U	5.0	5.0	1	NA	9/2/11 10:30	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	8/22/11 - 8/27/11
Sample Matrix:	Water	**Date Received:**	8/30/11
		Units:	mg/L
Analysis Method:	SM 2540 D	**Basis:**	NA

Solids, Total Suspended (TSS)

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
11RD09SW	K1108008-002	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD07SW	K1108008-003	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD05SW	K1108008-004	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD08SW	K1108008-005	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11MW03GW	K1108008-006	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11MW04GW	K1108008-007	ND	U	5.0	5.0	1	NA	8/31/11 15:10	*
11RD03SW	K1108008-008	ND	U	5.0	5.0	1	NA	9/2/11 10:30	
11RD06SW	K1108008-009	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD20SW	K1108008-010	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11MW06GW	K1108008-011	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD10SW	K1108008-012	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD02SW	K1108008-013	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD01SW	K1108008-014	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD12SW	K1108008-015	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11MW01GW	K1108008-016	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD04SW	K1108008-018	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
11RD21SW	K1108008-019	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB1	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB2	ND	U	5.0	5.0	1	NA	8/31/11 15:10	
Method Blank	K1108008-MB3	ND	U	5.0	5.0	1	NA	9/2/11 10:30	
Method Blank	K1108008-MB4	ND	U	5.0	5.0	1	NA	9/2/11 10:30	

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: K1108008**
Sampling Dates: 8/24/2011	**Sample Matrix: Water**
Analytical Method: ***Gas Range Organics by AK101***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** _____
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MW01GW	K1108008-016
2	11GW01EQ	K1108008-017
3	TRIP BLANK	K1108008-020
4		
5		
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7		
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19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as gasoline standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: TPH as gasoline standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Matrix Spike recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
__X__ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank or trip blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
___X___No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
___X___Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: RPD of MS and MSD <20%.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as gasoline was in the range of C6 to C10.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: No Gasoline was detected in the sample.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108008**
Sampling Dates: 8/24/2011 – 8/26/2011	**Sample Matrix: Water**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/10/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11RD08SW	K1108008-005/DISS
2	11RD20SW	K1108008-010/DISS
3	11MW06GW	K1108008-011/DISS
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- * — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- * — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample designated for matrix spike analysis were within control limits with the exception of 11MW06GWSD, Manganese was recovered above 125%, no results were qualified as the amount of manganese in the parent sample was greater than four times the amount spiked into the sample. A post spike for Manganese was performed and the recovery was within the control limits (91%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory duplicate was performed on 11RD08SW, Selenium, Silver, Vanadium, and Zinc all had RPD's greater than 20% and are qualified "J" in the parent sample.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: 11RD08SW was analyzed by serial dilution, Copper, Lead, Silver, and Vanadium all had % Differences greater than 10%, these analytes are qualified "J" as estimated in the parent sample. 11RD20SW was analyzed by serial dilution, Aluminum and Potassium had % Differences greater than 10%, these analytes are qualified "J" as estimated in the parent sample.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11RD08SW
Aluminum: (19.4 mg/L)(1000 ug/mg)(50 mL)/(50 mL) = 19400 ug/L = 19.40 mg/L
Lab Reported 19.4 mg/L
Iron: (189 mg/L)(1000 ug/mg)(50 mL)/(50mL) = 189000 ug/L = 189 mg/L
Lab Reported 189 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: WATER

Service Request: K1108008
Date Collected: 08/26/11
Date Received: 08/30/11
Units: ug/L
Basis: NA

Sample Name: 11RD08SW
Lab Code: K1108008-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	19.4	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	184		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	78.1		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	26.2		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	17900		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.52		
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	0.230		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.48		J
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	189		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.029		J
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	11000		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	32.0		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	1.23		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	312	J	
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.5	J	J
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	3710		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.008	J	J
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	2430		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.14	J	J
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	0.5	J	J

% Solids: 0.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108008
Project No.:	NA	Date Collected:	08/26/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	WATER	Units:	ug/L
		Basis:	NA

Sample Name: 11RD08SW Lab Code: K1108008-005DISS

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	19.7	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	184		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	80.9		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	27.3		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	17900		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.39		
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	0.236		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.50		
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	176		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.037		
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	11000		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	27.5		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	1.26		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	382	J	
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	U	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	3720		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.009	J	
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	2430		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.13	J	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	1.0		

% Solids: 0.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: WATER

Service Request: K1108008
Date Collected: 08/26/11
Date Received: 08/30/11
Units: ug/L
Basis: NA

Sample Name: 11RD20SW
Lab Code: K1108008-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	26.0	J	J
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	183		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	79.6		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	27.2		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.008	J	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	18100		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.20		
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	0.243		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.42		
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	175		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.032		
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	11200		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	27.4		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	1.11		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	372	J	J
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	J	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	3750		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.026		
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	2470		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.010	J	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.15	J	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	0.4	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: WATER

Service Request: K1108008
Date Collected: 08/26/11
Date Received: 08/30/11
Units: ug/L
Basis: NA

Sample Name: 11RD20SW
Lab Code: K1108008-010DISS

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	19.3	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	185		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	81.0		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	27.2		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	18100		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.27		
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	0.231		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.47		
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	180		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.030		
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	11100		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	27.8		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	1.19		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	402		
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	U	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	3710		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.006	J	
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	2440		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.14	J	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	0.4	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: WATER

Service Request: K1108008
Date Collected: 08/24/11
Date Received: 08/30/11
Units: ug/L
Basis: NA

Sample Name: 11MW06GW
Lab Code: K1108008-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	22.3	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	5.510		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	25.8		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	75.9		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.013	J	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	31100		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.05	J	
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	1.240		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.09	J	
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	1720		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.035		
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	29000		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	536		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	2.28		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	837		
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	U	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	8160		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.010	J	
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	4430		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.007	J	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.03	U	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	1.9		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108008
Project No.:	NA	Date Collected:	08/24/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	WATER	Units:	ug/L
		Basis:	NA

Sample Name: 11MW06GW Lab Code: K1108008-011DISS

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	2.4	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	5.300		
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	24.8		
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	73.6		
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.011	J	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	31100		
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.09	J	
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	1.190		
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.08	J	
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	1680		
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.011	J	
Magnesium	6010B	20.0	2.0	1.0	09/23/11	10/10/11	29000		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	547		
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	2.42		
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	820		
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	U	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	8170		
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.004	U	
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	4430		
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.03	U	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	1.2		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108008

Project No.: NA
Date Collected:

Project Name: Red Devil Mine
Date Received:

Matrix: WATER
Units: ug/L

Basis: NA

Sample Name: Method Blank
Lab Code: K1108008-MB

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	09/23/11	10/10/11	5.9	J	
Antimony	6020A	0.050	0.005	1.0	10/17/11	10/19/11	0.005	U	
Arsenic	6020A	0.5	0.1	1.0	09/23/11	10/07/11	0.1	U	
Barium	6020A	0.050	0.020	1.0	09/23/11	10/07/11	0.020	U	
Beryllium	6020A	0.020	0.006	1.0	09/23/11	10/05/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	09/23/11	10/10/11	32.0	J	
Chromium	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.04	J	
Cobalt	6020A	0.020	0.006	1.0	09/23/11	10/07/11	0.006	U	
Copper	6020A	0.10	0.02	1.0	09/23/11	10/07/11	0.02	U	
Iron	6010B	20.0	3.0	1.0	09/23/11	10/10/11	13.3	J	
Lead	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Magnesium	6010B	2.0	0.4	1.0	09/23/11	10/10/11	8.3		
Manganese	6020A	0.050	0.006	1.0	10/17/11	10/18/11	0.009	J	
Nickel	6020A	0.20	0.02	1.0	09/23/11	10/05/11	0.02	U	
Potassium	6010B	400	50.0	1.0	09/23/11	10/10/11	58.1	J	
Selenium	6020A	1.0	0.3	1.0	09/23/11	10/05/11	0.3	U	
Silicon	6010B	400	10.0	1.0	09/23/11	10/10/11	10.0	U	
Silver	6020A	0.020	0.004	1.0	09/23/11	10/07/11	0.016	J	
Sodium	6010B	200	20.0	1.0	09/23/11	10/10/11	20.0	U	
Thallium	6020A	0.020	0.005	1.0	09/23/11	10/05/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	09/23/11	10/05/11	0.03	U	
Zinc	6020A	0.5	0.2	1.0	09/23/11	10/05/11	0.2	U	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: K1108008**
Sampling Dates: 8/17/2011 – 8/24/2011	**Sample Matrix: Water**
Analytical Method: ***RRO by AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 11/10/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MW04GW	K1108008-007
2	11MW01GW	K1108008-016
3	11GW01EQ	K1108008-017
4	11SB01RS	K1108008-021
5		
6		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- * — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**NO**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**NO**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: RRO standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: RRO standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Matrix Spike and Duplicate were within control limits.

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__Acceptable
_____Detection Limits Adjusted

The following blanks were analyzed:
__X__Method (preparation) Blanks
_____Field Blanks
_____Instrument Blanks
_____Rinsate Blanks
_____Background Samples
_____VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level, low level detections were found in multiple Method Blanks, these blanks were associated with field samples, 11MW01GW and 11SB01RS are qualified "U" as non-detect due to this contamination.

8. SURROGATE COMPOUNDS

__X__Acceptable
_____Acceptable with qualification
_____Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
__X__No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

__X__Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
__X__Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicates were performed by batch QC, lab sample K1108353-001 had an RPD greater than 30%, all samples qualified “J” as estimated due to this non conformance. Lab duplicate performed on 11MW04GW had RPD greater than 30% sample is qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MW04GW

((Soln Conc*Prep Final Vol* DF)/Prep Amount)*Unit Factor
((316.9*2*1)/1020)*1000 = 621.37 ug/L
Lab reported 620 ug/L

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108008

Cover Page - Organic Analysis Data Package
Residual Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MW04GW	K1108008-007	08/22/2011	08/30/2011
11MW01GW	K1108008-016	08/24/2011	08/30/2011
11GW01EQ	K1108008-017	08/24/2011	08/30/2011
11SB01RS	K1108008-021	08/17/2011	08/30/2011
11MW04GW	KWG1109676-5	08/22/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Shane Murray

Date: 10/3/11 Title: _____

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/22/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11MW04GW	**Units:**	ug/L
Lab Code:	K1108008-007	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	620	O	J	500	19	1	08/30/11	09/12/11	KWG1108589	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	86	50-150	09/12/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11MW01GW	**Units:**	ug/L
Lab Code:	K1108008-016	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	55	J UJ	490	19	1	08/30/11	09/13/11	KWG1108589	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	74	50-150	09/13/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11GW01EQ	**Units:**	ug/L
Lab Code:	K1108008-017	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	ND	U	UJ	490	19	1	08/30/11	09/13/11	KWG1108589	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	77	50-150	09/13/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11SB01RS	**Units:**	ug/L
Lab Code:	K1108008-021	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	25	J	U J	490	19	1	08/30/11	09/13/11	KWG1108589	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	73	50-150	09/13/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: RO72**
Sampling Dates: 8/26/11 + 8/27/11	**Sample Matrix: Water**
Analytical Method: SVOCs + TICs (*EPA 8270D)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 11/9/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11RD11SW	K1108008-001
2	11RD09SW	K1108008-002
3	11RD07SW	K1108008-003
4	11RD05SW	K1108008-004
5	11RD08SW	K1108008-005
6	11MW04GW	K1108008-007
7	11RD03SW	K1108008-008
8	11RD06SW	K1108008-009
9	11RD20SW	K1108008-010
10	11RD10SW	K1108008-012
11	11RD12SW	K1108008-015
12	11MW01GW	K1108008-016
13	11GW01EQ	K1108008-017
14	11RD04SW	K1108008-018
15	11RD21SW	K1108008-019
16	11SB01RS	K1108008-021
17	11RD04SW	KWG1108534-1
18	11RD04SWMS	KWG1108534-2
19	11RD04SWMSD	KWG1108534-3
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- * — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- * — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**NO**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**NO**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**NO**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

_____ **Acceptable**
__x__ **Acceptable with qualification**
_____ **Unacceptable**

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met for all samples with the exception of 11MW04GW and 11SB01RS, these samples arrived at the lab past the specified holding time, all detected compounds qualified "J" as estimated, non detected compounds qualified "UJ" as estimated at the reporting limit.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Laboratory Control Samples Analyzed**

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory with the exception of Hexachlorocyclopentadiene, there were no positive detections of this compound in any of the samples in this SDG, no qualification of the data necessary.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Matrix Spike/Matrix Spike Duplicates Analyzed**

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Recoveries of Matrix Spike and Duplicate were within control limits.

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No compounds were detected in the Method Blanks for this SDG.

8. SURROGATE COMPOUNDS

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits with the exception of sample 11RD06SW 2-Fluorophenol had a recovery of less than 10% and Phenol-d6 was recovered less than the control limit, the acidic fraction compounds are qualified as “J” and “UJ” as appropriate. Nitrobenzene-d5 was recovered less than the control limits, no results qualified based on these recoveries.

9. INTERNAL STANDARDS

__X__ Acceptable

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable with qualification
_____ Unacceptable

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments:

Laboratory Duplicate analysis showed good precision for all compounds analyzed.

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion

profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MW04GW

ug/L = ((5.56)(1)(1)/(980))(1000) = 5.67

Laboratory reported 5.7

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Analytical Results

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD11SW
Lab Code: K1108008-001

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD11SW
Lab Code: K1108008-001

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD11SW	**Units:**	ug/L
Lab Code:	K1108008-001	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	43	39-103	09/05/11	Acceptable
Phenol-d6	48	38-107	09/05/11	Acceptable
Nitrobenzene-d5	49	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	57	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	82	46-127	09/05/11	Acceptable
Terphenyl-d14	129	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD09SW
Lab Code: K1108008-002

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD09SW
Lab Code: K1108008-002

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD09SW	**Units:**	ug/L
Lab Code:	K1108008-002	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	69	39-103	09/05/11	Acceptable
Phenol-d6	71	38-107	09/05/11	Acceptable
Nitrobenzene-d5	78	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	75	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	75	46-127	09/05/11	Acceptable
Terphenyl-d14	113	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD07SW	**Units:**	ug/L
Lab Code:	K1108008-003	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.9	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.9	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.9	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.9	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.9	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.9	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.9	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.9	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.9	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.9	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.9	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD07SW
Lab Code: K1108008-003

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.9	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.9	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.9	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.9	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.9	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.9	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.9	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.9	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.9	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.9	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.9	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.9	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD07SW	**Units:**	ug/L
Lab Code:	K1108008-003	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.9	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	73	39-103	09/05/11	Acceptable
Phenol-d6	79	38-107	09/05/11	Acceptable
Nitrobenzene-d5	76	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	77	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	78	46-127	09/05/11	Acceptable
Terphenyl-d14	120	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD05SW	**Units:**	ug/L
Lab Code:	K1108008-004	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	**0.68**	J	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	**1.2**	J	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD05SW
Lab Code: K1108008-004

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD05SW
Lab Code: K1108008-004

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	80	39-103	09/05/11	Acceptable
Phenol-d6	83	38-107	09/05/11	Acceptable
Nitrobenzene-d5	84	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	77	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	77	46-127	09/05/11	Acceptable
Terphenyl-d14	111	22-146	09/05/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD08SW	**Units:**	ug/L
Lab Code:	K1108008-005	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	10	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	10	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	10	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	10	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	10	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	10	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	10	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	10	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	10	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	10	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	10	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	10	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	10	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	10	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	10	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	10	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	10	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	10	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	10	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	10	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	10	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	10	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	10	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	10	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	10	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	10	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	10	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	10	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	10	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD08SW
Lab Code: K1108008-005

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	10	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	10	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	10	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	10	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	10	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	10	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	10	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	10	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	10	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	10	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	10	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	10	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	10	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	10	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	10	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	10	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	10	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	10	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	10	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	10	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	10	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	10	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	10	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	10	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD08SW	**Units:**	ug/L
Lab Code:	K1108008-005	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	10	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	80	39-103	09/05/11	Acceptable
Phenol-d6	81	38-107	09/05/11	Acceptable
Nitrobenzene-d5	90	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	83	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	77	46-127	09/05/11	Acceptable
Terphenyl-d14	112	22-146	09/05/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/22/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MW04GW	**Units:**	ug/L
Lab Code:	K1108008-007	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	26	0.49	1	08/30/11	09/05/11	KWG1108534	*
Aniline	ND	U	26	0.50	1	08/30/11	09/05/11	KWG1108534	*
Bis(2-chloroethyl) Ether	ND	U	11	0.34	1	08/30/11	09/05/11	KWG1108534	*
Phenol	ND	U	11	0.34	1	08/30/11	09/05/11	KWG1108534	*
2-Chlorophenol	ND	U	11	0.32	1	08/30/11	09/05/11	KWG1108534	*
1,3-Dichlorobenzene	ND	U	11	0.36	1	08/30/11	09/05/11	KWG1108534	*
1,4-Dichlorobenzene	ND	U	11	0.33	1	08/30/11	09/05/11	KWG1108534	*
1,2-Dichlorobenzene	ND	U	11	0.44	1	08/30/11	09/05/11	KWG1108534	*
Benzyl alcohol	ND	U	11	0.39	1	08/30/11	09/05/11	KWG1108534	*
Bis(2-chloroisopropyl) Ether	ND	U	11	0.32	1	08/30/11	09/05/11	KWG1108534	*
2-Methylphenol	ND	U	11	0.34	1	08/30/11	09/05/11	KWG1108534	*
Hexachloroethane	ND	U	11	0.30	1	08/30/11	09/05/11	KWG1108534	*
N-Nitrosodi-n-propylamine	ND	U	11	0.51	1	08/30/11	09/05/11	KWG1108534	*
4-Methylphenol†	ND	U	11	0.49	1	08/30/11	09/05/11	KWG1108534	*
Nitrobenzene	ND	U	11	0.58	1	08/30/11	09/05/11	KWG1108534	*
Isophorone	ND	U	11	0.26	1	08/30/11	09/05/11	KWG1108534	*
2-Nitrophenol	ND	U	11	0.39	1	08/30/11	09/05/11	KWG1108534	*
2,4-Dimethylphenol	ND	U	11	0.27	1	08/30/11	09/05/11	KWG1108534	*
Bis(2-chloroethoxy)methane	ND	U	11	0.29	1	08/30/11	09/05/11	KWG1108534	*
2,4-Dichlorophenol	ND	U	11	0.31	1	08/30/11	09/05/11	KWG1108534	*
Benzoic acid	ND	U	26	6.0	1	08/30/11	09/05/11	KWG1108534	*
1,2,4-Trichlorobenzene	ND	U	11	0.37	1	08/30/11	09/05/11	KWG1108534	*
Naphthalene	ND	U	11	0.38	1	08/30/11	09/05/11	KWG1108534	*
4-Chloroaniline	ND	U	11	0.39	1	08/30/11	09/05/11	KWG1108534	*
Hexachlorobutadiene	ND	U	11	0.30	1	08/30/11	09/05/11	KWG1108534	*
4-Chloro-3-methylphenol	ND	U	11	0.50	1	08/30/11	09/05/11	KWG1108534	*
2-Methylnaphthalene	ND	U	11	0.25	1	08/30/11	09/05/11	KWG1108534	*
Hexachlorocyclopentadiene	ND	U	11	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	11	0.21	1	08/30/11	09/05/11	KWG1108534	*
2,4,5-Trichlorophenol	ND	U	11	0.39	1	08/30/11	09/05/11	KWG1108534	*
2-Chloronaphthalene	ND	U	11	0.30	1	08/30/11	09/05/11	KWG1108534	*
2-Nitroaniline	ND	U	26	0.35	1	08/30/11	09/05/11	KWG1108534	*
Acenaphthylene	ND	U	11	0.25	1	08/30/11	09/05/11	KWG1108534	*

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/22/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MW04GW
Lab Code: K1108008-007

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	11	0.26	1	08/30/11	09/05/11	KWG1108534	*
2,6-Dinitrotoluene	ND	U	11	0.36	1	08/30/11	09/05/11	KWG1108534	*
Acenaphthene	ND	U	11	0.29	1	08/30/11	09/05/11	KWG1108534	*
3-Nitroaniline	ND	U	26	3.4	1	08/30/11	09/05/11	KWG1108534	*
2,4-Dinitrophenol	ND	U	26	2.3	1	08/30/11	09/05/11	KWG1108534	*
Dibenzofuran	ND	U	11	0.34	1	08/30/11	09/05/11	KWG1108534	*
4-Nitrophenol	ND	U	26	2.0	1	08/30/11	09/05/11	KWG1108534	*
2,4-Dinitrotoluene	ND	U	11	0.28	1	08/30/11	09/05/11	KWG1108534	*
Fluorene	ND	U	11	0.33	1	08/30/11	09/05/11	KWG1108534	*
4-Chlorophenyl Phenyl Ether	ND	U	11	0.29	1	08/30/11	09/05/11	KWG1108534	*
Diethyl Phthalate	ND	U	11	0.30	1	08/30/11	09/05/11	KWG1108534	*
4-Nitroaniline	ND	U	26	4.2	1	08/30/11	09/05/11	KWG1108534	*
2-Methyl-4,6-dinitrophenol	ND	U	26	2.2	1	08/30/11	09/05/11	KWG1108534	*
N-Nitrosodiphenylamine	ND	U	11	0.49	1	08/30/11	09/05/11	KWG1108534	*
4-Bromophenyl Phenyl Ether	ND	U	11	0.28	1	08/30/11	09/05/11	KWG1108534	*
Hexachlorobenzene	ND	U	11	0.65	1	08/30/11	09/05/11	KWG1108534	*
Pentachlorophenol	ND	U	26	2.5	1	08/30/11	09/05/11	KWG1108534	*
Phenanthrene	ND	U	11	0.50	1	08/30/11	09/05/11	KWG1108534	*
Anthracene	ND	U	11	0.63	1	08/30/11	09/05/11	KWG1108534	*
Di-n-butyl Phthalate	ND	U	11	0.38	1	08/30/11	09/05/11	KWG1108534	*
Fluoranthene	ND	U	11	0.67	1	08/30/11	09/05/11	KWG1108534	*
Pyrene	ND	U	11	0.75	1	08/30/11	09/05/11	KWG1108534	*
Butyl Benzyl Phthalate	ND	U	11	0.48	1	08/30/11	09/05/11	KWG1108534	*
3,3'-Dichlorobenzidine	ND	U	26	0.28	1	08/30/11	09/05/11	KWG1108534	*
Benz(a)anthracene	ND	U	11	0.61	1	08/30/11	09/05/11	KWG1108534	*
Chrysene	ND	U	11	0.81	1	08/30/11	09/05/11	KWG1108534	*
Bis(2-ethylhexyl) Phthalate	5.7	J	11	2.0	1	08/30/11	09/05/11	KWG1108534	*
Di-n-octyl Phthalate	ND	U	11	0.64	1	08/30/11	09/05/11	KWG1108534	*
Benzo(b)fluoranthene	ND	U	11	0.60	1	08/30/11	09/05/11	KWG1108534	*
Benzo(k)fluoranthene	ND	U	11	0.85	1	08/30/11	09/05/11	KWG1108534	*
Benzo(a)pyrene	ND	U	11	0.67	1	08/30/11	09/05/11	KWG1108534	*
Indeno(1,2,3-cd)pyrene	ND	U	11	0.70	1	08/30/11	09/05/11	KWG1108534	*
Dibenz(a,h)anthracene	ND	U	11	0.77	1	08/30/11	09/05/11	KWG1108534	*

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/22/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MW04GW	**Units:**	ug/L
Lab Code:	K1108008-007	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	UJ	11	0.83	1	08/30/11	09/05/11	KWG1108534	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	75	39-103	09/05/11	Acceptable
Phenol-d6	84	38-107	09/05/11	Acceptable
Nitrobenzene-d5	83	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	75	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	85	46-127	09/05/11	Acceptable
Terphenyl-d14	122	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD03SW
Lab Code: K1108008-008

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.9	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.9	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.9	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.9	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.9	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.9	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.9	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.9	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.9	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.9	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.9	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD03SW
Lab Code: K1108008-008

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.9	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.9	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.9	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.9	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.9	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.9	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.9	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.9	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.9	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.9	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.9	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.9	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD03SW	**Units:**	ug/L
Lab Code:	K1108008-008	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.9	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	68	39-103	09/05/11	Acceptable
Phenol-d6	73	38-107	09/05/11	Acceptable
Nitrobenzene-d5	72	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	77	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	76	46-127	09/05/11	Acceptable
Terphenyl-d14	107	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD06SW	**Units:**	ug/L
Lab Code:	K1108008-009	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U		25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U		25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U		9.9	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	UJ	9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	UJ	9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U		9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U		9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U		9.9	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U		9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U		9.9	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U		9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U		9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U		9.9	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U		9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U		9.9	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U		9.9	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	UJ	9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	UJ	9.9	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U		9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	UJ	9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U		25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U		9.9	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U		9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U		9.9	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U		9.9	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	UJ	9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U		9.9	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U		9.9	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	UJ	9.9	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U		9.9	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U		9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U		25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U		9.9	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD06SW
Lab Code: K1108008-009

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U		9.9	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U		9.9	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U		9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U		25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	UJ	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U		9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	UJ	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U		9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U		9.9	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U		9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U		9.9	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U		25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U		25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U		9.9	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U		9.9	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U		9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	UJ	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U		9.9	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U		9.9	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U		9.9	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U		9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U		9.9	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U		9.9	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U		25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U		9.9	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U		9.9	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U		9.9	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U		9.9	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U		9.9	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U		9.9	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U		9.9	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U		9.9	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U		9.9	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD06SW	**Units:**	ug/L
Lab Code:	K1108008-009	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.9	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	1	39-103	09/05/11	Outside Control Limits
Phenol-d6	10	38-107	09/05/11	Outside Control Limits
Nitrobenzene-d5	17	46-115	09/05/11	Outside Control Limits
2-Fluorobiphenyl	54	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	75	46-127	09/05/11	Acceptable
Terphenyl-d14	124	22-146	09/05/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD20SW	**Units:**	ug/L
Lab Code:	K1108008-010	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/26/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD20SW
Lab Code: K1108008-010

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD20SW	**Units:**	ug/L
Lab Code:	K1108008-010	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	85	39-103	09/05/11	Acceptable
Phenol-d6	86	38-107	09/05/11	Acceptable
Nitrobenzene-d5	88	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	84	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	84	46-127	09/05/11	Acceptable
Terphenyl-d14	122	22-146	09/05/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD10SW	**Units:**	ug/L
Lab Code:	K1108008-012	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/06/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/06/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/06/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/06/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/06/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/06/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/06/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/06/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/06/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/06/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/06/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/06/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/06/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/06/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/06/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/06/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/06/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/06/11	KWG1108534	
Naphthalene	ND	U	9.7	0.37	1	08/30/11	09/06/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/06/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/06/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.7	0.24	1	08/30/11	09/06/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/06/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/06/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/06/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/06/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/06/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD10SW	**Units:**	ug/L
Lab Code:	K1108008-012	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/06/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/06/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/06/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/06/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/06/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/06/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/06/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/06/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/06/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/06/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/06/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/06/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/06/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/06/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/06/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/06/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/06/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/06/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/06/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/06/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/06/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/06/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/06/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/06/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/06/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/06/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD10SW	**Units:**	ug/L
Lab Code:	K1108008-012	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/06/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	75	39-103	09/06/11	Acceptable
Phenol-d6	75	38-107	09/06/11	Acceptable
Nitrobenzene-d5	82	46-115	09/06/11	Acceptable
2-Fluorobiphenyl	79	48-114	09/06/11	Acceptable
2,4,6-Tribromophenol	76	46-127	09/06/11	Acceptable
Terphenyl-d14	121	22-146	09/06/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD12SW	**Units:**	ug/L
Lab Code:	K1108008-015	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/06/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	10	0.34	1	08/30/11	09/06/11	KWG1108534	
Phenol	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
2-Chlorophenol	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	10	0.36	1	08/30/11	09/06/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	10	0.44	1	08/30/11	09/06/11	KWG1108534	
Benzyl alcohol	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
2-Methylphenol	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
Hexachloroethane	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	10	0.50	1	08/30/11	09/06/11	KWG1108534	
4-Methylphenol†	ND	U	10	0.48	1	08/30/11	09/06/11	KWG1108534	
Nitrobenzene	ND	U	10	0.57	1	08/30/11	09/06/11	KWG1108534	
Isophorone	ND	U	10	0.25	1	08/30/11	09/06/11	KWG1108534	
2-Nitrophenol	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
2,4-Dimethylphenol	ND	U	10	0.27	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
2,4-Dichlorophenol	ND	U	10	0.30	1	08/30/11	09/06/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/06/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	10	0.36	1	08/30/11	09/06/11	KWG1108534	
Naphthalene	ND	U	10	0.37	1	08/30/11	09/06/11	KWG1108534	
4-Chloroaniline	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobutadiene	ND	U	10	0.30	1	08/30/11	09/06/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	10	0.49	1	08/30/11	09/06/11	KWG1108534	
2-Methylnaphthalene	ND	U	10	0.24	1	08/30/11	09/06/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	10	1.3	1	08/30/11	09/06/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	10	0.21	1	08/30/11	09/06/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	10	0.39	1	08/30/11	09/06/11	KWG1108534	
2-Chloronaphthalene	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/06/11	KWG1108534	
Acenaphthylene	ND	U	10	0.24	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD12SW
Lab Code: K1108008-015

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	10	0.26	1	08/30/11	09/06/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	10	0.35	1	08/30/11	09/06/11	KWG1108534	
Acenaphthene	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/06/11	KWG1108534	
Dibenzofuran	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Fluorene	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Diethyl Phthalate	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/06/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	10	0.48	1	08/30/11	09/06/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobenzene	ND	U	10	0.63	1	08/30/11	09/06/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/06/11	KWG1108534	
Phenanthrene	ND	U	10	0.49	1	08/30/11	09/06/11	KWG1108534	
Anthracene	ND	U	10	0.62	1	08/30/11	09/06/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	10	0.37	1	08/30/11	09/06/11	KWG1108534	
Fluoranthene	ND	U	10	0.66	1	08/30/11	09/06/11	KWG1108534	
Pyrene	ND	U	10	0.74	1	08/30/11	09/06/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	10	0.47	1	08/30/11	09/06/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/06/11	KWG1108534	
Benz(a)anthracene	ND	U	10	0.60	1	08/30/11	09/06/11	KWG1108534	
Chrysene	ND	U	10	0.79	1	08/30/11	09/06/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	10	1.9	1	08/30/11	09/06/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	10	0.63	1	08/30/11	09/06/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	10	0.59	1	08/30/11	09/06/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	10	0.83	1	08/30/11	09/06/11	KWG1108534	
Benzo(a)pyrene	ND	U	10	0.66	1	08/30/11	09/06/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	10	0.69	1	08/30/11	09/06/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	10	0.76	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD12SW	**Units:**	ug/L
Lab Code:	K1108008-015	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	10	0.82	1	08/30/11	09/06/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	67	39-103	09/06/11	Acceptable
Phenol-d6	70	38-107	09/06/11	Acceptable
Nitrobenzene-d5	74	46-115	09/06/11	Acceptable
2-Fluorobiphenyl	77	48-114	09/06/11	Acceptable
2,4,6-Tribromophenol	76	46-127	09/06/11	Acceptable
Terphenyl-d14	124	22-146	09/06/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MW01GW	**Units:**	ug/L
Lab Code:	K1108008-016	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/06/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.9	0.34	1	08/30/11	09/06/11	KWG1108534	
Phenol	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
2-Chlorophenol	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/06/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.9	0.44	1	08/30/11	09/06/11	KWG1108534	
Benzyl alcohol	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
2-Methylphenol	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
Hexachloroethane	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.9	0.50	1	08/30/11	09/06/11	KWG1108534	
4-Methylphenol†	ND	U	9.9	0.48	1	08/30/11	09/06/11	KWG1108534	
Nitrobenzene	ND	U	9.9	0.57	1	08/30/11	09/06/11	KWG1108534	
Isophorone	ND	U	9.9	0.25	1	08/30/11	09/06/11	KWG1108534	
2-Nitrophenol	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.9	0.27	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.9	0.30	1	08/30/11	09/06/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/06/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/06/11	KWG1108534	
Naphthalene	ND	U	9.9	0.37	1	08/30/11	09/06/11	KWG1108534	
4-Chloroaniline	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.9	0.30	1	08/30/11	09/06/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.9	0.49	1	08/30/11	09/06/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.9	0.24	1	08/30/11	09/06/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.9	1.3	1	08/30/11	09/06/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.9	0.21	1	08/30/11	09/06/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.9	0.39	1	08/30/11	09/06/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/06/11	KWG1108534	
Acenaphthylene	ND	U	9.9	0.24	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/24/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MW01GW
Lab Code: K1108008-016

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.9	0.26	1	08/30/11	09/06/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.9	0.35	1	08/30/11	09/06/11	KWG1108534	
Acenaphthene	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/06/11	KWG1108534	
Dibenzofuran	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Fluorene	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Diethyl Phthalate	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/06/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.9	0.48	1	08/30/11	09/06/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobenzene	ND	U	9.9	0.63	1	08/30/11	09/06/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/06/11	KWG1108534	
Phenanthrene	ND	U	9.9	0.49	1	08/30/11	09/06/11	KWG1108534	
Anthracene	ND	U	9.9	0.62	1	08/30/11	09/06/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.9	0.37	1	08/30/11	09/06/11	KWG1108534	
Fluoranthene	ND	U	9.9	0.66	1	08/30/11	09/06/11	KWG1108534	
Pyrene	ND	U	9.9	0.74	1	08/30/11	09/06/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.9	0.47	1	08/30/11	09/06/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/06/11	KWG1108534	
Benz(a)anthracene	ND	U	9.9	0.60	1	08/30/11	09/06/11	KWG1108534	
Chrysene	ND	U	9.9	0.79	1	08/30/11	09/06/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.9	1.9	1	08/30/11	09/06/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.9	0.63	1	08/30/11	09/06/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.9	0.59	1	08/30/11	09/06/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.9	0.83	1	08/30/11	09/06/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.9	0.66	1	08/30/11	09/06/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.9	0.69	1	08/30/11	09/06/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.9	0.76	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MW01GW	**Units:**	ug/L
Lab Code:	K1108008-016	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.9	0.82	1	08/30/11	09/06/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	62	39-103	09/06/11	Acceptable
Phenol-d6	69	38-107	09/06/11	Acceptable
Nitrobenzene-d5	71	46-115	09/06/11	Acceptable
2-Fluorobiphenyl	73	48-114	09/06/11	Acceptable
2,4,6-Tribromophenol	77	46-127	09/06/11	Acceptable
Terphenyl-d14	119	22-146	09/06/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/24/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11GW01EQ
Lab Code: K1108008-017

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/06/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	10	0.34	1	08/30/11	09/06/11	KWG1108534	
Phenol	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
2-Chlorophenol	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	10	0.36	1	08/30/11	09/06/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	10	0.44	1	08/30/11	09/06/11	KWG1108534	
Benzyl alcohol	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	10	0.32	1	08/30/11	09/06/11	KWG1108534	
2-Methylphenol	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
Hexachloroethane	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	10	0.50	1	08/30/11	09/06/11	KWG1108534	
4-Methylphenol†	ND	U	10	0.48	1	08/30/11	09/06/11	KWG1108534	
Nitrobenzene	ND	U	10	0.57	1	08/30/11	09/06/11	KWG1108534	
Isophorone	ND	U	10	0.25	1	08/30/11	09/06/11	KWG1108534	
2-Nitrophenol	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
2,4-Dimethylphenol	ND	U	10	0.27	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
2,4-Dichlorophenol	ND	U	10	0.30	1	08/30/11	09/06/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/06/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	10	0.36	1	08/30/11	09/06/11	KWG1108534	
Naphthalene	ND	U	10	0.37	1	08/30/11	09/06/11	KWG1108534	
4-Chloroaniline	ND	U	10	0.38	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobutadiene	ND	U	10	0.30	1	08/30/11	09/06/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	10	0.49	1	08/30/11	09/06/11	KWG1108534	
2-Methylnaphthalene	ND	U	10	0.24	1	08/30/11	09/06/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	10	1.3	1	08/30/11	09/06/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	10	0.21	1	08/30/11	09/06/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	10	0.39	1	08/30/11	09/06/11	KWG1108534	
2-Chloronaphthalene	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/06/11	KWG1108534	
Acenaphthylene	ND	U	10	0.24	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/24/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11GW01EQ
Lab Code: K1108008-017

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	10	0.26	1	08/30/11	09/06/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	10	0.35	1	08/30/11	09/06/11	KWG1108534	
Acenaphthene	ND	U	10	0.29	1	08/30/11	09/06/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/06/11	KWG1108534	
Dibenzofuran	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Fluorene	ND	U	10	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Diethyl Phthalate	0.55	J	10	0.29	1	08/30/11	09/06/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/06/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	10	0.48	1	08/30/11	09/06/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	10	0.28	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobenzene	ND	U	10	0.63	1	08/30/11	09/06/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/06/11	KWG1108534	
Phenanthrene	ND	U	10	0.49	1	08/30/11	09/06/11	KWG1108534	
Anthracene	ND	U	10	0.62	1	08/30/11	09/06/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	10	0.37	1	08/30/11	09/06/11	KWG1108534	
Fluoranthene	ND	U	10	0.66	1	08/30/11	09/06/11	KWG1108534	
Pyrene	ND	U	10	0.74	1	08/30/11	09/06/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	10	0.47	1	08/30/11	09/06/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/06/11	KWG1108534	
Benz(a)anthracene	ND	U	10	0.60	1	08/30/11	09/06/11	KWG1108534	
Chrysene	ND	U	10	0.79	1	08/30/11	09/06/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	10	1.9	1	08/30/11	09/06/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	10	0.63	1	08/30/11	09/06/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	10	0.59	1	08/30/11	09/06/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	10	0.83	1	08/30/11	09/06/11	KWG1108534	
Benzo(a)pyrene	ND	U	10	0.66	1	08/30/11	09/06/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	10	0.69	1	08/30/11	09/06/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	10	0.76	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11GW01EQ	**Units:**	ug/L
Lab Code:	K1108008-017	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	10	0.82	1	08/30/11	09/06/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	87	39-103	09/06/11	Acceptable
Phenol-d6	88	38-107	09/06/11	Acceptable
Nitrobenzene-d5	95	46-115	09/06/11	Acceptable
2-Fluorobiphenyl	85	48-114	09/06/11	Acceptable
2,4,6-Tribromophenol	80	46-127	09/06/11	Acceptable
Terphenyl-d14	132	22-146	09/06/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD04SW	**Units:**	ug/L
Lab Code:	K1108008-018	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/05/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.7	0.34	1	08/30/11	09/05/11	KWG1108534	
Phenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
2-Chlorophenol	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.7	0.44	1	08/30/11	09/05/11	KWG1108534	
Benzyl alcohol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.7	0.32	1	08/30/11	09/05/11	KWG1108534	
2-Methylphenol	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
Hexachloroethane	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.7	0.50	1	08/30/11	09/05/11	KWG1108534	
4-Methylphenol†	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
Nitrobenzene	ND	U	9.7	0.57	1	08/30/11	09/05/11	KWG1108534	
Isophorone	ND	U	9.7	0.25	1	08/30/11	09/05/11	KWG1108534	
2-Nitrophenol	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.7	0.27	1	08/30/11	09/05/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/05/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.7	0.36	1	08/30/11	09/05/11	KWG1108534	
Naphthalene	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
4-Chloroaniline	ND	U	9.7	0.38	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.7	0.30	1	08/30/11	09/05/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.7	1.3	1	08/30/11	09/05/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.7	0.21	1	08/30/11	09/05/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.7	0.39	1	08/30/11	09/05/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/05/11	KWG1108534	
Acenaphthylene	ND	U	9.7	0.24	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD045W	**Units:**	ug/L
Lab Code:	K1108008-018	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.7	0.26	1	08/30/11	09/05/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.7	0.35	1	08/30/11	09/05/11	KWG1108534	
Acenaphthene	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/05/11	KWG1108534	
Dibenzofuran	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/05/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Fluorene	ND	U	9.7	0.33	1	08/30/11	09/05/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Diethyl Phthalate	ND	U	9.7	0.29	1	08/30/11	09/05/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/05/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/05/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.7	0.48	1	08/30/11	09/05/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.7	0.28	1	08/30/11	09/05/11	KWG1108534	
Hexachlorobenzene	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/05/11	KWG1108534	
Phenanthrene	ND	U	9.7	0.49	1	08/30/11	09/05/11	KWG1108534	
Anthracene	ND	U	9.7	0.62	1	08/30/11	09/05/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.7	0.37	1	08/30/11	09/05/11	KWG1108534	
Fluoranthene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Pyrene	ND	U	9.7	0.74	1	08/30/11	09/05/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.7	0.47	1	08/30/11	09/05/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/05/11	KWG1108534	
Benz(a)anthracene	ND	U	9.7	0.60	1	08/30/11	09/05/11	KWG1108534	
Chrysene	ND	U	9.7	0.79	1	08/30/11	09/05/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.7	1.9	1	08/30/11	09/05/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.7	0.63	1	08/30/11	09/05/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.7	0.59	1	08/30/11	09/05/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.7	0.83	1	08/30/11	09/05/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.7	0.66	1	08/30/11	09/05/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.7	0.69	1	08/30/11	09/05/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.7	0.76	1	08/30/11	09/05/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD04SW
Lab Code: K1108008-018

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.7	0.82	1	08/30/11	09/05/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	76	39-103	09/05/11	Acceptable
Phenol-d6	78	38-107	09/05/11	Acceptable
Nitrobenzene-d5	86	46-115	09/05/11	Acceptable
2-Fluorobiphenyl	80	48-114	09/05/11	Acceptable
2,4,6-Tribromophenol	75	46-127	09/05/11	Acceptable
Terphenyl-d14	120	22-146	09/05/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD21SW	**Units:**	ug/L
Lab Code:	K1108008-019	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	25	0.48	1	08/30/11	09/06/11	KWG1108534	
Aniline	ND	U	25	0.49	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethyl) Ether	ND	U	9.9	0.34	1	08/30/11	09/06/11	KWG1108534	
Phenol	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
2-Chlorophenol	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
1,3-Dichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/06/11	KWG1108534	
1,4-Dichlorobenzene	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
1,2-Dichlorobenzene	ND	U	9.9	0.44	1	08/30/11	09/06/11	KWG1108534	
Benzyl alcohol	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroisopropyl) Ether	ND	U	9.9	0.32	1	08/30/11	09/06/11	KWG1108534	
2-Methylphenol	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
Hexachloroethane	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodi-n-propylamine	ND	U	9.9	0.50	1	08/30/11	09/06/11	KWG1108534	
4-Methylphenol†	ND	U	9.9	0.48	1	08/30/11	09/06/11	KWG1108534	
Nitrobenzene	ND	U	9.9	0.57	1	08/30/11	09/06/11	KWG1108534	
Isophorone	ND	U	9.9	0.25	1	08/30/11	09/06/11	KWG1108534	
2-Nitrophenol	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
2,4-Dimethylphenol	ND	U	9.9	0.27	1	08/30/11	09/06/11	KWG1108534	
Bis(2-chloroethoxy)methane	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
2,4-Dichlorophenol	ND	U	9.9	0.30	1	08/30/11	09/06/11	KWG1108534	
Benzoic acid	ND	U	25	5.9	1	08/30/11	09/06/11	KWG1108534	
1,2,4-Trichlorobenzene	ND	U	9.9	0.36	1	08/30/11	09/06/11	KWG1108534	
Naphthalene	ND	U	9.9	0.37	1	08/30/11	09/06/11	KWG1108534	
4-Chloroaniline	ND	U	9.9	0.38	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobutadiene	ND	U	9.9	0.30	1	08/30/11	09/06/11	KWG1108534	
4-Chloro-3-methylphenol	ND	U	9.9	0.49	1	08/30/11	09/06/11	KWG1108534	
2-Methylnaphthalene	ND	U	9.9	0.24	1	08/30/11	09/06/11	KWG1108534	
Hexachlorocyclopentadiene	ND	U	9.9	1.3	1	08/30/11	09/06/11	KWG1108534	*
2,4,6-Trichlorophenol	ND	U	9.9	0.21	1	08/30/11	09/06/11	KWG1108534	
2,4,5-Trichlorophenol	ND	U	9.9	0.39	1	08/30/11	09/06/11	KWG1108534	
2-Chloronaphthalene	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
2-Nitroaniline	ND	U	25	0.34	1	08/30/11	09/06/11	KWG1108534	
Acenaphthylene	ND	U	9.9	0.24	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/27/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11RD21SW
Lab Code: K1108008-019

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	9.9	0.26	1	08/30/11	09/06/11	KWG1108534	
2,6-Dinitrotoluene	ND	U	9.9	0.35	1	08/30/11	09/06/11	KWG1108534	
Acenaphthene	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
3-Nitroaniline	ND	U	25	3.3	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrophenol	ND	U	25	2.3	1	08/30/11	09/06/11	KWG1108534	
Dibenzofuran	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Nitrophenol	ND	U	25	2.0	1	08/30/11	09/06/11	KWG1108534	
2,4-Dinitrotoluene	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Fluorene	ND	U	9.9	0.33	1	08/30/11	09/06/11	KWG1108534	
4-Chlorophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Diethyl Phthalate	ND	U	9.9	0.29	1	08/30/11	09/06/11	KWG1108534	
4-Nitroaniline	ND	U	25	4.1	1	08/30/11	09/06/11	KWG1108534	
2-Methyl-4,6-dinitrophenol	ND	U	25	2.2	1	08/30/11	09/06/11	KWG1108534	
N-Nitrosodiphenylamine	ND	U	9.9	0.48	1	08/30/11	09/06/11	KWG1108534	
4-Bromophenyl Phenyl Ether	ND	U	9.9	0.28	1	08/30/11	09/06/11	KWG1108534	
Hexachlorobenzene	ND	U	9.9	0.63	1	08/30/11	09/06/11	KWG1108534	
Pentachlorophenol	ND	U	25	2.5	1	08/30/11	09/06/11	KWG1108534	
Phenanthrene	ND	U	9.9	0.49	1	08/30/11	09/06/11	KWG1108534	
Anthracene	ND	U	9.9	0.62	1	08/30/11	09/06/11	KWG1108534	
Di-n-butyl Phthalate	ND	U	9.9	0.37	1	08/30/11	09/06/11	KWG1108534	
Fluoranthene	ND	U	9.9	0.66	1	08/30/11	09/06/11	KWG1108534	
Pyrene	ND	U	9.9	0.74	1	08/30/11	09/06/11	KWG1108534	
Butyl Benzyl Phthalate	ND	U	9.9	0.47	1	08/30/11	09/06/11	KWG1108534	
3,3'-Dichlorobenzidine	ND	U	25	0.27	1	08/30/11	09/06/11	KWG1108534	
Benz(a)anthracene	ND	U	9.9	0.60	1	08/30/11	09/06/11	KWG1108534	
Chrysene	ND	U	9.9	0.79	1	08/30/11	09/06/11	KWG1108534	
Bis(2-ethylhexyl) Phthalate	ND	U	9.9	1.9	1	08/30/11	09/06/11	KWG1108534	
Di-n-octyl Phthalate	ND	U	9.9	0.63	1	08/30/11	09/06/11	KWG1108534	
Benzo(b)fluoranthene	ND	U	9.9	0.59	1	08/30/11	09/06/11	KWG1108534	
Benzo(k)fluoranthene	ND	U	9.9	0.83	1	08/30/11	09/06/11	KWG1108534	
Benzo(a)pyrene	ND	U	9.9	0.66	1	08/30/11	09/06/11	KWG1108534	
Indeno(1,2,3-cd)pyrene	ND	U	9.9	0.69	1	08/30/11	09/06/11	KWG1108534	
Dibenz(a,h)anthracene	ND	U	9.9	0.76	1	08/30/11	09/06/11	KWG1108534	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/27/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11RD21SW	**Units:**	ug/L
Lab Code:	K1108008-019	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	9.9	0.82	1	08/30/11	09/06/11	KWG1108534	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	79	39-103	09/06/11	Acceptable
Phenol-d6	79	38-107	09/06/11	Acceptable
Nitrobenzene-d5	78	46-115	09/06/11	Acceptable
2-Fluorobiphenyl	77	48-114	09/06/11	Acceptable
2,4,6-Tribromophenol	76	46-127	09/06/11	Acceptable
Terphenyl-d14	120	22-146	09/06/11	Acceptable

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11SB01RS	**Units:**	ug/L
Lab Code:	K1108008-021	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	ND	U	24	0.48	1	09/20/11	09/26/11	KWG1109347	*
Aniline	ND	U	24	0.49	1	09/20/11	09/26/11	KWG1109347	*
Bis(2-chloroethyl) Ether	ND	U	9.3	0.34	1	09/20/11	09/26/11	KWG1109347	*
Phenol	ND	U	9.3	0.33	1	09/20/11	09/26/11	KWG1109347	*
2-Chlorophenol	ND	U	9.3	0.32	1	09/20/11	09/26/11	KWG1109347	*
1,3-Dichlorobenzene	ND	U	9.3	0.36	1	09/20/11	09/26/11	KWG1109347	*
1,4-Dichlorobenzene	ND	U	9.3	0.32	1	09/20/11	09/26/11	KWG1109347	*
1,2-Dichlorobenzene	ND	U	9.3	0.44	1	09/20/11	09/26/11	KWG1109347	*
Benzyl alcohol	ND	U	9.3	0.38	1	09/20/11	09/26/11	KWG1109347	*
Bis(2-chloroisopropyl) Ether	ND	U	9.3	0.32	1	09/20/11	09/26/11	KWG1109347	*
2-Methylphenol	ND	U	9.3	0.33	1	09/20/11	09/26/11	KWG1109347	*
Hexachloroethane	ND	U	9.3	0.29	1	09/20/11	09/26/11	KWG1109347	*
N-Nitrosodi-n-propylamine	ND	U	9.3	0.50	1	09/20/11	09/26/11	KWG1109347	*
4-Methylphenol†	ND	U	9.3	0.48	1	09/20/11	09/26/11	KWG1109347	*
Nitrobenzene	ND	U	9.3	0.57	1	09/20/11	09/26/11	KWG1109347	*
Isophorone	ND	U	9.3	0.25	1	09/20/11	09/26/11	KWG1109347	*
2-Nitrophenol	ND	U	9.3	0.38	1	09/20/11	09/26/11	KWG1109347	*
2,4-Dimethylphenol	ND	U	9.3	0.27	1	09/20/11	09/26/11	KWG1109347	*
Bis(2-chloroethoxy)methane	ND	U	9.3	0.28	1	09/20/11	09/26/11	KWG1109347	*
2,4-Dichlorophenol	ND	U	9.3	0.30	1	09/20/11	09/26/11	KWG1109347	*
Benzoic acid	ND	U	24	5.9	1	09/20/11	09/26/11	KWG1109347	*
1,2,4-Trichlorobenzene	ND	U	9.3	0.36	1	09/20/11	09/26/11	KWG1109347	*
Naphthalene	ND	U	9.3	0.37	1	09/20/11	09/26/11	KWG1109347	*
4-Chloroaniline	ND	U	9.3	0.38	1	09/20/11	09/26/11	KWG1109347	*
Hexachlorobutadiene	ND	U	9.3	0.30	1	09/20/11	09/26/11	KWG1109347	*
4-Chloro-3-methylphenol	ND	U	9.3	0.49	1	09/20/11	09/26/11	KWG1109347	*
2-Methylnaphthalene	ND	U	9.3	0.24	1	09/20/11	09/26/11	KWG1109347	*
Hexachlorocyclopentadiene	ND	U	9.3	1.3	1	09/20/11	09/26/11	KWG1109347	*
2,4,6-Trichlorophenol	ND	U	9.3	0.21	1	09/20/11	09/26/11	KWG1109347	*
2,4,5-Trichlorophenol	ND	U	9.3	0.39	1	09/20/11	09/26/11	KWG1109347	*
2-Chloronaphthalene	ND	U	9.3	0.29	1	09/20/11	09/26/11	KWG1109347	*
2-Nitroaniline	ND	U	24	0.34	1	09/20/11	09/26/11	KWG1109347	*
Acenaphthylene	ND	U	9.3	0.24	1	09/20/11	09/26/11	KWG1109347	*

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/17/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11SB01RS
Lab Code: K1108008-021

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dimethyl Phthalate	ND	U	UJ	9.3	0.26	1	09/20/11	09/26/11	KWG1109347	*
2,6-Dinitrotoluene	ND	U		9.3	0.35	1	09/20/11	09/26/11	KWG1109347	*
Acenaphthene	ND	U		9.3	0.29	1	09/20/11	09/26/11	KWG1109347	*
3-Nitroaniline	ND	U		24	3.3	1	09/20/11	09/26/11	KWG1109347	*
2,4-Dinitrophenol	ND	U		24	2.3	1	09/20/11	09/26/11	KWG1109347	*
Dibenzofuran	ND	U		9.3	0.33	1	09/20/11	09/26/11	KWG1109347	*
4-Nitrophenol	ND	U		24	2.0	1	09/20/11	09/26/11	KWG1109347	*
2,4-Dinitrotoluene	ND	U		9.3	0.28	1	09/20/11	09/26/11	KWG1109347	*
Fluorene	ND	U		9.3	0.33	1	09/20/11	09/26/11	KWG1109347	*
4-Chlorophenyl Phenyl Ether	ND	U		9.3	0.28	1	09/20/11	09/26/11	KWG1109347	*
Diethyl Phthalate	0.46	J	J	9.3	0.29	1	09/20/11	09/26/11	KWG1109347	*
4-Nitroaniline	ND	U	UJ	24	4.1	1	09/20/11	09/26/11	KWG1109347	*
2-Methyl-4,6-dinitrophenol	ND	U		24	2.2	1	09/20/11	09/26/11	KWG1109347	*
N-Nitrosodiphenylamine	ND	U		9.3	0.48	1	09/20/11	09/26/11	KWG1109347	*
4-Bromophenyl Phenyl Ether	ND	U		9.3	0.28	1	09/20/11	09/26/11	KWG1109347	*
Hexachlorobenzene	ND	U		9.3	0.63	1	09/20/11	09/26/11	KWG1109347	*
Pentachlorophenol	ND	U		24	2.5	1	09/20/11	09/26/11	KWG1109347	*
Phenanthrene	ND	U		9.3	0.49	1	09/20/11	09/26/11	KWG1109347	*
Anthracene	ND	U		9.3	0.62	1	09/20/11	09/26/11	KWG1109347	*
Di-n-butyl Phthalate	ND	U		9.3	0.37	1	09/20/11	09/26/11	KWG1109347	*
Fluoranthene	ND	U		9.3	0.66	1	09/20/11	09/26/11	KWG1109347	*
Pyrene	ND	U		9.3	0.74	1	09/20/11	09/26/11	KWG1109347	*
Butyl Benzyl Phthalate	ND	U		9.3	0.47	1	09/20/11	09/26/11	KWG1109347	*
3,3'-Dichlorobenzidine	ND	U		24	0.27	1	09/20/11	09/26/11	KWG1109347	*
Benz(a)anthracene	ND	U		9.3	0.60	1	09/20/11	09/26/11	KWG1109347	*
Chrysene	ND	U		9.3	0.79	1	09/20/11	09/26/11	KWG1109347	*
Bis(2-ethylhexyl) Phthalate	ND	U		9.3	1.9	1	09/20/11	09/26/11	KWG1109347	*
Di-n-octyl Phthalate	ND	U		9.3	0.63	1	09/20/11	09/26/11	KWG1109347	*
Benzo(b)fluoranthene	ND	U		9.3	0.59	1	09/20/11	09/26/11	KWG1109347	*
Benzo(k)fluoranthene	ND	U		9.3	0.83	1	09/20/11	09/26/11	KWG1109347	*
Benzo(a)pyrene	ND	U		9.3	0.66	1	09/20/11	09/26/11	KWG1109347	*
Indeno(1,2,3-cd)pyrene	ND	U		9.3	0.69	1	09/20/11	09/26/11	KWG1109347	*
Dibenz(a,h)anthracene	ND	U		9.3	0.76	1	09/20/11	09/26/11	KWG1109347	*

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11SB01RS	**Units:**	ug/L
Lab Code:	K1108008-021	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(g,h,i)perylene	ND	U	UJ	9.3	0.82	1	09/20/11	09/26/11	KWG1109347	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	44	39-103	09/26/11	Acceptable
Phenol-d6	49	38-107	09/26/11	Acceptable
Nitrobenzene-d5	55	46-115	09/26/11	Acceptable
2-Fluorobiphenyl	51	48-114	09/26/11	Acceptable
2,4,6-Tribromophenol	60	46-127	09/26/11	Acceptable
Terphenyl-d14	100	22-146	09/26/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Inc.	**Lab Project Number: K1108008**
Sampling Dates: 8/24/11	**Sample Matrix: Water**
Analytical Method: VOCs + TICs (*EPA 8260C)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 11/10/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MW01GW	K1108008-016
2	11GW01EQ	K1108008-017
3	TRIP BLANK	K1108008-020
4		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- * — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- * — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**NO**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met for all samples.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Recoveries of Matrix Spike and Duplicate were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ **Acceptable**
_____ **Detection Limits Adjusted**

The following blanks were analyzed:
__X__ **Method (preparation) Blanks**
_____ **Field Blanks**
_____ **Instrument Blanks**
_____ **Rinsate Blanks**
_____ **Background Samples**
_____ **VOA Trip Blanks**

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No compounds were detected in the Method Blanks for this SDG.

8. SURROGATE COMPOUNDS

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
__X__ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments:

Laboratory Duplicate analysis showed good precision for all compounds analyzed with the exception of Toluene, result qualified in sample 11GW01EQ.

RPD Toluene = 2(2.7-2.0)/(2.7-2.0)*100
RPD Toluene = 30

11. ANALYTE IDENTIFICATION

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11GW01EQ

ug/L = ((2.73)(10)(1)/(10))(1) = 2.73

Laboratory reported 2.7

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Volatile Organic Compounds

Sample Name:	11MW01GW	**Units:**	ug/L
Lab Code:	K1108008-016	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzene	ND	U	0.50	0.054	1	09/01/11	09/01/11	KWG1108647	
Toluene	**1.8**		0.50	0.052	1	09/01/11	09/01/11	KWG1108647	
Ethylbenzene	ND	U	0.50	0.050	1	09/01/11	09/01/11	KWG1108647	
m,p-Xylenes	ND	U	0.50	0.091	1	09/01/11	09/01/11	KWG1108647	
o-Xylene	ND	U	0.50	0.074	1	09/01/11	09/01/11	KWG1108647	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	76	73-122	09/01/11	Acceptable
Toluene-d8	93	65-144	09/01/11	Acceptable
4-Bromofluorobenzene	82	68-117	09/01/11	Acceptable

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Water

Service Request: K1108008
Date Collected: 08/24/2011
Date Received: 08/30/2011

Volatile Organic Compounds

Sample Name: 11GW01EQ
Lab Code: K1108008-017

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzene	ND	U	0.50	0.054	1	09/01/11	09/01/11	KWG1108647	
Toluene	2.7	J	0.50	0.052	1	09/01/11	09/01/11	KWG1108647	
Ethylbenzene	ND	U	0.50	0.050	1	09/01/11	09/01/11	KWG1108647	
m,p-Xylenes	ND	U	0.50	0.091	1	09/01/11	09/01/11	KWG1108647	
o-Xylene	ND	U	0.50	0.074	1	09/01/11	09/01/11	KWG1108647	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	77	73-122	09/01/11	Acceptable
Toluene-d8	93	65-144	09/01/11	Acceptable
4-Bromofluorobenzene	85	68-117	09/01/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108008
Project:	Red Devil Mine	**Date Collected:**	08/24/2011
Sample Matrix:	Water	**Date Received:**	08/30/2011

Volatile Organic Compounds

Sample Name:	Trip Blank	**Units:**	ug/L
Lab Code:	K1108008-020	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzene	ND	U	0.50	0.054	1	09/01/11	09/01/11	KWG1108647	
Toluene	ND	U	0.50	0.052	1	09/01/11	09/01/11	KWG1108647	
Ethylbenzene	ND	U	0.50	0.050	1	09/01/11	09/01/11	KWG1108647	
m,p-Xylenes	ND	U	0.50	0.091	1	09/01/11	09/01/11	KWG1108647	
o-Xylene	ND	U	0.50	0.074	1	09/01/11	09/01/11	KWG1108647	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	77	73-122	09/01/11	Acceptable
Toluene-d8	94	65-144	09/01/11	Acceptable
4-Bromofluorobenzene	83	68-117	09/01/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 08/15/2011 to 08/21/2011	**Sample Matrix: Water**
Analytical Method: General Chemistry	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP15SB06	K1108028-001
2	11MP15SB04	K1108028-002
3	11MP11SB04	K1108028-003
4	11MP18SB20	K1108028-004
5	11MP14SB04	K1108028-005
6	11RD11SD	K1108028-009
7	11RD12SD	K1108028-011
8	11MP14SB58	K1108028-014
9	11MP30SB16	K1108028-015
10	11MP86SS	K1108028-016
11	11MP14SB16	K1108028-017
12	11MP17SB14	K1108028-018
13	11MP30SB12	K1108028-019
14	11MP11SB08	K1108028-020
15	11MP14SB08	K1108028-021
16	11MP11SB06	K1108028-022
17	11MP29SB08	K1108028-023
18	11MP18SB10	K1108028-024
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- x — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Total Solids by 160.3M, Particle Size Distribution by ASTM D422, and Atterberg Limits by ASTM D4318, Specific Gravity by SM2710F.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: ICV and CCV recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: LCS recovery was within the control limit.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 10MW04GW and 10MW01GW were used for MS. The matrix spike recovery of Nitrate+Nitrite was outside of control limit. Qualification was not necessary since no Nitrate+Nitrite was detected in the sample 10MW01GW.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory duplicate analysis was within QC Criteria.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate

section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 8/20/2011	**Sample Matrix: Soil**
Analytical Method: Hg SSE by EPA 1631	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 12/3/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11RD12SD	K1108028-011
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Sample No.	Sample I.D.	Laboratory I.D.
21		
22		
23		
24		
25		
26		
27		
28		
29		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- NR — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- NR — ICP Interference Check Sample results
- NR — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- NR — ICP Interelement Correction Factors
- NR — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**N/A**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**N/A**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
All samples were analyzed in accordance with EPA Method 1631.

1. HOLDING TIMES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of mercury in initial and continuing calibration verifications were within the control limits

3. LABORATORY CONTROL SAMPLE

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Batch QC was analyzed for Matrix Spike, results were within QC Criteria.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level except the method blank (34 ng/g) for Hg (F6) in the batch B101557. The laboratory reported all results form this batch without blank-correction. The detected Hg (F6) results from this batch were qualified as non-detect (U) when the sample concentration was less than 5x the blank concentration. Also, any Hg(F6) results less than 10x the blank and greater than 5x the blank were qualified as estimated (J).

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory Batch QC duplicate analysis was outside QC criteria, results qualified "J" as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

ug/L = $\frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$

Soil samples:

mg/kg = $\frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$

Comments: Analyte quantitation was acceptable.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: The data validator requested sample calculation and in doing the Hg (F0) calculation for 1040045-31, the laboratory found the incorrect sample preparation volume (30mL instead of 20 mL) was entered in LIMS for batch B101551/Sequence 1000785.

Resolution: A correct volume of 30mL was entered and the revised report was provided.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108028
Project:	Red Devil Mine	**Date Collected:**	8/20/2011
Sample Matrix:	Soil	**Date Received:**	8/30/2011

Methyl Mercury

Prep Method:	CAS SOP	Units:	ng/g
Analysis Method:	CAS SOP	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
11RD12SD	K1108028-011	0.5	0.05	1	10/11/2011	10/12/2011	0.40	J J
Method Blank 1	K1108028-MB1	0.4	0.04	1	10/11/2011	10/12/2011	ND	
Method Blank 2	K1108028-MB2	0.4	0.04	1	10/11/2011	10/12/2011	ND	
Method Blank 3	K1108028-MB3	0.4	0.04	1	10/11/2011	10/12/2011	ND	

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: 1108028**
Sampling Dates: 8/15/2011 to 8/21/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP15SB06	K1108028-001
2	11MP15SB04	K1108028-002
3	11MP11SB04	K1108028-003
4	11MP18SB20	K1108028-004
5	11MP14SB04	K1108028-005
6	11RD11SD	K1108028-009
7	11RD12SD	K1108028-011
8	11MP14SB58	K1108028-014
9	11MP30SB16	K1108028-015
10	11MP86SS	K1108028-016
11	11MP14SB16	K1108028-017
12	11MP17SB14	K1108028-018
13	11MP30SB12	K1108028-019
14	11MP11SB08	K1108028-020
15	11MP14SB08	K1108028-021
16	11MP11SB06	K1108028-022
17	11MP29SB08	K1108028-023
18	11MP18SB10	K1108028-024

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- _____ Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- X Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**NO**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Multiple metals were outside QC limits for Matrix Spike analysis, results are qualified "J" as estimated. Post spike analysis was within QC criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Multiple metals had RPDs outside of QC limits for laboratory duplicate analysis, results are qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: 11MP18SB20 analysis had Arsenic and Calcium above 10% results in parent sample qualified “J” as estimated.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP15SB06
Al = ((20.78 mg/L)*(0.1L))/((0.00127kg)*(0.894))*2 = 3660.448 mg/kg
Lab reported 3660 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108028

Sample Name:	Lab Code:
11MP15SB06	K1108028-001
11MP15SB06D	K1108028-001D
11MP15SB06S	K1108028-001S
11MP15SB06SD	K1108028-001SD
11MP15SB04	K1108028-002
11MP11SB04	K1108028-003
11MP18SB20	K1108028-004
11MP18SB20D	K1108028-004D
11MP18SB20S	K1108028-004S
11MP18SB20SD	K1108028-004SD
11MP14SB04	K1108028-005
11MP14SB04D	K1108028-005D
11MP14SB04S	K1108028-005S
11MP14SB04SD	K1108028-005SD
11RD11SD	K1108028-009
11RD11SDD	K1108028-009D
11RD11SDS	K1108028-009S
11RD11SDSD	K1108028-009SD
11MP18SB04	K1108028-010
11RD12SD	K1108028-011
11MP14SB58	K1108028-014
11MP30SB16	K1108028-015
11MP17SB14	K1108028-018
11MP30SB12	K1108028-019
11MP11SB08	K1108028-020
11MP11SB08D	K1108028-020D
11MP11SB08S	K1108028-020S
11MP11SB08SD	K1108028-020SD
11MP11SB06	K1108028-022
11MP18SB10	K1108028-024
Method Blank	K1108028-MB
Method Blank	K1108028-MB2

Comments:

Approved By: _____ Date: 10/24/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP15SB06 Lab Code: K1108028-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	8.8	5.3	2.0	09/07/11	09/14/11	3660		
Antimony	6020A	0.044	0.008	5.0	09/07/11	10/05/11	2.520		*
Arsenic	6020A	0.46	0.06	5.0	09/07/11	10/18/11	44.5		
Barium	6020A	0.046	0.005	5.0	09/07/11	10/18/11	191		N
Beryllium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.577		
Cadmium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.538		*
Calcium	6010B	8.8	1.8	2.0	09/07/11	09/14/11	1480		N
Chromium	6020A	0.18	0.03	5.0	09/07/11	10/18/11	15.6		N*
Cobalt	6020A	0.018	0.003	5.0	09/07/11	10/18/11	17.3		
Copper	6020A	0.09	0.05	5.0	09/07/11	10/18/11	72.4		N
Iron	6010B	3.5	0.3	2.0	09/07/11	09/14/11	47100		
Lead	6020A	0.046	0.008	5.0	09/07/11	10/18/11	16.4		N*
Magnesium	6010B	3.52	0.04	2.0	09/07/11	09/14/11	812		N
Manganese	6010B	1.76	0.04	2.0	09/07/11	09/14/11	1200		
Mercury	7471A	1.90	0.190	100.0	09/09/11	09/10/11	19.1		*
Nickel	6020A	0.18	0.03	5.0	09/07/11	10/18/11	56.0		N
Potassium	6010B	71	4.4	2.0	09/07/11	09/14/11	1010		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.51		
Silver	6020A	0.018	0.007	5.0	09/07/11	09/22/11	0.181		*
Sodium	6010B	17.6	3.5	2.0	09/07/11	09/14/11	23.0		
Thallium	6020A	0.018	0.002	5.0	09/07/11	10/18/11	0.096		
Vanadium	6020A	0.18	0.02	5.0	09/07/11	10/18/11	32.8		
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	117		N

% Solids: 89.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP15SB04 Lab Code: K1108028-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	8.5	5.1	2.0	09/07/11	09/14/11	3840		
Antimony	6010B	8.5	2.5	2.0	09/07/11	09/14/11	46.8		N*
Arsenic	6020A	0.45	0.05	5.0	09/07/11	10/18/11	80.4		
Barium	6020A	0.045	0.005	5.0	09/07/11	10/18/11	210		N
Beryllium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.564		
Cadmium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.676		*
Calcium	6010B	8.5	1.7	2.0	09/07/11	09/14/11	1950		N
Chromium	6020A	0.18	0.03	5.0	09/07/11	10/18/11	16.5		N*
Cobalt	6020A	0.018	0.003	5.0	09/07/11	10/18/11	20.2		
Copper	6020A	0.09	0.05	5.0	09/07/11	10/18/11	67.8		N
Iron	6010B	3.4	0.3	2.0	09/07/11	09/14/11	41100		
Lead	6020A	0.045	0.008	5.0	09/07/11	10/18/11	18.6		N*
Magnesium	6010B	3.38	0.03	2.0	09/07/11	09/14/11	956		N
Manganese	6010B	1.69	0.03	2.0	09/07/11	09/14/11	993		
Mercury	7471A	1.52	0.152	100.0	09/09/11	09/10/11	57.4		*
Nickel	6020A	0.18	0.03	5.0	09/07/11	10/18/11	56.7		N
Potassium	6010B	68	4.2	2.0	09/07/11	09/14/11	1130		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.67		
Silver	6020A	0.017	0.007	5.0	09/07/11	09/22/11	0.297		*
Sodium	6010B	16.9	3.4	2.0	09/07/11	09/14/11	27.9		
Thallium	6020A	0.018	0.002	5.0	09/07/11	10/18/11	0.117		
Vanadium	6020A	0.18	0.02	5.0	09/07/11	10/18/11	34.2		
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	117		N

% Solids: 89.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP11SB04 Lab Code: K1108028-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.9	4.1	2.0	09/07/11	09/14/11	7280		
Antimony	6010B	6.9	2.1	2.0	09/07/11	09/14/11	5760		N*
Arsenic	6010B	13.8	2.8	2.0	09/07/11	09/14/11	3740		*
Barium	6020A	0.035	0.003	5.0	09/07/11	10/18/11	394		N
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.636		
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.543		*
Calcium	6010B	6.9	1.4	2.0	09/07/11	09/14/11	3930		N
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	18.0		N*
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	16.2		
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	59.0		N
Iron	6010B	2.8	0.2	2.0	09/07/11	09/14/11	45700		
Lead	6020A	0.035	0.006	5.0	09/07/11	10/18/11	0.299		N*
Magnesium	6010B	2.75	0.03	2.0	09/07/11	09/14/11	4590		N
Manganese	6010B	1.38	0.03	2.0	09/07/11	09/14/11	900		
Mercury	7471A	19.2	1.92	1000.0	09/09/11	09/10/11	163		*
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	47.6		N
Potassium	6010B	55	3.4	2.0	09/07/11	09/14/11	1900		N
Selenium	7742	0.49	0.15	10.0	09/29/11	10/04/11	0.66		
Silver	6020A	0.014	0.006	5.0	09/07/11	09/22/11	0.263		*
Sodium	6010B	13.8	2.8	2.0	09/07/11	09/14/11	117		
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.167		
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	20.7		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	88.6		N

% Solids: 88.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP18SB20 Lab Code: K1108028-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.1	3.7	2.0	09/07/11	09/14/11	4440		
Antimony	6010B	6.1	1.8	2.0	09/07/11	09/14/11	412		N* J
Arsenic	6020A	0.31	0.04	5.0	09/07/11	10/18/11	106		J
Barium	6020A	0.031	0.003	5.0	09/07/11	10/18/11	152		N J
Beryllium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.486		
Cadmium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.477		* J
Calcium	6010B	6.1	1.2	2.0	09/07/11	09/14/11	1580		N J
Chromium	6020A	0.12	0.02	5.0	09/07/11	10/18/11	17.3		N* J
Cobalt	6020A	0.012	0.002	5.0	09/07/11	10/18/11	16.4		
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	55.6		N J
Iron	6010B	2.4	0.2	2.0	09/07/11	09/14/11	44300		
Lead	6020A	0.031	0.005	5.0	09/07/11	10/18/11	12.6		N* J
Magnesium	6010B	2.44	0.02	2.0	09/07/11	09/14/11	1200		N J
Manganese	6010B	1.22	0.02	2.0	09/07/11	09/14/11	659		
Mercury	7471A	0.087	0.009	5.0	09/09/11	09/10/11	1.78		* J
Nickel	6020A	0.12	0.02	5.0	09/07/11	10/18/11	49.4		N J
Potassium	6010B	49	3.1	2.0	09/07/11	09/14/11	1010		N J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.43		
Silver	6020A	0.012	0.005	5.0	09/07/11	09/22/11	0.196		* J
Sodium	6010B	12.2	2.4	2.0	09/07/11	09/14/11	37.5		
Thallium	6020A	0.012	0.001	5.0	09/07/11	10/18/11	0.076		
Vanadium	6020A	0.12	0.01	5.0	09/07/11	10/18/11	34.6		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	110		N J

% Solids: 85.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP14SB04 Lab Code: K1108028-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	8.4	5.0	2.0	09/07/11	09/14/11	5490		
Antimony	6010B	8.4	2.5	2.0	09/07/11	09/14/11	6430		N*J
Arsenic	6020A	8.36	1.00	100.0	09/07/11	10/19/11	1790		
Barium	6020A	0.042	0.004	5.0	09/07/11	10/18/11	333		NJ
Beryllium	6020A	0.017	0.003	5.0	09/07/11	10/18/11	0.610		
Cadmium	6020A	0.017	0.003	5.0	09/07/11	10/18/11	0.691		*
Calcium	6010B	8.4	1.7	2.0	09/07/11	09/14/11	2950		NJ
Chromium	6020A	0.17	0.03	5.0	09/07/11	10/18/11	16.0		N*J
Cobalt	6020A	0.017	0.003	5.0	09/07/11	10/18/11	14.7		
Copper	6020A	0.08	0.04	5.0	09/07/11	10/18/11	58.7		NJ
Iron	6010B	3.3	0.3	2.0	09/07/11	09/14/11	40600		
Lead	6020A	0.042	0.008	5.0	09/07/11	10/18/11	1.350		N*J
Magnesium	6010B	3.34	0.03	2.0	09/07/11	09/14/11	3440		NJ
Manganese	6010B	1.67	0.03	2.0	09/07/11	09/14/11	807		
Mercury	7471A	34.7	3.47	2000.0	09/09/11	09/10/11	1410		*
Nickel	6020A	0.17	0.03	5.0	09/07/11	10/18/11	44.0		NJ
Potassium	6010B	67	4.2	2.0	09/07/11	09/14/11	1630		NJ
Selenium	7742	0.49	0.15	10.0	09/29/11	10/04/11	4.92		
Silver	6020A	0.017	0.007	5.0	09/07/11	09/22/11	0.262		*
Sodium	6010B	16.7	3.3	2.0	09/07/11	09/14/11	85.5		
Thallium	6020A	0.017	0.002	5.0	09/07/11	10/18/11	0.162		
Vanadium	6020A	0.17	0.02	5.0	09/07/11	10/18/11	22.8		
Zinc	6020A	0.4	0.2	5.0	09/07/11	10/18/11	111		NJ

% Solids: 88.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD11SD Lab Code: K1108028-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	5.9	3.6	2.0	09/07/11	09/14/11	9930		
Antimony	6020A	0.030	0.005	5.0	09/07/11	10/05/11	7.390		* J
Arsenic	6020A	0.30	0.04	5.0	09/07/11	10/19/11	32.5		
Barium	6020A	0.030	0.003	5.0	09/07/11	10/18/11	130		N J
Beryllium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.311		
Cadmium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.163		* J
Calcium	6010B	5.9	1.2	2.0	09/07/11	09/14/11	2070		N J
Chromium	6020A	0.12	0.02	5.0	09/07/11	10/18/11	14.9		N* J
Cobalt	6020A	0.012	0.002	5.0	09/07/11	10/18/11	8.690		
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	13.2		N J
Iron	6010B	2.4	0.2	2.0	09/07/11	09/14/11	33200		
Lead	6020A	0.030	0.005	5.0	09/07/11	10/18/11	6.220		N* J
Magnesium	6010B	2.37	0.02	2.0	09/07/11	09/14/11	3250		N J
Manganese	6010B	1.19	0.02	2.0	09/07/11	09/14/11	854		
Mercury	7471A	0.093	0.009	5.0	09/09/11	09/10/11	1.57		* J
Nickel	6020A	0.12	0.02	5.0	09/07/11	10/18/11	22.0		N J
Potassium	6010B	48	3.0	2.0	09/07/11	09/14/11	636		N J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.39		
Silver	6020A	0.012	0.005	5.0	09/07/11	09/22/11	0.062		* J
Sodium	6010B	11.9	2.4	2.0	09/07/11	09/14/11	39.6		
Thallium	6020A	0.012	0.001	5.0	09/07/11	10/18/11	0.055		
Vanadium	6020A	0.12	0.01	5.0	09/07/11	10/18/11	24.7		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	51.1		N J

% Solids: 58.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP18SB04 Lab Code: K1108028-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	5.0	3.0	2.0	09/07/11	09/14/11	7880		
Antimony	6010B	5.0	1.5	2.0	09/07/11	09/14/11	164		N*
Arsenic	6020A	0.25	0.03	5.0	09/07/11	10/18/11	170		
Barium	6020A	0.025	0.003	5.0	09/07/11	10/18/11	136		N
Beryllium	6020A	0.010	0.002	5.0	09/07/11	10/18/11	0.440		
Cadmium	6020A	0.010	0.002	5.0	09/07/11	10/18/11	0.401		*
Calcium	6010B	5.0	1.0	2.0	09/07/11	09/14/11	1300		N
Chromium	6020A	0.10	0.02	5.0	09/07/11	10/18/11	14.5		N*
Cobalt	6020A	0.010	0.002	5.0	09/07/11	10/18/11	14.3		
Copper	6020A	0.05	0.03	5.0	09/07/11	10/18/11	35.4		N
Iron	6010B	2.0	0.2	2.0	09/07/11	09/14/11	35600		
Lead	6020A	0.025	0.005	5.0	09/07/11	10/18/11	10.7		N*
Magnesium	6010B	2.00	0.02	2.0	09/07/11	09/14/11	1770		N
Manganese	6010B	1.00	0.02	2.0	09/07/11	09/14/11	905		
Mercury	7471A	1.57	0.157	100.0	09/09/11	09/10/11	41.0		*
Nickel	6020A	0.10	0.02	5.0	09/07/11	10/18/11	38.5		N
Potassium	6010B	40	2.5	2.0	09/07/11	09/14/11	850		N
Selenium	7742	0.09	0.03	2.0	09/29/11	10/04/11	0.43		
Silver	6020A	0.010	0.004	5.0	09/07/11	09/22/11	0.121		*
Sodium	6010B	10.0	2.0	2.0	09/07/11	09/14/11	45.8		
Thallium	6020A	0.010	0.001	5.0	09/07/11	10/18/11	0.084		
Vanadium	6020A	0.10	0.01	5.0	09/07/11	10/18/11	30.9		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	87.7		N

% Solids: 81.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD12SD Lab Code: K1108028-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.7	4.0	2.0	09/07/11	09/14/11	10600		
Antimony	6010B	6.7	2.0	2.0	09/07/11	09/14/11	6360		N*
Arsenic	6010B	13.4	2.7	2.0	09/07/11	09/14/11	3610		*
Barium	6020A	0.664	0.066	100.0	09/07/11	10/19/11	985		N
Beryllium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.705		
Cadmium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.317		*
Calcium	6010B	6.7	1.3	2.0	09/07/11	09/14/11	3450		N
Chromium	6020A	0.13	0.02	5.0	09/07/11	10/18/11	47.4		N*
Cobalt	6020A	0.013	0.002	5.0	09/07/11	10/18/11	12.5		
Copper	6020A	0.07	0.03	5.0	09/07/11	10/18/11	45.7		N
Iron	6010B	2.7	0.2	2.0	09/07/11	09/14/11	28900		
Lead	6020A	0.033	0.006	5.0	09/07/11	10/18/11	1.720		N*
Magnesium	6010B	2.67	0.03	2.0	09/07/11	09/14/11	5200		N
Manganese	6010B	1.34	0.03	2.0	09/07/11	09/14/11	552		
Mercury	7471A	1.76	0.176	100.0	09/09/11	09/10/11	77.0		*
Nickel	6020A	0.13	0.02	5.0	09/07/11	10/18/11	47.2		N
Potassium	6010B	53	3.3	2.0	09/07/11	09/14/11	2870		N
Selenium	7742	0.49	0.15	10.0	09/29/11	10/04/11	0.62		
Silver	6020A	0.013	0.005	5.0	09/07/11	09/22/11	0.135		*
Sodium	6010B	13.4	2.7	2.0	09/07/11	09/14/11	225		
Thallium	6020A	0.013	0.001	5.0	09/07/11	10/18/11	0.297		
Vanadium	6020A	0.13	0.01	5.0	09/07/11	10/18/11	22.8		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	65.7		N

% Solids: 83.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP14SB58 Lab Code: K1108028-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.3	3.8	2.0	09/07/11	09/14/11	2140		
Antimony	6020A	0.031	0.006	5.0	09/07/11	10/05/11	3.010		*
Arsenic	6020A	0.32	0.04	5.0	09/07/11	10/18/11	51.9		
Barium	6020A	0.031	0.003	5.0	09/07/11	10/18/11	99.6		N
Beryllium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.797		
Cadmium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	1.320		*
Calcium	6010B	6.3	1.3	2.0	09/07/11	09/14/11	3000		N
Chromium	6020A	0.13	0.02	5.0	09/07/11	10/18/11	15.5		N*
Cobalt	6020A	0.013	0.002	5.0	09/07/11	10/18/11	22.8		
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	90.3		N
Iron	6010B	2.5	0.2	2.0	09/07/11	09/14/11	47900		
Lead	6020A	0.031	0.006	5.0	09/07/11	10/18/11	21.3		N*
Magnesium	6010B	2.50	0.03	2.0	09/07/11	09/14/11	10500		N
Manganese	6010B	1.25	0.03	2.0	09/07/11	09/14/11	1260		
Mercury	7471A	0.097	0.010	5.0	09/09/11	09/10/11	2.90		*
Nickel	6020A	0.13	0.02	5.0	09/07/11	10/18/11	77.9		N
Potassium	6010B	50	3.1	2.0	09/07/11	09/14/11	1270		N
Selenium	7742	0.50	0.15	10.0	09/29/11	10/04/11	2.59		
Silver	6020A	0.013	0.005	5.0	09/07/11	09/22/11	0.461		*
Sodium	6010B	12.5	2.5	2.0	09/07/11	09/14/11	41.2		
Thallium	6020A	0.013	0.001	5.0	09/07/11	10/18/11	0.099		
Vanadium	6020A	0.13	0.01	5.0	09/07/11	10/18/11	35.9		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	165		N

% Solids: 94.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108028
Project No.: NA
Date Collected: 08/16/11
Project Name: Red Devil Mine
Date Received: 08/30/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP30SB16
Lab Code: K1108028-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	7.2	4.3	2.0	09/07/11	09/14/11	10900		
Antimony	6010B	7.2	2.2	2.0	09/07/11	09/14/11	195		N* J
Arsenic	6020A	0.36	0.04	5.0	09/07/11	10/18/11	255		
Barium	6020A	0.036	0.004	5.0	09/07/11	10/18/11	124		N J
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.379		
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.289		* J
Calcium	6010B	7.2	1.4	2.0	09/07/11	09/14/11	2360		N J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	20.6		N* J
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	16.0		
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	23.4		N J
Iron	6010B	2.9	0.2	2.0	09/07/11	09/14/11	18900		
Lead	6020A	0.036	0.006	5.0	09/07/11	10/18/11	7.830		N* J
Magnesium	6010B	2.89	0.03	2.0	09/07/11	09/14/11	4990		N J
Manganese	6010B	1.44	0.03	2.0	09/07/11	09/14/11	179		
Mercury	7471A	1.62	0.162	100.0	09/09/11	09/10/11	73.7		* J
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	36.8		N J
Potassium	6010B	58	3.6	2.0	09/07/11	09/14/11	806		N J
Selenium	7742	0.49	0.15	10.0	09/29/11	10/04/11	3.04		
Silver	6020A	0.014	0.006	5.0	09/07/11	09/22/11	0.096		* J
Sodium	6010B	14.4	2.9	2.0	09/07/11	09/14/11	119		
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.084		
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	27.9		
Zinc	6020A	0.4	0.1	5.0	09/07/11	10/18/11	68.6		N J

% Solids: 82.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP17SB14 Lab Code: K1108028-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.5	6.3	2.0	09/07/11	09/14/11	10300		
Antimony	6010B	10.5	3.2	2.0	09/07/11	09/14/11	164		N*
Arsenic	6010B	21.1	4.2	2.0	09/07/11	09/14/11	141		*
Barium	6020A	0.054	0.005	5.0	09/07/11	10/18/11	126		N
Beryllium	6020A	0.022	0.003	5.0	09/07/11	10/18/11	0.370		
Cadmium	6020A	0.022	0.003	5.0	09/07/11	10/18/11	0.174		*
Calcium	6010B	10.5	2.1	2.0	09/07/11	09/14/11	1600		N
Chromium	6020A	0.22	0.03	5.0	09/07/11	10/18/11	19.0		N*
Cobalt	6020A	0.022	0.003	5.0	09/07/11	10/18/11	6.530		
Copper	6020A	0.11	0.05	5.0	09/07/11	10/18/11	21.7		N
Iron	6010B	4.2	0.3	2.0	09/07/11	09/14/11	29800		
Lead	6020A	0.054	0.010	5.0	09/07/11	10/18/11	10.5		N*
Magnesium	6010B	4.21	0.04	2.0	09/07/11	09/14/11	2200		N
Manganese	6010B	2.11	0.04	2.0	09/07/11	09/14/11	443		
Mercury	7471A	1.65	0.165	100.0	09/09/11	09/10/11	22.7		*
Nickel	6020A	0.22	0.03	5.0	09/07/11	10/18/11	21.3		N
Potassium	6010B	84	5.3	2.0	09/07/11	09/14/11	965		N
Selenium	7742	0.10	0.03	2.0	10/07/11	10/08/11	0.38		
Silver	6020A	0.021	0.008	5.0	09/07/11	09/22/11	0.119		*
Sodium	6010B	21.1	4.2	2.0	09/07/11	09/14/11	61.1		
Thallium	6020A	0.022	0.002	5.0	09/07/11	10/18/11	0.107		
Vanadium	6020A	0.22	0.02	5.0	09/07/11	10/18/11	35.0		
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	48.9		N

% Solids: 71.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1108028
Date Collected: 08/16/11
Date Received: 08/30/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP30SB12
Lab Code: K1108028-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.3	5.6	2.0	09/07/11	09/14/11	10700		
Antimony	6010B	9.3	2.8	2.0	09/07/11	09/14/11	4310		N* J
Arsenic	6010B	18.7	3.7	2.0	09/07/11	09/14/11	3990		* J
Barium	6020A	0.048	0.005	5.0	09/07/11	10/18/11	172		N J
Beryllium	6020A	0.019	0.003	5.0	09/07/11	10/18/11	0.381		
Cadmium	6020A	0.019	0.003	5.0	09/07/11	10/18/11	0.132		* J
Calcium	6010B	9.3	1.9	2.0	09/07/11	09/14/11	4230		N J
Chromium	6020A	0.19	0.03	5.0	09/07/11	10/18/11	18.6		N* J
Cobalt	6020A	0.019	0.003	5.0	09/07/11	10/18/11	7.480		
Copper	6020A	0.10	0.05	5.0	09/07/11	10/18/11	20.3		N J
Iron	6010B	3.7	0.3	2.0	09/07/11	09/14/11	30800		
Lead	6020A	0.048	0.009	5.0	09/07/11	10/18/11	5.440		N* J
Magnesium	6010B	3.73	0.04	2.0	09/07/11	09/14/11	5550		N J
Manganese	6010B	1.87	0.04	2.0	09/07/11	09/14/11	367		
Mercury	7471A	18.8	1.88	1000.0	09/09/11	09/10/11	136		* J
Nickel	6020A	0.19	0.03	5.0	09/07/11	10/18/11	24.1		N J
Potassium	6010B	75	4.7	2.0	09/07/11	09/14/11	2080		N J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.59		
Silver	6020A	0.019	0.007	5.0	09/07/11	09/22/11	0.186		* J
Sodium	6010B	18.7	3.7	2.0	09/07/11	09/14/11	150		
Thallium	6020A	0.019	0.002	5.0	09/07/11	10/18/11	0.126		
Vanadium	6020A	0.19	0.02	5.0	09/07/11	10/18/11	26.1		
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	51.1		N J

% Solids: 80.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP11SB08 Lab Code: K1108028-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	7.6	4.6	2.0	09/07/11	09/14/11	6980		
Antimony	6020A	0.038	0.007	5.0	09/07/11	10/05/11	5.860		*
Arsenic	6010B	15.2	3.0	2.0	09/07/11	09/14/11	38.2		*
Barium	6020A	0.038	0.004	5.0	09/07/11	10/18/11	188		N
Beryllium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.578		
Cadmium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.495		*
Calcium	6010B	7.6	1.5	2.0	09/07/11	09/14/11	943		N
Chromium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	20.1		N*
Cobalt	6020A	0.015	0.002	5.0	09/07/11	10/18/11	12.1		
Copper	6020A	0.08	0.04	5.0	09/07/11	10/18/11	41.5		N
Iron	6010B	3.0	0.2	2.0	09/07/11	09/14/11	25700		
Lead	6020A	0.038	0.007	5.0	09/07/11	10/18/11	11.1		N*
Magnesium	6010B	3.04	0.03	2.0	09/07/11	09/14/11	2060		N
Manganese	6010B	1.52	0.03	2.0	09/07/11	09/14/11	219		
Mercury	7471A	0.091	0.009	5.0	09/09/11	09/10/11	0.914		*
Nickel	6020A	0.15	0.02	5.0	09/07/11	10/18/11	43.0		N
Potassium	6010B	61	3.8	2.0	09/07/11	09/14/11	1130		N
Selenium	7742	0.10	0.03	2.0	10/07/11	10/08/11	0.36		
Silver	6020A	0.015	0.006	5.0	09/07/11	09/22/11	0.118		*
Sodium	6010B	15.2	3.0	2.0	09/07/11	09/14/11	34.9		
Thallium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.096		
Vanadium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	34.1		
Zinc	6020A	0.4	0.2	5.0	09/07/11	10/18/11	96.1		N

% Solids: 83.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP11SB06 Lab Code: K1108028-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.0	3.6	2.0	09/07/11	09/14/11	12500		
Antimony	6010B	6.0	1.8	2.0	09/07/11	09/14/11	323		N*
Arsenic	6010B	12.1	2.4	2.0	09/07/11	09/14/11	471		*
Barium	6020A	0.030	0.003	5.0	09/07/11	10/18/11	194		N
Beryllium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.535		
Cadmium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.431		*
Calcium	6010B	6.0	1.2	2.0	09/07/11	09/14/11	1390		N
Chromium	6020A	0.12	0.02	5.0	09/07/11	10/18/11	19.9		N*
Cobalt	6020A	0.012	0.002	5.0	09/07/11	10/18/11	11.7		
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	38.2		N
Iron	6010B	2.4	0.2	2.0	09/07/11	09/14/11	39800		
Lead	6020A	0.030	0.005	5.0	09/07/11	10/18/11	10.8		N*
Magnesium	6010B	2.41	0.02	2.0	09/07/11	09/14/11	4420		N
Manganese	6010B	1.21	0.02	2.0	09/07/11	09/14/11	701		
Mercury	7471A	1.77	0.177	100.0	09/09/11	09/10/11	71.2		*
Nickel	6020A	0.12	0.02	5.0	09/07/11	10/18/11	40.4		N
Potassium	6010B	48	3.0	2.0	09/07/11	09/14/11	984		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.25		
Silver	6020A	0.012	0.005	5.0	09/07/11	09/22/11	0.120		*
Sodium	6010B	12.1	2.4	2.0	09/07/11	09/14/11	42.6		
Thallium	6020A	0.012	0.001	5.0	09/07/11	10/18/11	0.082		
Vanadium	6020A	0.12	0.01	5.0	09/07/11	10/18/11	31.6		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	81.7		N

% Solids: 86.3

Comments:

Metals

- I -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP18SB10 Lab Code: K1108028-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.7	4.0	2.0	09/07/11	09/14/11	10200		
Antimony	6020A	0.033	0.006	5.0	09/07/11	10/05/11	3.970		*
Arsenic	6010B	13.4	2.7	2.0	09/07/11	09/14/11	31.1		*
Barium	6020A	0.033	0.003	5.0	09/07/11	10/18/11	115		N
Beryllium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.579		
Cadmium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.413		*
Calcium	6010B	6.7	1.3	2.0	09/07/11	09/14/11	1160		N
Chromium	6020A	0.13	0.02	5.0	09/07/11	10/18/11	15.4		N*
Cobalt	6020A	0.013	0.002	5.0	09/07/11	10/18/11	15.6		
Copper	6020A	0.07	0.03	5.0	09/07/11	10/18/11	42.6		N
Iron	6010B	2.7	0.2	2.0	09/07/11	09/14/11	36200		
Lead	6020A	0.033	0.006	5.0	09/07/11	10/18/11	11.8		N*
Magnesium	6010B	2.67	0.03	2.0	09/07/11	09/14/11	2130		N
Manganese	6010B	1.34	0.03	2.0	09/07/11	09/14/11	728		
Mercury	7471A	0.088	0.009	5.0	09/09/11	09/10/11	1.24		*
Nickel	6020A	0.13	0.02	5.0	09/07/11	10/18/11	44.0		N
Potassium	6010B	54	3.3	2.0	09/07/11	09/14/11	862		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/04/11	0.37		
Silver	6020A	0.013	0.005	5.0	09/07/11	09/22/11	0.115		*
Sodium	6010B	13.4	2.7	2.0	09/07/11	09/14/11	53.3		
Thallium	6020A	0.013	0.001	5.0	09/07/11	10/18/11	0.088		
Vanadium	6020A	0.13	0.01	5.0	09/07/11	10/18/11	32.6		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	92.0		N

% Solids: 76.7

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 08/20/2011	**Sample Matrix: Soil**
Analytical Method: PCBs (*EPA 8082)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP86SS	K1108028-016
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: MS/MSD recovery was within control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank is free of contamination at the reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within QC Critieria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.

13. OVERALL ASSESSMENT OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108028

Cover Page - Organic Analysis Data Package
Polychlorinated Biphenyls (PCBs)

Sample Name	Lab Code	Date Collected	Date Received
11MP86SS	K1108028-016	08/20/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: LISA HARRIS

Date: September 9, 2011 Title: Scientist

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108028
Project:	Red Devil Mine	**Date Collected:**	08/20/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP86SS	**Units:**	mg/Kg
Lab Code:	K1108028-016	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1221	ND	U	0.12	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1232	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1242	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1248	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1254	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1260	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	92	35-133	09/03/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 8/15/2011 to 8/21/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP11SB04	K1108028-003
2	11MP18SB20	K1108028-004
3	11MP14SB04	K1108028-005
4	11MP18SB04	K1108028-010
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- * — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**NO**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Aluminum, Antimony, and Silver were outside QC limits for Matrix Spike analysis, results qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: RPDs of 10SM21SS and 10SM21SS Duplicate were within the control limits. (less than 20%)

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Silver was outside QC criteria for 11MP18SB20 and 11MP18SB04, results qualified “J” as estimated..

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP11SB04
Al: (1.493 mg/L)*(50ml/50ml) = 1.493 mg/L = 1493 ug/L
Lab reported 1490 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

ALASKA, JUNE 4, 2010 (QAPP) .

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108028

Sample Name:	Lab Code:
11MP11SB04	K1108028-003
11MP11SB04D	K1108028-003D
11MP11SB04S	K1108028-003S
11MP18SB20	K1108028-004
11MP18SB20D	K1108028-004D
11MP18SB20S	K1108028-004S
11MP18SB20SD	K1108028-004SD
11MP14SB04	K1108028-005
11MP18SB04	K1108028-010
11MP18SB04D	K1108028-010D
11MP18SB04S	K1108028-010S
11MP18SB04SD	K1108028-010SD
Method Blank	K1108028-MB1
Method Blank	K1108028-MB2

Comments:

Approved By: _____ Date: 10/23/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP11SB04 Lab Code: K1108028-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1490		N J
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	5710		N J
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	3080		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	35.5	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	2730		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.9	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	6.5	J	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2570		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	3680		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	43.6		
Mercury	7470A	5.00	2.00	5.0	09/07/11	09/08/11	37.8		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	5.7	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1070		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	6.2	J	N J
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	7750	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	8.1	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	31.4	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP18SB20 Lab Code: K1108028-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	3600		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	109		N
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	26	J	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	75.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.22	J	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1590		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	6.6	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	3.0	J	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	14.6		
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	7410		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	964		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	117		
Mercury	7470A	1.00	0.40	1.0	09/07/11	09/08/11	3.71		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	14.3	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1470		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	11.1	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	1610	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	13.3		
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	75.4	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP14SB04 Lab Code: K1108028-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1270		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	4810		N
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	2900		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	35.0	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	3700		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2250		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	2910		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	57.2		
Mercury	7470A	100	40.0	100.0	09/07/11	09/08/11	166		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.4	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	898		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	6880	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	6.4	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.1	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP18SB04 Lab Code: K1108028-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1910		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	587		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	39	J	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	34.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1010		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2700		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	571		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	81.3		
Mercury	7470A	1.00	0.40	1.0	09/21/11	09/21/11	0.82	J	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.1	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	690		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	10.4	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	1870	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.2	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.0	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 08/20/2011	**Sample Matrix: Soil**
Analytical Method: SVOCs + TICs (*EPA 8270D)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11RD11SD	K1108028-009
2		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: MS/MSD analysis was within QC Criteria generated by the laboratory.

7. BLANKS AND BACKGROUND SAMPLES

_____ Acceptable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Several TICs were identified in the method blank, no results qualified as the sample results were greater than 5x the blank concentration.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

__X__ Acceptable
_____ Acceptable with qualification

_____ **Unacceptable**

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
_____ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: None

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11RD11SD
Phenol: ((47.71x2.0x1)/(40.005x0.587)x1 = 4.06337 ug/kg
Lab reported 4.1 ug/kg

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108028

Sample Name:	Lab Code:
11MP11SB04	K1108028-003
11MP11SB04D	K1108028-003D
11MP11SB04S	K1108028-003S
11MP18SB20	K1108028-004
11MP18SB20D	K1108028-004D
11MP18SB20S	K1108028-004S
11MP18SB20SD	K1108028-004SD
11MP14SB04	K1108028-005
11MP18SB04	K1108028-010
11MP18SB04D	K1108028-010D
11MP18SB04S	K1108028-010S
11MP18SB04SD	K1108028-010SD
Method Blank	K1108028-MB1
Method Blank	K1108028-MB2

Comments:

Approved By: _____ Date: 10/23/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP11SB04 Lab Code: K1108028-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1490		N J
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	5710		N J
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	3080		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	35.5	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	2730		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.9	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	6.5	J	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2570		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	3680		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	43.6		
Mercury	7470A	5.00	2.00	5.0	09/07/11	09/08/11	37.8		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	5.7	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1070		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	6.2	J	N J
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	7750	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	8.1	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	31.4	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP18SB20 Lab Code: K1108028-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	3600		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	109		N
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	26	J	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	75.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.22	J	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1590		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	6.6	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	3.0	J	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	14.6		
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	7410		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	964		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	117		
Mercury	7470A	1.00	0.40	1.0	09/07/11	09/08/11	3.71		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	14.3	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1470		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	11.1	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	1610	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	13.3		
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	75.4	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP14SB04 Lab Code: K1108028-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1270		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	4810		N
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	2900		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	35.0	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	3700		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2250		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	2910		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	57.2		
Mercury	7470A	100	40.0	100.0	09/07/11	09/08/11	166		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.4	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	898		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	6880	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	6.4	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.1	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP18SB04 Lab Code: K1108028-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1910		N
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	587		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	39	J	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	34.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1010		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2700		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	571		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	81.3		
Mercury	7470A	1.00	0.40	1.0	09/21/11	09/21/11	0.82	J	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.1	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	690		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	10.4	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	1870	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.2	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.0	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108028**
Sampling Dates: 8/15/2011 to 8/21/2011	**Sample Matrix: Soil**
Analytical Method: TCLP Metals	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP11SB04	K1108028-003
2	11MP18SB20	K1108028-004
3	11MP14SB04	K1108028-005
4	11MP19SB04	K1108028-008
5	11MP18SB04	K1108028-010
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Matrix spike analysis was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Analysis of laboratory duplicate was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis of mercury was within QC critieria.

9. ANALYTE QUANTITATION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL) / (Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL) / (weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP18SB20
As: (0.0377 mg/L)(50ml/50ml) = 0.0377 mg/L
Lab reported 0.04 mg/L
Ba: (0.65457 mg/L)(50ml/50ml) = 0.65457 mg/L
Lab reported 0.655 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108028

Sample Name:	Lab Code:
11MP11SB04	K1108028-003
11MP11SB04D	K1108028-003D
11MP11SB04S	K1108028-003S
11MP18SB20	K1108028-004
11MP18SB20D	K1108028-004D
11MP18SB20S	K1108028-004S
11MP18SB20SD	K1108028-004SD
11MP14SB04	K1108028-005
11MP19SB04	K1108028-008
11MP18SB04	K1108028-010
Method Blank	K1108028-MB

Comments:

Approved By: _____ **Date:** 10/23/11

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	TCLP	Units:	mg/L
		Basis:	NA

Sample Name: 11MP11SB04 Lab Code: K1108028-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/20/11	09/21/11	7.58		
Barium	6010B	1.000	0.300	1.0	09/20/11	09/21/11	0.332	J	
Cadmium	6010B	0.010	0.002	1.0	09/20/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/20/11	09/21/11	0.003	J	
Lead	6010B	0.10	0.02	1.0	09/20/11	09/21/11	0.02	U	
Mercury	7470A	0.0100	0.0040	1.0	09/08/11	09/26/11	0.0113		
Selenium	6010B	0.20	0.02	1.0	09/20/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/20/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: TCLP

Service Request: K1108028
Date Collected: 08/15/11
Date Received: 08/30/11
Units: mg/L
Basis: NA

Sample Name: 11MP18SB20
Lab Code: K1108028-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/20/11	09/21/11	0.04	J	
Barium	6010B	1.000	0.300	1.0	09/20/11	09/21/11	0.655	J	
Cadmium	6010B	0.010	0.002	1.0	09/20/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/20/11	09/21/11	0.003	U	
Lead	6010B	0.10	0.02	1.0	09/20/11	09/21/11	0.02	U	
Mercury	7470A	0.0100	0.0040	1.0	09/08/11	09/26/11	0.0040	U	
Selenium	6010B	0.20	0.02	1.0	09/20/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/20/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108028
Project No.: NA
Date Collected: 08/20/11
Project Name: Red Devil Mine
Date Received: 08/30/11
Matrix: TCLP
Units: mg/L
Basis: NA

Sample Name: 11MP14SB04
Lab Code: K1108028-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/20/11	09/21/11	9.01		
Barium	6010B	1.000	0.300	1.0	09/20/11	09/21/11	0.695	J	
Cadmium	6010B	0.010	0.002	1.0	09/20/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/20/11	09/21/11	0.003	U	
Lead	6010B	0.10	0.02	1.0	09/20/11	09/21/11	0.02	U	
Mercury	7470A	0.0100	0.0040	1.0	09/08/11	09/26/11	0.0758		
Selenium	6010B	0.20	0.02	1.0	09/20/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/20/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	TCLP	Units:	mg/L
		Basis:	NA

Sample Name: 11MP19SB04 Lab Code: K1108028-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/20/11	09/21/11	0.01	U	
Barium	6010B	1.000	0.300	1.0	09/20/11	09/21/11	0.594	J	
Cadmium	6010B	0.010	0.002	1.0	09/20/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/20/11	09/21/11	0.003	U	
Lead	6010B	0.10	0.02	1.0	09/20/11	09/21/11	0.02	U	
Mercury	7470A	0.0100	0.0040	1.0	09/08/11	09/26/11	0.0040	U	
Selenium	6010B	0.20	0.02	1.0	09/20/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/20/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108028
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	TCLP	Units:	mg/L
		Basis:	NA

Sample Name: 11MP18SB04 Lab Code: K1108028-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/20/11	09/21/11	0.04	J	
Barium	6010B	1.000	0.300	1.0	09/20/11	09/21/11	0.530	J	
Cadmium	6010B	0.010	0.002	1.0	09/20/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/20/11	09/21/11	0.003	U	
Lead	6010B	0.10	0.02	1.0	09/20/11	09/21/11	0.02	U	
Mercury	7470A	0.0100	0.0040	1.0	09/08/11	09/26/11	0.0040	U	
Selenium	6010B	0.20	0.02	1.0	09/20/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/20/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 08/13/2011 to 8/22/2011	**Sample Matrix: Soil**
Analytical Method: General Chemistry	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 12/3/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP24SB12	K1108031-001
2	11MP28SB08	K1108031-002
3	11MP25SB08	K1108031-003
4	11MP12SB12	K1108031-004
5	11RD13SB14	K1108031-006
6	11MP20SB04	K1108031-007
7	11MP33SB06	K1108031-008
8	11MP40SB10	K1108031-009
9	11MP13SB04	K1108031-010
10	11MP21SB04	K1108031-011
11	11MP24SB04	K1108031-013
12	11MP30SB08	K1108031-014
13	11MP32SB04	K1108031-015
14	11MP24SB18	K1108031-016
15	11MP25SB20	K1108031-017
16	11MP25SB26	K1108031-018
17	11MP21SB14	K1108031-019
18	11MP29SB10	K1108031-020
19	11MP39SB06	K1108031-023
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Total Solids by 160.3M, Particle Size Distribution by ASTM D422, and Atterberg Limits by ASTM D4318, Specific Gravity by SM2710F.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: N/A.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: N/A

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: N/A

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
_____ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: N/A

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory duplicates were within QC Criteria.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 08/13/2011 to 08/22/2011	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11MP24SB12	K1108031-001
2	11MP28SB08	K1108031-002
3	11MP25SB08	K1108031-003
4	11MP12SB12	K1108031-004
5	11RD13SB14	K1108031-006
6	11MP20SB04	K1108031-007
7	11MP33SB06	K1108031-008
8	11MP40SB10	K1108031-009
9	11MP13SB04	K1108031-010
10	11MP21SB04	K1108031-011
11	11MP24SB04	K1108031-013
12	11MP24SB18	K1108031-016
13	11MP25SB20	K1108031-017
14	11MP25SB26	K1108031-018
15	11MP21SB14	K1108031-019
16	11MP29SB10	K1108031-020
17	11MP39SB06	K1108031-023

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- _____ Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- X Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Several metals were recovered outside QC criteria for matrix spike analysis, all "N" flagged data is qualified "J" as estimated. Post digestion spike was within control criteria.

5. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Iron was detected in the method blank, no results qualified based on this detection. Calibration blanks were free from contamination at the reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Lead had an RPD greater than QC criteria, results are qualified "J" as estimated.

Analyte	11MP33SB04	11MP33SB06	RPD	Rating	Sample Qualifier
Aluminum	2110.00	1640.00	25.07	GOOD	None
Antimony	3.68	0.59	144.57	POOR	J
Arsenic	9.91	15.70	45.22	GOOD	None
Barium	152.00	65.00	80.18	POOR	J
Beryllium	0.63	0.64	1.42	GOOD	None
Cadmium	1.00	0.92	7.82	GOOD	None
Calcium	1470.00	1410.00	4.17	GOOD	None
Chromium	15.20	19.60	25.29	GOOD	None
Cobalt	34.40	21.80	44.84	GOOD	None
Copper	105.00	113.00	7.34	GOOD	None
Iron	47300.00	30600.00	42.88	GOOD	None
Lead	26.10	22.20	16.15	GOOD	None
Magnesium	663.00	529.00	22.48	GOOD	None
Manganese	1270.00	587.00	73.56	POOR	J
Mercury	3.40	3.44	1.17	GOOD	None
Nickel	74.40	87.80	16.52	GOOD	None
Potassium	1010.00	914.00	9.98	GOOD	None
Selenium	1.32	0.75	55.07	GOOD	None
Silver	0.44	0.46	5.79	GOOD	None
Sodium	24.40	23.00	5.91	GOOD	None
Thallium	0.14	0.07	62.14	GOOD	None
Vanadium	32.80	42.70	26.23	GOOD	None
Zinc	160.00	199.00	21.73	GOOD	None

Comments: 11MP33SB06 is a field duplicate of 11MP33SB04, results with an RPD greater than 70% are qualified "J" as estimated.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated

detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Serial dilution analysis was within control criteria.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike was within control criteria.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP24SB12

Al: (((67.32 mg/L)*(0.10L))/((0.00138 kg)*(0.894)))*2 = 10913.335 mg/kg
Lab reported 10900 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108031

Sample Name:	Lab Code:
11MP24SB12	K1108031-001
11MP24SB12D	K1108031-001D
11MP24SB12S	K1108031-001S
11MP24SB12SD	K1108031-001SD
11MP28SB08	K1108031-002
11MP28SB08D	K1108031-002D
11MP28SB08S	K1108031-002S
11MP28SB08SD	K1108031-002SD
11MP25SB08	K1108031-003
11MP12SB12	K1108031-004
11RD13SB14	K1108031-006
11RD13SB14D	K1108031-006D
11RD13SB14S	K1108031-006S
11RD13SB14SD	K1108031-006SD
11MP20SB04	K1108031-007
11MP33SB06	K1108031-008
11MP40SB10	K1108031-009
11MP13SB04	K1108031-010
11MP21SB04	K1108031-011
11MP24SB04	K1108031-013
11MP24SB18	K1108031-016
11MP25SB20	K1108031-017
11MP25SB26	K1108031-018
11MP21SB14	K1108031-019
11MP29SB10	K1108031-020
11MP39SB06	K1108031-023
Method Blank	K1108031-MB

Comments:

Approved By: _____ Date: 10/21/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/18/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP24SB12 **Lab Code:** K1108031-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	8.1	4.9	2.0	09/07/11	09/14/11	10900			
Antimony	6010B	40.5	12.2	10.0	09/07/11	09/20/11	16100		N	J
Arsenic	6010B	81.1	16.2	10.0	09/07/11	09/20/11	9250			
Barium	6020A	1.60	0.160	200.0	09/07/11	10/19/11	855			
Beryllium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.667			
Cadmium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.336			
Calcium	6010B	8.1	1.6	2.0	09/07/11	09/14/11	7920		N	J
Chromium	6020A	0.16	0.02	5.0	09/07/11	10/18/11	32.1			
Cobalt	6020A	0.016	0.002	5.0	09/07/11	10/18/11	13.0			
Copper	6020A	0.08	0.04	5.0	09/07/11	10/18/11	55.0		N	J
Iron	6010B	3.2	0.2	2.0	09/07/11	09/14/11	39600			
Lead	6020A	0.040	0.007	5.0	09/07/11	10/18/11	0.250		N*	J
Magnesium	6010B	3.24	0.03	2.0	09/07/11	09/14/11	9460		N	J
Manganese	6010B	1.62	0.03	2.0	09/07/11	09/14/11	788			
Mercury	7471A	34.4	3.44	2000.0	09/09/11	09/09/11	1520			
Nickel	6020A	0.16	0.02	5.0	09/07/11	10/18/11	53.0			
Potassium	6010B	65	4.1	2.0	09/07/11	09/14/11	2840		N	J
Selenium	7742	0.49	0.15	10.0	09/29/11	10/05/11	1.58			
Silver	6020A	0.032	0.013	10.0	09/07/11	09/22/11	0.254			
Sodium	6010B	16.2	3.2	2.0	09/07/11	09/14/11	295			
Thallium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.344			
Vanadium	6020A	0.16	0.02	5.0	09/07/11	10/18/11	22.0			
Zinc	6020A	0.4	0.2	5.0	09/07/11	10/18/11	76.2			

% Solids: 89.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/22/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP28SB08 **Lab Code:** K1108031-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.5	4.5	2.0	09/07/11	09/14/11	6720			
Antimony	6010B	7.5	2.3	2.0	09/07/11	09/14/11	212		N	J
Arsenic	6010B	15.0	3.0	2.0	09/07/11	09/14/11	361			
Barium	6020A	0.038	0.004	5.0	09/07/11	10/18/11	208			
Beryllium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.509			
Cadmium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.603			
Calcium	6010B	7.5	1.5	2.0	09/07/11	09/14/11	1310		N	J
Chromium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	16.7			
Cobalt	6020A	0.015	0.002	5.0	09/07/11	10/18/11	18.4			
Copper	6020A	0.08	0.04	5.0	09/07/11	10/18/11	48.2		N	J
Iron	6010B	3.0	0.2	2.0	09/07/11	09/14/11	36700			
Lead	6020A	0.038	0.007	5.0	09/07/11	10/18/11	13.4		N*	J
Magnesium	6010B	3.01	0.03	2.0	09/07/11	09/14/11	2210		N	J
Manganese	6010B	1.50	0.03	2.0	09/07/11	09/14/11	664			
Mercury	7471A	1.94	0.194	100.0	09/09/11	09/09/11	42.1			
Nickel	6020A	0.15	0.02	5.0	09/07/11	10/18/11	45.9			
Potassium	6010B	60	3.8	2.0	09/07/11	09/14/11	1020		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.44			
Silver	6020A	0.015	0.006	5.0	09/07/11	09/20/11	0.239			
Sodium	6010B	15.0	3.0	2.0	09/07/11	09/14/11	37.3			
Thallium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.129			
Vanadium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	29.5			
Zinc	6020A	0.4	0.2	5.0	09/07/11	10/18/11	89.0			

% Solids: 84.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/18/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP25SB08 **Lab Code:** K1108031-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	8.0	4.8	2.0	09/07/11	09/14/11	11500		
Antimony	6010B	40.1	12.0	10.0	09/07/11	09/20/11	13000		N
Arsenic	6010B	80.3	16.1	10.0	09/07/11	09/20/11	5360		
Barium	6010B	1.6	0.2	2.0	09/07/11	09/14/11	1050		
Beryllium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.672		
Cadmium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.326		
Calcium	6010B	8.0	1.6	2.0	09/07/11	09/14/11	4990		N
Chromium	6020A	0.16	0.02	5.0	09/07/11	10/18/11	38.9		
Cobalt	6020A	0.016	0.002	5.0	09/07/11	10/18/11	13.9		
Copper	6020A	0.08	0.04	5.0	09/07/11	10/18/11	56.2		N
Iron	6010B	3.2	0.2	2.0	09/07/11	09/14/11	37100		
Lead	6020A	0.040	0.007	5.0	09/07/11	10/18/11	0.145		N*
Magnesium	6010B	3.21	0.03	2.0	09/07/11	09/14/11	7120		N
Manganese	6010B	1.61	0.03	2.0	09/07/11	09/14/11	631		
Mercury	7471A	19.0	1.90	1000.0	09/09/11	09/09/11	564		
Nickel	6020A	0.16	0.02	5.0	09/07/11	10/18/11	55.3		
Potassium	6010B	64	4.0	2.0	09/07/11	09/14/11	2990		N
Selenium	7742	0.49	0.15	10.0	09/29/11	10/05/11	1.40		
Silver	6020A	0.032	0.013	10.0	09/07/11	09/22/11	0.237		
Sodium	6010B	16.1	3.2	2.0	09/07/11	09/14/11	287		
Thallium	6020A	0.016	0.002	5.0	09/07/11	10/18/11	0.512		
Vanadium	6020A	0.16	0.02	5.0	09/07/11	10/18/11	22.0		
Zinc	6020A	0.4	0.2	5.0	09/07/11	10/18/11	74.2		

% Solids: 89.6

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP12SB12 Lab Code: K1108031-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	6.8	4.1	2.0	09/07/11	09/14/11	3490			
Antimony	6020A	0.034	0.006	5.0	09/07/11	10/05/11	0.547		N	J
Arsenic	6010B	13.6	2.7	2.0	09/07/11	09/14/11	91.0			
Barium	6020A	0.035	0.003	5.0	09/07/11	10/18/11	90.5			
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.584			
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.648			
Calcium	6010B	6.8	1.4	2.0	09/07/11	09/14/11	1490		N	J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	11.9			
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	18.2			
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	79.3		N	J
Iron	6010B	2.7	0.2	2.0	09/07/11	09/14/11	42300			
Lead	6020A	0.035	0.006	5.0	09/07/11	10/18/11	16.1		N*	J
Magnesium	6010B	2.73	0.03	2.0	09/07/11	09/14/11	732		N	J
Manganese	6010B	1.36	0.03	2.0	09/07/11	09/14/11	758			
Mercury	7471A	0.190	0.019	10.0	09/09/11	09/09/11	1.50			
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	53.5			
Potassium	6010B	55	3.4	2.0	09/07/11	09/14/11	1280		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.55			
Silver	6020A	0.014	0.005	5.0	09/07/11	09/20/11	0.229			
Sodium	6010B	13.6	2.7	2.0	09/07/11	09/14/11	36.1			
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.076			
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	26.7			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	128			

% Solids: 89.9

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/13/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD13SB14 Lab Code: K1108031-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.1	5.5	2.0	09/07/11	09/14/11	12700			
Antimony	6020A	0.045	0.008	5.0	09/07/11	10/05/11	3.910		N	J
Arsenic	6020A	0.45	0.05	5.0	09/07/11	10/19/11	12.8			
Barium	6020A	0.045	0.005	5.0	09/07/11	10/18/11	156			
Beryllium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.357			
Cadmium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.274			
Calcium	6010B	9.1	1.8	2.0	09/07/11	09/14/11	2510		N	J
Chromium	6020A	0.18	0.03	5.0	09/07/11	10/18/11	18.9			
Cobalt	6020A	0.018	0.003	5.0	09/07/11	10/18/11	7.210			
Copper	6020A	0.09	0.05	5.0	09/07/11	10/18/11	20.1		N	J
Iron	6010B	3.6	0.3	2.0	09/07/11	09/14/11	24300			
Lead	6020A	0.045	0.008	5.0	09/07/11	10/18/11	7.460		N*	J
Magnesium	6010B	3.63	0.04	2.0	09/07/11	09/14/11	4370		N	J
Manganese	6010B	1.82	0.04	2.0	09/07/11	09/14/11	287			
Mercury	7471A	0.195	0.020	10.0	09/09/11	09/09/11	3.92			
Nickel	6020A	0.18	0.03	5.0	09/07/11	10/18/11	22.3			
Potassium	6010B	73	4.5	2.0	09/07/11	09/14/11	609		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.37			
Silver	6020A	0.018	0.007	5.0	09/07/11	09/20/11	0.138			
Sodium	6010B	18.2	3.6	2.0	09/07/11	09/14/11	77.8			
Thallium	6020A	0.018	0.002	5.0	09/07/11	10/18/11	0.076			
Vanadium	6020A	0.18	0.02	5.0	09/07/11	10/18/11	29.7			
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	53.7			

% Solids: 76.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/13/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP20SB04 Lab Code: K1108031-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	6.4	3.8	2.0	09/07/11	09/14/11	2670			
Antimony	6020A	0.032	0.006	5.0	09/07/11	10/05/11	0.909		N	J
Arsenic	6020A	0.32	0.04	5.0	09/07/11	10/19/11	22.2			
Barium	6020A	0.032	0.003	5.0	09/07/11	10/18/11	190			
Beryllium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.555			
Cadmium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.429			
Calcium	6010B	6.4	1.3	2.0	09/07/11	09/14/11	1160		N	J
Chromium	6020A	0.13	0.02	5.0	09/07/11	10/18/11	14.1			
Cobalt	6020A	0.013	0.002	5.0	09/07/11	10/18/11	14.1			
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	59.2		N	J
Iron	6010B	2.6	0.2	2.0	09/07/11	09/14/11	45000			
Lead	6020A	0.032	0.006	5.0	09/07/11	10/18/11	12.3		N*	J
Magnesium	6010B	2.55	0.03	2.0	09/07/11	09/14/11	666		N	J
Manganese	6010B	1.27	0.03	2.0	09/07/11	09/14/11	1100			
Mercury	7471A	0.148	0.015	10.0	09/09/11	09/09/11	2.12			
Nickel	6020A	0.13	0.02	5.0	09/07/11	10/18/11	44.5			
Potassium	6010B	51	3.2	2.0	09/07/11	09/14/11	923		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.63			
Silver	6020A	0.013	0.005	5.0	09/07/11	09/20/11	0.277			
Sodium	6010B	12.7	2.6	2.0	09/07/11	09/14/11	24.5			
Thallium	6020A	0.013	0.001	5.0	09/07/11	10/18/11	0.082			
Vanadium	6020A	0.13	0.01	5.0	09/07/11	10/18/11	28.2			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	89.1			

% Solids: 87.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/14/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP33SB06 Lab Code: K1108031-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	4.7	2.8	2.0	09/07/11	09/14/11	1640			
Antimony	6020A	0.023	0.004	5.0	09/07/11	10/05/11	0.592		N	J
Arsenic	6020A	0.23	0.03	5.0	09/07/11	10/19/11	15.7			
Barium	6020A	0.023	0.002	5.0	09/07/11	10/18/11	65.0			J
Beryllium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.637			
Cadmium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.921			
Calcium	6010B	4.7	0.9	2.0	09/07/11	09/14/11	1410		N	J
Chromium	6020A	0.09	0.01	5.0	09/07/11	10/18/11	19.6			
Cobalt	6020A	0.009	0.001	5.0	09/07/11	10/18/11	21.8			
Copper	6020A	0.05	0.02	5.0	09/07/11	10/18/11	113		N	J
Iron	6010B	1.9	0.1	2.0	09/07/11	09/14/11	30600			
Lead	6020A	0.023	0.004	5.0	09/07/11	10/18/11	22.2		N*	J
Magnesium	6010B	1.87	0.02	2.0	09/07/11	09/14/11	529		N	J
Manganese	6010B	0.94	0.02	2.0	09/07/11	09/14/11	587			J
Mercury	7471A	0.173	0.017	10.0	09/09/11	09/09/11	3.44			
Nickel	6020A	0.09	0.01	5.0	09/07/11	10/18/11	87.8			
Potassium	6010B	38	2.3	2.0	09/07/11	09/14/11	914		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.75			
Silver	6020A	0.009	0.004	5.0	09/07/11	09/20/11	0.462			
Sodium	6010B	9.4	1.9	2.0	09/07/11	09/14/11	23.0			
Thallium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.071			
Vanadium	6020A	0.09	0.01	5.0	09/07/11	10/18/11	42.7			
Zinc	6020A	0.2	0.1	5.0	09/07/11	10/18/11	199			

% Solids: 92.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/16/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP40SB10 Lab Code: K1108031-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	5.3	3.2	2.0	09/07/11	09/14/11	7380			
Antimony	6010B	5.3	1.6	2.0	09/07/11	09/14/11	868		N	J
Arsenic	6010B	10.5	2.1	2.0	09/07/11	09/14/11	1150			
Barium	6020A	0.026	0.003	5.0	09/07/11	10/18/11	347			
Beryllium	6020A	0.010	0.002	5.0	09/07/11	10/18/11	0.356			
Cadmium	6020A	0.010	0.002	5.0	09/07/11	10/18/11	0.335			
Calcium	6010B	5.3	1.1	2.0	09/07/11	09/14/11	1680		N	J
Chromium	6020A	0.11	0.02	5.0	09/07/11	10/18/11	21.3			
Cobalt	6020A	0.010	0.002	5.0	09/07/11	10/18/11	11.5			
Copper	6020A	0.05	0.03	5.0	09/07/11	10/18/11	30.2		N	J
Iron	6010B	2.1	0.2	2.0	09/07/11	09/14/11	33200			
Lead	6020A	0.026	0.005	5.0	09/07/11	10/18/11	6.920		N*	J
Magnesium	6010B	2.11	0.02	2.0	09/07/11	09/14/11	3360		N	J
Manganese	6010B	1.05	0.02	2.0	09/07/11	09/14/11	743			
Mercury	7471A	16.7	1.67	1000.0	09/09/11	09/09/11	119			
Nickel	6020A	0.11	0.02	5.0	09/07/11	10/18/11	40.0			
Potassium	6010B	42	2.6	2.0	09/07/11	09/14/11	1310		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.41			
Silver	6020A	0.011	0.004	5.0	09/07/11	09/20/11	0.153			
Sodium	6010B	10.5	2.1	2.0	09/07/11	09/14/11	76.5			
Thallium	6020A	0.010	0.001	5.0	09/07/11	10/18/11	0.109			
Vanadium	6020A	0.11	0.01	5.0	09/07/11	10/18/11	22.8			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	70.1			

% Solids: 86.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/21/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP13SB04 **Lab Code:** K1108031-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	6.9	4.2	2.0	09/07/11	09/14/11	2440			
Antimony	6010B	6.9	2.1	2.0	09/07/11	09/14/11	50.1		N	J
Arsenic	6020A	0.34	0.04	5.0	09/07/11	10/19/11	126			
Barium	6020A	0.034	0.003	5.0	09/07/11	10/18/11	99.4			
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.386			
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.480			
Calcium	6010B	6.9	1.4	2.0	09/07/11	09/14/11	1400		N	J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	13.3			
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	13.7			
Copper	6020A	0.07	0.03	5.0	09/07/11	10/18/11	42.9		N	J
Iron	6010B	2.8	0.2	2.0	09/07/11	09/14/11	35200			
Lead	6020A	0.034	0.006	5.0	09/07/11	10/18/11	11.0		N*	J
Magnesium	6010B	2.78	0.03	2.0	09/07/11	09/14/11	626		N	J
Manganese	6010B	1.39	0.03	2.0	09/07/11	09/14/11	974			
Mercury	7471A	1.87	0.187	100.0	09/09/11	09/09/11	16.6			
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	46.9			
Potassium	6010B	56	3.5	2.0	09/07/11	09/14/11	824		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.61			
Silver	6020A	0.014	0.006	5.0	09/07/11	09/20/11	0.222			
Sodium	6010B	13.9	2.8	2.0	09/07/11	09/14/11	25.3			
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.066			
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	23.3			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	103			

% Solids: 91.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP21SB04 Lab Code: K1108031-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.0	4.2	2.0	09/07/11	09/14/11	6290			
Antimony	6020A	0.035	0.006	5.0	09/07/11	10/05/11	15.3		N	J
Arsenic	6020A	0.36	0.04	5.0	09/07/11	10/19/11	15.3			
Barium	6020A	0.036	0.004	5.0	09/07/11	10/18/11	212			
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.586			
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.515			
Calcium	6010B	7.0	1.4	2.0	09/07/11	09/14/11	1170		N	J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	16.1			
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	18.5			
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	59.2		N	J
Iron	6010B	2.8	0.2	2.0	09/07/11	09/14/11	39800			
Lead	6020A	0.036	0.006	5.0	09/07/11	10/18/11	15.7		N*	J
Magnesium	6010B	2.78	0.03	2.0	09/07/11	09/14/11	1320		N	J
Manganese	6010B	1.39	0.03	2.0	09/07/11	09/14/11	973			
Mercury	7471A	0.163	0.016	10.0	09/09/11	09/09/11	1.09			
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	53.5			
Potassium	6010B	56	3.5	2.0	09/07/11	09/14/11	946		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.67			
Silver	6020A	0.014	0.006	5.0	09/07/11	09/20/11	0.252			
Sodium	6010B	13.9	2.8	2.0	09/07/11	09/14/11	27.4			
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.093			
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	34.5			
Zinc	6020A	0.4	0.1	5.0	09/07/11	10/18/11	119			

% Solids: 86.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP24SB04 Lab Code: K1108031-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.3	4.4	2.0	09/07/11	09/14/11	2190			
Antimony	6010B	7.3	2.2	2.0	09/07/11	09/14/11	201		N	J
Arsenic	6010B	14.5	2.9	2.0	09/07/11	09/14/11	1900			
Barium	6020A	0.037	0.004	5.0	09/07/11	10/18/11	139			
Beryllium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.659			
Cadmium	6020A	0.015	0.002	5.0	09/07/11	10/18/11	0.600			
Calcium	6010B	7.3	1.5	2.0	09/07/11	09/14/11	4060		N	J
Chromium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	27.5			
Cobalt	6020A	0.015	0.002	5.0	09/07/11	10/18/11	24.6			
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	71.3		N	J
Iron	6010B	2.9	0.2	2.0	09/07/11	09/14/11	38700			
Lead	6020A	0.037	0.007	5.0	09/07/11	10/18/11	19.0		N*	J
Magnesium	6010B	2.90	0.03	2.0	09/07/11	09/14/11	10200		N	J
Manganese	6010B	1.45	0.03	2.0	09/07/11	09/14/11	678			
Mercury	7471A	18.5	1.85	1000.0	09/09/11	09/09/11	390			
Nickel	6020A	0.15	0.02	5.0	09/07/11	10/18/11	86.5			
Potassium	6010B	58	3.6	2.0	09/07/11	09/14/11	1080		N	J
Selenium	7742	0.50	0.15	10.0	09/29/11	10/05/11	0.78			
Silver	6020A	0.014	0.006	5.0	09/07/11	09/20/11	0.266			
Sodium	6010B	14.5	2.9	2.0	09/07/11	09/14/11	44.2			
Thallium	6020A	0.015	0.001	5.0	09/07/11	10/18/11	0.297			
Vanadium	6020A	0.15	0.02	5.0	09/07/11	10/18/11	30.6			
Zinc	6020A	0.4	0.1	5.0	09/07/11	10/18/11	116			

% Solids: 92.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP24SB18 Lab Code: K1108031-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	7.0	4.2	2.0	09/07/11	09/14/11	6170			
Antimony	6010B	7.0	2.1	2.0	09/07/11	09/14/11	4430		N	J
Arsenic	6010B	14.0	2.8	2.0	09/07/11	09/14/11	3150			
Barium	6020A	0.036	0.004	5.0	09/07/11	10/18/11	463			
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.826			
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.432			
Calcium	6010B	7.0	1.4	2.0	09/07/11	09/14/11	6910		N	J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	37.9			
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	17.6			
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	62.7		N	J
Iron	6010B	2.8	0.2	2.0	09/07/11	09/14/11	35300			
Lead	6020A	0.036	0.006	5.0	09/07/11	10/18/11	7.750		N*	J
Magnesium	6010B	2.80	0.03	2.0	09/07/11	09/14/11	11100		N	J
Manganese	6010B	1.40	0.03	2.0	09/07/11	09/14/11	550			
Mercury	7471A	19.4	1.94	1000.0	09/09/11	09/09/11	499			
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	64.1			
Potassium	6010B	56	3.5	2.0	09/07/11	09/14/11	1970		N	J
Selenium	7742	0.49	0.15	10.0	09/29/11	10/05/11	0.96			
Silver	6020A	0.014	0.006	5.0	09/07/11	09/20/11	0.208			
Sodium	6010B	14.0	2.8	2.0	09/07/11	09/14/11	185			
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.244			
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	29.4			
Zinc	6020A	0.4	0.1	5.0	09/07/11	10/18/11	97.3			

% Solids: 90.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP25SB20 Lab Code: K1108031-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.1	5.4	2.0	09/07/11	09/14/11	9800			
Antimony	6010B	9.1	2.7	2.0	09/07/11	09/14/11	405		N	J
Arsenic	6020A	0.46	0.06	5.0	09/07/11	10/19/11	84.8			
Barium	6020A	0.046	0.005	5.0	09/07/11	10/18/11	120			
Beryllium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.483			
Cadmium	6020A	0.018	0.003	5.0	09/07/11	10/18/11	0.337			
Calcium	6010B	9.1	1.8	2.0	09/07/11	09/14/11	1540		N	J
Chromium	6020A	0.18	0.03	5.0	09/07/11	10/18/11	20.2			
Cobalt	6020A	0.018	0.003	5.0	09/07/11	10/18/11	13.0			
Copper	6020A	0.09	0.05	5.0	09/07/11	10/18/11	26.8		N	J
Iron	6010B	3.6	0.3	2.0	09/07/11	09/14/11	29700			
Lead	6020A	0.046	0.008	5.0	09/07/11	10/18/11	8.710		N*	J
Magnesium	6010B	3.63	0.04	2.0	09/07/11	09/14/11	3490		N	J
Manganese	6010B	1.81	0.04	2.0	09/07/11	09/14/11	456			
Mercury	7471A	0.193	0.019	10.0	09/09/11	09/09/11	2.91			
Nickel	6020A	0.18	0.03	5.0	09/07/11	10/18/11	27.8			
Potassium	6010B	73	4.5	2.0	09/07/11	09/14/11	931		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.32			
Silver	6020A	0.018	0.007	5.0	09/07/11	09/20/11	0.126			
Sodium	6010B	18.1	3.6	2.0	09/07/11	09/14/11	80.8			
Thallium	6020A	0.018	0.002	5.0	09/07/11	10/18/11	0.084			
Vanadium	6020A	0.18	0.02	5.0	09/07/11	10/18/11	35.8			
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	63.2			

% Solids: 84.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP25SB26 Lab Code: K1108031-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	5.5	3.3	2.0	09/07/11	09/14/11	8920			
Antimony	6010B	5.5	1.7	2.0	09/07/11	09/14/11	608		N	J
Arsenic	6020A	0.27	0.03	5.0	09/07/11	10/19/11	451			
Barium	6020A	0.027	0.003	5.0	09/07/11	10/18/11	341			
Beryllium	6020A	0.011	0.002	5.0	09/07/11	10/18/11	0.495			
Cadmium	6020A	0.011	0.002	5.0	09/07/11	10/18/11	0.927			
Calcium	6010B	5.5	1.1	2.0	09/07/11	09/14/11	2570		N	J
Chromium	6020A	0.11	0.02	5.0	09/07/11	10/18/11	19.7			
Cobalt	6020A	0.011	0.002	5.0	09/07/11	10/18/11	15.6			
Copper	6020A	0.05	0.03	5.0	09/07/11	10/18/11	28.9		N	J
Iron	6010B	2.2	0.2	2.0	09/07/11	09/14/11	43700			
Lead	6020A	0.027	0.005	5.0	09/07/11	10/18/11	7.390		N*	J
Magnesium	6010B	2.20	0.02	2.0	09/07/11	09/14/11	3740		N	J
Manganese	6010B	1.10	0.02	2.0	09/07/11	09/14/11	3510			
Mercury	7471A	1.70	0.170	100.0	09/09/11	09/09/11	62.2			
Nickel	6020A	0.11	0.02	5.0	09/07/11	10/18/11	51.4			
Potassium	6010B	44	2.8	2.0	09/07/11	09/14/11	885		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.33			
Silver	6020A	0.011	0.004	5.0	09/07/11	09/20/11	0.205			
Sodium	6010B	11.0	2.2	2.0	09/07/11	09/14/11	63.0			
Thallium	6020A	0.011	0.001	5.0	09/07/11	10/18/11	0.093			
Vanadium	6020A	0.11	0.01	5.0	09/07/11	10/18/11	31.0			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	79.5			

% Solids: 88.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/15/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP21SB14 **Lab Code:** K1108031-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	6.9	4.1	2.0	09/07/11	09/14/11	2700			
Antimony	6020A	0.034	0.006	5.0	09/07/11	10/05/11	1.130		N	J
Arsenic	6020A	0.34	0.04	5.0	09/07/11	10/19/11	8.10			
Barium	6020A	0.034	0.003	5.0	09/07/11	10/18/11	99.7			
Beryllium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.600			
Cadmium	6020A	0.013	0.002	5.0	09/07/11	10/18/11	0.359			
Calcium	6010B	6.9	1.4	2.0	09/07/11	09/14/11	1150		N	J
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	14.2			
Cobalt	6020A	0.013	0.002	5.0	09/07/11	10/18/11	16.2			
Copper	6020A	0.07	0.03	5.0	09/07/11	10/18/11	48.2		N	J
Iron	6010B	2.7	0.2	2.0	09/07/11	09/14/11	39800			
Lead	6020A	0.034	0.006	5.0	09/07/11	10/18/11	12.1		N*	J
Magnesium	6010B	2.74	0.03	2.0	09/07/11	09/14/11	759		N	J
Manganese	6010B	1.37	0.03	2.0	09/07/11	09/14/11	599			
Mercury	7471A	0.076	0.008	5.0	09/09/11	09/09/11	0.751			
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	49.1			
Potassium	6010B	55	3.4	2.0	09/07/11	09/14/11	987		N	J
Selenium	7742	0.10	0.03	2.0	09/29/11	10/05/11	0.45			
Silver	6020A	0.014	0.005	5.0	09/07/11	09/20/11	0.097			
Sodium	6010B	13.7	2.7	2.0	09/07/11	09/14/11	21.3			
Thallium	6020A	0.013	0.001	5.0	09/07/11	10/18/11	0.053			
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	36.1			
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	93.4			

% Solids: 89.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108031
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP29SB10 Lab Code: K1108031-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	4.6	2.8	2.0	09/07/11	09/14/11	9580			
Antimony	6010B	23.1	6.9	10.0	09/07/11	09/20/11	12600		N	J
Arsenic	6010B	46.3	9.3	10.0	09/07/11	09/20/11	5580			
Barium	6010B	0.9	0.1	2.0	09/07/11	09/14/11	664			
Beryllium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.676			
Cadmium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.354			
Calcium	6010B	4.6	0.9	2.0	09/07/11	09/14/11	6770		N	J
Chromium	6020A	0.09	0.01	5.0	09/07/11	10/18/11	29.4			
Cobalt	6020A	0.009	0.001	5.0	09/07/11	10/18/11	12.2			
Copper	6020A	0.05	0.02	5.0	09/07/11	10/18/11	51.1		N	J
Iron	6010B	1.9	0.1	2.0	09/07/11	09/14/11	32000			
Lead	6020A	0.023	0.004	5.0	09/07/11	10/18/11	0.055		N*	J
Magnesium	6010B	1.85	0.02	2.0	09/07/11	09/14/11	6900		N	J
Manganese	6010B	0.93	0.02	2.0	09/07/11	09/14/11	665			
Mercury	7471A	16.9	1.69	1000.0	09/09/11	09/09/11	163			
Nickel	6020A	0.09	0.01	5.0	09/07/11	10/18/11	50.5			
Potassium	6010B	37	2.3	2.0	09/07/11	09/14/11	3200	-	N	J
Selenium	7742	0.48	0.14	10.0	09/29/11	10/05/11	1.10			
Silver	6020A	0.019	0.007	10.0	09/07/11	09/22/11	0.232			
Sodium	6010B	9.3	1.9	2.0	09/07/11	09/14/11	258			
Thallium	6020A	0.009	0.001	5.0	09/07/11	10/18/11	0.423			
Vanadium	6020A	0.09	0.01	5.0	09/07/11	10/18/11	17.0			
Zinc	6020A	0.2	0.1	5.0	09/07/11	10/18/11	69.1			

% Solids: 87.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108031
Project No.: NA
Date Collected: 08/13/11
Project Name: Red Devil Mine
Date Received: 08/30/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP39SB06
Lab Code: K1108031-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	4.1	2.5	2.0	09/07/11	09/14/11	10100			
Antimony	6010B	4.1	1.2	2.0	09/07/11	09/14/11	5430		N	J
Arsenic	6010B	8.3	1.7	2.0	09/07/11	09/14/11	3240			
Barium	6020A	0.411	0.041	100.0	09/07/11	10/19/11	936			
Beryllium	6020A	0.008	0.001	5.0	09/07/11	10/18/11	0.463			
Cadmium	6020A	0.008	0.001	5.0	09/07/11	10/18/11	0.263			
Calcium	6010B	4.1	0.8	2.0	09/07/11	09/14/11	4080		N	J
Chromium	6020A	0.08	0.01	5.0	09/07/11	10/18/11	21.5			
Cobalt	6020A	0.008	0.001	5.0	09/07/11	10/18/11	9.180			
Copper	6020A	0.04	0.02	5.0	09/07/11	10/18/11	28.5		N	J
Iron	6010B	1.7	0.1	2.0	09/07/11	09/14/11	25200			
Lead	6020A	0.021	0.004	5.0	09/07/11	10/18/11	4.380		N*	J J
Magnesium	6010B	1.66	0.02	2.0	09/07/11	09/14/11	3980		N	J
Manganese	6010B	0.83	0.02	2.0	09/07/11	09/14/11	432			
Mercury	7471A	1.71	0.171	100.0	09/09/11	09/09/11	81.1			
Nickel	6020A	0.08	0.01	5.0	09/07/11	10/18/11	35.3			
Potassium	6010B	33	2.1	2.0	09/07/11	09/14/11	3100		N	J
Selenium	7742	0.50	0.15	10.0	09/29/11	10/05/11	1.02			
Silver	6020A	0.017	0.007	10.0	09/07/11	09/22/11	0.163			
Sodium	6010B	8.3	1.7	2.0	09/07/11	09/14/11	195			
Thallium	6020A	0.008	0.001	5.0	09/07/11	10/18/11	0.349			
Vanadium	6020A	0.08	0.01	5.0	09/07/11	10/18/11	18.5			
Zinc	6020A	0.2	0.1	5.0	09/07/11	10/18/11	45.6			

% Solids: 88.8

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 08/13/2011 to 08/17/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP39SB16	K1108031-012
2	11MP29SB10	K1108031-020
3	11RD13SB10	K1108031-022
4	11MP39SB06	K1108031-023
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Arsenic, Cadmium, and Selenium were recovered outside QC criteria for Matrix Spike analysis results are qualified “J” as estimated, 4x rule applied to Antimony.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Antimony, Cadmium, and Selenium had RPDs greater than QC limits in laboratory duplicate analysis, results are qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Analysis of serial dilutions was within QC criteria.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP39SB16
Al: (0.9811 mg/L)*(50ml/50ml) = 0.9811 mg/L = 981.1 ug/L
Lab reported 981 ug/L
Sb: (5.837 mg/L)*(50ml/50ml) = 5.837 mg/L = 5837 ug/L
Lab reported 5840 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 08/13/2011 to 08/17/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP39SB16	K1108031-012
2	11MP29SB10	K1108031-020
3	11RD13SB10	K1108031-022
4	11MP39SB06	K1108031-023
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Arsenic, Cadmium, and Selenium were recovered outside QC criteria for Matrix Spike analysis results are qualified “J” as estimated, 4x rule applied to Antimony.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Antimony, Cadmium, and Selenium had RPDs greater than QC limits in laboratory duplicate analysis, results are qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Analysis of serial dilutions was within QC criteria.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP39SB16
Al: (0.9811 mg/L)*(50ml/50ml) = 0.9811 mg/L = 981.1 ug/L
Lab reported 981 ug/L
Sb: (5.837 mg/L)*(50ml/50ml) = 5.837 mg/L = 5837 ug/L
Lab reported 5840 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 08/17/2011 to 08/18/2011	**Sample Matrix: Soil**
Analytical Method: SVOCs + TICs (*EPA 8270D)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP32SB04	K1108031-015
2	11MP25SB26	K1108031-018
3		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- * — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: MS/MSD analysis was within QC Criteria.

7. BLANKS AND BACKGROUND SAMPLES

_____ Acceptable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Several TICs were detected in the method blank below the reporting limit level, no results qualified based on these detections.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

__X__ Acceptable
_____ Acceptable with qualification

_____ **Unacceptable**

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
_____ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: NA

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion

profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP32SB04
Naphthalene: ((248.12 ng/ml*2.0ml*1)/(40.039g*0.818))*1 = 15.15 ng/g = 15.15 ug/kg
Lab reported 15 ug/kg

13. OVERALL ASSESSMENT OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108031

Cover Page - Organic Analysis Data Package
Semi-Volatile Organic Compounds by GC/MS

Sample Name	Lab Code	Date Collected	Date Received
11MP32SB04	K1108031-015	08/17/2011	08/30/2011
11MP25SB26	K1108031-018	08/18/2011	08/30/2011
11MP32SB04MS	KWG1108561-1	08/17/2011	08/30/2011
11MP32SB04DMS	KWG1108561-2	08/17/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Carl Degner

Date: 9/27/11 Title: SVOA Supervisor

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Soil

Service Request: K1108031
Date Collected: 08/17/2011
Date Received: 08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MP32SB04
Lab Code: K1108031-015

Extraction Method: EPA 3541
Analysis Method: 8270C

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	6.2	1.9	1	08/31/11	09/14/11	KWG1108561	
Phenol	ND	U	19	2.0	1	08/31/11	09/14/11	KWG1108561	
2-Chlorophenol	ND	U	6.2	2.0	1	08/31/11	09/14/11	KWG1108561	
1,3-Dichlorobenzene	ND	U	6.2	3.0	1	08/31/11	09/14/11	KWG1108561	
1,4-Dichlorobenzene	ND	U	6.2	2.9	1	08/31/11	09/14/11	KWG1108561	
1,2-Dichlorobenzene	ND	U	6.2	2.9	1	08/31/11	09/14/11	KWG1108561	
Benzyl Alcohol	ND	U	13	2.1	1	08/31/11	09/14/11	KWG1108561	
Bis(2-chloroisopropyl) Ether	ND	U	6.2	2.6	1	08/31/11	09/14/11	KWG1108561	
2-Methylphenol	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Hexachloroethane	ND	U	6.2	3.1	1	08/31/11	09/14/11	KWG1108561	
N-Nitrosodi-n-propylamine	ND	U	6.2	2.4	1	08/31/11	09/14/11	KWG1108561	
4-Methylphenol†	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Nitrobenzene	ND	U	6.2	2.2	1	08/31/11	09/14/11	KWG1108561	
Isophorone	ND	U	6.2	1.0	1	08/31/11	09/14/11	KWG1108561	
2-Nitrophenol	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dimethylphenol	ND	U	31	5.5	1	08/31/11	09/14/11	KWG1108561	
Bis(2-chloroethoxy)methane	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dichlorophenol	ND	U	6.2	1.0	1	08/31/11	09/14/11	KWG1108561	
Benzoic Acid	ND	U	130	96	1	08/31/11	09/14/11	KWG1108561	
1,2,4-Trichlorobenzene	ND	U	6.2	2.6	1	08/31/11	09/14/11	KWG1108561	
Naphthalene	**15**		6.2	2.3	1	08/31/11	09/14/11	KWG1108561	
4-Chloroaniline	ND	U	6.2	1.9	1	08/31/11	09/14/11	KWG1108561	
Hexachlorobutadiene	ND	U	6.2	2.5	1	08/31/11	09/14/11	KWG1108561	
4-Chloro-3-methylphenol	ND	U	6.2	1.4	1	08/31/11	09/14/11	KWG1108561	
2-Methylnaphthalene	**28**		6.2	2.2	1	08/31/11	09/14/11	KWG1108561	
Hexachlorocyclopentadiene	ND	U	31	29	1	08/31/11	09/14/11	KWG1108561	
2,4,6-Trichlorophenol	ND	U	6.2	1.4	1	08/31/11	09/14/11	KWG1108561	
2,4,5-Trichlorophenol	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
2-Chloronaphthalene	ND	U	6.2	1.6	1	08/31/11	09/14/11	KWG1108561	
2-Nitroaniline	ND	U	13	3.2	1	08/31/11	09/14/11	KWG1108561	
Acenaphthylene	ND	U	6.2	1.2	1	08/31/11	09/14/11	KWG1108561	
Dimethyl Phthalate	ND	U	6.2	1.0	1	08/31/11	09/14/11	KWG1108561	
2,6-Dinitrotoluene	ND	U	6.2	2.0	1	08/31/11	09/14/11	KWG1108561	
Acenaphthene	ND	U	6.2	1.4	1	08/31/11	09/14/11	KWG1108561	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP32SB04	**Units:**	ug/Kg
Lab Code:	K1108031-015	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
3-Nitroaniline	ND	U	13	2.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dinitrophenol	ND	U	130	17	1	08/31/11	09/14/11	KWG1108561	
Dibenzofuran	ND	U	6.2	1.2	1	08/31/11	09/14/11	KWG1108561	
4-Nitrophenol	ND	U	62	18	1	08/31/11	09/14/11	KWG1108561	
2,4-Dinitrotoluene	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Fluorene	**2.0**	J	6.2	1.1	1	08/31/11	09/14/11	KWG1108561	
4-Chlorophenyl Phenyl Ether	ND	U	6.2	1.4	1	08/31/11	09/14/11	KWG1108561	
Diethyl Phthalate	ND	U	6.2	1.3	1	08/31/11	09/14/11	KWG1108561	
4-Nitroaniline	ND	U	13	1.8	1	08/31/11	09/14/11	KWG1108561	
2-Methyl-4,6-dinitrophenol	ND	U	62	1.4	1	08/31/11	09/14/11	KWG1108561	
N-Nitrosodiphenylamine	ND	U	6.2	1.6	1	08/31/11	09/14/11	KWG1108561	
4-Bromophenyl Phenyl Ether	ND	U	6.2	1.6	1	08/31/11	09/14/11	KWG1108561	
Hexachlorobenzene	ND	U	6.2	1.2	1	08/31/11	09/14/11	KWG1108561	
Pentachlorophenol	ND	U	62	20	1	08/31/11	09/14/11	KWG1108561	
Phenanthrene	**8.4**		6.2	1.4	1	08/31/11	09/14/11	KWG1108561	
Anthracene	ND	U	6.2	1.6	1	08/31/11	09/14/11	KWG1108561	
Di-n-butyl Phthalate	ND	U	13	7.9	1	08/31/11	09/14/11	KWG1108561	
Fluoranthene	ND	U	6.2	1.6	1	08/31/11	09/14/11	KWG1108561	
Pyrene	**1.8**	J	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Butyl Benzyl Phthalate	ND	U	6.2	3.2	1	08/31/11	09/14/11	KWG1108561	
3,3'-Dichlorobenzidine	ND	U	62	3.7	1	08/31/11	09/14/11	KWG1108561	
Benz(a)anthracene	ND	U	6.2	1.7	1	08/31/11	09/14/11	KWG1108561	
Chrysene	**2.9**	J	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Bis(2-ethylhexyl) Phthalate	ND	U	62	7.0	1	08/31/11	09/14/11	KWG1108561	
Di-n-octyl Phthalate	ND	U	6.2	1.7	1	08/31/11	09/14/11	KWG1108561	
Benzo(b)fluoranthene	**3.1**	J	6.2	1.2	1	08/31/11	09/14/11	KWG1108561	
Benzo(k)fluoranthene	ND	U	6.2	1.4	1	08/31/11	09/14/11	KWG1108561	
Benzo(a)pyrene	ND	U	6.2	1.7	1	08/31/11	09/14/11	KWG1108561	
Indeno(1,2,3-cd)pyrene	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Dibenz(a,h)anthracene	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	
Benzo(g,h,i)perylene	ND	U	6.2	1.5	1	08/31/11	09/14/11	KWG1108561	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP32SB04	**Units:**	ug/Kg
Lab Code:	K1108031-015	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	55	11-80	09/14/11	Acceptable
Phenol-d6	56	20-86	09/14/11	Acceptable
Nitrobenzene-d5	61	27-91	09/14/11	Acceptable
2-Fluorobiphenyl	57	25-97	09/14/11	Acceptable
2,4,6-Tribromophenol	59	10-119	09/14/11	Acceptable
Terphenyl-d14	83	33-129	09/14/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011
		Date Extracted:	08/31/2011
		Date Analyzed:	09/14/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP32SB04	**Units:**	ug/Kg
Lab Code:	K1108031-015	**Basis:**	Dry
File ID:	J:\MS06\DATA\091411\0914F018.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108561
Analysis Method:	8270C		
Sample Amount:	40.039 g		
% Solids:	81.8		
Dilution Factor:	1		

CAS No.	Analyte Name	RT	Result	Q	Note
629-50-5	Tridecane	11.75	60	JN	
-	Unknown Alkane	22.16	52	J	
-	Unknown	22.99	210	J	
-	Unknown Alkane	24.89	62	J	
-	Unknown Alkane	25.68	89	J	
-	Unknown	26.31	70	J	
-	Unknown Alkane	26.41	50	J	
-	Unknown Alkane	27.10	57	J	
-	Unknown	27.24	560	J	
-	Unknown	28.30	57	J	

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP25SB26	**Units:**	ug/Kg
Lab Code:	K1108031-018	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	5.7	1.9	1	08/31/11	09/14/11	KWG1108561	
Phenol	ND	U	17	2.0	1	08/31/11	09/14/11	KWG1108561	
2-Chlorophenol	ND	U	5.7	2.0	1	08/31/11	09/14/11	KWG1108561	
1,3-Dichlorobenzene	ND	U	5.7	3.0	1	08/31/11	09/14/11	KWG1108561	
1,4-Dichlorobenzene	ND	U	5.7	2.9	1	08/31/11	09/14/11	KWG1108561	
1,2-Dichlorobenzene	ND	U	5.7	2.9	1	08/31/11	09/14/11	KWG1108561	
Benzyl Alcohol	ND	U	12	2.1	1	08/31/11	09/14/11	KWG1108561	
Bis(2-chloroisopropyl) Ether	ND	U	5.7	2.6	1	08/31/11	09/14/11	KWG1108561	
2-Methylphenol	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Hexachloroethane	ND	U	5.7	3.1	1	08/31/11	09/14/11	KWG1108561	
N-Nitrosodi-n-propylamine	ND	U	5.7	2.4	1	08/31/11	09/14/11	KWG1108561	
4-Methylphenol†	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Nitrobenzene	ND	U	5.7	2.2	1	08/31/11	09/14/11	KWG1108561	
Isophorone	ND	U	5.7	1.0	1	08/31/11	09/14/11	KWG1108561	
2-Nitrophenol	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dimethylphenol	ND	U	29	5.5	1	08/31/11	09/14/11	KWG1108561	
Bis(2-chloroethoxy)methane	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dichlorophenol	ND	U	5.7	1.0	1	08/31/11	09/14/11	KWG1108561	
Benzoic Acid	ND	U	120	96	1	08/31/11	09/14/11	KWG1108561	
1,2,4-Trichlorobenzene	ND	U	5.7	2.6	1	08/31/11	09/14/11	KWG1108561	
Naphthalene	ND	U	5.7	2.3	1	08/31/11	09/14/11	KWG1108561	
4-Chloroaniline	ND	U	5.7	1.9	1	08/31/11	09/14/11	KWG1108561	
Hexachlorobutadiene	ND	U	5.7	2.5	1	08/31/11	09/14/11	KWG1108561	
4-Chloro-3-methylphenol	ND	U	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	
2-Methylnaphthalene	ND	U	5.7	2.2	1	08/31/11	09/14/11	KWG1108561	
Hexachlorocyclopentadiene	ND	U	29	29	1	08/31/11	09/14/11	KWG1108561	
2,4,6-Trichlorophenol	ND	U	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	
2,4,5-Trichlorophenol	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
2-Chloronaphthalene	ND	U	5.7	1.6	1	08/31/11	09/14/11	KWG1108561	
2-Nitroaniline	ND	U	12	3.2	1	08/31/11	09/14/11	KWG1108561	
Acenaphthylene	ND	U	5.7	1.2	1	08/31/11	09/14/11	KWG1108561	
Dimethyl Phthalate	ND	U	5.7	1.0	1	08/31/11	09/14/11	KWG1108561	
2,6-Dinitrotoluene	ND	U	5.7	2.0	1	08/31/11	09/14/11	KWG1108561	
Acenaphthene	ND	U	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP25SB26	**Units:**	ug/Kg
Lab Code:	K1108031-018	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
3-Nitroaniline	ND	U	12	2.5	1	08/31/11	09/14/11	KWG1108561	
2,4-Dinitrophenol	ND	U	120	17	1	08/31/11	09/14/11	KWG1108561	
Dibenzofuran	ND	U	5.7	1.2	1	08/31/11	09/14/11	KWG1108561	
4-Nitrophenol	ND	U	57	18	1	08/31/11	09/14/11	KWG1108561	
2,4-Dinitrotoluene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Fluorene	ND	U	5.7	1.1	1	08/31/11	09/14/11	KWG1108561	
4-Chlorophenyl Phenyl Ether	ND	U	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	
Diethyl Phthalate	ND	U	5.7	1.3	1	08/31/11	09/14/11	KWG1108561	
4-Nitroaniline	ND	U	12	1.8	1	08/31/11	09/14/11	KWG1108561	
2-Methyl-4,6-dinitrophenol	ND	U	57	1.4	1	08/31/11	09/14/11	KWG1108561	
N-Nitrosodiphenylamine	ND	U	5.7	1.6	1	08/31/11	09/14/11	KWG1108561	
4-Bromophenyl Phenyl Ether	ND	U	5.7	1.6	1	08/31/11	09/14/11	KWG1108561	
Hexachlorobenzene	ND	U	5.7	1.2	1	08/31/11	09/14/11	KWG1108561	
Pentachlorophenol	ND	U	57	20	1	08/31/11	09/14/11	KWG1108561	
Phenanthrene	2.3	J	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	
Anthracene	ND	U	5.7	1.6	1	08/31/11	09/14/11	KWG1108561	
Di-n-butyl Phthalate	ND	U	12	7.9	1	08/31/11	09/14/11	KWG1108561	
Fluoranthene	ND	U	5.7	1.6	1	08/31/11	09/14/11	KWG1108561	
Pyrene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Butyl Benzyl Phthalate	ND	U	5.7	3.2	1	08/31/11	09/14/11	KWG1108561	
3,3'-Dichlorobenzidine	ND	U	57	3.7	1	08/31/11	09/14/11	KWG1108561	
Benz(a)anthracene	ND	U	5.7	1.7	1	08/31/11	09/14/11	KWG1108561	
Chrysene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Bis(2-ethylhexyl) Phthalate	52	J	57	7.0	1	08/31/11	09/14/11	KWG1108561	
Di-n-octyl Phthalate	ND	U	5.7	1.7	1	08/31/11	09/14/11	KWG1108561	
Benzo(b)fluoranthene	ND	U	5.7	1.2	1	08/31/11	09/14/11	KWG1108561	
Benzo(k)fluoranthene	ND	U	5.7	1.4	1	08/31/11	09/14/11	KWG1108561	
Benzo(a)pyrene	ND	U	5.7	1.7	1	08/31/11	09/14/11	KWG1108561	
Indeno(1,2,3-cd)pyrene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Dibenz(a,h)anthracene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	
Benzo(g,h,i)perylene	ND	U	5.7	1.5	1	08/31/11	09/14/11	KWG1108561	

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP25SB26	**Units:**	ug/Kg
Lab Code:	K1108031-018	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	50	11-80	09/14/11	Acceptable
Phenol-d6	53	20-86	09/14/11	Acceptable
Nitrobenzene-d5	59	27-91	09/14/11	Acceptable
2-Fluorobiphenyl	55	25-97	09/14/11	Acceptable
2,4,6-Tribromophenol	56	10-119	09/14/11	Acceptable
Terphenyl-d14	77	33-129	09/14/11	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011
		Date Extracted:	08/31/2011
		Date Analyzed:	09/14/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP25SB26	**Units:**	ug/Kg
Lab Code:	K1108031-018	**Basis:**	Dry
File ID:	J:\MS06\DATA\091411\0914F019.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108561
Analysis Method:	8270C		
Sample Amount:	40.048 g		
% Solids:	88.3		
Dilution Factor:	1		

CAS No.	Analyte Name	RT	Result	Q	Note
112-80-1	Oleic Acid	18.16	130	JN	
-	Unknown	19.06	60	J	
-	Unknown	20.40	250	J	
112-85-6	Docosanoic acid	20.98	230	JN	
-	Unknown Alkane	22.17	240	J	
-	Unknown Carboxylic Acid	22.88	110	J	
-	Unknown	23.51	68	J	
-	Unknown Alkane	25.69	110	J	
-	Unknown	25.74	68	J	
83-46-5	.beta.-Sitosterol	27.34	160	JN	

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K11108031**
Sampling Dates: 08/17/2011 to 08/18/2011	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP23SB24	K1108031-005
2	11MP32SB08	K1108031-021
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Matrix spike analysis was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Analysis of laboratory duplicates was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was within QC criteria

9. ANALYTE QUANTITATION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL) / (Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL) / (weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP23SB24
As: (2.516 mg/L)(50ml/50ml) = 2.516 mg/L
Lab reported 2.52 mg/L
Ba: (0.28623 mg/L)(50ml/50ml) = 0.28623 mg/L
Lab reported 0.300 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108031

Sample Name:	Lab Code:
11MP23SB24	K1108031-005
11MP23SB24D	K1108031-005D
11MP23SB24S	K1108031-005S
11MP23SB24SD	K1108031-005SD
11MP32SB08	K1108031-021
Method Blank	K1108031-MB

Comments:

Approved By: _____ **Date:** 10/21/11

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108031
Project No.:	NA	**Date Collected:**	08/18/11
Project Name:	Red Devil Mine	**Date Received:**	08/30/11
Matrix:	TCLP	**Units:**	mg/L
		Basis:	NA

Sample Name: 11MP23SB24 **Lab Code:** K1108031-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/07/11	09/21/11	2.52		
Barium	6010B	1.000	0.300	1.0	09/07/11	09/21/11	0.300	U	
Cadmium	6010B	0.010	0.002	1.0	09/07/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/07/11	09/21/11	0.003	U	
Lead	6010B	0.10	0.02	1.0	09/07/11	09/21/11	0.02	U	
Mercury	7470A	0.01000	0.00400	1.0	09/08/11	09/26/11	0.03870		
Selenium	6010B	0.20	0.02	1.0	09/07/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/07/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

TCLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108031
Project No.: NA
Date Collected: 08/17/11
Project Name: Red Devil Mine
Date Received: 08/30/11
Matrix: TCLP
Units: mg/L
Basis: NA

Sample Name: 11MP32SB08
Lab Code: K1108031-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010B	0.10	0.01	1.0	09/07/11	09/21/11	2.39		
Barium	6010B	1.000	0.300	1.0	09/07/11	09/21/11	0.542	J	
Cadmium	6010B	0.010	0.002	1.0	09/07/11	09/21/11	0.002	U	
Chromium	6010B	0.020	0.003	1.0	09/07/11	09/21/11	0.005	J	
Lead	6010B	0.10	0.02	1.0	09/07/11	09/21/11	0.02	U	
Mercury	7470A	0.01000	0.00400	1.0	09/08/11	09/26/11	0.00400	U	
Selenium	6010B	0.20	0.02	1.0	09/07/11	09/21/11	0.02	U	
Silver	6010B	0.020	0.007	1.0	09/07/11	09/21/11	0.007	U	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108031**
Sampling Dates: 8/17/2011 to 8/18/2011	**Sample Matrix: Soil**
Analytical Method: ***TPHD by AK102/AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/3/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP32SB04	K1108031-015
2	11MP25SB26	K1108031-018
3		
4		
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6		
7		
8		
9		
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12		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**YES**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as diesel and motor oil standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Diesel and motor oil standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: MS/MSD analysis was within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
__X__No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

__X__Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
_____Field Duplicates
__X__Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within QC criteria for Diesel analysis. Duplicate analysis of 11MP32SB04 for Motor Oil range had an RPD above QC limits results qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25 and TPH as motor oil was in the range of C25 to C36.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP32SB04
TPHD: ((23.65*10*1)/(30.38*0.818))*1 = 9.51678 mg/kg
Lab reported: 9.5 mg/kg
TPH as Motor Oil: ((80.16*10*1)/(30.38*0.818))*1 = 32.256 mg/kg
Lab reported 32 mg/kg

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____Acceptable
__X__Acceptable with Qualification
_____Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ERS Screening
_____Non-definitive with 10 % Conformation by Definitive Methodology
_____Definitive, Comprehensive Statistical Error Determination was performed.
__X__Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11MP32SB04	**Units:**	mg/Kg
Lab Code:	K1108031-015	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	32	J	J	130	3.6	1	08/31/11	09/14/11	KWG1108616	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	93	50-150	09/14/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated **Service Request:** K1108031
Project: Red Devil Mine

Cover Page - Organic Analysis Data Package
Residual Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP32SB04	K1108031-015	08/17/2011	08/30/2011
11MP25SB26	K1108031-018	08/18/2011	08/30/2011
11MP32SB04MS	KWG1108616-4	08/17/2011	08/30/2011
11MP32SB04DMS	KWG1108616-5	08/17/2011	08/30/2011
11MP32SB04	KWG1109296-1	08/17/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Loren E. Patwood Name: Loren Patwood

Date: 9/28/11 Title: Scientist

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11MP25SB26	**Units:**	mg/Kg
Lab Code:	K1108031-018	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	**2.7**	J	23	1.5	1	08/31/11	09/14/11	KWG1108617	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	95	50-150	09/14/11	Acceptable

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/17/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Diesel Range Organics

Sample Name:	11MP32SB04	**Units:**	mg/Kg
Lab Code:	K1108031-015	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	9.5	J	25	1.6	1	08/31/11	09/14/11	KWG1108617	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	101	50-150	09/14/11	Acceptable

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108031

Cover Page - Organic Analysis Data Package
Diesel Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP32SB04	K1108031-015	08/17/2011	08/30/2011
11MP25SB26	K1108031-018	08/18/2011	08/30/2011
11MP32SB04MS	KWG1108617-4	08/17/2011	08/30/2011
11MP32SB04DMS	KWG1108617-5	08/17/2011	08/30/2011
11MP32SB04	KWG1109299-1	08/17/2011	08/30/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Loren E. Portwood Name: Loren Portwood

Date: 9/28/11 Title: Scientist

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108031
Project:	Red Devil Mine	**Date Collected:**	08/18/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Residual Range Organics

Sample Name:	11MP25SB26	**Units:**	mg/Kg
Lab Code:	K1108031-018	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	**15**	J	120	3.3	1	08/31/11	09/14/11	KWG1108616	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	94	50-150	09/14/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 08/23/2011 to 08/29/2011	**Sample Matrix: Soil**
Analytical Method: General Chemistry	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP47SB26	K1108365-001
2	11MP47SB22	K1108365-002
3	11MP60SB24	K1108365-003
4	11MP45SB12	K1108365-004
5	11MP60SB04	K1108365-005
6	11MP52SB08	K1108365-006
7	11MP54SB04	K1108365-007
8	11MP46SB04	K1108365-008
9	11MP66SB10	K1108365-009
10	11MP66SB06	K1108365-010
11	11MP61SB08	K1108365-011
12	11MP49SB16	K1108365-012
13	11MP57SB12	K1108365-013
14	11MP89SB30	K1108365-020
15	11MP51SB04	K1108365-022
16	11MP61SB04	K1108365-023
17	11MP56SB06	K1108365-024
18	11MP58SB08	K1108365-025
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Total Solids by 160.3M, Particle Size Distribution by ASTM D422, and Atterberg Limits by ASTM D4318, Specific Gravity by SM2710F.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: NA

3. LABORATORY CONTROL SAMPLE

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: NA

4. MATRIX SPIKE

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: NA

5. BLANKS AND BACKGROUND SAMPLES

___X___ Acceptable
_____ Detection Limits Adjusted

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The following blanks were analyzed:

__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: NA

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:

____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: NA

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/22/11 to 8/29/11	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 12/2/11**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP47SB26	K1108365-001
2	11MP47SB22	K1108365-002
3	11MP60SB24	K1108365-003
4	11MP45SB12	K1108365-004
5	11MP60SB04	K1108365-005
6	11MP46SB04	K1108365-008
7	11MP66SB10	K1108365-009
8	11MP66SB06	K1108365-010
9	11MP61SB08	K1108365-011
10	11MP49SB16	K1108365-012
11	11MP57SB12	K1108365-013
12	11MP89SB30	K1108365-020
13	11MP51SB04	K1108365-022
14	11MP61SB04	K1108365-023
15	11MP56SB06	K1108365-024
16	11MP58SB08	K1108365-025

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- _____ Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- X Method of Standard Additions results
- * ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**NO**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Matrix spikes analyzed had Antimony, Calcium, Copper, Magnesium and Zinc recoveries outside QC limits, associated results are qualified “J”. Post digestion spike results were within QC limits.

5. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Laboratory duplicate analysis had Antimony and Mercury that was above control limits, results are qualified "J" as estimated in associated samples.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Chromium had a percent difference greater than 10 in 11MP46SB04 serial dilution, results qualified "J".

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was within QC Criteria.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/24/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP47SB26
Lab Code: K1108365-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.8	0.4	2.0	09/22/11	10/11/11	5130			
Antimony	6020A	0.049	0.009	5.0	09/22/11	10/26/11	23.9		N*	J
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	111			
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	138			
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/26/11	0.756			
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.496			
Calcium	6010B	9.8	2.0	2.0	09/22/11	10/11/11	1970		N	J
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	16.7			
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	9.570			
Copper	6020A	0.10	0.05	5.0	09/23/11	10/26/11	57.2		N	J
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	33400			
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	15.7			
Magnesium	6010B	3.9	0.3	2.0	09/22/11	10/11/11	2020		N	J
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	326			
Mercury	7471A	1.80	0.180	100.0	09/14/11	09/14/11	16.0		*	J
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	30.2			
Potassium	6010B	58.6	19.5	2.0	09/22/11	10/11/11	1270			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.68			
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.325			
Sodium	6010B	39.0	3.9	2.0	09/22/11	10/11/11	66.9			
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.088			
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	34.3			
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	108		N	J

% Solids: 86.1

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108365

Sample Name:	Lab Code:
Batch QC1D	K1108363-008D
Batch QC1S	K1108363-008S
Batch QC1SD	K1108363-008SD
11MP47SB26	K1108365-001
11MP47SB26D	K1108365-001D
11MP47SB26S	K1108365-001S
11MP47SB26SD	K1108365-001SD
11MP47SB22	K1108365-002
11MP60SB24	K1108365-003
11MP45SB12	K1108365-004
11MP45SB12D	K1108365-004D
11MP45SB12S	K1108365-004S
11MP45SB12SD	K1108365-004SD
11MP60SB04	K1108365-005
11MP60SB04D	K1108365-005D
11MP60SB04S	K1108365-005S
11MP60SB04SD	K1108365-005SD
11MP46SB04	K1108365-008
11MP66SB10	K1108365-009
11MP66SB06	K1108365-010
11MP61SB08	K1108365-011
11MP49SB16	K1108365-012
11MP57SB12	K1108365-013
11MP89SB30	K1108365-020
11MP51SB04	K1108365-022
11MP61SB04	K1108365-023
11MP56SB06	K1108365-024
11MP58SB08	K1108365-025
Method Blank	K1108365-MB1
Method Blank	K1108365-MB2

Comments:

Approved By: _____ Date: 11/1/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/24/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP47SB22
Lab Code: K1108365-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.9	0.4	2.0	09/22/11	10/11/11	3180			
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	481		N*	J
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	1470			
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	133			
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/26/11	0.542			
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.621			
Calcium	6010B	9.9	2.0	2.0	09/22/11	10/11/11	5270		N	J
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	17.9			
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	17.7			
Copper	6020A	0.10	0.05	5.0	09/23/11	10/26/11	61.6		N	J
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	47300			
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	12.1			
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	11400		N	J
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	794			
Mercury	7471A	19.9	1.99	1000.0	09/14/11	09/14/11	303		*	J
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	62.3			
Potassium	6010B	59.4	19.8	2.0	09/22/11	10/11/11	1360			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.84			
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.255			
Sodium	6010B	39.6	4.0	2.0	09/22/11	10/11/11	71.0			
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.111			
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	20.8			
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	107		N	J

% Solids: 91.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/23/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP60SB24
Lab Code: K1108365-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	9.8	0.4	2.0	09/22/11	10/11/11	4420			
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	64.9		N*	J
Arsenic	6020A	0.49	0.06	5.0	09/23/11	10/26/11	496			
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	87.1			
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/26/11	0.516			
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.313			
Calcium	6010B	9.8	2.0	2.0	09/22/11	10/11/11	1350		N	J
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	12.4			
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	7.310			
Copper	6020A	0.10	0.05	5.0	09/23/11	10/26/11	35.4		N	J
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	30700			
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	9.550			
Magnesium	6010B	3.9	0.3	2.0	09/22/11	10/11/11	1620		N	J
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	501			
Mercury	7471A	1.81	0.181	100.0	09/14/11	09/14/11	38.6		*	J
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	27.2			
Potassium	6010B	58.9	19.6	2.0	09/22/11	10/11/11	1130			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.26			
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.230			
Sodium	6010B	39.3	3.9	2.0	09/22/11	10/11/11	79.1			
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.112			
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	24.0			
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	67.8		N	J

% Solids: 87.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/22/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP45SB12
Lab Code: K1108365-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	4110			
Antimony	6020A	0.050	0.009	5.0	09/22/11	10/26/11	16.5		N*	J
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	152			
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	126			
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/26/11	0.441			
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.595			
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1970		N	J
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	13.8			
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	13.9			
Copper	6020A	0.10	0.05	5.0	09/23/11	10/26/11	47.1		N	J
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	36900			
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	12.3			
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	1020		N	J
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	767			
Mercury	7471A	38.6	3.86	2000.0	09/14/11	09/14/11	1020		*	J
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	41.5			
Potassium	6010B	59.7	19.9	2.0	09/22/11	10/11/11	1040			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.58			
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.173			
Sodium	6010B	39.8	4.0	2.0	09/22/11	10/11/11	49.9			
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.116			
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	25.3			
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	96.2		N	J

% Solids: 86.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP60SB04 Lab Code: K1108365-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	2160			
Antimony	6020A	0.498	0.090	50.0	09/29/11	10/26/11	181		N	J
Arsenic	6020A	9.96	1.20	100.0	09/29/11	10/26/11	2510			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	145			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.880			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.387			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	5980			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	10.1			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	17.7			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	57.9			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	40800			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	15.1			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	8040			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	845			
Mercury	7471A	19.0	1.90	1000.0	09/14/11	09/14/11	276		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	56.1			
Potassium	6010B	59.8	19.9	2.0	09/29/11	10/10/11	1240			
Selenium	7742	0.49	0.15	10.0	10/13/11	10/21/11	0.95			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.227			
Sodium	6010B	39.8	4.0	2.0	09/29/11	10/10/11	47.8			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.170			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	20.7			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	101		N	J

% Solids: 92.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/23/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP46SB04
Lab Code: K1108365-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	8830			
Antimony	6010B	2.0	0.5	2.0	09/29/11	10/10/11	15800		N	J
Arsenic	6010B	2.0	0.9	2.0	09/29/11	10/10/11	4650		*	J
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	830			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.690			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.390			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	4830			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	26.9			J
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	11.4			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	81.6			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	29200			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	0.074			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	6510			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	626			
Mercury	7471A	19.2	1.92	1000.0	09/14/11	09/14/11	167		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	50.7			
Potassium	6010B	60.2	20.1	2.0	09/29/11	10/10/11	3240			
Selenium	7742	0.99	0.30	20.0	10/13/11	10/21/11	2.73			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.222			
Sodium	6010B	40.1	4.0	2.0	09/29/11	10/10/11	279			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.414			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	19.1			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	90.8		N	J

% Solids: 89.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/28/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP66SB10
Lab Code: K1108365-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	9950			
Antimony	6020A	0.050	0.009	5.0	09/29/11	10/26/11	24.6		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	78.0			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	90.9			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.396			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.442			
Calcium	6010B	2.0	0.6	2.0	09/29/11	10/10/11	1760			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	20.7			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	16.1			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	33.8			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	45400			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	9.360			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	4210			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	731			
Mercury	7471A	0.190	0.019	10.0	09/14/11	09/14/11	1.87		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	39.8			
Potassium	6010B	60.2	20.1	2.0	09/29/11	10/10/11	897			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.19			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.132			
Sodium	6010B	40.1	4.0	2.0	09/29/11	10/10/11	49.9			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.067			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	29.1			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	95.9		N	J

% Solids: 87.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/28/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP66SB06
Lab Code: K1108365-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	10600			
Antimony	6010B	2.0	0.5	2.0	09/29/11	10/10/11	131		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	196			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	87.3			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.365			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.401			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2520			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	19.9			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	14.3			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	29.6			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	21400			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	9.170			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	4710			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	360			
Mercury	7471A	1.88	0.188	100.0	09/14/11	09/14/11	31.0		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	33.0			
Potassium	6010B	60.1	20.0	2.0	09/29/11	10/10/11	981			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.34			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.139			
Sodium	6010B	40.0	4.0	2.0	09/29/11	10/10/11	55.3			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.074			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	29.2			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	84.3		N	J

% Solids: 88.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/29/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP61SB08
Lab Code: K1108365-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	14200			
Antimony	6020A	0.050	0.009	5.0	09/29/11	10/26/11	4.390		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	42.0			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	123			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.327			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.162			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2470			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	19.1			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	6.270			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	16.9			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	18600			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	7.470			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	3600			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	227			
Mercury	7471A	0.020	0.002	1.0	09/14/11	09/14/11	0.779		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	18.6			
Potassium	6010B	59.9	20.0	2.0	09/29/11	10/10/11	597			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.21			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.106			
Sodium	6010B	39.9	4.0	2.0	09/29/11	10/10/11	79.1			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.100			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	32.0			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	47.3		N	J

% Solids: 73.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/26/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP49SB16
Lab Code: K1108365-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	11400			
Antimony	6020A	0.050	0.009	5.0	09/29/11	10/26/11	37.5		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	68.0			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	110			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.267			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.184			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2450			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	18.8			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	6.790			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	17.5			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	17700			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	5.130			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	4190			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	226			
Mercury	7471A	0.180	0.018	10.0	09/14/11	09/14/11	2.68		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	18.7			
Potassium	6010B	59.8	19.9	2.0	09/29/11	10/10/11	705			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.04	J		
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.090			
Sodium	6010B	39.8	4.0	2.0	09/29/11	10/10/11	151			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.069			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	27.1			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	46.8		N	J

% Solids: 87.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP57SB12 Lab Code: K1108365-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	8130			
Antimony	6010B	2.0	0.5	2.0	09/29/11	10/10/11	8190		N	J
Arsenic	6010B	2.0	0.9	2.0	09/29/11	10/10/11	3900		*	J
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	150			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.331			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.263			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	5730			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	14.3			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	6.990			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	25.0			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	26700			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	1.100			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	2560			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	351			
Mercury	7471A	37.4	3.74	2000.0	09/14/11	09/14/11	1610		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	23.5			
Potassium	6010B	59.9	20.0	2.0	09/29/11	10/10/11	836			
Selenium	7742	0.49	0.15	10.0	10/13/11	10/21/11	1.82			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.126			
Sodium	6010B	39.9	4.0	2.0	09/29/11	10/10/11	85.2			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.143			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	18.9			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	50.6		N	J

% Solids: 85.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/27/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP89SB30
Lab Code: K1108365-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	5280			
Antimony	6020A	0.050	0.009	5.0	09/29/11	10/26/11	46.1		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	28.7			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	79.6			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.470			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.254			
Calcium	6010B	2.0	0.6	2.0	09/29/11	10/10/11	663			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	16.8			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	8.070			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	36.1			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	33700			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	9.290			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	936			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	168			
Mercury	7471A	0.183	0.018	10.0	09/14/11	09/14/11	0.932		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	39.7			
Potassium	6010B	60.1	20.0	2.0	09/29/11	10/10/11	966			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.24			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.113			
Sodium	6010B	40.1	4.0	2.0	09/29/11	10/10/11	40.4			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.090			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	31.9			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	85.7		N	J

% Solids: 87.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108365
Project No.: NA
Date Collected: 08/24/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP51SB04
Lab Code: K1108365-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	3130			
Antimony	6010B	2.0	0.5	2.0	09/29/11	10/10/11	247		N	J
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	879			
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	90.1			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.576			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.461			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2150			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	10.8			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	14.3			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	59.1			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	39600			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	13.1			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	1820			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	388			
Mercury	7471A	1.85	0.185	100.0	09/14/11	09/14/11	70.7		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	49.8			
Potassium	6010B	59.9	20.0	2.0	09/29/11	10/10/11	940			
Selenium	7742	0.49	0.15	10.0	10/13/11	10/21/11	1.06			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.181			
Sodium	6010B	39.9	4.0	2.0	09/29/11	10/10/11	37.1	J		
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.154			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	18.0			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	94.7		N	J

% Solids: 89.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP61SB04 Lab Code: K1108365-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	14300		
Antimony	6020A	0.050	0.009	5.0	09/29/11	10/26/11	2.330		N
Arsenic	6020A	0.50	0.06	5.0	09/29/11	10/26/11	52.9		
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	119		
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.315		
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.156		
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2490		
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	18.4		
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	6.070		
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	16.7		
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	17900		
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	7.340		
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	3540		
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	211		
Mercury	7471A	0.189	0.019	10.0	09/14/11	09/14/11	2.62		*
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	17.1		
Potassium	6010B	59.9	20.0	2.0	09/29/11	10/10/11	568		
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.24		
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.099		
Sodium	6010B	39.9	4.0	2.0	09/29/11	10/10/11	75.2		
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.099		
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	33.2		
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	47.1		N

% Solids: 74.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP56SB06 Lab Code: K1108365-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	10400			
Antimony	6010B	2.0	0.5	2.0	09/29/11	10/10/11	1190		N	JJ
Arsenic	6010B	2.0	0.9	2.0	09/29/11	10/10/11	715		*	JJ
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	198			
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.398			
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.514			
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	2190			
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	22.0			
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	9.250			
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	56.8			
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	37200			
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	59.8			
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	3260			
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	378			
Mercury	7471A	94.2	9.42	5000.0	09/14/11	09/14/11	2030		*	J
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	27.2			
Potassium	6010B	60.1	20.0	2.0	09/29/11	10/10/11	854			
Selenium	7742	0.10	0.03	2.0	10/13/11	10/21/11	0.46			
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.158			
Sodium	6010B	40.1	4.0	2.0	09/29/11	10/10/11	86.8			
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.114			
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	34.1			
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	461		N	J

% Solids: 77.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1108365
Date Collected: 08/29/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP58SB08
Lab Code: K1108365-025

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/29/11	10/10/11	7310		
Antimony	6010B	20.0	5.0	20.0	09/29/11	10/11/11	19600		N
Arsenic	6010B	2.0	0.9	2.0	09/29/11	10/10/11	4460		*
Barium	6020A	0.050	0.005	5.0	09/29/11	10/25/11	446		
Beryllium	6020A	0.020	0.003	5.0	09/29/11	10/26/11	0.327		
Cadmium	6020A	0.020	0.003	5.0	09/29/11	10/25/11	0.271		
Calcium	6010B	10.0	2.0	2.0	09/29/11	10/10/11	3090		
Chromium	6020A	0.20	0.03	5.0	09/29/11	10/25/11	16.8		
Cobalt	6020A	0.020	0.003	5.0	09/29/11	10/25/11	5.500		
Copper	6020A	0.10	0.05	5.0	09/29/11	10/26/11	26.9		
Iron	6010B	2.0	0.7	2.0	09/29/11	10/10/11	27900		
Lead	6020A	0.050	0.009	5.0	09/29/11	10/25/11	0.047	J	
Magnesium	6010B	4.0	0.3	2.0	09/29/11	10/10/11	2150		
Manganese	6010B	0.20	0.02	2.0	09/29/11	10/10/11	247		
Mercury	7471A	18.9	1.89	1000.0	09/14/11	09/14/11	622		*
Nickel	6020A	0.20	0.03	5.0	09/29/11	10/26/11	18.6		
Potassium	6010B	59.9	20.0	2.0	09/29/11	10/10/11	1440		
Selenium	7742	0.99	0.30	20.0	10/13/11	10/21/11	3.04		
Silver	6020A	0.020	0.008	5.0	09/29/11	10/27/11	0.196		
Sodium	6010B	39.9	4.0	2.0	09/29/11	10/10/11	96.5		
Thallium	6020A	0.020	0.002	5.0	09/29/11	10/25/11	0.257		
Vanadium	6020A	0.20	0.02	5.0	09/29/11	10/25/11	14.2		
Zinc	6020A	0.5	0.2	5.0	09/29/11	10/25/11	41.7		N

% Solids: 86.4

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/26/2011 to 8/29/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP52SB28	K1108365-018
2	11MP56SB06	K1108365-024
3	11MP58SB08	K1108365-025
4		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- * — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP52SB28 and 11MP58SB08 were designated for matrix spike. All SPLP metals recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_____ **Acceptable**
__X__ **Detection Limits Adjusted**

The following blanks were analyzed:
__X__ **Method (preparation) Blanks**
_____ **Field Blanks**
_____ **Calibration Blanks**
_____ **Rinsate Blanks**
_____ **Background Samples**

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank contains Calcium above the reporting limit, results for Calcium in samples 11MP52SB28 and 11MP56SB06 are qualified "U" as non-detect.

6. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
__X__ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis had RPD greater than 35% for Aluminum, associated results are qualified "J" as estimated, all other metals were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Serial Dilution analyses was within control limits with the exceptions of aluminum and Silver, associated results are qualified “J”.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL) / (Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL) / (weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP52SB28
Al: (2.722mg/L)*(50mL/50mL) = 2.722 mg/L = 2722 ug/L
Lab reported 2720 ug/L
SB: (0.1983mg/L)*(50mL/50mL) = 0.1983 mg/L = 198.3 ug/L
Lab reported 198 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108365

Sample Name:	Lab Code:
11MP52SB28	K1108365-018
11MP52SB28D	K1108365-018D
11MP52SB28S	K1108365-018S
11MP56SB06	K1108365-024
11MP58SB08	K1108365-025
11MP58SB08D	K1108365-025D
11MP58SB08S	K1108365-025S
11MP58SB08SD	K1108365-025SD
Method Blank	K1108365-MB

Comments:

Approved By: _____ Date: 10/31/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/26/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP52SB28 Lab Code: K1108365-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	45	1.0	09/14/11	10/12/11	2720		
Antimony	6010B	50.0	20.0	1.0	09/14/11	10/12/11	198		
Arsenic	6010B	100	20	1.0	09/14/11	10/12/11	43	J	
Barium	6010B	1000	1.0	1.0	09/14/11	10/12/11	33.6	J	
Beryllium	6010B	5.0	0.15	1.0	09/14/11	10/12/11	0.19	J	
Cadmium	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U	
Calcium	6010B	1000	10.0	1.0	09/14/11	10/12/11	1330		x
Chromium	6010B	10.0	2.5	1.0	09/14/11	10/12/11	3.5	J	
Cobalt	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U	
Copper	6010B	10.0	3.0	1.0	09/14/11	10/12/11	6.3	J	
Iron	6010B	20.0	10.0	1.0	09/14/11	10/12/11	3160		
Lead	6010B	50.0	15.0	1.0	09/14/11	10/12/11	15.0	U	
Magnesium	6010B	200	1.0	1.0	09/14/11	10/12/11	621		
Manganese	6010B	5.0	0.4	1.0	09/14/11	10/12/11	25.8		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	5.76		
Nickel	6010B	20.0	2.0	1.0	09/14/11	10/12/11	5.7	J	
Potassium	6010B	400	100	1.0	09/14/11	10/12/11	480		
Selenium	6010B	100	20	1.0	09/14/11	10/12/11	20	U	
Silver	6010B	20.0	5.0	1.0	09/14/11	10/12/11	7.3	J	
Sodium	6010B	10000	30	1.0	09/14/11	10/12/11	9460	J	
Thallium	6010B	100	20	1.0	09/14/11	10/12/11	20	U	
Vanadium	6010B	10.0	3.0	1.0	09/14/11	10/12/11	11.0		
Zinc	6010B	500	4.5	1.0	09/14/11	10/12/11	25.5	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP56SB06 Lab Code: K1108365-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	45	1.0	09/14/11	10/12/11	2260		
Antimony	6010B	50.0	20.0	1.0	09/14/11	10/12/11	2930		
Arsenic	6010B	100	20	1.0	09/14/11	10/12/11	204		
Barium	6010B	1000	1.0	1.0	09/14/11	10/12/11	36.4	J	
Beryllium	6010B	5.0	0.15	1.0	09/14/11	10/12/11	0.15	U	
Cadmium	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U	
Calcium	6010B	1000	10.0	1.0	09/14/11	10/12/11	1570		x
Chromium	6010B	10.0	2.5	1.0	09/14/11	10/12/11	4.5	J	
Cobalt	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U	
Copper	6010B	10.0	3.0	1.0	09/14/11	10/12/11	5.6	J	
Iron	6010B	20.0	10.0	1.0	09/14/11	10/12/11	2250		
Lead	6010B	50.0	15.0	1.0	09/14/11	10/12/11	15.0	U	
Magnesium	6010B	200	1.0	1.0	09/14/11	10/12/11	818		
Manganese	6010B	5.0	0.4	1.0	09/14/11	10/12/11	24.2		
Mercury	7470A	10.0	4.00	10.0	09/14/11	10/13/11	65.5		
Nickel	6010B	20.0	2.0	1.0	09/14/11	10/12/11	3.1	J	
Potassium	6010B	400	100	1.0	09/14/11	10/12/11	493		
Selenium	6010B	100	20	1.0	09/14/11	10/12/11	20	U	
Silver	6010B	20.0	5.0	1.0	09/14/11	10/12/11	8.0	J	
Sodium	6010B	10000	30	1.0	09/14/11	10/12/11	6860	J	
Thallium	6010B	100	20	1.0	09/14/11	10/12/11	20	U	
Vanadium	6010B	10.0	3.0	1.0	09/14/11	10/12/11	6.6	J	
Zinc	6010B	500	4.5	1.0	09/14/11	10/12/11	28.5	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108365
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP58SB08 Lab Code: K1108365-025

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q	
Aluminum	6010B	50	45	1.0	09/14/11	10/12/11	325			J
Antimony	6010B	50.0	20.0	1.0	09/14/11	10/12/11	26200			
Arsenic	6010B	100	20	1.0	09/14/11	10/12/11	4880			
Barium	6010B	1000	1.0	1.0	09/14/11	10/12/11	48.3	J		
Beryllium	6010B	5.0	0.15	1.0	09/14/11	10/12/11	0.15	U		
Cadmium	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U		
Calcium	6010B	1000	10.0	1.0	09/14/11	10/12/11	6410		x	
Chromium	6010B	10.0	2.5	1.0	09/14/11	10/12/11	2.5	U		
Cobalt	6010B	10	2.0	1.0	09/14/11	10/12/11	2.0	U		
Copper	6010B	10.0	3.0	1.0	09/14/11	10/12/11	3.0	U		
Iron	6010B	20.0	10.0	1.0	09/14/11	10/12/11	490			
Lead	6010B	50.0	15.0	1.0	09/14/11	10/12/11	15.0	U		
Magnesium	6010B	200	1.0	1.0	09/14/11	10/12/11	3920			
Manganese	6010B	5.0	0.4	1.0	09/14/11	10/12/11	74.9			
Mercury	7470A	10.0	4.00	10.0	09/14/11	10/13/11	25.2			
Nickel	6010B	20.0	2.0	1.0	09/14/11	10/12/11	2.8	J		
Potassium	6010B	400	100	1.0	09/14/11	10/12/11	1030			
Selenium	6010B	100	20	1.0	09/14/11	10/12/11	20	U		
Silver	6010B	20.0	5.0	1.0	09/14/11	10/12/11	7.7	J		J
Sodium	6010B	10000	30	1.0	09/14/11	10/12/11	7150	J		
Thallium	6010B	100	20	1.0	09/14/11	10/12/11	20	U		
Vanadium	6010B	10.0	3.0	1.0	09/14/11	10/12/11	3.0	U		
Zinc	6010B	500	4.5	1.0	09/14/11	10/12/11	6.7	J		

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/26/2011	**Sample Matrix: Soil**
Analytical Method: SVOCs + TICs (*EPA 8270D)*	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date: 12/2/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP54SB04	K1108365-007
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- * — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — GC/MS Tuning and Mass Calibration
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- X — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Reconstructed Ion Current (RIC) Chromatogram
- X — Quantitation Reports
- X — Raw and Enhanced Mass Spectra
- X — Reference Mass Spectra for Target Compounds
- X — Mass Spectral Library Search for TICs

Raw QC Data Package Section

- X — DFTPP and/or BFB mass spectra and mass listings
- X — RIC Chromatogram for Standards, LCS, and MS/MSD
- X — Quantitation Reports for Standards, LCS, and MS/MSD
- NR — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**GC/MS Tuning Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**NO**
6	**Matrix Spike/Matrix Spike Duplicate**	**NO**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**YES**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgment.

Water Samples:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C: 7 days (from collection) for extraction; 40 days (from extraction) for analysis.
Soil or Other Matrices:
EPA 8260B: 14 days (from collection) for analysis.
EPA 8270C:14 days (from collection) for extraction;40 days (from extraction) for analysis.

Comments: Analytical holding time was met.

2. GC/MS INSTRUMENT PERFORMANCE CRITERIA

X	**BFB (EPA 8260B) or DFTPP (EPA 8270C) has been run for every 12 hours of sample analysis per instrument.**
X	**The BFB or DFTPP ion abundance criteria indicated in EPA/540/G-90/004 have been met for each instrument.**

Comments: None.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (average RRF >= 0.05; %RSD <= 30). For analytes which exceeded the %RSD control limit, associated detected results are qualified as estimated (J). If the low calibration level was not detected, the non-detected results are qualified (UJ). For analytes which exceeded the RRF control limit, associated detected results are qualified as estimated (J) and the non-detected results are qualified as rejected (R).

Comments: Percent relative standard deviation values of all target analytes were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Percent Difference (%D) values were within the control limit (%D <= 20). For analytes which exceeded the %D control limit, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Percent difference values were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Laboratory Control Samples Analyzed**

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: All LCS recoveries were within the control limits generated by the laboratory, with the exception of Benzoic Acid, results are qualified "J" as estimated.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Matrix Spike/Matrix Spike Duplicates Analyzed**

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Batch QC was used for MS/MSD analysis, multiple compounds had poor recovery, these results are qualified as estimated "J".

7. BLANKS AND BACKGROUND SAMPLES

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No compounds were detected in the method blank at the reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: Surrogate recoveries were within the control limits.

9. INTERNAL STANDARDS

__X__ Acceptable

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **Acceptable with qualification**
_____ **Unacceptable**

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: The internal standard areas were within the range of 50% to 200% of the internal standard area for the continuing calibration.

10. DUPLICATE ANALYSES

__X__ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
__X__ **Field Duplicates**
_____ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was within QC criteria.

11. ANALYTE IDENTIFICATION

Evaluate the ion profiles for the sample analytes and compare them to the library ion profiles provided by the laboratory. Note any identifications which are not sufficiently supported by comparison to known ion profiles.

Comments: Analyte identification was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

EPA 8260B, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(volume of water purged, mL)}}$$

EPA 8260B, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)}}{\text{(internal standard area)(RF)(weight of soil extracted, g)(fraction solids)}}$$

EPA 8270C, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(volume of sample extracted, mL)(injection volume, uL)}}$$

EPA 8270C, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of internal standard, ng)(total volume of extract, uL)}}{\text{(internal standard area)(RF)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP54SB04
Acenaphthene: ((45.64x2x100)/(40.033x84.1))*100 = 271.119 ug/kg
Lab reported 270 ug/kg

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108365

Cover Page - Organic Analysis Data Package
Semi-Volatile Organic Compounds by GC/MS

Sample Name	Lab Code	Date Collected	Date Received
11MP54SB04	K1108365-007	08/26/2011	09/07/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Carl Degen

Date: 11/1/11 Title: Surv Supervisor

u:\Stealth\Crystal.rpt\FormSSum.rpt SuperSet Reference: RR134883

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Soil	**Date Received:**	09/07/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP54SB04	**Units:**	ug/Kg
Lab Code:	K1108365-007	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U		600	190	100	09/09/11	10/17/11	KWG1108867	
Phenol	ND	U		1800	200	100	09/09/11	10/17/11	KWG1108867	
2-Chlorophenol	ND	U		600	200	100	09/09/11	10/17/11	KWG1108867	
1,3-Dichlorobenzene	ND	U		600	300	100	09/09/11	10/17/11	KWG1108867	
1,4-Dichlorobenzene	ND	U		600	290	100	09/09/11	10/17/11	KWG1108867	
1,2-Dichlorobenzene	ND	U		600	290	100	09/09/11	10/17/11	KWG1108867	
Benzyl Alcohol	ND	U		1200	210	100	09/09/11	10/17/11	KWG1108867	
Bis(2-chloroisopropyl) Ether	ND	U		600	260	100	09/09/11	10/17/11	KWG1108867	
2-Methylphenol	ND	U		600	150	100	09/09/11	10/17/11	KWG1108867	
Hexachloroethane	ND	U		600	310	100	09/09/11	10/17/11	KWG1108867	
N-Nitrosodi-n-propylamine	ND	U	UJ	600	240	100	09/09/11	10/17/11	KWG1108867	
4-Methylphenol†	ND	U		600	150	100	09/09/11	10/17/11	KWG1108867	
Nitrobenzene	ND	U		600	220	100	09/09/11	10/17/11	KWG1108867	
Isophorone	ND	U		600	100	100	09/09/11	10/17/11	KWG1108867	
2-Nitrophenol	ND	U		600	150	100	09/09/11	10/17/11	KWG1108867	
2,4-Dimethylphenol	ND	U		3000	550	100	09/09/11	10/17/11	KWG1108867	
Bis(2-chloroethoxy)methane	ND	U		600	150	100	09/09/11	10/17/11	KWG1108867	
2,4-Dichlorophenol	ND	U		600	100	100	09/09/11	10/17/11	KWG1108867	
Benzoic Acid	ND	U	UJ	12000	9600	100	09/09/11	10/17/11	KWG1108867	*
1,2,4-Trichlorobenzene	ND	U		600	260	100	09/09/11	10/17/11	KWG1108867	
Naphthalene	**810**	D		600	230	100	09/09/11	10/17/11	KWG1108867	
4-Chloroaniline	ND	U		600	190	100	09/09/11	10/17/11	KWG1108867	
Hexachlorobutadiene	ND	U		600	250	100	09/09/11	10/17/11	KWG1108867	
4-Chloro-3-methylphenol	ND	U		600	140	100	09/09/11	10/17/11	KWG1108867	
2-Methylnaphthalene	**1900**	D		600	220	100	09/09/11	10/17/11	KWG1108867	
Hexachlorocyclopentadiene	ND	U		3000	2900	100	09/09/11	10/17/11	KWG1108867	
2,4,6-Trichlorophenol	ND	U		600	140	100	09/09/11	10/17/11	KWG1108867	
2,4,5-Trichlorophenol	ND	U		600	150	100	09/09/11	10/17/11	KWG1108867	
2-Chloronaphthalene	ND	U		600	160	100	09/09/11	10/17/11	KWG1108867	
2-Nitroaniline	ND	U		1200	320	100	09/09/11	10/17/11	KWG1108867	
Acenaphthylene	ND	Ui		600	200	100	09/09/11	10/17/11	KWG1108867	
Dimethyl Phthalate	ND	U		600	100	100	09/09/11	10/17/11	KWG1108867	
2,6-Dinitrotoluene	ND	U		600	200	100	09/09/11	10/17/11	KWG1108867	

Comments:

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Sample Matrix: Soil

Service Request: K1108365
Date Collected: 08/26/2011
Date Received: 09/07/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name: 11MP54SB04
Lab Code: K1108365-007

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8270C

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Acenaphthene	**270**	JD	600	140	100	09/09/11	10/17/11	KWG1108867	
3-Nitroaniline	ND	U	1200	250	100	09/09/11	10/17/11	KWG1108867	
2,4-Dinitrophenol	ND	U	12000	1700	100	09/09/11	10/17/11	KWG1108867	
Dibenzofuran	ND	Ui	600	200	100	09/09/11	10/17/11	KWG1108867	
4-Nitrophenol	ND	U UJ	6000	1800	100	09/09/11	10/17/11	KWG1108867	
2,4-Dinitrotoluene	ND	U UJ	600	150	100	09/09/11	10/17/11	KWG1108867	
Fluorene	**850**	D	600	110	100	09/09/11	10/17/11	KWG1108867	
4-Chlorophenyl Phenyl Ether	ND	U	600	140	100	09/09/11	10/17/11	KWG1108867	
Diethyl Phthalate	ND	U	600	130	100	09/09/11	10/17/11	KWG1108867	
4-Nitroaniline	ND	U	1200	180	100	09/09/11	10/17/11	KWG1108867	
2-Methyl-4,6-dinitrophenol	ND	U	6000	140	100	09/09/11	10/17/11	KWG1108867	
N-Nitrosodiphenylamine	ND	U	600	160	100	09/09/11	10/17/11	KWG1108867	
4-Bromophenyl Phenyl Ether	ND	U	600	160	100	09/09/11	10/17/11	KWG1108867	
Hexachlorobenzene	ND	U	600	120	100	09/09/11	10/17/11	KWG1108867	
Pentachlorophenol	ND	U UJ	6000	2000	100	09/09/11	10/17/11	KWG1108867	
Phenanthrene	**630**	D	600	140	100	09/09/11	10/17/11	KWG1108867	
Anthracene	ND	U	600	160	100	09/09/11	10/17/11	KWG1108867	
Di-n-butyl Phthalate	ND	U	1200	790	100	09/09/11	10/17/11	KWG1108867	
Fluoranthene	ND	U	600	160	100	09/09/11	10/17/11	KWG1108867	
Pyrene	ND	U	600	150	100	09/09/11	10/17/11	KWG1108867	
Butyl Benzyl Phthalate	ND	U	600	320	100	09/09/11	10/17/11	KWG1108867	
3,3'-Dichlorobenzidine	ND	U	6000	370	100	09/09/11	10/17/11	KWG1108867	
Benz(a)anthracene	ND	U	600	170	100	09/09/11	10/17/11	KWG1108867	
Chrysene	ND	U	600	150	100	09/09/11	10/17/11	KWG1108867	
Bis(2-ethylhexyl) Phthalate	ND	U	6000	700	100	09/09/11	10/17/11	KWG1108867	
Di-n-octyl Phthalate	ND	U	600	170	100	09/09/11	10/17/11	KWG1108867	
Benzo(b)fluoranthene	ND	U	600	120	100	09/09/11	10/17/11	KWG1108867	
Benzo(k)fluoranthene	ND	U	600	140	100	09/09/11	10/17/11	KWG1108867	
Benzo(a)pyrene	ND	U	600	170	100	09/09/11	10/17/11	KWG1108867	
Indeno(1,2,3-cd)pyrene	ND	U	600	150	100	09/09/11	10/17/11	KWG1108867	
Dibenz(a,h)anthracene	ND	U	600	150	100	09/09/11	10/17/11	KWG1108867	
Benzo(g,h,i)perylene	ND	U	600	150	100	09/09/11	10/17/11	KWG1108867	

* See Case Narrative

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Soil	**Date Received:**	09/07/2011

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP54SB04	**Units:**	ug/Kg
Lab Code:	K1108365-007	**Basis:**	Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	27	11-80	10/17/11	Acceptable
Phenol-d6	65	20-86	10/17/11	Acceptable
Nitrobenzene-d5	225	27-91	10/17/11	Outside Control Limits
2-Fluorobiphenyl	97	25-97	10/17/11	Acceptable
2,4,6-Tribromophenol	56	10-119	10/17/11	Acceptable
Terphenyl-d14	144	33-129	10/17/11	Outside Control Limits

† Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Soil	**Date Received:**	09/07/2011
		Date Extracted:	09/09/2011
		Date Analyzed:	10/17/2011

Tentatively Identified Compounds (TIC)
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	11MP54SB04	**Units:**	ug/Kg
Lab Code:	K1108365-007	**Basis:**	Dry
File ID:	J:\MS06\DATA\101711\1017F010.D	**Level:**	Low
Instrument ID:	MS06		
Extraction Method:	EPA 3541	**Extraction Lot:**	KWG1108867
Analysis Method:	8270C		
Sample Amount:	40.033 g		
% Solids:	84.1		
Dilution Factor:	100		

CAS No.	Analyte Name	RT	Result	Q	Note
-	Unknown	9.72	6500	J	
1120-21-4	Undecane	9.85	15000	JN	
17301-23-4	Undecane, 2,6-dimethyl-	11.03	7900	JN	
-	Unknown	11.62	16000	J	
-	Unknown Alkane	11.90	20000	J	
629-59-4	Tetradecane	12.83	5700	JN	
-	Unknown Branched Alkane	13.35	5000	J	
1921-70-6	Pentadecane, 2,6,10,14-tetramethyl	15.33	56000	JN	
593-45-3	Octadecane	16.04	11000	JN	
-	Unknown	16.74	8000	J	

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/28/11 to 8/29/11	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP59SB12	K1108365-021
2	11MP56SB06	K1108365-024
3	11MP58SB08	K1108365-025
4		
5		
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7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP58SB12 was designated for matrix spike. All TCLP metals recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis of 11MP59SB12 had Barium RPD outside control limits, all other RPDs were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP59SB12
As: (0.4155 mg/L)*(50mL/50mL) = 0.4155 mg/L
Lab reported 0.42 mg/L
Ba: (0.90635 mg/L)*(50mL/50mL) = 0.90635 mg/L
Lab reported 0.906 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/28/11 to 8/29/11	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP59SB12	K1108365-021
2	11MP56SB06	K1108365-024
3	11MP58SB08	K1108365-025
4		
5		
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12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP58SB12 was designated for matrix spike. All TCLP metals recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis of 11MP59SB12 had Barium RPD outside control limits, all other RPDs were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP59SB12
As: (0.4155 mg/L)*(50mL/50mL) = 0.4155 mg/L
Lab reported 0.42 mg/L
Ba: (0.90635 mg/L)*(50mL/50mL) = 0.90635 mg/L
Lab reported 0.906 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/28/11 to 8/29/11	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP59SB12	K1108365-021
2	11MP56SB06	K1108365-024
3	11MP58SB08	K1108365-025
4		
5		
6		
7		
8		
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11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- NR — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP58SB12 was designated for matrix spike. All TCLP metals recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis of 11MP59SB12 had Barium RPD outside control limits, all other RPDs were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP59SB12
As: (0.4155 mg/L)*(50mL/50mL) = 0.4155 mg/L
Lab reported 0.42 mg/L
Ba: (0.90635 mg/L)*(50mL/50mL) = 0.90635 mg/L
Lab reported 0.906 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108365**
Sampling Dates: 8/26/2011	**Sample Matrix: Soil**
Analytical Method: ***TPHD by AK102/AK103***	**Data Reviewer: B. Kroon**

REVIEW AND APPROVAL:

Data Reviewer: Bryan Kroon **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP54SB04	K1108365-007
2		
3		
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9		
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11		
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- * — Matrix Spike/Spike Duplicate Recoveries
- X — Laboratory Control Sample Recoveries
- X — Method Blank Summaries
- X — Initial Calibration Data
- X — Continuing Calibration Data
- X — Surrogate Compound Recovery Summary
- NR — Internal Standard Area Summary

Sample and Blank Data Package Section

- X — Chromatograms
- X — Quantitation Reports

Raw QC Data Package Section

- X — Quantitation Reports for Standards, LCS, and MS/MSD
- X — List of Instrument Detection Limits
- X — Chain-of-Custody Records
- X — Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Instrument Performance Criteria**	**YES**
3	**Initial Calibrations**	**YES**
4	**Continuing Calibrations**	**YES**
5	**Laboratory Control Sample**	**YES**
6	**Matrix Spike/Matrix Spike Duplicate**	**NO**
7	**Blanks and Background Samples**	**YES**
8	**Surrogate Compounds**	**YES**
9	**Internal Standards**	**N/A**
10	**Duplicate Analyses**	**YES**
11	**Analyte Identification**	**YES**
12	**Analyte Quantitation**	**YES**
13	**Overall Assessment of Data**	**YES**
14	**Usability of Data**	**YES**

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Purgeable analyses: 14 days (from collection) to analysis.
Extractable analyses: 14 days (from collection) to extraction;40 days (from extraction) to analysis.

Comments: Analytical holding time was met.

2. INSTRUMENT PERFORMANCE CRITERIA

X	**Raw data has been checked to verify that there is adequate resolution (>25%) between peaks of the standard compounds.**
X	**Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.**

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the non-detected results are qualified (UJ).

Comments: TPH as diesel and motor oil standards were used and %RSD values were within the control limit.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated non-detected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgment of the reviewer.

Comments: Diesel and motor oil standards were analyzed and percent difference values were within the control limit.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries were within the control limit.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Batch QC was used for Matrix Spike and Duplicate pair, the duplicate had an RPD greater than QC limits, sample result qualified “J” as estimated.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the non-detected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____Acceptable
_____Acceptable with qualification
_____Unacceptable
___X___No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and nondetected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments:

10. DUPLICATE ANALYSES

___X___Acceptable
_____Acceptable with qualification
_____Unacceptable
_____No Duplicates Analyzed

Type of duplicates analyzed:
___X___Field Duplicates
____X__Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analysis was performed and was within QC criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match.

Comments: TPH as diesel was in the range of C10 to C25 and TPH as motor oil was in the range of C25 to C36.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Purgeable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(volume of water purged, mL)}}$$

Purgeable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)}}{\text{(external standard area)(weight of soil extracted, g)(fraction solids)}}$$

Extractable analyses, water samples:

$$\text{ug/L} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(volume of sample extracted, mL)(injection volume, uL)}}$$

Extractable analyses, soil samples:

$$\text{ug/kg} = \frac{\text{(analyte area)(amount of external standard, ng)(total volume of extract, uL)}}{\text{(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP54SB04
TPH as Diesel: ((18349x10x1)/(30.05x84.1)x100 = 7260 mg/kg
Lab reported 7300 mg/kg

13. OVERALL ASSESSMENT OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

14. USABILITY OF DATA

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problem requiring corrective action was found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine		

Cover Page - Organic Analysis Data Package
Diesel Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP54SB04	K1108365-007	08/26/2011	09/07/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Lorin E Porthood Name: Lorin Porthood

Date: 10/11/11 Title: Scientist

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Soil	**Date Received:**	09/07/2011

Diesel Range Organics

Sample Name:	11MP54SB04	**Units:**	mg/Kg
Lab Code:	K1108365-007	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK102		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C10 - C25 DRO	7300	Y J	24	1.6	1	09/08/11	10/09/11	KWG1108897	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	98	50-150	10/09/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine
Service Request: K1108365

Cover Page - Organic Analysis Data Package
Residual Range Organics

Sample Name	Lab Code	Date Collected	Date Received
11MP54SB04	K1108365-007	08/26/2011	09/07/2011

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Lorin E Bortwood Name: Lorin Bortwood

Date: 10/11/11 Title: Scientist

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108365
Project:	Red Devil Mine	**Date Collected:**	08/26/2011
Sample Matrix:	Soil	**Date Received:**	09/07/2011

Residual Range Organics

Sample Name:	11MP54SB04	**Units:**	mg/Kg
Lab Code:	K1108365-007	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	AK103		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
C25 - C36 RRO	**530**	L J	120	3.5	1	09/08/11	10/09/11	KWG1108896	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
n-Triacontane	114	50-150	10/09/11	Acceptable

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1107701**
Sampling Dates: 8/2/2011 – 8/8/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/06/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11RD03SB10	K1107701-001
2	11RD03SB08	K1107701-002
3	11RD03SB06	K1107701-003
4	11RD02SB10	K1107701-004
5	11RD02SB06	K1107701-005
6	11RD02SB02	K1107701-006
7	11UP11SB04	K1107701-007
8	11RD01SB04	K1107701-008
9	11RD01SB14	K1107701-009
10	11RD01SB10	K1107701-010
11	11UP11SB08	K1107701-011
12	11UP11SB06	K1107701-012
13	11SM10SB10	K1107701-013
14	11SM10SB04	K1107701-014
15	11SM10SB12	K1107701-015
16	11SM11SB04	K1107701-016
17	11SM11SB14	K1107701-017
18	11SM11SB16	K1107701-018
19	11MP41SB04	K1107701-019
20	11MP41SB06	K1107701-020
21	11RS01SB04	K1107701-021

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

22	11RS01SB12	K1107701-022
23	11RS01SB08	K1107701-023
24	11RS02SB08	K1107701-024
25	11RS02SB04	K1107701-025
26	11RS02SB14	K1107701-026
27	11DS02SB10	K1107701-027
28	11MP71SS	K1107701-028
29	11DS02SB14	K1107701-029
30	11DS02SB04	K1107701-030
31	11SM31SB06	K1107701-031

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- **X** Included: no problems
- ***** Included: problems noted in review
- **O** Not Included and/or Not Available
- **NR** Not Required
- **RS** Provided As Re-submission

Case Narrative:

- **X** Case Narrative present

Quality Control Summary Package:

- **X** Data Summary sheets
- **X** Initial and Continuing Calibration results
- **X** CRDL Standard results
- **X** Preparation Blank and Calibration Blank results
- **X** ICP Interference Check Sample results
- ***** Matrix Spike recoveries
- ***** Matrix Duplicate results
- **X** Laboratory Control Sample recoveries
- **NR** Method of Standard Additions results
- ***** ICP Serial Dilution results

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	NO
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11RD02SB04 was used for matrix spike and matrix spike duplicate for a all total metals. All spike recoveries were within control limits with the exception of Barium, Copper, and Nickel, which exceeded 125% in the matrix spike, and Zinc, which was below 75% in the matrix spike. Additionally, Sodium exceeded 125%, and Silver was below 75% in the matrix spike duplicate. Associated sample results were qualified as estimated (J) with the exception of Silver, which had a parent sample result greater than four times the spike sample.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Sample RS02SB08 was used for matrix spike and matrix spike duplicate for all total metals. Antimony, Arsenic, Calcium, and Magnesium exceeded 125%; associated results were qualified as estimated (J). Additionally, Chromium was less than 75% in the matrix spike duplicate; associated results were qualified as estimated (J).

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs

using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: 11RD03SB10 and 11RD03SB10 were mercury duplicates with RPDs within control limits. 11RD02SB04 was a duplicate of all total metals; RPDs were within control limits with the exception of Barium, Cadmium, and Calcium, which all exceeded 35%. Associated results were qualified as estimated (J). 11RS02SB08 was a duplicate of all total metals; Antimony and Calcium exceeded 35% RPD; associated results were qualified as estimated (J). All other duplicate analyses were within RPD control limits.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11RD02SB was analyzed by serial dilution, Cadmium had a % Difference greater than 10%, however, initial sample results were not greater than 50x the MDL, so no action was taken. 11UP11SB04 was analyzed by serial dilution for a subset of total metals; Antimony had a % Difference greater than 10%, however initial sample results were not greater than 50x the MDL, so no action was taken. 11RS02SB08 was analyzed by serial dilution for all total metals; Sodium had a % Difference greater than 10%, however initial sample results were not greater than 50x the MDL so no action was taken. All other serial dilutions were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11RD03SB10
Aluminum: (41.24 mg/L) (100L/1.14g) (2) (100/87.8) = 8240 mg/kg
Lab Reported 8240 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE

REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB10 **Lab Code:** K1107701-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	8240		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	545	J	N
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/22/11	503	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/22/11	113	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.432		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.315	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1890	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/22/11	21.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/22/11	16.5		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/22/11	32.6	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	34600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/22/11	8.800		
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	3520	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	399		
Mercury	7471A	1.67	0.167	100.0	08/30/11	08/30/11	70.3		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/22/11	47.5	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	874		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.67	UJ	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.089	UJ	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	50.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/22/11	0.113		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/22/11	28.2		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/22/11	88.2	J	N

% Solids: 87.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB08 **Lab Code:** K1107701-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	5330		
Antimony	6010B	9.9	3.0	2.0	10/10/11	10/19/11	844	J	N
Arsenic	6020A	9.98	1.20	100.0	09/01/11	10/17/11	1790	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	227	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.511		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.282	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2380	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.5	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	12.6		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	34.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	32300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	11.7		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	3370	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	591		
Mercury	7471A	18.7	1.87	1000.0	08/30/11	08/30/11	471		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	40.3	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1470		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/03/11	0.80		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.142	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	393	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.251		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	22.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	75.1	J	N

% Solids: 87.1

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/04/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB06 Lab Code: K1107701-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	9160		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	2710	J	N
Arsenic	6020A	9.96	1.19	100.0	09/01/11	10/17/11	3510	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	553	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.798		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.419	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	6660	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.7		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	57.1	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	41100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	5.780		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	7010	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	786		
Mercury	7471A	18.7	1.87	1000.0	08/30/11	08/30/11	340		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	49.2	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	3190		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/03/11	0.80		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.191	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	259	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.388		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	25.3		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	97.2	J	N

% Solids: 91.3

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/03/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB10 **Lab Code:** K1107701-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	8630		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	92.0	J	N
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	181	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	95.4	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.390		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.273	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1740	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	19.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.4		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	20.4	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	61100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	5.660		
Magnesium	6010B	3.99	0.04	2.0	10/10/11	10/19/11	3740	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	561		
Mercury	7471A	0.189	0.019	10.0	08/30/11	08/30/11	1.78		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.0	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	792		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.46		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.033	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	39.5	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.051		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	31.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	76.1	J	N

% Solids: 85.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/03/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB06 **Lab Code:** K1107701-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	10600		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	868	J	N
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	1410	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	254	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.503		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.332	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	32700	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	25.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	12.3		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	45.1	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	30800		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	10.3		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	4880	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	477		
Mercury	7471A	1.91	0.191	100.0	08/30/11	08/30/11	30.6		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.3	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1680		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/03/11	0.40	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.132	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	335	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.203		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	30.0		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	120	J	N

% Solids: 84.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/03/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB04 Lab Code: K1107701-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	12100		
Antimony	6010B	9.8	2.9	2.0	10/10/11	10/19/11	1950	J	N
Arsenic	6020A	9.98	1.20	100.0	09/01/11	10/17/11	1880	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	310	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.532		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.290	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	117000	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	29.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	13.1		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	74.5	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	30700		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.050		
Magnesium	6010B	3.92	0.04	2.0	10/10/11	10/19/11	5710	J	
Manganese	6010B	1.96	0.04	2.0	10/10/11	10/19/11	451		
Mercury	7471A	8.15	0.815	500.0	08/30/11	08/30/11	94.5		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	33.1	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	2140		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/03/11	0.34	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.106	J	N
Sodium	6010B	19.6	3.9	2.0	10/10/11	10/19/11	876	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.754		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	31.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	176	J	N

% Solids: 88.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB04 Lab Code: K1107701-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	16300		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.277	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	7.21	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	200	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.415		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.367	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2280	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	24.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	9.910		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	26.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	25500		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.060		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	4770	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	1280		
Mercury	7471A	0.018	0.002	1.0	08/30/11	08/30/11	0.220		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	30.0	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	917		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/19/11	0.131	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	92.2	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.103		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	38.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	74.2	J	N

% Solids: 79.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB04 **Lab Code:** K1107701-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	5.8	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.657	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	10.3	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	124	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.375		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.170	J	*
Calcium	6010B	9.7	1.9	2.0	10/10/11	10/19/11	1280	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	22.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	6.020		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	19.1	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	19600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.060		
Magnesium	6010B	3.89	0.04	2.0	10/10/11	10/19/11	3900	J	
Manganese	6010B	1.94	0.04	2.0	10/10/11	10/19/11	117		
Mercury	7471A	0.020	0.002	1.0	08/30/11	08/30/11	0.154		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	20.9	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	657		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.54		
Silver	6020A	0.019	0.008	5.0	10/10/11	10/17/11	0.139	J	N
Sodium	6010B	19.4	3.9	2.0	10/10/11	10/19/11	81.2	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.108		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	33.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	55.9	J	N

% Solids: 76.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB14 **Lab Code:** K1107701-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	14600		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.359	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	8.74	J	
Barium	6020A	0.049	0.005	5.0	09/01/11	09/23/11	140	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.479		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.437	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	3540	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	29.0	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	22900		
Lead	6020A	0.049	0.009	5.0	09/01/11	09/23/11	10.1		
Magnesium	6010B	3.90	0.04	2.0	10/10/11	10/19/11	6630	J	
Manganese	6010B	1.95	0.04	2.0	10/10/11	10/19/11	221		
Mercury	7471A	0.014	0.001	1.0	08/30/11	08/30/11	0.063		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	31.7	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1570		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.216	~~J~~	N
Sodium	6010B	19.5	3.9	2.0	10/10/11	10/19/11	230	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.170		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	38.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	90.4	J	N

% Solids: 74.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/04/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB10 Lab Code: K1107701-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.352	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	3.36	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	167	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.477		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.252	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	3120	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	28.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	9.650		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	30.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	23200		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.640		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	6180	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	222		
Mercury	7471A	0.014	0.001	1.0	08/30/11	08/30/11	0.064		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	33.8	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1280		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.54		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.175	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	210	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.137		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	40.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	87.4	J	N

% Solids: 74.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB08 Lab Code: K1107701-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	7880		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.591	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	7.82	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	132	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.484		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.500	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1750	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	14.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	19.1		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	59.7	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	39300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	14.3		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	2860	J	
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	739		
Mercury	7471A	0.016	0.002	1.0	08/30/11	08/30/11	0.498		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	52.2	J	N
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	1080		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.34		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.319	J	N
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	48.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.088		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	26.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	106	J	N

% Solids: 87.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB06 Lab Code: K1107701-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.264	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	6.95	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	178	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.421		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.231	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2010	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	6.730		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	28.2	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	25600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.720		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	4230	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	951		
Mercury	7471A	0.019	0.002	1.0	08/30/11	08/30/11	0.234		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.4	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	939		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.09	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.167	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	79.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.087		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	30.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	72.5	J	N

% Solids: 82.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB10 Lab Code: K1107701-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	2210		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	6.150	J	
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	6240	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	220	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.588		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.457	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1430	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	11.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	52.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	64700		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	15.7		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	385	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	549		
Mercury	7471A	1.64	0.164	100.0	08/30/11	08/30/11	48.3		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.6	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1220		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/04/11	2.59		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.179	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	53.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	1.540		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	19.1		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	77.0	J	N

% Solids: 93.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB04 Lab Code: K1107701-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	10000		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	2.490	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	200	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	139	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.595		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.358	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1860	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	16.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	13.2		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	39.6	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	35400		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.590		
Magnesium	6010B	3.93	0.04	2.0	10/10/11	10/19/11	2740	J	
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	635		
Mercury	7471A	1.74	0.174	100.0	08/30/11	08/30/11	11.8		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.0	J	N
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	846		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.23	-	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.139	~~J~~	N
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	78.4	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.110		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	29.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	75.1	J	N

% Solids: 84.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB12 Lab Code: K1107701-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	2790		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	4.280	J	
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	1690	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	81.5	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.828		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.855	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1380	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	9.80	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	19.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	91.7	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	49100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	25.0		
Magnesium	6010B	3.90	0.04	2.0	10/10/11	10/19/11	527	J	
Manganese	6010B	1.95	0.04	2.0	10/10/11	10/19/11	802		
Mercury	7471A	1.54	0.154	100.0	08/30/11	08/30/11	17.9		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	59.5	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1350		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/04/11	0.62		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.292	J	N
Sodium	6010B	19.5	3.9	2.0	10/10/11	10/19/11	49.9	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.540		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	18.9		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	137	J	N

% Solids: 92.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB04 Lab Code: K1107701-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	16800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.250	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	10/17/11	8.67	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	157	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.403		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.249	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1770	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	22.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.4		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	17.6	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	28500		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	7.540		
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	5170	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	525		
Mercury	7471A	0.015	0.001	1.0	08/30/11	08/30/11	0.032		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.0	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	667		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.25		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.083	~~J~~	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	153	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.097		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	37.8		
Zinc	6020A	0.5	0.2	5.0	09/01/11	10/17/11	60.8	J	N

% Solids: 80.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB14 Lab Code: K1107701-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	5980		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.500	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	122	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	220	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.760	J	
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	1.130	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1720	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	10.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	17.9		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	76.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	66400		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	15.8		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	1300	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	2170		
Mercury	7471A	0.319	0.032	20.0	08/30/11	08/30/11	7.18		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	64.3	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1180		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.87		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.244	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	47.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.146		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	19.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	109	J	N

% Solids: 74.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB16 Lab Code: K1107701-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	3080		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.430	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	261	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	118	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.905		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	1.220	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1740	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	12.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	25.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	96.8	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	55000		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	21.3		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	692	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	1330		
Mercury	7471A	0.380	0.038	20.0	08/30/11	08/30/11	6.93		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	99.1	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1290		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	1.01		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.377	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	38.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.121		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	25.3		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	168	J	N

% Solids: 90.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/06/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP41SB04 **Lab Code:** K1107701-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	7330		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.040	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	30.7	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	154	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.638		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.494	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	825	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	17.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.9		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	41.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	49300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.680		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	1480	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	942		
Mercury	7471A	0.096	0.010	5.0	08/30/11	08/30/11	2.07		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	34.5	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	832		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.45		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.131	~~J~~	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	36.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.106		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	33.0		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	76.8	J	N

% Solids: 86.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP41SB06 Lab Code: K1107701-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	5.8	2.0	10/10/11	10/19/11	2990		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	1.140	J	
Arsenic	6020A	0.49	0.06	5.0	09/01/11	09/23/11	59.8	J	
Barium	6020A	0.049	0.005	5.0	09/01/11	09/23/11	152	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.784		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.912	J	*
Calcium	6010B	9.7	1.9	2.0	10/10/11	10/19/11	1140	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	11.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	27.0		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	139	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	41800		
Lead	6020A	0.049	0.009	5.0	09/01/11	09/23/11	20.5		
Magnesium	6010B	3.88	0.04	2.0	10/10/11	10/19/11	578	J	
Manganese	6010B	1.94	0.04	2.0	10/10/11	10/19/11	1010		
Mercury	7471A	0.088	0.009	5.0	08/30/11	08/30/11	3.55		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	86.8	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1100		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.61		
Silver	6020A	0.019	0.008	5.0	10/10/11	10/17/11	0.179	J	N
Sodium	6010B	19.4	3.9	2.0	10/10/11	10/19/11	24.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.131		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	29.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	153	J	N

% Solids: 89.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB04 Lab Code: K1107701-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	11500		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	24.7	J	N*
Arsenic	6020A	0.63	0.08	5.0	09/02/11	09/23/11	54.7	J	N
Barium	6020A	0.063	0.006	5.0	09/02/11	09/23/11	137	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.354		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.326	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	11100	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	21.1	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	8.080		
Copper	6020A	0.13	0.06	5.0	09/02/11	09/23/11	22.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	29400		
Lead	6020A	0.063	0.011	5.0	09/02/11	09/23/11	9.790		
Magnesium	6010B	3.99	0.04	2.0	10/10/11	10/19/11	6160	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	526		
Mercury	7471A	0.342	0.034	20.0	08/30/11	08/30/11	6.44		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	25.0	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1230		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.38		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.145	~~J~~	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	226	J	
Thallium	6020A	0.025	0.003	5.0	09/02/11	09/23/11	0.140		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	28.1		
Zinc	6020A	0.6	0.3	5.0	09/02/11	09/23/11	73.6	J	

% Solids: 71.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB12 Lab Code: K1107701-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.1	6.1	2.0	10/10/11	10/19/11	11800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	25.8	J	N*
Arsenic	6020A	0.58	0.07	5.0	09/02/11	09/23/11	50.0	J	N
Barium	6020A	0.058	0.006	5.0	09/02/11	09/23/11	124	J	
Beryllium	6020A	0.023	0.003	5.0	09/02/11	09/23/11	0.384		
Cadmium	6020A	0.023	0.003	5.0	09/02/11	09/23/11	0.281	J	
Calcium	6010B	10.1	2.0	2.0	10/10/11	10/19/11	2370	J	N*
Chromium	6020A	0.23	0.04	5.0	09/02/11	09/23/11	22.3	J	N
Cobalt	6020A	0.023	0.003	5.0	09/02/11	09/23/11	8.670		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	26.7	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	41400		
Lead	6020A	0.058	0.010	5.0	09/02/11	09/23/11	17.6		
Magnesium	6010B	4.03	0.04	2.0	10/10/11	10/19/11	4860	J	N
Manganese	6010B	2.02	0.04	2.0	10/10/11	10/19/11	292		
Mercury	7471A	0.303	0.030	20.0	08/30/11	08/30/11	7.44		
Nickel	6020A	0.23	0.04	5.0	09/02/11	09/23/11	26.5	J	
Potassium	6010B	81	5.0	2.0	10/10/11	10/19/11	893		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.35		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.153	~~J~~	
Sodium	6010B	20.2	4.0	2.0	10/10/11	10/19/11	149	J	
Thallium	6020A	0.023	0.002	5.0	09/02/11	09/23/11	0.104		
Vanadium	6020A	0.23	0.02	5.0	09/02/11	09/23/11	30.5		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	71.6	J	

% Solids: 78.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB08 Lab Code: K1107701-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	6180		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	68.7	J	N*
Arsenic	6020A	0.45	0.05	5.0	09/02/11	09/23/11	142	J	N
Barium	6020A	0.045	0.004	5.0	09/02/11	09/23/11	104	J	
Beryllium	6020A	0.018	0.003	5.0	09/02/11	09/23/11	0.484		
Cadmium	6020A	0.018	0.003	5.0	09/02/11	09/23/11	0.430	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1690	J	N*
Chromium	6020A	0.18	0.03	5.0	09/02/11	09/23/11	25.1	J	N
Cobalt	6020A	0.018	0.003	5.0	09/02/11	09/23/11	12.9		
Copper	6020A	0.09	0.05	5.0	09/02/11	09/23/11	55.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	66100		
Lead	6020A	0.045	0.008	5.0	09/02/11	09/23/11	28.6		
Magnesium	6010B	4.01	0.04	2.0	10/10/11	10/19/11	1930	J	N
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	509		
Mercury	7471A	1.86	0.186	100.0	08/30/11	08/30/11	27.9		
Nickel	6020A	0.18	0.03	5.0	09/02/11	09/23/11	43.3	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1060		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.40		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.261	J#	
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	57.5	J	
Thallium	6020A	0.018	0.002	5.0	09/02/11	09/23/11	0.083		
Vanadium	6020A	0.18	0.02	5.0	09/02/11	09/23/11	30.7		
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/23/11	103	J	

% Solids: 82.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS02SB08 Lab Code: K1107701-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	3940		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	34.5	J	N*
Arsenic	6020A	0.51	0.06	5.0	09/02/11	09/23/11	93.4	J	N
Barium	6020A	0.051	0.005	5.0	09/02/11	09/23/11	94.6	J	
Beryllium	6020A	0.021	0.003	5.0	09/02/11	09/23/11	0.640		
Cadmium	6020A	0.021	0.003	5.0	09/02/11	09/23/11	0.492	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1550	J	N*
Chromium	6020A	0.21	0.03	5.0	09/02/11	09/23/11	27.4	J	N
Cobalt	6020A	0.021	0.003	5.0	09/02/11	09/23/11	15.5		
Copper	6020A	0.10	0.05	5.0	09/02/11	09/23/11	46.0	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	51400		
Lead	6020A	0.051	0.009	5.0	09/02/11	09/23/11	12.9		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	1070	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	1190		
Mercury	7471A	0.375	0.037	20.0	08/30/11	08/30/11	8.07		
Nickel	6020A	0.21	0.03	5.0	09/02/11	09/23/11	49.8	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	878		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.110	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	28.8	J	
Thallium	6020A	0.021	0.002	5.0	09/02/11	09/23/11	0.082		
Vanadium	6020A	0.21	0.02	5.0	09/02/11	09/23/11	39.7		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/23/11	114	J	

% Solids: 86.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1107701
Project No.: NA
Date Collected: 08/08/11
Project Name: Red Devil Mine
Date Received: 08/18/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11RS02SB04
Lab Code: K1107701-025

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	8920		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	24.4	J	N*
Arsenic	6020A	0.41	0.05	5.0	09/02/11	09/23/11	138	J	N
Barium	6020A	0.041	0.004	5.0	09/02/11	09/23/11	103	J	
Beryllium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.584		
Cadmium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.464	J	
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	6250	J	N*
Chromium	6020A	0.17	0.03	5.0	09/02/11	09/23/11	19.1	J	N
Cobalt	6020A	0.016	0.002	5.0	09/02/11	09/23/11	23.9		
Copper	6020A	0.08	0.04	5.0	09/02/11	09/23/11	39.6	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	38300		
Lead	6020A	0.041	0.007	5.0	09/02/11	09/23/11	11.6		
Magnesium	6010B	3.92	0.04	2.0	10/10/11	10/19/11	3810	J	N
Manganese	6010B	1.96	0.04	2.0	10/10/11	10/19/11	1160		
Mercury	7471A	1.78	0.178	100.0	08/30/11	08/30/11	33.1		
Nickel	6020A	0.17	0.03	5.0	09/02/11	09/23/11	42.3	J	
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	998		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.32		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.099	~~J~~	
Sodium	6010B	19.6	3.9	2.0	10/10/11	10/19/11	114	J	
Thallium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.093		
Vanadium	6020A	0.17	0.02	5.0	09/02/11	09/23/11	35.5		
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/23/11	83.1	J	

% Solids: 85.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS02SB14 Lab Code: K1107701-026

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	14000		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.170	J	N*
Arsenic	6020A	0.62	0.07	5.0	09/02/11	09/23/11	8.01	J	N
Barium	6020A	0.062	0.006	5.0	09/02/11	09/23/11	154	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.481		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.429	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	3210	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	28.0	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	9.930		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	29.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	23300		
Lead	6020A	0.062	0.011	5.0	09/02/11	09/23/11	9.890		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	5940	J	N
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	235		
Mercury	7471A	0.018	0.002	1.0	08/30/11	08/30/11	0.198		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	30.4	J	
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1210		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.50		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.156	J	
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	184	J	
Thallium	6020A	0.025	0.002	5.0	09/02/11	09/23/11	0.166		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	39.3		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	87.5	J	

% Solids: 73.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB10 Lab Code: K1107701-027

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	4950		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	122	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/02/11	09/23/11	205	J	N
Barium	6020A	0.050	0.005	5.0	09/02/11	09/23/11	110	J	
Beryllium	6020A	0.020	0.003	5.0	09/02/11	09/23/11	0.776		
Cadmium	6020A	0.020	0.003	5.0	09/02/11	09/23/11	0.540	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1410	J	N*
Chromium	6020A	0.20	0.03	5.0	09/02/11	09/23/11	18.5	J	N
Cobalt	6020A	0.020	0.003	5.0	09/02/11	09/23/11	16.2		
Copper	6020A	0.10	0.05	5.0	09/02/11	09/23/11	62.9	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	64000		
Lead	6020A	0.050	0.009	5.0	09/02/11	09/23/11	12.4		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	1180	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	832		
Mercury	7471A	1.75	0.175	100.0	08/30/11	08/30/11	16.4		
Nickel	6020A	0.20	0.03	5.0	09/02/11	09/23/11	51.0	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	962		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.143	J	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	39.4	J	
Thallium	6020A	0.020	0.002	5.0	09/02/11	09/23/11	0.093		
Vanadium	6020A	0.20	0.02	5.0	09/02/11	09/23/11	28.2		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/23/11	117	J	

% Solids: 87.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/02/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP71SS Lab Code: K1107701-028

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	10800		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.708	J	N*
Arsenic	6020A	0.37	0.05	5.0	09/02/11	09/23/11	10.8	J	N
Barium	6020A	0.037	0.004	5.0	09/02/11	09/23/11	99.1	J	
Beryllium	6020A	0.015	0.002	5.0	09/02/11	09/23/11	0.381		
Cadmium	6020A	0.015	0.002	5.0	09/02/11	09/23/11	0.385	J	
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1140	J	N*
Chromium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	20.3	J	N
Cobalt	6020A	0.015	0.002	5.0	09/02/11	09/23/11	12.5		
Copper	6020A	0.07	0.04	5.0	09/02/11	09/23/11	32.6	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	43000		
Lead	6020A	0.037	0.007	5.0	09/02/11	09/23/11	8.910		
Magnesium	6010B	3.93	0.04	2.0	10/10/11	10/19/11	3860	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	703		
Mercury	7471A	0.016	0.002	1.0	08/30/11	08/30/11	0.428		
Nickel	6020A	0.15	0.02	5.0	09/02/11	09/23/11	39.9	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	772		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.24		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.123	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	43.2	J	
Thallium	6020A	0.015	0.001	5.0	09/02/11	09/23/11	0.071		
Vanadium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	35.4		
Zinc	6020A	0.4	0.1	5.0	09/02/11	09/23/11	85.5	J	

% Solids: 80.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/08/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB14 **Lab Code:** K1107701-029

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	12100		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.886	J	N*
Arsenic	6020A	0.62	0.08	5.0	09/02/11	09/23/11	12.0	J	N
Barium	6020A	0.062	0.006	5.0	09/02/11	09/23/11	149	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.424		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.396	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2970	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	24.8	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	9.550		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	26.0	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	22100		
Lead	6020A	0.062	0.011	5.0	09/02/11	09/23/11	8.550		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	5160	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	224		
Mercury	7471A	0.019	0.002	1.0	08/30/11	08/30/11	0.168		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	29.7	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	1020		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.51		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.134	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	171	J	
Thallium	6020A	0.025	0.002	5.0	09/02/11	09/23/11	0.138		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	35.3		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	80.4	J	

% Solids: 75.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB04 Lab Code: K1107701-030

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	5930		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	31.5	J	N*
Arsenic	6020A	0.55	0.07	5.0	09/02/11	09/23/11	360	J	N
Barium	6020A	0.055	0.006	5.0	09/02/11	09/23/11	123	J	
Beryllium	6020A	0.022	0.003	5.0	09/02/11	09/23/11	0.637		
Cadmium	6020A	0.022	0.003	5.0	09/02/11	09/23/11	0.466	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1560	J	N*
Chromium	6020A	0.22	0.03	5.0	09/02/11	09/23/11	17.2	J	N
Cobalt	6020A	0.022	0.003	5.0	09/02/11	09/23/11	12.0		
Copper	6020A	0.11	0.06	5.0	09/02/11	09/23/11	46.9	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	47900		
Lead	6020A	0.055	0.010	5.0	09/02/11	09/23/11	10.7		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	2070	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	965		
Mercury	7471A	17.4	1.74	1000.0	08/30/11	08/30/11	133		
Nickel	6020A	0.22	0.03	5.0	09/02/11	09/23/11	38.2	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	947		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.74		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.222	J	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	68.8	J	
Thallium	6020A	0.022	0.002	5.0	09/02/11	09/23/11	0.112		
Vanadium	6020A	0.22	0.02	5.0	09/02/11	09/23/11	23.6		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	93.5	J	

% Solids: 87.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM31SB06 Lab Code: K1107701-031

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	2130		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	8.570	J	N*
Arsenic	6020A	0.36	0.04	5.0	09/02/11	09/23/11	273	J	N
Barium	6020A	0.036	0.004	5.0	09/02/11	09/23/11	71.7	J	
Beryllium	6020A	0.014	0.002	5.0	09/02/11	09/23/11	0.981		
Cadmium	6020A	0.014	0.002	5.0	09/02/11	09/23/11	0.776	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1440	J	N*
Chromium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	8.22	J	N
Cobalt	6020A	0.014	0.002	5.0	09/02/11	09/23/11	12.3		
Copper	6020A	0.07	0.04	5.0	09/02/11	09/23/11	70.4	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	54900		
Lead	6020A	0.036	0.007	5.0	09/02/11	09/23/11	16.8		
Magnesium	6010B	4.02	0.04	2.0	10/10/11	10/19/11	381	J	N
Manganese	6010B	2.01	0.04	2.0	10/10/11	10/19/11	459		
Mercury	7471A	1.66	0.166	100.0	08/30/11	08/30/11	15.2		
Nickel	6020A	0.15	0.02	5.0	09/02/11	09/23/11	52.1	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1190		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.50	@	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.243	J	
Sodium	6010B	20.1	4.0	2.0	10/10/11	10/19/11	38.0	J	
Thallium	6020A	0.014	0.001	5.0	09/02/11	09/23/11	0.087		
Vanadium	6020A	0.15	0.01	5.0	09/02/11	09/23/11	14.8		
Zinc	6020A	0.4	0.1	5.0	09/02/11	09/23/11	113	J	

% Solids: 92.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1107701

Project No.: NA
Date Collected:

Project Name: Red Devil Mine
Date Received:

Matrix: SOIL
Units: mg/Kg

Basis: DRY

Sample Name: Method Blank
Lab Code: K1107701-MB1

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	6.0	U	
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	3.0	U	N
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.009	U	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/22/11	0.10	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	10/17/11	0.036	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.007	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	2.0	U	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/22/11	0.10	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.012	J	
Copper	6020A	0.10	0.05	5.0	09/01/11	09/22/11	0.05	U	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	0.7	J	
Lead	6020A	0.050	0.009	5.0	09/01/11	10/17/11	0.010	J	
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	0.08	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	0.06	J	
Mercury	7471A	0.020	0.002	1.0	08/30/11	08/30/11	0.002	U	
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/22/11	0.06	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	5.0	U	
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.008	U	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	4.0	U	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/22/11	0.008	J	
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/22/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/22/11	0.2	U	N

% Solids: 100.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1107701**
Sampling Dates: 08/13/2011 to 08/22/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/4/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11RD03SB06	K1107701-003
2	11UP11SB04	K1107701-007
3	11SM10SB10	K1107701-013
4	11MP41SB06	K1107701-020
5	11RS01SB12	K1107701-022
6	11MP71SS	K1107701-028
7	11SM31SB06	K1107701-031

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits with the exception of Sodium, which exceeded the control limit. Associated sample results were qualified as estimated (J).

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11RD03SB was used for matrix spike for Mercury; recovery was within control limits. Sample 11SM10SB10 was used for matrix spike and matrix spike duplicate for total metals. Aluminum and Silver were less than 75% recovery; however parent Silver result was greater than four times the spike result. Associated Aluminum sample results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank contained Iron contamination; however, all sample results were greater than 5x the method blank contamination so no action was taken.

Initial and continuing calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

$$\text{RPD} = \frac{2(\text{Value 1} - \text{Value 2})}{\text{Value 1} + \text{Value 2}} \times 100\%$$

Comments: Sample 11SM10SB10 was analyzed as a laboratory duplicate. Cadmium, Cobalt, Nickel, and Zinc exceeded 20% RPD; however, sample results were less than 5x the MDL with the exception of Zinc so no action was taken. Associated Zinc results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the

correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Not analyzed.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11RD03SB06
Ba: (0.2410 mg/L)*(50mL/50mL) = 0.2410 mg/L = 24.1 ug/L
Lab reported 24.1 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB10 **Lab Code:** K1107701-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	8240		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	545	J	N
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/22/11	503	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/22/11	113	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.432		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.315	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1890	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/22/11	21.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/22/11	16.5		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/22/11	32.6	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	34600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/22/11	8.800		
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	3520	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	399		
Mercury	7471A	1.67	0.167	100.0	08/30/11	08/30/11	70.3		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/22/11	47.5	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	874		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.67	UJ	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.089	UJ	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	50.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/22/11	0.113		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/22/11	28.2		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/22/11	88.2	J	N

% Solids: 87.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB08 **Lab Code:** K1107701-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	5330		
Antimony	6010B	9.9	3.0	2.0	10/10/11	10/19/11	844	J	N
Arsenic	6020A	9.98	1.20	100.0	09/01/11	10/17/11	1790	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	227	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.511		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.282	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2380	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.5	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	12.6		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	34.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	32300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	11.7		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	3370	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	591		
Mercury	7471A	18.7	1.87	1000.0	08/30/11	08/30/11	471		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	40.3	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1470		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/03/11	0.80		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.142	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	393	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.251		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	22.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	75.1	J	N

% Solids: 87.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/04/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD03SB06 Lab Code: K1107701-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	9160		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	2710	J	N
Arsenic	6020A	9.96	1.19	100.0	09/01/11	10/17/11	3510	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	553	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.798		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.419	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	6660	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.7		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	57.1	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	41100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	5.780		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	7010	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	786		
Mercury	7471A	18.7	1.87	1000.0	08/30/11	08/30/11	340		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	49.2	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	3190		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/03/11	0.80		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.191	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	259	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.388		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	25.3		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	97.2	J	N

% Solids: 91.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/03/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB10 **Lab Code:** K1107701-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	8630		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	92.0	J	N
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	181	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	95.4	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.390		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.273	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1740	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	19.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.4		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	20.4	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	61100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	5.660		
Magnesium	6010B	3.99	0.04	2.0	10/10/11	10/19/11	3740	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	561		
Mercury	7471A	0.189	0.019	10.0	08/30/11	08/30/11	1.78		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.0	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	792		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.46		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.033	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	39.5	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.051		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	31.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	76.1	J	N

% Solids: 85.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/03/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB06 **Lab Code:** K1107701-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	10600		
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	868	J	N
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	1410	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	254	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.503		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.332	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	32700	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	25.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	12.3		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	45.1	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	30800		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	10.3		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	4880	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	477		
Mercury	7471A	1.91	0.191	100.0	08/30/11	08/30/11	30.6		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.3	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1680		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/03/11	0.40	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.132	J	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	335	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.203		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	30.0		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	120	J	N

% Solids: 84.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/03/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD02SB04 Lab Code: K1107701-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	12100		
Antimony	6010B	9.8	2.9	2.0	10/10/11	10/19/11	1950	J	N
Arsenic	6020A	9.98	1.20	100.0	09/01/11	10/17/11	1880	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	310	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.532		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.290	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	117000	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	29.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	13.1		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	74.5	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	30700		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.050		
Magnesium	6010B	3.92	0.04	2.0	10/10/11	10/19/11	5710	J	
Manganese	6010B	1.96	0.04	2.0	10/10/11	10/19/11	451		
Mercury	7471A	8.15	0.815	500.0	08/30/11	08/30/11	94.5		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	33.1	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	2140		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/03/11	0.34	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.106	J	N
Sodium	6010B	19.6	3.9	2.0	10/10/11	10/19/11	876	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.754		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	31.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	176	J	N

% Solids: 88.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB04 Lab Code: K1107701-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	16300		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.277	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	7.21	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	200	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.415		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.367	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2280	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	24.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	9.910		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	26.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	25500		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.060		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	4770	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	1280		
Mercury	7471A	0.018	0.002	1.0	08/30/11	08/30/11	0.220		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	30.0	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	917		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/19/11	0.131	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	92.2	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.103		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	38.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	74.2	J	N

% Solids: 79.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB04 **Lab Code:** K1107701-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	5.8	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.657	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	10.3	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	124	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.375		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.170	J	*
Calcium	6010B	9.7	1.9	2.0	10/10/11	10/19/11	1280	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	22.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	6.020		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	19.1	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	19600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	8.060		
Magnesium	6010B	3.89	0.04	2.0	10/10/11	10/19/11	3900	J	
Manganese	6010B	1.94	0.04	2.0	10/10/11	10/19/11	117		
Mercury	7471A	0.020	0.002	1.0	08/30/11	08/30/11	0.154		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	20.9	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	657		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.54		
Silver	6020A	0.019	0.008	5.0	10/10/11	10/17/11	0.139	J	N
Sodium	6010B	19.4	3.9	2.0	10/10/11	10/19/11	81.2	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.108		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	33.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	55.9	J	N

% Solids: 76.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/04/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB14 **Lab Code:** K1107701-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	14600		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.359	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	8.74	J	
Barium	6020A	0.049	0.005	5.0	09/01/11	09/23/11	140	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.479		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.437	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	3540	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	29.0	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	22900		
Lead	6020A	0.049	0.009	5.0	09/01/11	09/23/11	10.1		
Magnesium	6010B	3.90	0.04	2.0	10/10/11	10/19/11	6630	J	
Manganese	6010B	1.95	0.04	2.0	10/10/11	10/19/11	221		
Mercury	7471A	0.014	0.001	1.0	08/30/11	08/30/11	0.063		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	31.7	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1570		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.216	~~J~~	N
Sodium	6010B	19.5	3.9	2.0	10/10/11	10/19/11	230	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.170		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	38.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	90.4	J	N

% Solids: 74.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/04/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD01SB10 Lab Code: K1107701-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.352	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	3.36	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	167	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.477		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.252	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	3120	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	28.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	9.650		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	30.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	23200		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.640		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	6180	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	222		
Mercury	7471A	0.014	0.001	1.0	08/30/11	08/30/11	0.064		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	33.8	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1280		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.54		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.175	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	210	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.137		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	40.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	87.4	J	N

% Solids: 74.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB08 Lab Code: K1107701-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	7880		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.591	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	7.82	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	132	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.484		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.500	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1750	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	14.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	19.1		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	59.7	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	39300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	14.3		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	2860	J	
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	739		
Mercury	7471A	0.016	0.002	1.0	08/30/11	08/30/11	0.498		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	52.2	J	N
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	1080		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.34		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.319	J	N
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	48.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.088		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	26.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	106	J	N

% Solids: 87.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/05/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP11SB06 Lab Code: K1107701-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	14800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.264	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	6.95	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	178	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.421		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.231	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2010	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	6.730		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	28.2	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	25600		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.720		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	4230	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	951		
Mercury	7471A	0.019	0.002	1.0	08/30/11	08/30/11	0.234		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	27.4	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	939		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.09	J	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.167	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	79.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.087		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	30.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	72.5	J	N

% Solids: 82.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB10 Lab Code: K1107701-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	2210		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	6.150	J	
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	6240	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	220	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.588		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.457	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1430	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	11.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	52.0	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	64700		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	15.7		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	385	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	549		
Mercury	7471A	1.64	0.164	100.0	08/30/11	08/30/11	48.3		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.6	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1220		
Selenium	7742	0.50	0.15	10.0	09/28/11	10/04/11	2.59		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.179	~~J~~	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	53.1	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	1.540		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	19.1		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	77.0	J	N

% Solids: 93.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB04 Lab Code: K1107701-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	10000		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	2.490	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	200	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	139	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.595		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.358	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1860	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	16.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	13.2		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	39.6	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	35400		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.590		
Magnesium	6010B	3.93	0.04	2.0	10/10/11	10/19/11	2740	J	
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	635		
Mercury	7471A	1.74	0.174	100.0	08/30/11	08/30/11	11.8		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	35.0	J	N
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	846		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.23	-	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.139	~~J~~	N
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	78.4	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.110		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	29.4		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	75.1	J	N

% Solids: 84.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM10SB12 Lab Code: K1107701-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	2790		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	4.280	J	
Arsenic	6020A	10.0	1.20	100.0	09/01/11	10/17/11	1690	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	81.5	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.828		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.855	J	*
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1380	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	9.80	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	19.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	91.7	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	49100		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	25.0		
Magnesium	6010B	3.90	0.04	2.0	10/10/11	10/19/11	527	J	
Manganese	6010B	1.95	0.04	2.0	10/10/11	10/19/11	802		
Mercury	7471A	1.54	0.154	100.0	08/30/11	08/30/11	17.9		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	59.5	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1350		
Selenium	7742	0.49	0.15	10.0	09/28/11	10/04/11	0.62		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.292	J	N
Sodium	6010B	19.5	3.9	2.0	10/10/11	10/19/11	49.9	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.540		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	18.9		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	137	J	N

% Solids: 92.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB04 Lab Code: K1107701-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	16800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.250	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	10/17/11	8.67	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	157	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.403		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.249	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1770	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	22.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	10.4		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	17.6	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	28500		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	7.540		
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	5170	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	525		
Mercury	7471A	0.015	0.001	1.0	08/30/11	08/30/11	0.032		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	23.0	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	667		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.25		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.083	~~J~~	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	153	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.097		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	37.8		
Zinc	6020A	0.5	0.2	5.0	09/01/11	10/17/11	60.8	J	N

% Solids: 80.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB14 Lab Code: K1107701-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	5980		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.500	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	122	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	220	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.760	J	
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	1.130	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1720	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	10.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	17.9		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	76.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	66400		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	15.8		
Magnesium	6010B	3.96	0.04	2.0	10/10/11	10/19/11	1300	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	2170		
Mercury	7471A	0.319	0.032	20.0	08/30/11	08/30/11	7.18		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	64.3	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1180		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.87		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.244	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	47.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.146		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	19.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	109	J	N

% Solids: 74.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11SB16 Lab Code: K1107701-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	3080		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.430	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	261	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	118	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.905		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	1.220	J	*
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1740	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	12.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	25.8		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	96.8	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	55000		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	21.3		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	692	J	
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	1330		
Mercury	7471A	0.380	0.038	20.0	08/30/11	08/30/11	6.93		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	99.1	J	N
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1290		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	1.01		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.377	J	N
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	38.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.121		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	25.3		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	168	J	N

% Solids: 90.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/06/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP41SB04 **Lab Code:** K1107701-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	7330		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.040	J	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/23/11	30.7	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	09/23/11	154	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.638		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.494	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	825	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	17.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	16.9		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	41.7	J	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	49300		
Lead	6020A	0.050	0.009	5.0	09/01/11	09/23/11	9.680		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	1480	J	
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	942		
Mercury	7471A	0.096	0.010	5.0	08/30/11	08/30/11	2.07		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	34.5	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	832		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.45		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.131	~~J~~	N
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	36.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.106		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	33.0		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	76.8	J	N

% Solids: 86.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/06/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP41SB06 Lab Code: K1107701-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	5.8	2.0	10/10/11	10/19/11	2990		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	1.140	J	
Arsenic	6020A	0.49	0.06	5.0	09/01/11	09/23/11	59.8	J	
Barium	6020A	0.049	0.005	5.0	09/01/11	09/23/11	152	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.784		
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/23/11	0.912	J	*
Calcium	6010B	9.7	1.9	2.0	10/10/11	10/19/11	1140	J	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/23/11	11.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/23/11	27.0		
Copper	6020A	0.10	0.05	5.0	09/01/11	09/23/11	139	J	N
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	41800		
Lead	6020A	0.049	0.009	5.0	09/01/11	09/23/11	20.5		
Magnesium	6010B	3.88	0.04	2.0	10/10/11	10/19/11	578	J	
Manganese	6010B	1.94	0.04	2.0	10/10/11	10/19/11	1010		
Mercury	7471A	0.088	0.009	5.0	08/30/11	08/30/11	3.55		
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/23/11	86.8	J	N
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	1100		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.61		
Silver	6020A	0.019	0.008	5.0	10/10/11	10/17/11	0.179	J	N
Sodium	6010B	19.4	3.9	2.0	10/10/11	10/19/11	24.0	J	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/23/11	0.131		
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/23/11	29.7		
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/23/11	153	J	N

% Solids: 89.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB04 Lab Code: K1107701-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	11500		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	24.7	J	N*
Arsenic	6020A	0.63	0.08	5.0	09/02/11	09/23/11	54.7	J	N
Barium	6020A	0.063	0.006	5.0	09/02/11	09/23/11	137	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.354		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.326	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	11100	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	21.1	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	8.080		
Copper	6020A	0.13	0.06	5.0	09/02/11	09/23/11	22.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	29400		
Lead	6020A	0.063	0.011	5.0	09/02/11	09/23/11	9.790		
Magnesium	6010B	3.99	0.04	2.0	10/10/11	10/19/11	6160	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	526		
Mercury	7471A	0.342	0.034	20.0	08/30/11	08/30/11	6.44		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	25.0	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1230		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.38		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.145	~~J~~	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	226	J	
Thallium	6020A	0.025	0.003	5.0	09/02/11	09/23/11	0.140		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	28.1		
Zinc	6020A	0.6	0.3	5.0	09/02/11	09/23/11	73.6	J	

% Solids: 71.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB12 Lab Code: K1107701-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.1	6.1	2.0	10/10/11	10/19/11	11800		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	25.8	J	N*
Arsenic	6020A	0.58	0.07	5.0	09/02/11	09/23/11	50.0	J	N
Barium	6020A	0.058	0.006	5.0	09/02/11	09/23/11	124	J	
Beryllium	6020A	0.023	0.003	5.0	09/02/11	09/23/11	0.384		
Cadmium	6020A	0.023	0.003	5.0	09/02/11	09/23/11	0.281	J	
Calcium	6010B	10.1	2.0	2.0	10/10/11	10/19/11	2370	J	N*
Chromium	6020A	0.23	0.04	5.0	09/02/11	09/23/11	22.3	J	N
Cobalt	6020A	0.023	0.003	5.0	09/02/11	09/23/11	8.670		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	26.7	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	41400		
Lead	6020A	0.058	0.010	5.0	09/02/11	09/23/11	17.6		
Magnesium	6010B	4.03	0.04	2.0	10/10/11	10/19/11	4860	J	N
Manganese	6010B	2.02	0.04	2.0	10/10/11	10/19/11	292		
Mercury	7471A	0.303	0.030	20.0	08/30/11	08/30/11	7.44		
Nickel	6020A	0.23	0.04	5.0	09/02/11	09/23/11	26.5	J	
Potassium	6010B	81	5.0	2.0	10/10/11	10/19/11	893		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.35		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.153	~~J~~	
Sodium	6010B	20.2	4.0	2.0	10/10/11	10/19/11	149	J	
Thallium	6020A	0.023	0.002	5.0	09/02/11	09/23/11	0.104		
Vanadium	6020A	0.23	0.02	5.0	09/02/11	09/23/11	30.5		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	71.6	J	

% Solids: 78.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS01SB08 Lab Code: K1107701-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	6180		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	68.7	J	N*
Arsenic	6020A	0.45	0.05	5.0	09/02/11	09/23/11	142	J	N
Barium	6020A	0.045	0.004	5.0	09/02/11	09/23/11	104	J	
Beryllium	6020A	0.018	0.003	5.0	09/02/11	09/23/11	0.484		
Cadmium	6020A	0.018	0.003	5.0	09/02/11	09/23/11	0.430	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1690	J	N*
Chromium	6020A	0.18	0.03	5.0	09/02/11	09/23/11	25.1	J	N
Cobalt	6020A	0.018	0.003	5.0	09/02/11	09/23/11	12.9		
Copper	6020A	0.09	0.05	5.0	09/02/11	09/23/11	55.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	66100		
Lead	6020A	0.045	0.008	5.0	09/02/11	09/23/11	28.6		
Magnesium	6010B	4.01	0.04	2.0	10/10/11	10/19/11	1930	J	N
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	509		
Mercury	7471A	1.86	0.186	100.0	08/30/11	08/30/11	27.9		
Nickel	6020A	0.18	0.03	5.0	09/02/11	09/23/11	43.3	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1060		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.40		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.261	J#	
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	57.5	J	
Thallium	6020A	0.018	0.002	5.0	09/02/11	09/23/11	0.083		
Vanadium	6020A	0.18	0.02	5.0	09/02/11	09/23/11	30.7		
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/23/11	103	J	

% Solids: 82.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS02SB08 Lab Code: K1107701-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	3940		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	34.5	J	N*
Arsenic	6020A	0.51	0.06	5.0	09/02/11	09/23/11	93.4	J	N
Barium	6020A	0.051	0.005	5.0	09/02/11	09/23/11	94.6	J	
Beryllium	6020A	0.021	0.003	5.0	09/02/11	09/23/11	0.640		
Cadmium	6020A	0.021	0.003	5.0	09/02/11	09/23/11	0.492	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	1550	J	N*
Chromium	6020A	0.21	0.03	5.0	09/02/11	09/23/11	27.4	J	N
Cobalt	6020A	0.021	0.003	5.0	09/02/11	09/23/11	15.5		
Copper	6020A	0.10	0.05	5.0	09/02/11	09/23/11	46.0	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	51400		
Lead	6020A	0.051	0.009	5.0	09/02/11	09/23/11	12.9		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	1070	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	1190		
Mercury	7471A	0.375	0.037	20.0	08/30/11	08/30/11	8.07		
Nickel	6020A	0.21	0.03	5.0	09/02/11	09/23/11	49.8	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	878		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.110	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	28.8	J	
Thallium	6020A	0.021	0.002	5.0	09/02/11	09/23/11	0.082		
Vanadium	6020A	0.21	0.02	5.0	09/02/11	09/23/11	39.7		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/23/11	114	J	

% Solids: 86.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1107701
Date Collected: 08/08/11
Date Received: 08/18/11
Units: mg/Kg
Basis: DRY

Sample Name: 11RS02SB04
Lab Code: K1107701-025

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	8920		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	24.4	J	N*
Arsenic	6020A	0.41	0.05	5.0	09/02/11	09/23/11	138	J	N
Barium	6020A	0.041	0.004	5.0	09/02/11	09/23/11	103	J	
Beryllium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.584		
Cadmium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.464	J	
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	6250	J	N*
Chromium	6020A	0.17	0.03	5.0	09/02/11	09/23/11	19.1	J	N
Cobalt	6020A	0.016	0.002	5.0	09/02/11	09/23/11	23.9		
Copper	6020A	0.08	0.04	5.0	09/02/11	09/23/11	39.6	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	38300		
Lead	6020A	0.041	0.007	5.0	09/02/11	09/23/11	11.6		
Magnesium	6010B	3.92	0.04	2.0	10/10/11	10/19/11	3810	J	N
Manganese	6010B	1.96	0.04	2.0	10/10/11	10/19/11	1160		
Mercury	7471A	1.78	0.178	100.0	08/30/11	08/30/11	33.1		
Nickel	6020A	0.17	0.03	5.0	09/02/11	09/23/11	42.3	J	
Potassium	6010B	78	4.9	2.0	10/10/11	10/19/11	998		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.32		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.099	~~J~~	
Sodium	6010B	19.6	3.9	2.0	10/10/11	10/19/11	114	J	
Thallium	6020A	0.016	0.002	5.0	09/02/11	09/23/11	0.093		
Vanadium	6020A	0.17	0.02	5.0	09/02/11	09/23/11	35.5		
Zinc	6020A	0.4	0.2	5.0	09/02/11	09/23/11	83.1	J	

% Solids: 85.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RS02SB14 Lab Code: K1107701-026

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	6.0	2.0	10/10/11	10/19/11	14000		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	1.170	J	N*
Arsenic	6020A	0.62	0.07	5.0	09/02/11	09/23/11	8.01	J	N
Barium	6020A	0.062	0.006	5.0	09/02/11	09/23/11	154	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.481		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.429	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	3210	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	28.0	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	9.930		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	29.2	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	23300		
Lead	6020A	0.062	0.011	5.0	09/02/11	09/23/11	9.890		
Magnesium	6010B	3.97	0.04	2.0	10/10/11	10/19/11	5940	J	N
Manganese	6010B	1.98	0.04	2.0	10/10/11	10/19/11	235		
Mercury	7471A	0.018	0.002	1.0	08/30/11	08/30/11	0.198		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	30.4	J	
Potassium	6010B	79	5.0	2.0	10/10/11	10/19/11	1210		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.50		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.156	J	
Sodium	6010B	19.8	4.0	2.0	10/10/11	10/19/11	184	J	
Thallium	6020A	0.025	0.002	5.0	09/02/11	09/23/11	0.166		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	39.3		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	87.5	J	

% Solids: 73.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB10 Lab Code: K1107701-027

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	4950		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	122	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/02/11	09/23/11	205	J	N
Barium	6020A	0.050	0.005	5.0	09/02/11	09/23/11	110	J	
Beryllium	6020A	0.020	0.003	5.0	09/02/11	09/23/11	0.776		
Cadmium	6020A	0.020	0.003	5.0	09/02/11	09/23/11	0.540	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1410	J	N*
Chromium	6020A	0.20	0.03	5.0	09/02/11	09/23/11	18.5	J	N
Cobalt	6020A	0.020	0.003	5.0	09/02/11	09/23/11	16.2		
Copper	6020A	0.10	0.05	5.0	09/02/11	09/23/11	62.9	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	64000		
Lead	6020A	0.050	0.009	5.0	09/02/11	09/23/11	12.4		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	1180	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	832		
Mercury	7471A	1.75	0.175	100.0	08/30/11	08/30/11	16.4		
Nickel	6020A	0.20	0.03	5.0	09/02/11	09/23/11	51.0	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	962		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.48		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.143	J	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	39.4	J	
Thallium	6020A	0.020	0.002	5.0	09/02/11	09/23/11	0.093		
Vanadium	6020A	0.20	0.02	5.0	09/02/11	09/23/11	28.2		
Zinc	6020A	0.5	0.2	5.0	09/02/11	09/23/11	117	J	

% Solids: 87.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/02/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP71SS Lab Code: K1107701-028

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	5.9	2.0	10/10/11	10/19/11	10800		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.708	J	N*
Arsenic	6020A	0.37	0.05	5.0	09/02/11	09/23/11	10.8	J	N
Barium	6020A	0.037	0.004	5.0	09/02/11	09/23/11	99.1	J	
Beryllium	6020A	0.015	0.002	5.0	09/02/11	09/23/11	0.381		
Cadmium	6020A	0.015	0.002	5.0	09/02/11	09/23/11	0.385	J	
Calcium	6010B	9.8	2.0	2.0	10/10/11	10/19/11	1140	J	N*
Chromium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	20.3	J	N
Cobalt	6020A	0.015	0.002	5.0	09/02/11	09/23/11	12.5		
Copper	6020A	0.07	0.04	5.0	09/02/11	09/23/11	32.6	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	43000		
Lead	6020A	0.037	0.007	5.0	09/02/11	09/23/11	8.910		
Magnesium	6010B	3.93	0.04	2.0	10/10/11	10/19/11	3860	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	703		
Mercury	7471A	0.016	0.002	1.0	08/30/11	08/30/11	0.428		
Nickel	6020A	0.15	0.02	5.0	09/02/11	09/23/11	39.9	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	772		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.24		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.123	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	43.2	J	
Thallium	6020A	0.015	0.001	5.0	09/02/11	09/23/11	0.071		
Vanadium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	35.4		
Zinc	6020A	0.4	0.1	5.0	09/02/11	09/23/11	85.5	J	

% Solids: 80.1

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1107701
Project No.:	NA	**Date Collected:**	08/08/11
Project Name:	Red Devil Mine	**Date Received:**	08/18/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB14 **Lab Code:** K1107701-029

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	5.9	2.0	10/10/11	10/19/11	12100		
Antimony	6020A	0.049	0.009	5.0	10/10/11	10/19/11	0.886	J	N*
Arsenic	6020A	0.62	0.08	5.0	09/02/11	09/23/11	12.0	J	N
Barium	6020A	0.062	0.006	5.0	09/02/11	09/23/11	149	J	
Beryllium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.424		
Cadmium	6020A	0.025	0.004	5.0	09/02/11	09/23/11	0.396	J	
Calcium	6010B	9.9	2.0	2.0	10/10/11	10/19/11	2970	J	N*
Chromium	6020A	0.25	0.04	5.0	09/02/11	09/23/11	24.8	J	N
Cobalt	6020A	0.025	0.004	5.0	09/02/11	09/23/11	9.550		
Copper	6020A	0.12	0.06	5.0	09/02/11	09/23/11	26.0	J	
Iron	6010B	3.9	0.3	2.0	10/10/11	10/19/11	22100		
Lead	6020A	0.062	0.011	5.0	09/02/11	09/23/11	8.550		
Magnesium	6010B	3.94	0.04	2.0	10/10/11	10/19/11	5160	J	N
Manganese	6010B	1.97	0.04	2.0	10/10/11	10/19/11	224		
Mercury	7471A	0.019	0.002	1.0	08/30/11	08/30/11	0.168		
Nickel	6020A	0.25	0.04	5.0	09/02/11	09/23/11	29.7	J	
Potassium	6010B	79	4.9	2.0	10/10/11	10/19/11	1020		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.51		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.134	J	
Sodium	6010B	19.7	3.9	2.0	10/10/11	10/19/11	171	J	
Thallium	6020A	0.025	0.002	5.0	09/02/11	09/23/11	0.138		
Vanadium	6020A	0.25	0.03	5.0	09/02/11	09/23/11	35.3		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	80.4	J	

% Solids: 75.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/08/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11DS02SB04 Lab Code: K1107701-030

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	5930		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	31.5	J	N*
Arsenic	6020A	0.55	0.07	5.0	09/02/11	09/23/11	360	J	N
Barium	6020A	0.055	0.006	5.0	09/02/11	09/23/11	123	J	
Beryllium	6020A	0.022	0.003	5.0	09/02/11	09/23/11	0.637		
Cadmium	6020A	0.022	0.003	5.0	09/02/11	09/23/11	0.466	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1560	J	N*
Chromium	6020A	0.22	0.03	5.0	09/02/11	09/23/11	17.2	J	N
Cobalt	6020A	0.022	0.003	5.0	09/02/11	09/23/11	12.0		
Copper	6020A	0.11	0.06	5.0	09/02/11	09/23/11	46.9	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	47900		
Lead	6020A	0.055	0.010	5.0	09/02/11	09/23/11	10.7		
Magnesium	6010B	3.98	0.04	2.0	10/10/11	10/19/11	2070	J	N
Manganese	6010B	1.99	0.04	2.0	10/10/11	10/19/11	965		
Mercury	7471A	17.4	1.74	1000.0	08/30/11	08/30/11	133		
Nickel	6020A	0.22	0.03	5.0	09/02/11	09/23/11	38.2	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	947		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.74		
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.222	J	
Sodium	6010B	19.9	4.0	2.0	10/10/11	10/19/11	68.8	J	
Thallium	6020A	0.022	0.002	5.0	09/02/11	09/23/11	0.112		
Vanadium	6020A	0.22	0.02	5.0	09/02/11	09/23/11	23.6		
Zinc	6020A	0.6	0.2	5.0	09/02/11	09/23/11	93.5	J	

% Solids: 87.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1107701
Project No.:	NA	Date Collected:	08/07/11
Project Name:	Red Devil Mine	Date Received:	08/18/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM31SB06 Lab Code: K1107701-031

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	2130		
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	8.570	J	N*
Arsenic	6020A	0.36	0.04	5.0	09/02/11	09/23/11	273	J	N
Barium	6020A	0.036	0.004	5.0	09/02/11	09/23/11	71.7	J	
Beryllium	6020A	0.014	0.002	5.0	09/02/11	09/23/11	0.981		
Cadmium	6020A	0.014	0.002	5.0	09/02/11	09/23/11	0.776	J	
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	1440	J	N*
Chromium	6020A	0.15	0.02	5.0	09/02/11	09/23/11	8.22	J	N
Cobalt	6020A	0.014	0.002	5.0	09/02/11	09/23/11	12.3		
Copper	6020A	0.07	0.04	5.0	09/02/11	09/23/11	70.4	J	
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	54900		
Lead	6020A	0.036	0.007	5.0	09/02/11	09/23/11	16.8		
Magnesium	6010B	4.02	0.04	2.0	10/10/11	10/19/11	381	J	N
Manganese	6010B	2.01	0.04	2.0	10/10/11	10/19/11	459		
Mercury	7471A	1.66	0.166	100.0	08/30/11	08/30/11	15.2		
Nickel	6020A	0.15	0.02	5.0	09/02/11	09/23/11	52.1	J	
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	1190		
Selenium	7742	0.10	0.03	2.0	09/28/11	10/04/11	0.50	@	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/18/11	0.243	J	
Sodium	6010B	20.1	4.0	2.0	10/10/11	10/19/11	38.0	J	
Thallium	6020A	0.014	0.001	5.0	09/02/11	09/23/11	0.087		
Vanadium	6020A	0.15	0.01	5.0	09/02/11	09/23/11	14.8		
Zinc	6020A	0.4	0.1	5.0	09/02/11	09/23/11	113	J	

% Solids: 92.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1107701

Project No.: NA
Date Collected:

Project Name: Red Devil Mine
Date Received:

Matrix: SOIL
Units: mg/Kg

Basis: DRY

Sample Name: Method Blank
Lab Code: K1107701-MB1

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	10/10/11	10/19/11	6.0	U	
Antimony	6010B	10.0	3.0	2.0	10/10/11	10/19/11	3.0	U	N
Antimony	6020A	0.050	0.009	5.0	10/10/11	10/19/11	0.009	U	
Arsenic	6020A	0.50	0.06	5.0	09/01/11	09/22/11	0.10	J	
Barium	6020A	0.050	0.005	5.0	09/01/11	10/17/11	0.036	J	N*
Beryllium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.007	J	*
Calcium	6010B	10.0	2.0	2.0	10/10/11	10/19/11	2.0	U	*
Chromium	6020A	0.20	0.03	5.0	09/01/11	09/22/11	0.10	J	
Cobalt	6020A	0.020	0.003	5.0	09/01/11	09/22/11	0.012	J	
Copper	6020A	0.10	0.05	5.0	09/01/11	09/22/11	0.05	U	N
Iron	6010B	4.0	0.3	2.0	10/10/11	10/19/11	0.7	J	
Lead	6020A	0.050	0.009	5.0	09/01/11	10/17/11	0.010	J	
Magnesium	6010B	4.00	0.04	2.0	10/10/11	10/19/11	0.08	J	
Manganese	6010B	2.00	0.04	2.0	10/10/11	10/19/11	0.06	J	
Mercury	7471A	0.020	0.002	1.0	08/30/11	08/30/11	0.002	U	
Nickel	6020A	0.20	0.03	5.0	09/01/11	09/22/11	0.06	J	N
Potassium	6010B	80	5.0	2.0	10/10/11	10/19/11	5.0	U	
Selenium	7742	0.10	0.03	2.0	09/28/11	10/03/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/10/11	10/17/11	0.008	U	N
Sodium	6010B	20.0	4.0	2.0	10/10/11	10/19/11	4.0	U	N
Thallium	6020A	0.020	0.002	5.0	09/01/11	09/22/11	0.008	J	
Vanadium	6020A	0.20	0.02	5.0	09/01/11	09/22/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/01/11	09/22/11	0.2	U	N

% Solids: 100.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108355**
Sampling Dates: 8/17/2011 – 8/31/2011	**Sample Matrix: Water**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/05/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11KR44SD	K1108355-001
2	11KR45SD	K1108355-002
3	11KR40SD	K1108355-003
4	11KR41SD	K1108355-004
5	11KR42SD	K1108355-005

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- **X** Included: no problems
- ***** Included: problems noted in review
- **O** Not Included and/or Not Available
- **NR** Not Required
- **RS** Provided As Re-submission

Case Narrative:

- **X** Case Narrative present

Quality Control Summary Package:

- **X** Data Summary sheets
- **X** Initial and Continuing Calibration results
- **X** CRDL Standard results
- **X** Preparation Blank and Calibration Blank results
- **X** ICP Interference Check Sample results

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- X Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

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1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11VG01RS was used for matrix spike and matrix spike duplicate for a subset of total metals. All spike recoveries were within control limits. Sample 11VG02RS for a subset of total metals. All spike recoveries were within control limits. A post spike was performed for a subset of total metals; all recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Laboratory duplicate analyses were performed on 11VG01RS and 11VG02RS. 11VG01RSD was a duplicate of a subset of total metals. Calcium, Magnesium, and Potassium results exceeded 20% RPD; however, the parent samples were less than five times the reporting

limit. No action was taken. 11VG02RSD was a duplicate of a subset of total metals; Antimony, Chromium, Copper, and Nickel exceeded 35% RPD; however the parent results were less than five times the detection limit. No action was taken.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11VG01RS was analyzed by serial dilution for a subset of total metals, Aluminum, Calcium, Magnesium, and Potassium % Differences greater than 10%, however, initial sample results were not greater than 50x the MDL, so no action was taken. 11VG02RS was analyzed by serial dilution for a subset of total metals; Antimony, Manganese, Nickel, and Vanadium had % Differences greater than 10%, however initial sample results were not greater than 50x the MDL, so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11VG01RS
Aluminum: (3.5 ug/L) (50 mL)/(50 mL) = 3.5 ug/L
Lab Reported 3.5 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108357**
Sampling Dates: 8/18/2011 – 8/23/2011	**Sample Matrix: Plant Tissue**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/05/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11UP01WS	K1108357-001
2	11UP09BL	K1108357-002
3	11MP34GA	K1108357-003
4	11SM18BL	K1108357-004
5	11SM18GA	K1108357-005
6	11MP44GA	K1108357-006
7	11RD12GA	K1108357-007
8	11SM24BL	K1108357-008
9	11RD12BL	K1108357-009
10	11MP88PV	K1108357-010
11	11MP82PV	K1108357-011
12	11UP02WS	K1108357-012
13	11MP34WS	K1108357-013
14	11SM11WS	K1108357-014
15	11UP07WS	K1108357-015
16	11UP09WS	K1108357-016
17	11SM07GA	K1108357-017
18	11RD11WS	K1108357-018
19	11MP91WS	K1108357-019
20	11MP85PV	K1108357-020
21	11MP83PV	K1108357-021

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

22	11MP84PV	K1108357-022
23	11MP87PV	K1108357-023
24	11MP86PV	K1108357-024
25	11MP81PV	K1108357-025
26	11RD40BL	K1108357-026
27	11MP20WS	K1108357-027

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- * ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Raw QC Data Package Section

- **X Chain-of-Custody Records**
- **X Instrument Printouts**
- **X Sample Preparation Notebook Pages**
- **X Logbook and Worksheet Pages**
- **X Percent Solids Determination**

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	NO
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	NO
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11UP01WS was used for matrix spike and matrix spike duplicate for mercury. Spike recoveries were within control limits. Sample 11SM18BL was used for matrix spike and matrix spike duplicate for Selenium. Spike recoveries were within control limtis. Sample RD12GA was used for matrix spike and matrix spike duplicate for a subset of total metals. All spike recoveries were within control limits with the exception of Zinc, which exceeded 125% in the matrix spike. Associated sample results were qualified as estimated (J). Samples 11MP82PV, 11UP07WS, 11RD11WS, 11MP86PV, 11RD40BL and 11MP20WS were used as matrix spike and matrix spike duplicate for various subsets of total metals. All spike recoveries were within control limits. A post spike was performed for a subset of total metals; all recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blank were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{} \times 100\%$$

Comments: 11UP01WSD was a mercury duplicate with RPD greater than 35%; Mercury results were qualified as estimated (J). 11SM18BL was a Selenium duplicate; RPD was within control limits. 11RD12GA was a duplicate of a subset of total metals; Arsenic exceeded 35% RPD; however, the parent result was less than five times the detection limit so no action was taken. 11MP82PV was a duplicate of a subset of total metals; Antimony exceeded 35% RPD and the parent result was greater than five times the detection limit; associated results were qualified as estimated (J). All other duplicate analyses were within RPD control limits.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11UP01WS was analyzed by serial dilution, Arsenic, Beryllium, Lead, Thallium and Vanadium had % Differences greater than 10%, however, initial sample results were not greater than 50x the MDL, so no action was taken. 11MP82PV was analyzed by serial dilution for a subset of total metals; Chromium and Silver had % Differences greater than 10%, however initial sample results were not greater than 50x the MDL, so no action was taken. 11UP09WS was analyzed by serial dilution for a subset of total metals; Beryllium, Cadmium, Lead, and Vanadium had % Differences greater than 10%, however initial sample results were not greater than 50x the MDL so no action was taken. Sample 11MP86PV was analyzed by serial dilution for a subset of total metals; Chromium had a % Difference greater than 10%; however, initial sample result was not greater than 50x the MDL so no action was taken. 11MP20WS was analyzed by serial dilution for Mercury; % Difference was greater than 10%; associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP88PV
Mercury: (3.67 ug/L)(0.05L/2,596g) (20) (100/26.8) = 5.275 ug/g = 5.275 mg/kg
Lab Reported 5.28 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP01WS Lab Code: K1108357-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	68.8		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.096	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.06	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	7.50		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.007	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.032		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	3210		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.048		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	1.31		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	16.6		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.044	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	863		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	931		
Mercury	7471B	0.020	0.002	2.0	09/15/11	09/16/11	0.034	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.39		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	3800		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	13.5	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.015	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	25.1	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP09BL Lab Code: K1108357-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	51.5		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.126	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.16	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	48.8		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.019	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.432		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	3100		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.105		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	6.58		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	32.8		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.085		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	1060		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1020		
Mercury	7471B	0.021	0.002	2.0	09/15/11	09/16/11	0.034	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	2.01		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	3750		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	15.8	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.019	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.06	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	39.5	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108357
Project No.:	NA	**Date Collected:**	08/18/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	PLANT TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP34GA **Lab Code:** K1108357-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	9.2		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.635	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.91		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	2.35		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.013	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.014	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	5990		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.191		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	5.22		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	24.5		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.113		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	967		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	477		
Mercury	7471B	0.021	0.002	2.0	09/15/11	09/15/11	0.289	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	3.47		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	2220		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	13.4	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.013	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.06	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	35.9	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM18BL Lab Code: K1108357-004

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	59.7		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.096	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.15	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	68.0		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	1.200		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	2400		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.035		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	3.58		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	20.3		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.061		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	902		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1430		
Mercury	7471B	0.021	0.002	2.0	09/15/11	09/15/11	0.034	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	6.68		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	3930		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	12.9	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.005	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	31.3	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM18GA Lab Code: K1108357-005

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	9.7		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.165	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.13	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	181		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.007	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.129		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	10800		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.171		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	4.33		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	19.9		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.106		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	529		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	462		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/15/11	0.017	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	2.66		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	1530		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.22	J	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	9.8	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.006	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	49.0	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108357
Project No.:	NA	**Date Collected:**	08/18/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	PLANT TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP44GA **Lab Code:** K1108357-006

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	3.7		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.435	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.23	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	46.5		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.005	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.056		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	4560		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.074		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	5.19		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	17.6		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.060		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	731		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	707		
Mercury	7471B	0.023	0.002	2.0	09/15/11	09/15/11	0.027	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	2.42		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	2610		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	12.2	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.008	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	54.9	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/22/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD12GA Lab Code: K1108357-007

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	4.6		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.139	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.06	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	24.2		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.029		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	4630		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.027		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	4.61		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	12.5		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.061		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	627		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	229		
Mercury	7471B	0.020	0.002	2.0	09/15/11	09/16/11	0.021	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	0.16	J	
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	2610		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	13.3	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	66.9	J	N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108357
Date Collected: 08/23/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11SM24BL
Lab Code: K1108357-008

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	64.6		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.131	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.08	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	50.4		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.332		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	2430		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.099		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	5.97		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	25.6		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.067		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	1120		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1630		
Mercury	7471B	0.023	0.002	2.0	09/15/11	09/16/11	0.023	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.89		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	4340		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	12.2	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.006	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	42.6	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/22/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD12BL Lab Code: K1108357-009

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	11.5		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.146	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.10	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	36.3		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.255		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	2430		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.017	J	
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	3.93		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	19.6		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.056		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	1060		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	462		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/16/11	0.016	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	0.51		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	3300		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	11.7	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	48.9	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP88PV Lab Code: K1108357-010

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	94.2		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	78.8	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	64.7		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	36.2		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.006	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.014	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	13900		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.539		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	3.43		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	234		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.608		
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	8460		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	65.7		
Mercury	7471B	0.287	0.029	20.0	09/15/11	09/16/11	5.28	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	3.21		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	16000		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	52.5		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.026		
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.23		
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	43.3	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP82PV Lab Code: K1108357-011

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	80.7		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.386	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	1.24		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	47.5		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.004	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.023		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	17600		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.592		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	4.27		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	529		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.068		
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	4740		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1480		
Mercury	7471B	0.038	0.004	2.0	09/15/11	09/16/11	0.071	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	0.56		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	15300		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.18	J	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.015	J	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	2010		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.010	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.21		
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	31.8	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP02WS Lab Code: K1108357-012

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	53.4		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	1.490	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	11.3		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.005	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.018	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	4240		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.041		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	1.46		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	17.3		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.036	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	653		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1590		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/16/11	0.032	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.02		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	4280		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.154		
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	7.8	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.004	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	50.3	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP34WS Lab Code: K1108357-013

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	7.5		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.686	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.41	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	4.16		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.028		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	6710		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.224		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	2.13		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	23.3		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.053		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	773		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	963		
Mercury	7471B	0.020	0.002	2.0	09/15/11	09/15/11	0.264	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	3.26		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	6090		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.016	J	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	8.6	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	18.4	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11WS Lab Code: K1108357-014

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	56.5		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.199	J	*
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.11	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	23.0		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.008	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.010	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	4650		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.051		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	1.32		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	29.9		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.039	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	683		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	312		
Mercury	7471B	0.021	0.002	2.0	09/15/11	09/16/11	0.032	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	0.67		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	3450		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	9.5	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	19.0	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/21/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11UP07WS Lab Code: K1108357-015

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	14.0		
Antimony	6020A	0.048	0.009	5.0	09/30/11	10/26/11	0.101	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	5.31		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.009	J	
Calcium	6010B	9.6	1.9	2.0	09/30/11	10/13/11	3310		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.094		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	1.75		
Iron	6010B	1.9	0.7	2.0	09/30/11	10/13/11	12.8		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.022	J	
Magnesium	6010B	0.48	0.06	2.0	09/30/11	10/13/11	943		
Manganese	6010B	0.19	0.02	2.0	09/30/11	10/13/11	1040		
Mercury	7471B	0.020	0.002	2.0	09/15/11	09/16/11	0.021	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.01		
Potassium	6010B	57.7	19.2	2.0	09/30/11	10/13/11	5370		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.019	0.008	5.0	09/30/11	10/26/11	0.011	J	
Sodium	6010B	38.5	3.9	2.0	09/30/11	10/13/11	10.5	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.008	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	28.7	J	N

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108357
Project No.:	NA	**Date Collected:**	08/21/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	PLANT TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11UP09WS **Lab Code:** K1108357-016

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	9.8		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.107	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	9.05		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.015	J	
Calcium	6010B	9.9	2.0	2.0	09/30/11	10/13/11	3840		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.034		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	1.38		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	14.9		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.020	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	988		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1350		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/16/11	0.038	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.11		
Potassium	6010B	59.4	19.8	2.0	09/30/11	10/13/11	3990		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	39.6	4.0	2.0	09/30/11	10/13/11	7.0	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.015	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.02	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	29.3	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM07GA Lab Code: K1108357-017

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	17.3		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.375	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/26/11	0.47	J	
Barium	6020A	0.049	0.005	5.0	09/30/11	10/26/11	167		
Beryllium	6020A	0.019	0.003	5.0	09/30/11	10/26/11	0.015	J	
Cadmium	6020A	0.019	0.003	5.0	09/30/11	10/26/11	0.107		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	10300		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.019	0.003	5.0	09/30/11	10/26/11	0.528		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	6.64		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	32.2		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/26/11	0.102		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	582		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1140		
Mercury	7471B	0.025	0.003	2.0	09/15/11	09/16/11	0.043	J	
Nickel	6020A	0.19	0.03	5.0	09/30/11	10/26/11	4.15		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	2150		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	14.1	J	
Thallium	6020A	0.019	0.002	5.0	09/30/11	10/26/11	0.030		
Vanadium	6020A	0.19	0.02	5.0	09/30/11	10/26/11	0.06	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	108	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/22/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD11WS Lab Code: K1108357-018

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	3.8		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.205	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/26/11	0.11	J	
Barium	6020A	0.049	0.005	5.0	09/30/11	10/26/11	64.5		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.005	J	
Calcium	6010B	9.9	2.0	2.0	09/30/11	10/13/11	4720		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.023		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	2.34		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	18.3		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/26/11	0.032	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	681		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	58.8		
Mercury	7471B	0.022	0.002	2.0	09/15/11	09/16/11	0.056	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	0.28		
Potassium	6010B	59.4	19.8	2.0	09/30/11	10/13/11	5930		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	39.6	4.0	2.0	09/30/11	10/13/11	13.4	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.002	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.02	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	24.2	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108357
Project No.:	NA	**Date Collected:**	08/19/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	PLANT TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP91WS **Lab Code:** K1108357-019

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	5.1		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.343	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/26/11	0.23	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/26/11	37.4		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.052		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	3940		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.074		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	2.77		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	20.2		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.027	J	
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	904		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	218		
Mercury	7471B	0.024	0.002	2.0	09/15/11	09/15/11	0.036	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	1.29		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	7740		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.016	J	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	6.0	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.005	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	53.2	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP85PV Lab Code: K1108357-020

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	12.2		
Antimony	6020A	0.049	0.009	5.0	09/30/11	10/26/11	42.2	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/26/11	175		
Barium	6020A	0.049	0.005	5.0	09/30/11	10/26/11	18.2		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.003	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.017	J	
Calcium	6010B	9.8	2.0	2.0	09/30/11	10/13/11	15700		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/26/11	0.886		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/26/11	5.48		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	124		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/26/11	0.395		
Magnesium	6010B	3.9	0.3	2.0	09/30/11	10/13/11	9870		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	145		
Mercury	7471B	0.099	0.010	4.0	09/15/11	09/16/11	3.17	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/26/11	3.09		
Potassium	6010B	58.8	19.6	2.0	09/30/11	10/13/11	39500		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	39.2	3.9	2.0	09/30/11	10/13/11	76.8		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/26/11	0.066		
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/26/11	0.05	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/26/11	45.0	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP83PV Lab Code: K1108357-021

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	292		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.794	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/27/11	2.66		
Barium	6020A	0.049	0.005	5.0	09/30/11	10/27/11	120		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.013	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.053		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	20300		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.5	J	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.770		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	5.02		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	618		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/27/11	0.207		
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	6020		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	635		
Mercury	7471B	0.042	0.004	2.0	09/15/11	09/16/11	0.045	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	1.45		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	15200		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.16	J	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.012	J	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	673		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.018	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.73		
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	38.2	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP84PV Lab Code: K1108357-022

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	74.3		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	4.920	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/27/11	32.1		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/27/11	28.2		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.006	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.220		
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	13300		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.438		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	9.62		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	282		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/27/11	1.180		
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	6340		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	199		
Mercury	7471B	0.153	0.015	4.0	09/15/11	09/16/11	2.70	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	1.11		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	22300		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.81		
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	377		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.017	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.29		
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	55.7	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP87PV Lab Code: K1108357-023

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	54.6		
Antimony	6020A	0.048	0.009	5.0	09/30/11	10/26/11	71.3	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/27/11	72.5		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/27/11	30.0		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.005	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.010	J	
Calcium	6010B	9.6	1.9	2.0	09/30/11	10/13/11	14700		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.620		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	3.67		
Iron	6010B	1.9	0.7	2.0	09/30/11	10/13/11	177		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/27/11	0.472		
Magnesium	6010B	3.9	0.3	2.0	09/30/11	10/13/11	9990		
Manganese	6010B	0.19	0.02	2.0	09/30/11	10/13/11	71.0		
Mercury	7471B	0.061	0.006	4.0	09/15/11	09/16/11	0.780	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	3.06		
Potassium	6010B	57.7	19.2	2.0	09/30/11	10/13/11	15400		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.019	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	38.5	3.9	2.0	09/30/11	10/13/11	56.0		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.026		
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.17	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	44.2	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP86PV Lab Code: K1108357-024

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	8.3		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	97.4	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/27/11	309		
Barium	6020A	0.049	0.005	5.0	09/30/11	10/27/11	23.1		
Beryllium	6020A	0.019	0.003	5.0	09/30/11	10/27/11	0.004	J	
Cadmium	6020A	0.019	0.003	5.0	09/30/11	10/27/11	0.009	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	14100		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	J	
Cobalt	6020A	0.019	0.003	5.0	09/30/11	10/27/11	0.308		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	3.40		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	163		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/27/11	0.320		
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	13400		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	46.8		
Mercury	7471B	0.041	0.004	2.0	09/15/11	09/16/11	0.923	J	
Nickel	6020A	0.19	0.03	5.0	09/30/11	10/27/11	3.14		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	30300		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	57.1		
Thallium	6020A	0.019	0.002	5.0	09/30/11	10/27/11	0.083		
Vanadium	6020A	0.19	0.02	5.0	09/30/11	10/27/11	0.09	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	36.0	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP81PV Lab Code: K1108357-025

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	50.7		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	1.050	J	
Arsenic	6020A	0.49	0.06	5.0	09/30/11	10/27/11	3.23		
Barium	6020A	0.049	0.005	5.0	09/30/11	10/27/11	30.3		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.009	J	
Calcium	6010B	10.0	2.0	2.0	09/30/11	10/13/11	17700		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.307		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	3.39		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	185		
Lead	6020A	0.049	0.009	5.0	09/30/11	10/27/11	0.042	J	
Magnesium	6010B	4.0	0.3	2.0	09/30/11	10/13/11	5470		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	702		
Mercury	7471B	0.042	0.004	2.0	09/15/11	09/16/11	0.027	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	0.36		
Potassium	6010B	60.0	20.0	2.0	09/30/11	10/13/11	8960		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.048		
Sodium	6010B	40.0	4.0	2.0	09/30/11	10/13/11	766		
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.006	J	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.13	J	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	25.5	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD40BL Lab Code: K1108357-026

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	16.1		
Antimony	6020A	0.049	0.009	5.0	09/30/11	10/26/11	0.357	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/27/11	0.22	J	
Barium	6020A	0.050	0.005	5.0	09/30/11	10/27/11	42.7		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.140		
Calcium	6010B	2.0	0.6	2.0	09/30/11	10/13/11	2820		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.023		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	5.08		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	33.0		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/27/11	0.027	J	
Magnesium	6010B	0.49	0.06	2.0	09/30/11	10/13/11	1600		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	342		
Mercury	7471B	0.024	0.002	2.0	09/15/11	09/16/11	0.036	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	0.49		
Potassium	6010B	58.8	19.6	2.0	09/30/11	10/13/11	5180		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.008	U	
Sodium	6010B	39.2	3.9	2.0	09/30/11	10/13/11	17.5	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	38.8	J	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108357
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP20WS Lab Code: K1108357-027

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.0	0.4	2.0	09/30/11	10/13/11	172		
Antimony	6020A	0.050	0.009	5.0	09/30/11	10/26/11	0.667	J	
Arsenic	6020A	0.50	0.06	5.0	09/30/11	10/27/11	0.82		
Barium	6020A	0.050	0.005	5.0	09/30/11	10/27/11	70.8		
Beryllium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.008	J	
Cadmium	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.069		
Calcium	6010B	9.9	2.0	2.0	09/30/11	10/13/11	9920		
Chromium	6010B	0.8	0.2	2.0	09/30/11	10/13/11	0.5	J	
Cobalt	6020A	0.020	0.003	5.0	09/30/11	10/27/11	0.303		
Copper	6020A	0.10	0.05	5.0	09/30/11	10/27/11	4.42		
Iron	6010B	2.0	0.7	2.0	09/30/11	10/13/11	201		
Lead	6020A	0.050	0.009	5.0	09/30/11	10/27/11	0.466		
Magnesium	6010B	0.50	0.06	2.0	09/30/11	10/13/11	958		
Manganese	6010B	0.20	0.02	2.0	09/30/11	10/13/11	1340		
Mercury	7471B	0.028	0.003	2.0	09/15/11	09/15/11	0.641	J	
Nickel	6020A	0.20	0.03	5.0	09/30/11	10/27/11	5.23		
Potassium	6010B	59.4	19.8	2.0	09/30/11	10/13/11	4300		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	09/30/11	10/26/11	0.016	J	
Sodium	6010B	39.6	4.0	2.0	09/30/11	10/13/11	24.8	J	
Thallium	6020A	0.020	0.002	5.0	09/30/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/30/11	10/27/11	0.47		
Zinc	6020A	0.5	0.2	5.0	09/30/11	10/27/11	44.8	J	

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	**Lab Project Number: K118357**
Sampling Dates: 8/18/11	**Sample Matrix: Plant Tissue**
Analytical Method: Methyl Hg by EPA 1630	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/7/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP34GA	K1108357-003
2	11SM18BL	K1108357-004
3	11RD12GA	K1108357-007
4	11SM24BL	K1108357-008
5	11RD12BL	K1108357-009
6	11UP02WS	K1108357-012
7	11MP34WS	K1108357-013
8	11SM11WS	K1108357-014
9	11UP07WS	K1108357-015
10	11SM07GA	K1108357-017
11	11MP84PV	K1108357-022
12	11MP81PV	K1108357-025
13	11MP20WS	K1108357-027

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- NR — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- NR — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- NR — ICP Interelement Correction Factors
- NR — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**N/A**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments:

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP34GA was analyzed for matrix spike and matrix spike duplicate. Both analyses were within control limits.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Sample 11MP34GA was analyzed as a laboratory duplicate. Both the initial sample result and duplicate sample result were non-detected. No action was taken.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

1630, Sediment – dry-weight corrected

$$\frac{\frac{CDFE_{ext}}{AD_{rec}} - (B_f * I_d * 1000)}{I * 1000} \div \frac{\%TS}{100}$$

C – result produced at the instrument, pg

F – Final volume of the sample preparation, mL

D – Dilution factor of any dilution of the preparation made at the instrument

A – Analyzed volume of the prep or dilution of the prep, mL

E_{ext} – The mass of DCM added to the sample, g

E_{rec} – The mass of DCM recovered from the sample, g

B_f- the mean of the method blank final result, ng/g

I_d – The default aliquot prepared used for method blanks, 2.5g

I – aliquot of sample prepared, g.

Sample 11MP84PV, Lab ID K1108357-022
Methyl Hg:
((1.80 pg) (50 mL))/ (0.05)) – ((0.305 pg) (0.25)(1000))= 1723.75 pg
(1723.75 pg) / ((0.25g) (1000)) = 6.895 ng/g
Lab reported 6.9 ng/g

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **Definitive**, **Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive**, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH

AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108358**
Sampling Dates: 8/13/2011 – 8/22/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/06/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP22SB12	K1108358-001
2	11MP23SB14	K1108358-003
3	11MP31SB04	K1108358-004
4	11MP32SB04	K1108358-005
5	11MP22SB04	K1108358-006
6	11MP32SB06	K1108358-007
7	11MP23SB20	K1108358-008
8	11MP20SB12	K1108358-009
9	11MP20SB08	K1108358-010
10	11MP23SB10	K1108358-011
11	11MP32SB08	K1108358-012
12	11MP01SB04	K1108358-013
13	11M01SB12	K1108358-014
14	11MP20SB16	K1108358-016
15	11MP19SB04	K1108358-017
16	11MP40SB06	K1108358-018
17	11MP10SB06	K1108358-019
18	11MP10SB04	K1108358-020
19	11MP39SB08	K1108358-021
20	11MP25SB14	K1108358-022
21	11MP21SB08	K1108358-023

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

22	11MP28SB10	K1108358-024
23	11MP26SB10	K1108358-025
24	11MP29SB06	K1108358-026
25	11MP22SB08	K1108358-027
26	11MP26SB04	K1108358-028
27	11MP26SB16	K1108358-029

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- **X** Included: no problems
- ***** Included: problems noted in review
- **O** Not Included and/or Not Available
- **NR** Not Required
- **RS** Provided As Re-submission

Case Narrative:

- **X** Case Narrative present

Quality Control Summary Package:

- **X** Data Summary sheets
- **X** Initial and Continuing Calibration results
- **X** CRDL Standard results
- **X** Preparation Blank and Calibration Blank results
- **X** ICP Interference Check Sample results
- ***** Matrix Spike recoveries
- ***** Matrix Duplicate results
- **X** Laboratory Control Sample recoveries
- **NR** Method of Standard Additions results
- ***** ICP Serial Dilution results

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	NO
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP23SB10 was used for matrix spike and matrix spike duplicate for all total metals. All spike recoveries were within control limits with the exception of Antimony, Copper, and Zinc, which were below 75% in the matrix spike. Associated sample results were qualified as estimated (J). Sample 11MP19SB04 was used for matrix spike and matrix spike duplicate for Selenium. Percent recovery was less than 75% in the duplicate; however parent sample result was greater than four times the spike result, so no action was taken. A Batch QC

sample was used for matrix spike and matrix spike duplicate. All recoveries were within control limits with the exception of Arsenic, which exceeded 125% recovery, and Antimony, Potassium, and Zinc, which were less than 75% recovery; associated results were qualified as estimated (J).

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs

using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: 11MP31SB04 and 11MP32SB06 were mercury duplicates with RPDs within control limits. 11MP23SB10 was a duplicate of all total metals; RPDs were within control limits with the exception of Antimony and Arsenic, which exceeded 35%. Associated results were qualified as estimated (J). A Batch QC sample was a duplicate of all total metals; Antimony and exceeded 35% RPD; associated results were qualified as estimated (J). All other duplicate analyses were within RPD control limits.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11MP22SB04, 11MP20SB08, and 11MP28SB10 were analyzed by serial dilution, All % Differences were within control limits. 11MP23SB10 was analyzed by serial dilution for all total metals; Aluminum and Antimony had % Differences greater than 10%, associated results were qualified as estimated. All other serial dilutions were within control limits.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP22SB12
Aluminum: (29.06 ug/L) (100L/1.36g) (2) (100/73.8) = 5790.7 mg/kg
Lab Reported 5790 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP22SB12 Lab Code: K1108358-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/20/11	10/06/11	5790	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	2680	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	2370	J	N
Barium	6020A	0.049	0.005	5.0	09/20/11	10/19/11	286		
Beryllium	6020A	0.019	0.003	5.0	09/20/11	10/19/11	0.583		
Cadmium	6020A	0.019	0.003	5.0	09/20/11	10/19/11	0.293		
Calcium	6010B	10.0	2.0	2.0	09/20/11	10/06/11	3120		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	17.7		
Cobalt	6020A	0.019	0.003	5.0	09/20/11	10/19/11	9.520		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	39.0	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	25400		
Lead	6020A	0.049	0.009	5.0	09/20/11	10/19/11	3.520		
Magnesium	6010B	4.0	0.3	2.0	09/20/11	10/06/11	4340		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	677		
Mercury	7471A	2.47	0.247	100.0	09/10/11	09/10/11	72.8		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	33.8		
Potassium	6010B	59.8	19.9	2.0	09/20/11	10/06/11	1570	J	N
Selenium	7742	0.49	0.15	10.0	10/23/11	10/24/11	0.55	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.209		
Sodium	6010B	39.9	4.0	2.0	09/20/11	10/06/11	105		
Thallium	6020A	0.019	0.002	5.0	09/20/11	10/19/11	0.213		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	18.9		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	54.2	J	N

% Solids: 73.8

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP23SB14 Lab Code: K1108358-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/20/11	10/06/11	2270	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	1350	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	1420	J	N
Barium	6020A	0.049	0.005	5.0	09/20/11	10/19/11	157		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.630		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.634		
Calcium	6010B	9.8	2.0	2.0	09/20/11	10/06/11	6140		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	14.1		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	29.7		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	74.1	J	
Iron	6010B	3.9	0.7	2.0	09/20/11	10/06/11	39900		
Lead	6020A	0.049	0.009	5.0	09/20/11	10/19/11	13.1		
Magnesium	6010B	3.9	0.3	2.0	09/20/11	10/06/11	8420		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	1410		
Mercury	7471A	19.2	1.92	1000.0	09/10/11	09/10/11	119		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	85.4		
Potassium	6010B	58.5	19.5	2.0	09/20/11	10/06/11	1420	J	N
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	0.84	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.237		
Sodium	6010B	39.0	3.9	2.0	09/20/11	10/06/11	53.6		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.131		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	20.7		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	126	J	N

% Solids: 93.2

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP31SB04 Lab Code: K1108358-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/20/11	10/06/11	2640	J	
Antimony	6020A	0.050	0.009	5.0	09/20/11	10/25/11	2.340	J	
Arsenic	6020A	0.50	0.06	5.0	09/20/11	10/19/11	19.7	J	
Barium	6020A	0.050	0.005	5.0	09/20/11	10/19/11	79.2		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.551		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/27/11	0.330		
Calcium	6010B	9.9	2.0	2.0	09/20/11	10/06/11	2200		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	11.0		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	14.3		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	55.9	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	23600		
Lead	6020A	0.050	0.009	5.0	09/20/11	10/19/11	11.9		
Magnesium	6010B	0.59	0.06	2.0	09/20/11	10/06/11	520		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	187		
Mercury	7471A	0.201	0.020	10.0	09/10/11	09/10/11	1.92		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	41.0		
Potassium	6010B	59.4	19.8	2.0	09/20/11	10/06/11	1160	J	N
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.47	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.129		
Sodium	6010B	39.6	4.0	2.0	09/20/11	10/06/11	46.8		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.068		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	32.1		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	95.1	J	N

% Solids: 92.6

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP32SB04 Lab Code: K1108358-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/20/11	10/06/11	1760	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	128	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	3720	J	N
Barium	6020A	0.049	0.005	5.0	09/20/11	10/19/11	94.0		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.548		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/27/11	0.251		
Calcium	6010B	9.8	2.0	2.0	09/20/11	10/06/11	6190		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	17.3		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	8.620		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	30.6	J	
Iron	6010B	3.9	0.7	2.0	09/20/11	10/06/11	36700		
Lead	6020A	0.049	0.009	5.0	09/20/11	10/19/11	95.2		
Magnesium	6010B	3.9	0.3	2.0	09/20/11	10/06/11	8500		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	841		
Mercury	7471A	20.9	2.09	1000.0	09/10/11	09/10/11	134		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	23.0		
Potassium	6010B	58.6	19.5	2.0	09/20/11	10/06/11	1020	J	N
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	0.59	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.126		
Sodium	6010B	39.1	3.9	2.0	09/20/11	10/06/11	40.9		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.307		*
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	19.9		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	65.1	J	N

% Solids: 82.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP22SB04 Lab Code: K1108358-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/20/11	10/06/11	11800	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	6370	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	4970	J	N
Barium	6020A	0.050	0.005	5.0	09/20/11	10/19/11	565		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.868		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.432		
Calcium	6010B	9.9	2.0	2.0	09/20/11	10/06/11	7090		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	18.1		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	11.3		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	47.8	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	35500		
Lead	6020A	0.050	0.009	5.0	09/20/11	10/19/11	0.587		
Magnesium	6010B	4.0	0.3	2.0	09/20/11	10/06/11	6460		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	978		
Mercury	7471A	1.78	0.178	100.0	09/10/11	09/10/11	61.7		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	42.3		
Potassium	6010B	59.2	19.7	2.0	09/20/11	10/06/11	3650	J	N
Selenium	7742	0.49	0.15	10.0	10/23/11	10/24/11	0.71	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.253		
Sodium	6010B	39.5	4.0	2.0	09/20/11	10/06/11	310		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.475		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	20.1		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	78.2	J	

% Solids: 89.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP32SB06 Lab Code: K1108358-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/20/11	10/06/11	1890	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	214	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	4170	J	N
Barium	6020A	0.049	0.005	5.0	09/20/11	10/19/11	89.4		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.602		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/27/11	0.294		
Calcium	6010B	10.0	2.0	2.0	09/20/11	10/06/11	5470		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	19.5		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	9.320		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	34.8	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	37800		
Lead	6020A	0.049	0.009	5.0	09/20/11	10/19/11	104		
Magnesium	6010B	4.0	0.3	2.0	09/20/11	10/06/11	7750		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	848		
Mercury	7471A	19.4	1.94	1000.0	09/10/11	09/10/11	214		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	26.9		
Potassium	6010B	60.1	20.0	2.0	09/20/11	10/06/11	1130	J	N
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	0.72	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.165		
Sodium	6010B	40.1	4.0	2.0	09/20/11	10/06/11	42.9		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.324		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	20.6		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	71.9	J	N

% Solids: 81.1

Comments:

Columbia Analytical Services

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP23SB20 Lab Code: K1108358-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/20/11	10/06/11	9180	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	10200	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	5430	J	N
Barium	6020A	0.050	0.005	5.0	09/20/11	10/19/11	352		
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.387		
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/27/11	0.288		
Calcium	6010B	10.0	2.0	2.0	09/20/11	10/06/11	2980		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	18.3		
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	6.000		
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	29.3	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	22300		
Lead	6020A	0.050	0.009	5.0	09/20/11	10/19/11	0.083		
Magnesium	6010B	4.0	0.3	2.0	09/20/11	10/06/11	3890		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	217		
Mercury	7471A	130	13.0	5000.0	09/10/11	09/10/11	3410		
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	23.9		
Potassium	6010B	59.8	19.9	2.0	09/20/11	10/06/11	1530	J	N
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	1.73	J	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.174		
Sodium	6010B	39.9	4.0	2.0	09/20/11	10/06/11	193		
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.164		
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	21.4		
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	43.5	J	

% Solids: 68.2

Comments:

Columbia Analytical Services

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108358

Project No.: NA
Date Collected: 08/13/11

Project Name: Red Devil Mine
Date Received: 09/07/11

Matrix: SOIL
Units: mg/Kg

Basis: DRY

Sample Name: 11MP20SB12
Lab Code: K1108358-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	3950	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.190	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	5.52	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	139		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.487		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.596		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	2000		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	15.5		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	18.6		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	59.7	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	54000		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	14.0		
Magnesium	6010B	0.60	0.06	2.0	09/21/11	10/06/11	1020		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	1280		
Mercury	7471A	0.086	0.009	5.0	09/10/11	09/10/11	0.718		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	57.3		
Potassium	6010B	59.9	20.0	2.0	09/21/11	10/06/11	1290	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.61	J	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.208		
Sodium	6010B	39.9	4.0	2.0	09/21/11	10/06/11	43.9		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.078		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	30.2		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	108	J	N

% Solids: 89.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/13/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP20SB08 Lab Code: K1108358-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	5970	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.351	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	15.5	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	266		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.591		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.392		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	1540		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	22.8		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	17.1		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	46.1	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	41600		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	13.1		
Magnesium	6010B	0.60	0.06	2.0	09/21/11	10/06/11	1570		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	1320		
Mercury	7471A	0.093	0.009	5.0	09/10/11	09/10/11	0.639		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	43.4		
Potassium	6010B	60.0	20.0	2.0	09/21/11	10/06/11	1190	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.50	~~J~~	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.169		
Sodium	6010B	40.0	4.0	2.0	09/21/11	10/06/11	50.1		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.072		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	38.3		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	102	J	

% Solids: 88.5

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP23SB10 Lab Code: K1108358-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	2100	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	61.3	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	443	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	111		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.607		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.575		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	4310		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	11.1		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	19.5		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	73.6	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	35500		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	14.2		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	9460		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	595		
Mercury	7471A	35.3	3.53	2000.0	09/10/11	09/10/11	337		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	70.0		
Potassium	6010B	59.4	19.8	2.0	09/21/11	10/06/11	1330	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.88	~~J~~	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.237		
Sodium	6010B	39.6	4.0	2.0	09/21/11	10/06/11	49.2		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.087		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	20.5		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	126	J	N

% Solids: 94.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP32SB08 Lab Code: K1108358-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	6550	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	186	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	4010	J	*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	115		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.579		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.226		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	8300		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	25.8		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	17.6		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	33.5	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	37300		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	124		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	9610		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	1050		
Mercury	7471A	39.4	3.94	2000.0	09/10/11	09/10/11	378		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	67.0		
Potassium	6010B	58.5	19.5	2.0	09/21/11	10/06/11	1190	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/24/11	0.70	J	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.140		
Sodium	6010B	39.0	3.9	2.0	09/21/11	10/06/11	64.4		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.437		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	27.9		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	65.2	J	

% Solids: 74.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/14/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP01SB04 Lab Code: K1108358-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	14400	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.940	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	10.3	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	147		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.431		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.331		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	1240		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	19.6		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	13.3		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	32.4	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	31200		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	9.920		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	3630		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	611		
Mercury	7471A	0.065	0.006	5.0	09/10/11	09/10/11	0.435		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	34.0		
Potassium	6010B	59.7	19.9	2.0	09/21/11	10/06/11	855	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.17	J	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.095		
Sodium	6010B	39.8	4.0	2.0	09/21/11	10/06/11	57.0		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.085		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	35.5		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	76.1	J	N

% Solids: 78.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/14/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP01SB12 Lab Code: K1108358-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	14200	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.245	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	12.5	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	148		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.536		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.372		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	2430		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	26.3		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	15.8		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	47.1	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	53100		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	11.9		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	4870		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	507		
Mercury	7471A	0.033	0.003	2.0	09/10/11	09/10/11	0.361		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	47.6		
Potassium	6010B	59.7	19.9	2.0	09/21/11	10/06/11	1290	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.32	J	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.182		
Sodium	6010B	39.8	4.0	2.0	09/21/11	10/06/11	53.2		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.070		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	36.8		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	107	J	

% Solids: 84.4

Comments:

Columbia Analytical Services

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108358
Project No.: NA
Date Collected: 08/13/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11MP20SB16
Lab Code: K1108358-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	4580	J	
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.358	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	7.77	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	166		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.533		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.761		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	2700		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	18.1		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	25.7		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	74.4	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	52700		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	16.8		
Magnesium	6010B	0.60	0.06	2.0	09/21/11	10/06/11	1020		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	1270		
Mercury	7471A	0.083	0.008	5.0	09/10/11	09/10/11	0.758		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	73.6		
Potassium	6010B	60.0	20.0	2.0	09/21/11	10/06/11	1350	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.62	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.194		
Sodium	6010B	40.0	4.0	2.0	09/21/11	10/06/11	48.7		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.096		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	37.5		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	143	J	N

% Solids: 90.1

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108358

Project No.: NA
Date Collected: 08/15/11

Project Name: Red Devil Mine
Date Received: 09/07/11

Matrix: SOIL
Units: mg/Kg

Basis: DRY

Sample Name: 11MP19SB04
Lab Code: K1108358-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	4970	J	
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	1.040	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	19.6	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	254		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.459		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.339		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	1710		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	11.6		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	14.7		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	37.4	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	40700		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	9.820		
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	875		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	1060		
Mercury	7471A	0.187	0.019	10.0	09/10/11	09/10/11	1.88		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	40.9		
Potassium	6010B	59.0	19.7	2.0	09/21/11	10/06/11	1200	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.38	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.116		
Sodium	6010B	39.4	3.9	2.0	09/21/11	10/06/11	71.1		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.074		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	36.4		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	89.0	J	

% Solids: 84.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/16/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP40SB06 Lab Code: K1108358-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	11200	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	347	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	276	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	120		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.346		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.155		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	1950		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	16.9		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	6.830		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	19.4	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	23200		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	8.270		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	3230		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	246		
Mercury	7471A	0.443	0.044	20.0	09/10/11	09/10/11	10.3		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	22.5		
Potassium	6010B	59.2	19.7	2.0	09/21/11	10/06/11	1030	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.45	~~J~~	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.097		
Sodium	6010B	39.5	4.0	2.0	09/21/11	10/06/11	72.2		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.085		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	29.4		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	55.0	J	N

% Solids: 76.2

Comments:

Columbia Analytical Services

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP10SB06 Lab Code: K1108358-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	2830	J	
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	3.380	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	15.6	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	126		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.305		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.303		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	2660		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	14.1		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	15.7		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	25.4	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	41300		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	6.730		
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	758		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	697		
Mercury	7471A	0.197	0.020	10.0	09/10/11	09/10/11	5.63		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	43.8		
Potassium	6010B	59.2	19.7	2.0	09/21/11	10/06/11	816	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.29	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.094		
Sodium	6010B	39.4	3.9	2.0	09/21/11	10/06/11	44.6		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.068		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	35.7		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	72.8	J	

% Solids: 93.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP10SB04 Lab Code: K1108358-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	3000	J	
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	8.090	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	25.5	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	133		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.334		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.413		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	3090		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	13.5		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	13.8		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	35.2	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	51500		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	8.310		
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	680		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	731		
Mercury	7471A	0.180	0.018	10.0	09/10/11	09/10/11	3.60		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	47.0		
Potassium	6010B	59.0	19.7	2.0	09/21/11	10/06/11	876	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.34	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.118		
Sodium	6010B	39.3	3.9	2.0	09/21/11	10/06/11	45.1		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.065		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	31.6		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	82.6	J	N

% Solids: 93.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: SOIL

Service Request: K1108358
Date Collected: 08/13/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP39SB08
Lab Code: K1108358-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	13800	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	2180	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	866	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	358		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.368		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.224		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	4060		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	23.7		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	7.350		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	21.7	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	18700		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	7.550		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	3810		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	322		
Mercury	7471A	2.80	0.280	100.0	09/10/11	09/10/11	43.8		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	29.4		
Potassium	6010B	58.9	19.6	2.0	09/21/11	10/06/11	1670	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/25/11	0.45	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.123		
Sodium	6010B	39.3	3.9	2.0	09/21/11	10/06/11	163		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.185		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	23.9		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	50.8	J	

% Solids: 65.7

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP25SB14 Lab Code: K1108358-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	12900	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	16800	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	7020	J	*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	680		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.574		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.341		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	7160		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	21.8		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	10.0		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	51.8	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	37800		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	0.089		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	8000		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	668		
Mercury	7471A	32.5	3.25	2000.0	09/10/11	09/10/11	565		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	37.6		
Potassium	6010B	58.5	19.5	2.0	09/21/11	10/06/11	3650	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/27/11	1.25	J	N
Silver	6020A	0.019	0.008	5.0	09/21/11	10/24/11	0.274		
Sodium	6010B	39.0	3.9	2.0	09/21/11	10/06/11	353		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.393		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	17.0		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	78.3	J	N

% Solids: 89.2

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108358
Project No.:	NA	**Date Collected:**	08/15/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP21SB08 **Lab Code:** K1108358-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	5000	J	
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	1.480	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	10.8	J	
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	114		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.541		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.622		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	885		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	16.3		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	16.2		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	67.4	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	46600		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	11.6		
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	741		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	362		
Mercury	7471A	0.071	0.007	5.0	09/10/11	09/10/11	0.850		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	48.4	J	
Potassium	6010B	58.7	19.6	2.0	09/21/11	10/06/11	1320	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.68	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.142		
Sodium	6010B	39.2	3.9	2.0	09/21/11	10/06/11	35.3	J	
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.077		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	33.3		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	122	J	

% Solids: 87.3

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/22/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP28SB10 Lab Code: K1108358-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	12400	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	723	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	222	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	135		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.387		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.270		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	1870		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	17.2		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	9.640		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	26.5	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	24800		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	7.850		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	3230		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	775		
Mercury	7471A	2.16	0.216	100.0	09/10/11	09/10/11	56.9		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	27.7		
Potassium	6010B	59.9	20.0	2.0	09/21/11	10/06/11	1320	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.41	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.147		
Sodium	6010B	39.9	4.0	2.0	09/21/11	10/06/11	114		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.107		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	33.4		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	67.7	J	N

% Solids: 77.7

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP26SB10 Lab Code: K1108358-025

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	10500	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	12400	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	8870	J	*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	743		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.624		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.402		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	3980		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	16.4		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	8.280		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	53.3	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	32700		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	3.710		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	4940		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	499		
Mercury	7471A	41.2	4.12	2000.0	09/10/11	09/10/11	1070		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	31.6		
Potassium	6010B	58.7	19.6	2.0	09/21/11	10/06/11	4580	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	1.38	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.260		
Sodium	6010B	39.1	3.9	2.0	09/21/11	10/06/11	318		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.339		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	16.7		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	85.8	J	

% Solids: 90.5

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP29SB06 Lab Code: K1108358-026

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	12100	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	15800	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	7360	J	*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	717		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.597		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.353		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	6490		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	32.4		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	8.640		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	46.8	J	N
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	48500		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	0.180		
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	7620		
Manganese	6010B	1.98	0.40	2.0	09/21/11	10/06/11	1720		
Mercury	7471A	3.61	0.361	200.0	09/10/11	09/10/11	89.4		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	31.0		
Potassium	6010B	59.5	19.8	2.0	09/21/11	10/06/11	4140	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/27/11	0.91	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/24/11	0.229		
Sodium	6010B	39.6	4.0	2.0	09/21/11	10/06/11	362		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.554		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	18.0		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	76.0	J	N

% Solids: 89.3

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP22SB08 Lab Code: K1108358-027

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	9420	J	
Antimony	6010B	19.7	4.9	20.0	09/21/11	10/28/11	19300	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	7320	J	*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	608		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.691		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.433		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	3650		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	12.6		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	11.5		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	67.4	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	42800		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	0.055		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	5140		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	532		
Mercury	7471A	19.7	1.97	1000.0	09/10/11	09/10/11	223		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	44.1		
Potassium	6010B	59.0	19.7	2.0	09/21/11	10/06/11	2580	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	1.39	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/24/11	0.398		
Sodium	6010B	39.3	3.9	2.0	09/21/11	10/06/11	195		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.332		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	17.0		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	104	J	N

% Solids: 90.0

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP26SB04 Lab Code: K1108358-028

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	09/21/11	10/06/11	9440	J	
Antimony	6010B	1.9	0.5	2.0	09/21/11	10/06/11	14600	J	N*
Arsenic	6010B	1.9	0.9	2.0	09/21/11	10/06/11	9530	J	*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	609		
Beryllium	6020A	0.019	0.003	5.0	09/21/11	10/24/11	0.610		
Cadmium	6020A	0.019	0.003	5.0	09/21/11	10/24/11	0.324		
Calcium	6010B	9.7	1.9	2.0	09/21/11	10/06/11	5810		
Chromium	6020A	0.19	0.03	5.0	09/21/11	10/24/11	18.8		
Cobalt	6020A	0.019	0.003	5.0	09/21/11	10/24/11	10.2		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	63.9	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	32500		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	0.053		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	5910		
Manganese	6010B	0.19	0.02	2.0	09/21/11	10/06/11	518		
Mercury	7471A	89.1	8.91	5000.0	09/10/11	09/10/11	1270		
Nickel	6020A	0.19	0.03	5.0	09/21/11	10/24/11	37.6		
Potassium	6010B	58.3	19.4	2.0	09/21/11	10/06/11	3220	J	
Selenium	7742	1.00	0.30	20.0	10/23/11	10/27/11	2.25	J	N
Silver	6020A	0.019	0.008	5.0	09/21/11	10/24/11	0.248		
Sodium	6010B	38.9	3.9	2.0	09/21/11	10/06/11	338		
Thallium	6020A	0.019	0.002	5.0	09/21/11	10/24/11	0.504		
Vanadium	6020A	0.19	0.02	5.0	09/21/11	10/24/11	16.5		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	80.0	J	N

% Solids: 91.1

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP26SB16 Lab Code: K1108358-029

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	11400	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	1280	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	808	J	
Barium	6020A	0.049	0.005	5.0	09/21/11	10/24/11	196		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.452		
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.352		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	2980		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	14.9		
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	13.1		
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	32.4	J	N
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	26700		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/24/11	9.320		
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	3630		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	671		
Mercury	7471A	2.29	0.229	100.0	09/10/11	09/10/11	44.2		
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	31.4		
Potassium	6010B	58.9	19.6	2.0	09/21/11	10/06/11	2050	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	0.36	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.150		
Sodium	6010B	39.3	3.9	2.0	09/21/11	10/06/11	164		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.151		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	25.5		
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	72.6	J	N

% Solids: 76.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo Service Request: K1108358

Project No.: NA Date Collected:

Project Name: Red Devil Mine Date Received:

Matrix: SOIL Units: mg/Kg

Basis: DRY

Sample Name: Method Blank Lab Code: K1108358-MB1

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/20/11	10/06/11	2.0	J	
Antimony	6010B	2.0	0.5	2.0	09/20/11	10/06/11	0.5	U	N*
Arsenic	6010B	2.0	0.9	2.0	09/20/11	10/06/11	0.9	U	N
Arsenic	6020A	0.50	0.06	5.0	09/20/11	10/19/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	09/20/11	10/19/11	0.039	J	
Beryllium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.003	U	
Calcium	6010B	10.0	2.0	2.0	09/20/11	10/06/11	10.8		
Chromium	6020A	0.20	0.03	5.0	09/20/11	10/19/11	0.06	J	
Cobalt	6020A	0.020	0.003	5.0	09/20/11	10/19/11	0.016	J	
Copper	6020A	0.10	0.05	5.0	09/20/11	10/19/11	0.09	J	
Iron	6010B	4.0	0.7	2.0	09/20/11	10/06/11	7.2		
Lead	6020A	0.050	0.009	5.0	09/20/11	10/19/11	0.020	J	
Magnesium	6010B	0.60	0.06	2.0	09/20/11	10/06/11	1.20		
Manganese	6010B	0.20	0.02	2.0	09/20/11	10/06/11	0.08	J	
Mercury	7471A	0.020	0.002	1.0	09/10/11	09/10/11	0.002	U	
Nickel	6020A	0.20	0.03	5.0	09/20/11	10/19/11	0.08	J	
Potassium	6010B	60.0	20.0	2.0	09/20/11	10/06/11	20.0	U	N
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	09/20/11	10/19/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/20/11	10/06/11	4.0	U	
Thallium	6020A	0.020	0.002	5.0	09/20/11	10/19/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/20/11	10/19/11	0.02	J	
Zinc	6020A	0.5	0.2	5.0	09/20/11	10/19/11	0.3	J	N

% Solids: 100.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108358**
Sampling Dates: 08/15/2011 to 08/18/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: J.Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/8/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP32SB06	K1108358-007
2	11MP23SB20	K1108358-008
3	11MP19SB04	K1108358-017
4	11MP10SB06	K1108358-019

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits with the exception of Sodium, which exceeded the control limit. Associated sample results were qualified as estimated (J).

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP32SB06 was used for matrix spike for Mercury; recovery was within control limits. Sample 11MP23SB20 was used for matrix spike and matrix spike duplicate for total metals. Thallium had less than 75% recovery; however the parent sample result was greater than four times the spike result so no action was taken.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Sample 11MP32SB06 was analyzed as a laboratory duplicate for Mercury. Sample 11MP23SB200 was analyzed as a laboratory duplicate for all total metals. All RPDs were within control limits.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample 11MP23SB20 was used for serial dilution analysis. Aluminum, Silver, and Thallium had % Differences greater than 10%; however, initial sample results were less than 50x the MDL so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Not analyzed.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP32SB06
Al: (0.892 mg/L)*(50mL/50mL) = 0.892 mg/L = 892 ug/L
Lab reported 892 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108358
Project No.:	NA	**Date Collected:**	08/17/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SPLP	**Units:**	ug/L
		Basis:	NA

Sample Name: 11MP32SB06 **Lab Code:** K1108358-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	892		
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	450		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	1390		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	17.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	2680		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	4.7	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	1450		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	13.6	J	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	2280		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	15.6		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	7.42		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.7	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	559		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	11.1	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	6780	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	43.4	J	

% Solids: 0.0

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108358

Sample Name:	Lab Code:
11MP32SB06	K1108358-007
11MP32SB06D	K1108358-007D
11MP32SB06S	K1108358-007S
11MP23SB20	K1108358-008
11MP23SB20D	K1108358-008D
11MP23SB20S	K1108358-008S
11MP23SB20SD	K1108358-008SD
11MP19SB04	K1108358-017
11MP10SB06	K1108358-019
Method Blank	K1108358-MB

Comments:

Approved By: _____ **Date:** 10/29/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP23SB20 Lab Code: K1108358-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	361		
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	31200		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	5330		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	32.2	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	4260		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	962		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	6080		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	54.2		
Mercury	7470A	50.0	20.0	50.0	09/14/11	10/13/11	312		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1090		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	8.4	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	9540	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	6.3	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	29.9	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108358
Project No.:	NA	Date Collected:	08/15/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP19SB04 Lab Code: K1108358-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1690		
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	20.0	U	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	20	U	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	40.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	969	J	
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.1	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2570		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	206		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	101		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	1.58		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.5	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	754		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	6.2	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	13500	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	54.0	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108358
Project No.:	NA	**Date Collected:**	08/15/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SPLP	**Units:**	ug/L
		Basis:	NA

Sample Name: 11MP10SB06 **Lab Code:** K1108358-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1800		
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	24.0	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	20	U	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	47.8	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1240		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.4	J	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4530		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	353		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	120		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	2.24		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	6.5	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	777		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	9.4	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	8310	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	7.4	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	53.8	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108358

Project No.: NA
Date Collected:

Project Name: Red Devil Mine
Date Received:

Matrix: SPLP
Units: ug/L

Basis: NA

Sample Name: Method Blank
Lab Code: K1108358-MB

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	30	U	
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	20.6	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	20	U	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	1.0	U	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	561	J	
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.3	J	
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	62.9	J	
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	0.4	U	
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	0.40	U	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	50	U	
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	4840	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.9	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108358**
Sampling Dates: 08/15/2011	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/7/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP10SB06	K1108358-019
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- X ICP Serial Dilution results
- NR Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: 11MP10SB06 was analyzed for matrix spike and matrix spike duplicate. All recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Analysis of laboratory duplicates was within QC Criteria.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: % Differences for all analytes were within control limits with the exception of Barium; however, initial sample result was less than 50x MDL so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was within QC criteria

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP10SB06
Ba: (0.423 mg/L)(50ml/50ml) = 0.423 mg/L
Lab reported 0.423 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108359**
Sampling Dates: 8/24/2011 – 8/29/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/06/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP49SB10	K1108359-001
2	11MP51SB06	K1108359-003
3	11MP52SB06	K1108359-004
4	11MP52SB10	K1108359-005
5	11MP53SB08	K1108359-006
6	11MP54SB04	K1108359-007
7	11MP57SB04	K1108359-010
8	11MP59SB12	K1108359-012
9	11MP59SB14	K1108359-015
10	11MP62SB04	K1108359-016
11	11MP62SB24	K1108359-017
12	11MP57SB06	K1108359-018
13	11MP52SB26	K1108359-019
14	11MP62SB14	K1108359-020
15	11MP49SB06	K1108359-021

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- * ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	NO
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	NO
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are

rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP52SB10 was used for matrix spike and matrix spike duplicate for all total metals. All spike recoveries were within control limits with the exception of Antimony, which was less than 75%, and Arsenic, which exceeded 125%. Associated sample results were qualified as estimated (J). Sample 11MP52SB06 was used for matrix spike and matrix spike duplicate for Selenium. Percent recovery was within control limits.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also

detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
_____ **Field Duplicates**
__X__ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: 11MP49SB10 was a Mercury duplicates with RPD exceeding control limits; associated sample results were qualified as estimated (J). 11MP52SB06 was a Selenium duplicate with RPDs within control limits. 11MP52SB10 was a duplicate of all total metals; RPDs were within control limits with the exception of Antimony and Arsenic, which exceeded 35%. Associated results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated

detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11MP49SB10 was analyzed as a serial dilution of Mercury; % Difference was greater than 10%. Associated results were qualified as estimated (J). 11MP52SB10 was analyzed by serial dilution for all total metals. Aluminum, Beryllium, Chromium, Cobalt, Lead, Potassium, and Vanadium exceeded 10% Difference and were greater than 50x the MDL; associated results were qualified as estimated (J).

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP49SB10
Aluminum: (67.54 mg/L) (0.1 L 1.18 g) (2) (100/84.8) = 13.5 mg/g = 13500 mg/kg
Lab Reported 13500 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108359
Project No.:	NA	Date Collected:	08/26/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP49SB10 Lab Code: K1108359-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	13500		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	1240	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	348	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	135		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.338	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.250		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	3110		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	20.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	6.840	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	18.8		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	24800		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	5.360	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	5090		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	378		
Mercury	7471A	17.4	1.74	1000.0	09/14/11	09/17/11	263	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	20.9		
Potassium	6010B	60.0	20.0	2.0	09/21/11	10/06/11	1150	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.48		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.165		
Sodium	6010B	40.0	4.0	2.0	09/21/11	10/06/11	181		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.115		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	30.7	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	52.9		

% Solids: 84.8

Comments:

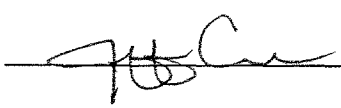
Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108359

Sample Name:	Lab Code:
11MP49SB10	K1108359-001
11MP49SB10D	K1108359-001D
11MP49SB10S	K1108359-001S
11MP49SB10SD	K1108359-001SD
11MP51SB06	K1108359-003
11MP52SB06	K1108359-004
11MP52SB06D	K1108359-004D
11MP52SB06S	K1108359-004S
11MP52SB06SD	K1108359-004SD
11MP52SB10	K1108359-005
11MP52SB10D	K1108359-005D
11MP52SB10S	K1108359-005S
11MP52SB10SD	K1108359-005SD
11MP53SB08	K1108359-006
11MP54SB04	K1108359-007
11MP57SB04	K1108359-010
11MP59SB12	K1108359-012
11MP59SB14	K1108359-013
11MP62SB04	K1108359-015
11MP62SB24	K1108359-016
11MP57SB06	K1108359-017
11MP52SB26	K1108359-018
11MP57SB08	K1108359-019
11MP62SB14	K1108359-020
11MP49SB06	K1108359-021
Method Blank	K1108359-MB

Comments:

Approved By:  **Date:** 11/1/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP51SB06 **Lab Code:** K1108359-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	8410		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	863	J	N
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	2210	J	N
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	189		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.386	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.319		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	13700		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	28.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	10.8	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	83.1		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	36700		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	18.2	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	5300		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	531		
Mercury	7471A	19.3	1.93	1000.0	09/14/11	09/17/11	438	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	38.7		
Potassium	6010B	59.9	20.0	2.0	09/21/11	10/06/11	1520	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/24/11	0.62		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.187		
Sodium	6010B	39.9	4.0	2.0	09/21/11	10/06/11	241		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.264		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	42.1	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	288		

% Solids: 87.1

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP52SB06 **Lab Code:** K1108359-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	7340		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	3770	J	N
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	2690	J	N
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	300		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.551	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.522		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	4270		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	19.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	11.7	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	49.6		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	36900		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	0.767	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	4820		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	760		
Mercury	7471A	18.6	1.86	1000.0	09/14/11	09/17/11	500	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	40.3		
Potassium	6010B	59.4	19.8	2.0	09/21/11	10/06/11	2120	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	0.81		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.210		
Sodium	6010B	39.6	4.0	2.0	09/21/11	10/06/11	266		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.207		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	19.6	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	88.0		

% Solids: 91.8

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP52SB10 **Lab Code:** K1108359-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	10800		
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	73.8	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	76.1	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/24/11	107		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.278	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.210		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	2950		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	19.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	5.700	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	17.3		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	14800		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	6.250	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	4130		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	170		
Mercury	7471A	1.80	0.180	100.0	09/14/11	09/17/11	18.8	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	18.2		
Potassium	6010B	60.2	20.1	2.0	09/21/11	10/06/11	913	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.04	J	
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.066		
Sodium	6010B	40.2	4.0	2.0	09/21/11	10/06/11	263		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.084		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	27.6	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	50.9		

% Solids: 91.4

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP53SB08 **Lab Code:** K1108359-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	6020		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	262	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	625	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/25/11	103		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.541	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.455		
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	2840		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	15.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	11.1	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	60.2		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	35500		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/25/11	13.7	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	1860		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	430		
Mercury	7471A	3.62	0.362	200.0	09/14/11	09/17/11	108	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	37.3		
Potassium	6010B	60.2	20.1	2.0	09/21/11	10/06/11	1150	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.53		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.140		
Sodium	6010B	40.1	4.0	2.0	09/21/11	10/06/11	52.0		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.110		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	28.1	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	123		

% Solids: 86.7

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP54SB04 **Lab Code:** K1108359-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	6380		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	110	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	746	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	121		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.529	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.459		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	2190		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	15.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	11.1	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	40.7		
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	39400		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	11.5	J	
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	1540		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	452		
Mercury	7471A	89.2	8.92	5000.0	09/14/11	09/17/11	4340	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	37.0		
Potassium	6010B	59.0	19.7	2.0	09/21/11	10/06/11	1250	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.56		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.115		
Sodium	6010B	39.3	3.9	2.0	09/21/11	10/06/11	82.4		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.129		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	23.8	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	83.4		

% Solids: 84.8

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP57SB04 **Lab Code:** K1108359-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	9140		
Antimony	6010B	20.0	5.0	20.0	10/23/11	10/31/11	28900	J	
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	9460	J	N
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	161		
Beryllium	6020A	0.019	0.003	5.0	09/21/11	10/25/11	0.313	J	
Cadmium	6020A	0.019	0.003	5.0	09/21/11	10/25/11	0.826		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	11600		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	14.1	J	
Cobalt	6020A	0.019	0.003	5.0	09/21/11	10/25/11	7.380	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	28.1		
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	44700		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	0.250	J	
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	2370		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	435		
Mercury	7471A	99.0	9.90	5000.0	09/14/11	09/17/11	2070	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	20.2		
Potassium	6010B	58.5	19.5	2.0	09/21/11	10/06/11	1010	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/24/11	2.27		
Silver	6020A	0.019	0.008	5.0	09/21/11	10/24/11	0.250		
Sodium	6010B	39.0	3.9	2.0	09/21/11	10/06/11	88.0		
Thallium	6020A	0.019	0.002	5.0	09/21/11	10/25/11	0.158		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	20.1	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	141		

% Solids: 86.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP59SB12 **Lab Code:** K1108359-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	13900		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	441	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	319	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	144		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.404	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.192		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	5170		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	20.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	9.290	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	26.2		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	29600		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	6.910	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	6580		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	441		
Mercury	7471A	1.90	0.190	100.0	09/14/11	09/17/11	31.1	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	26.8		
Potassium	6010B	59.4	19.8	2.0	09/21/11	10/06/11	926	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.34		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.471		
Sodium	6010B	39.6	4.0	2.0	09/21/11	10/06/11	118		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.083		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	34.9	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	62.0		

% Solids: 84.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP59SB14 **Lab Code:** K1108359-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	10900		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	570	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	366	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	101		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.286	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.198		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	2090		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	19.7	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	10.7	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	19.1		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	32400		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	5.200	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	3730		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	817		
Mercury	7471A	1.91	0.191	100.0	09/14/11	09/17/11	16.4	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	22.4		
Potassium	6010B	59.3	19.8	2.0	09/21/11	10/06/11	743	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.21		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.093		
Sodium	6010B	39.5	4.0	2.0	09/21/11	10/06/11	107		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.072		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	33.6	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	51.9		

% Solids: 86.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP62SB04 **Lab Code:** K1108359-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	8510		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	973	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	416	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/25/11	112		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.370	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.199		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	6350		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	15.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	9.590	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	24.2		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	24900		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/25/11	8.180	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	5770		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	463		
Mercury	7471A	19.0	1.90	1000.0	09/14/11	09/17/11	906	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	35.8		
Potassium	6010B	59.6	19.9	2.0	09/21/11	10/06/11	1150	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.58		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/24/11	0.158		
Sodium	6010B	39.7	4.0	2.0	09/21/11	10/06/11	66.4		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.086		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	29.1	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	58.6		

% Solids: 84.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP62SB24 **Lab Code:** K1108359-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	17400		
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	4.550	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	26.4	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	141		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.431	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.286		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	2870		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	19.7	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	7.710	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	22.5		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	13600		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	7.950	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	4100		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	116		
Mercury	7471A	0.018	0.002	1.0	09/14/11	09/17/11	0.787	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	29.4		
Potassium	6010B	59.6	19.9	2.0	09/21/11	10/06/11	780	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	1.23		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.152		
Sodium	6010B	39.7	4.0	2.0	09/21/11	10/06/11	161		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.115		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	40.5	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	64.1		

% Solids: 77.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP57SB06 **Lab Code:** K1108359-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	10300		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	57.8	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	581	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	89.1		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.425	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.295		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	1930		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	17.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	10.9	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	22.5		
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	37900		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	8.550	J	
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	2510		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	492		
Mercury	7471A	1.96	0.196	100.0	09/14/11	09/17/11	15.2	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	25.7		
Potassium	6010B	59.1	19.7	2.0	09/21/11	10/06/11	823	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.32		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.083		
Sodium	6010B	39.4	3.9	2.0	09/21/11	10/06/11	54.9		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.082		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	35.6	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	58.3		

% Solids: 89.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP52SB26 **Lab Code:** K1108359-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	5090		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	70.2	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	174	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	267		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.727	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.838		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	4680		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	13.8	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	15.0	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	54.7		
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	65900		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	11.9	J	
Magnesium	6010B	0.60	0.06	2.0	09/21/11	10/06/11	1030		
Manganese	6010B	1.99	0.40	2.0	09/21/11	10/06/11	1790		
Mercury	7471A	1.73	0.173	100.0	09/14/11	09/17/11	25.0	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	60.8		
Potassium	6010B	59.6	19.9	2.0	09/21/11	10/06/11	1310	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.81		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.184		
Sodium	6010B	39.7	4.0	2.0	09/21/11	10/06/11	60.5		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.159		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	27.0	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	136		

% Solids: 90.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108359
Project No.:	NA	Date Collected:	08/29/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP57SB08 Lab Code: K1108359-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	7640		
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	137	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	483	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/25/11	85.9		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.388	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.318		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	1780		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	17.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	10.9	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	28.8		
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	29400		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/25/11	6.570	J	
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	2460		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	395		
Mercury	7471A	2.00	0.200	100.0	09/14/11	09/17/11	33.9	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	30.4		
Potassium	6010B	58.9	19.6	2.0	09/21/11	10/06/11	1010	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.24		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.130		
Sodium	6010B	39.2	3.9	2.0	09/21/11	10/06/11	78.7		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.093		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	24.7	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	70.0		

% Solids: 89.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP62SB14 **Lab Code:** K1108359-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	11800		
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	3.230	J	N
Arsenic	6020A	0.51	0.06	5.0	09/21/11	10/25/11	27.3	J	N*
Barium	6020A	0.051	0.005	5.0	09/21/11	10/25/11	75.7		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.187	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.143		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	1920		
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	17.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	6.330	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	17.5		
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	16200		
Lead	6020A	0.051	0.009	5.0	09/21/11	10/25/11	9.180	J	
Magnesium	6010B	3.9	0.3	2.0	09/21/11	10/06/11	4260		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	102		
Mercury	7471A	0.017	0.002	1.0	09/14/11	09/17/11	0.493	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	51.7		
Potassium	6010B	59.1	19.7	2.0	09/21/11	10/06/11	1140	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/24/11	0.56		
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.096		
Sodium	6010B	39.4	3.9	2.0	09/21/11	10/06/11	103		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.063		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	22.6	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	41.2		

% Solids: 86.7

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108359**
Sampling Dates: 08/24/2011 to 08/28/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: J.Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/8/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP51SB06	K1108359-003
2	11MP52SB06	K1108359-004
3	11MP52SB10	K1108359-005
4	11MP59SB12	K1108359-012

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	YES
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits with the exception of Sodium, which exceeded the control limit. Associated sample results were qualified as estimated (J).

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP51SB06 was used for matrix spike for Mercury; recovery was within control limits. Sample 11MP52SB06 was used for matrix spike and matrix spike duplicate for total metals. Antimony had greater than 125% recovery in the duplicate; associated sample results were qualified as estimated (J) or rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Sample 11MP51SB06 was analyzed as a laboratory duplicate for Mercury. Sample 11MP52SB06 was analyzed as a laboratory duplicate for all total metals. All RPDs were within control limits with the exception of Aluminum; associated results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample 11MP23SB20 was used for serial dilution analysis. Aluminum, Silver, and Vanadium had % Differences greater than 10%; however, initial sample results were less than 50x the MDL so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Not analyzed.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP51SB06
Al: (1.010 mg/L)*(50mL/50mL) = 1.010 mg/L = 1010 ug/L
Lab reported 1010 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108359
Project No.:	NA	Date Collected:	08/24/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP51SB06 Lab Code: K1108359-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1010	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	2220	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	614		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	11.1	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	55800		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	17.8		
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.2	J	
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	52.8	J	
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	0.4	U	
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	0.88	J	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	323	J	
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	3360	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	9.2	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	34.8	J	

% Solids: 0.0

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:

Service Request: K1108359

Sample Name:	Lab Code:
11MP51SB06	K1108359-003
11MP51SB06D	K1108359-003D
11MP51SB06S	K1108359-003S
11MP52SB06	K1108359-004
11MP52SB06D	K1108359-004D
11MP52SB06S	K1108359-004S
11MP52SB06SD	K1108359-004SD
11MP52SB10	K1108359-005
11MP59SB12	K1108359-012
Method Blank	K1108359-MB

Comments:

Approved By: _____ **Date:** 11/1/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SPLP	**Units:**	ug/L
		Basis:	NA

Sample Name: 11MP52SB06 **Lab Code:** K1108359-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	809	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	3100	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	841		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	20.0	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	2950		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	1870		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	2660		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	17.8		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	9.40		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.1	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	1040		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	8440	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	20.8	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108359
Project No.:	NA	Date Collected:	08/26/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP52SB10 Lab Code: K1108359-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	2320	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	241	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	86	J	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	27.9	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1210		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.8	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2530		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	619		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	20.1		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	4.51		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.3	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	445		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	7.6	J	
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	7820	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	9.8	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	47.6	J	

% Solids: 0.0

Comments:

SPLP Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108359
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SPLP	**Units:**	ug/L
		Basis:	NA

Sample Name: 11MP59SB12 **Lab Code:** K1108359-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	1090	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	3080	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	208		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	18.7	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	1380		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.1	J	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	1690		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	2560		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	15.7		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	2.43		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	3.0	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	399	J	
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	10.4	J	
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	1680	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	22.0	J	

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo Service Request: K1108359

Project No.: NA Date Collected:

Project Name: Red Devil Mine Date Received:

Matrix: SPLP Units: ug/L

Basis: NA

Sample Name: Method Blank Lab Code: K1108359-MB

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	30	U	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	20.6	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	20	U	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	1.0	U	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	561	J	
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.3	J	
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	62.9	J	
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	0.4	U	
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	0.40	U	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	50	U	
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	4840	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.9	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108359**
Sampling Dates: 08/26/2011	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/7/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP51SB06	K1108359-003
2	11MP52SB06	K1108359-004
3	11MP52SB10	K1108359-005
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- X ICP Serial Dilution results
- NR Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: 11MP51SB06 was analyzed for matrix spike and matrix spike duplicate. All recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Sample 11MP51SB06 was analyzed as a laboratory duplicate. All RPDs were within control limits with the exception of Selenium, which exceeded 20%. However, initial sample result was less than 5x the MDL, so no action was taken.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: % Differences for all analytes were within control limits with the exception of Barium; however, initial sample result was less than 50x MDL so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was within QC criteria

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP51SB06
As: (0.1371 mg/L)(50ml/50ml) = 0.1371 mg/L
Lab reported 0.14 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1108363**
Sampling Dates: 8/17/2011 – 8/29/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/06/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP48SB08	1 K1108363-001
2	11MP48SB16	K1108363-002
3	11MP49SB14	K1108363-004
4	11MP50SB04	K1108363-005
5	11MP51SB14	K1108363-006
6	11MP58SB16	K1108363-008
7	11MP60SB14	K1108363-009
8	11MP63SB04	K1108363-012
9	11MP63SB06	K1108363-013
10	11MP66SB18	K1108363-014
11	11MP29SB28	K1108363-015
12	11MP27SB08	K1108363-016
13	11MP59SB18	K1108363-017
14	11MP46SB12	K1108363-018
15	11MP45SB10	K1108363-019
16	11MP66SB24	K1108363-020
17	11MP28SB12	K1108363-021
18	11MP45SB04	K1108363-022
19	11MP47SB04	K1108363-023
20	11MP61SB06	K1108363-024

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- * ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**NO**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**NO**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP58SB16 was used for matrix spike and matrix spike duplicate for all total metals. Antimony, Calcium, Copper, Magnesium, and Zinc exceeded 125%. Associated sample results were qualified as estimated (J). Sample 11MP48SB08 was used for matrix spike and matrix spike duplicate for Selenium. Percent recovery exceeded control limits; however parent sample result was greater than four times the spike result so no action was taken. A Batch QC sample was used for matrix spike and matrix spike duplicate for all total metals. Antimony was less than 75% recovery, and Arsenic exceeded 125% recovery; associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: 11MP48SB080 was a Mercury and Selenium duplicate with Mercury RPD exceeding control limits; associated sample results were qualified as estimated (J).

11MP58SB16 was a duplicate of all total metals; RPDs were within control limits with the exception of Antimony, which exceeded 35%. Associated results were qualified as estimated (J). A Batch QC sample was a duplicate of all total metals; RPDs were within control limits with the exception of Arsenic, which exceeded 35%. Associated results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11MP59SB18 was analyzed as a serial dilution of Mercury; % Difference was greater than 10%. Associated results were qualified as estimated (J). 11MP58SB16 was analyzed by serial dilution for a subset of total metals. % Differences were within control limits with the exception of Sodium; however, sample result was less than 50x the MDL, so no action was taken. Sample 11MP66SB18 was analyzed by serial dilution for a subset of total metals. % Differences were within control limits with the exception of Antimony; however, initial sample result was less than 50x the MDL, so no action was taken. A Batch QC sample was analyzed by serial dilution for all total metals. Aluminum, Beryllium, Chromium, Cobalt, Lead, Potassium, and Vanadium exceeded 10% Difference and were greater than 50x the MDL; associated results were qualified as estimated (J).

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP48SB08
Aluminum: (17.17 mg/L) (0.1L/ 1.08g) (2) (100/93.3) = 3.407 mg/g = 3407 mg/kg
Lab Reported 3410 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

.a Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP48SB08 **Lab Code:** K1108363-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	3410	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	324	J	N
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	2550	J	N
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	110		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.619	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.451		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	4900	J	
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	27.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	14.6	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	50.3	J	
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	44400		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	13.7	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	5870	J	
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	639		
Mercury	7471A	37.7	3.77	2000.0	09/14/11	09/14/11	304	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	57.6		
Potassium	6010B	59.5	19.8	2.0	09/21/11	10/06/11	1420	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/27/11	1.03	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.193		
Sodium	6010B	39.7	4.0	2.0	09/21/11	10/06/11	64.2		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.169		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	25.5	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	102	J	

% Solids: 93.3

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108363

Sample Name:	Lab Code:
Batch QC3D	K1108354-003D
Batch QC3S	K1108354-003S
Batch QC3SD	K1108354-003SD
Batch QC1D	K1108359-005D
Batch QC1S	K1108359-005S
Batch QC1SD	K1108359-005SD
11MP48SB08	K1108363-001
11MP48SB08D	K1108363-001D
11MP48SB08S	K1108363-001S
11MP48SB08SD	K1108363-001SD
11MP48SB16	K1108363-002
11MP49SB14	K1108363-004
11MP50SB04	K1108363-005
11MP51SB14	K1108363-006
11MP58SB16	K1108363-008
11MP58SB16D	K1108363-008D
11MP58SB16S	K1108363-008S
11MP58SB16SD	K1108363-008SD
11MP60SB14	K1108363-009
11MP63SB04	K1108363-012
11MP63SB06	K1108363-013
11MP66SB18	K1108363-014
11MP29SB28	K1108363-015
11MP27SB08	K1108363-016
11MP59SB18	K1108363-017
11MP46SB12	K1108363-018
11MP45SB10	K1108363-019
11MP66SB24	K1108363-020
11MP28SB12	K1108363-021
11MP45SB04	K1108363-022
11MP45SB04D	K1108363-022D
11MP45SB04S	K1108363-022S
11MP45SB04SD	K1108363-022SD
11MP47SB04	K1108363-023
11MP61SB06	K1108363-024
Method Blank	K1108363-MB1
Method Blank	K1108363-MB2

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP48SB16 **Lab Code:** K1108363-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	11700	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	415	J	N
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	2150	J	N
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	128		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.334	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.181		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	2280	J	
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	25.8	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	8.420	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	25.5	J	
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	29100		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	7.260	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	3480	J	
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	259		
Mercury	7471A	1.91	0.191	100.0	09/14/11	09/14/11	93.3	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	28.4		
Potassium	6010B	59.4	19.8	2.0	09/21/11	10/06/11	1120	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.29	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.128		
Sodium	6010B	39.6	4.0	2.0	09/21/11	10/06/11	127		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.123		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	30.4	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	58.0	J	

% Solids: 87.9

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/26/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP49SB14 **Lab Code:** K1108363-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/21/11	10/06/11	12000	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	94.6	J	N
Arsenic	6020A	0.49	0.06	5.0	09/21/11	10/25/11	35.6	J	N*
Barium	6020A	0.049	0.005	5.0	09/21/11	10/25/11	104		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.282	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.153		
Calcium	6010B	9.9	2.0	2.0	09/21/11	10/06/11	2590	J	
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	19.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	6.020	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	16.0	J	
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	17900		
Lead	6020A	0.049	0.009	5.0	09/21/11	10/25/11	4.830	J	
Magnesium	6010B	4.0	0.3	2.0	09/21/11	10/06/11	4250	J	
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	221		
Mercury	7471A	1.96	0.196	100.0	09/14/11	09/14/11	38.5	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	19.9		
Potassium	6010B	59.2	19.7	2.0	09/21/11	10/06/11	775	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.05	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.071		
Sodium	6010B	39.5	4.0	2.0	09/21/11	10/06/11	177		
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.065		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	30.1	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	43.8	J	

% Solids: 91.3

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP50SB04 **Lab Code:** K1108363-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	09/21/11	10/06/11	2230	J	
Antimony	6020A	0.049	0.009	5.0	09/21/11	10/25/11	5.000	J	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	230	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/25/11	117		
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.500	J	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/25/11	0.821		
Calcium	6010B	9.8	2.0	2.0	09/21/11	10/06/11	1150	J	
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/25/11	17.7	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/25/11	14.5	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/25/11	38.4	J	
Iron	6010B	3.9	0.7	2.0	09/21/11	10/06/11	50700		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/25/11	10.2	J	
Magnesium	6010B	0.59	0.06	2.0	09/21/11	10/06/11	316	J	
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	947		
Mercury	7471A	1.82	0.182	100.0	09/14/11	09/14/11	18.0	J	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/25/11	49.5		
Potassium	6010B	58.9	19.6	2.0	09/21/11	10/06/11	999	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/27/11	1.23	J	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.200		
Sodium	6010B	39.2	3.9	2.0	09/21/11	10/06/11	26.8	J	
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/25/11	0.094		
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/25/11	29.5	J	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/25/11	123	J	

% Solids: 91.0

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/24/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP51SB14 Lab Code: K1108363-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	1830	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	343	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/25/11	823	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	75.0		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.367	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.363		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	2050	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	12.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	10.2	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	23.4	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	57400		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	6.770	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	401	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	353		
Mercury	7471A	1.91	0.191	100.0	09/14/11	09/14/11	38.3	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/25/11	35.1		
Potassium	6010B	60.2	20.1	2.0	09/22/11	10/11/11	779	J	
Selenium	7742	0.49	0.15	10.0	10/23/11	10/27/11	0.30	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.067		
Sodium	6010B	40.1	4.0	2.0	09/22/11	10/11/11	25.1	J	
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.078		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	19.1	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	101	J	N

% Solids: 90.6

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP58SB16 **Lab Code:** K1108363-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	8150	J	
Antimony	6020A	1.000	0.180	100.0	09/22/11	10/25/11	195	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/25/11	291	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	93.4		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.369	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.372		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1840	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	14.8	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	9.780	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	20.9	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	32400		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	8.660	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	2130	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	639	J	
Mercury	7471A	1.78	0.178	100.0	09/14/11	09/14/11	19.1	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/25/11	24.3		
Potassium	6010B	60.0	20.0	2.0	09/22/11	10/11/11	856	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.38	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.114		
Sodium	6010B	40.0	4.0	2.0	09/22/11	10/11/11	76.8		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.067		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	25.6	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	54.9	J	N

% Solids: 87.7

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP60SB14 **Lab Code:** K1108363-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/22/11	10/11/11	2300	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	240	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	3120	J	
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	116		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.746	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.500		
Calcium	6010B	9.9	2.0	2.0	09/22/11	10/11/11	5170	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	17.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	22.0	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	66.4	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	46200		
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	15.2	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	8410	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	976		
Mercury	7471A	19.1	1.91	1000.0	09/14/11	09/14/11	348	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/25/11	82.8		
Potassium	6010B	59.4	19.8	2.0	09/22/11	10/11/11	1390	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	1.52	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.304		
Sodium	6010B	39.6	4.0	2.0	09/22/11	10/11/11	69.0		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.158		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	19.1	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	115	J	N

% Solids: 91.9

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/28/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP63SB04 Lab Code: K1108363-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	10700	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	115	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/25/11	61.6	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	95.5		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.274	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.168		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1600	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	15.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	6.800	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	14.2	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	21500		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	4.480	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	3470	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	472		
Mercury	7471A	0.019	0.002	1.0	09/14/11	09/14/11	0.509	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/25/11	18.1		
Potassium	6010B	60.1	20.0	2.0	09/22/11	10/11/11	687	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.09	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.068		
Sodium	6010B	40.1	4.0	2.0	09/22/11	10/11/11	93.3		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.068		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	22.0	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	39.8	J	N

% Solids: 87.6

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP63SB06 **Lab Code:** K1108363-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	09/22/11	10/11/11	10300	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	223	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/25/11	208	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	85.8		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.320	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.307		
Calcium	6010B	9.7	2.0	2.0	09/22/11	10/11/11	2020	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	17.8	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	7.220	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	22.3	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	42700		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	6.100	J	
Magnesium	6010B	3.9	0.3	2.0	09/22/11	10/11/11	3920	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	470		
Mercury	7471A	0.197	0.020	10.0	09/14/11	09/14/11	7.89	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/25/11	29.2		
Potassium	6010B	58.4	19.5	2.0	09/22/11	10/11/11	849	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	1.04	J	N
Silver	6020A	0.019	0.008	5.0	09/22/11	10/27/11	0.125		
Sodium	6010B	39.0	3.9	2.0	09/22/11	10/11/11	83.5		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.063		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	23.6	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	64.8	J	N

% Solids: 87.0

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP66SB18 **Lab Code:** K1108363-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	3900	J	
Antimony	6020A	0.050	0.009	5.0	09/22/11	10/25/11	1.020	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	36.6	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	78.5		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.665	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.877		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1930	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	11.1	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	15.3	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	79.3	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	51100		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	19.9	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	1500	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	374		
Mercury	7471A	0.196	0.020	10.0	09/14/11	09/14/11	6.86	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	78.7		
Potassium	6010B	60.0	20.0	2.0	09/22/11	10/11/11	1110	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	1.37	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.237		
Sodium	6010B	40.0	4.0	2.0	09/22/11	10/11/11	46.5		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.092	J	
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	28.5	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	178	J	N

% Solids: 87.0

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/17/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP29SB28 Lab Code: K1108363-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/22/11	10/11/11	10500	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	15800	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	5500	J	
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	777		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.692	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.401		
Calcium	6010B	9.9	2.0	2.0	09/22/11	10/11/11	5410	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	19.6	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	10.0	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	55.0	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	29600		
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	0.237	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	6390	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	558		
Mercury	7471A	18.6	1.86	1000.0	09/14/11	09/14/11	172	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	39.0		
Potassium	6010B	59.4	19.8	2.0	09/22/11	10/11/11	4060	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	0.67	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.256		
Sodium	6010B	39.6	4.0	2.0	09/22/11	10/11/11	343		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.432		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	18.7	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	82.8	J	N

% Solids: 89.4

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/21/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP27SB08 **Lab Code:** K1108363-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	13000	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	33.3	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	78.6	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	234		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.452	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.568		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1600	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	29.3	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	16.8	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	32.6	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	34600		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	10.8	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	4020	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	923		
Mercury	7471A	0.174	0.017	10.0	09/14/11	09/14/11	1.79	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	44.6		
Potassium	6010B	60.1	20.0	2.0	09/22/11	10/11/11	1060	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.11	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.141		
Sodium	6010B	40.1	4.0	2.0	09/22/11	10/11/11	77.1		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.106		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	39.7	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	84.1	J	N

% Solids: 84.6

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/28/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP59SB18 Lab Code: K1108363-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	10800	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	565	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	318	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	104		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.288	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.182		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	2280	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	18.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	10.2	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	21.0	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	26900		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	5.700	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	4130	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	571		
Mercury	7471A	1.85	0.185	100.0	09/14/11	09/14/11	40.3	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	22.7		
Potassium	6010B	60.2	20.1	2.0	09/22/11	10/11/11	761	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.26	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.095		
Sodium	6010B	40.2	4.0	2.0	09/22/11	10/11/11	130		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.068		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	31.2	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	53.6	J	N

% Solids: 86.6

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP46SB12 Lab Code: K1108363-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	2260	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	3150	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	449	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	141		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.595	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.509		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	5640	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	12.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	18.0	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	78.7	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	43600		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	7.500	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	10200	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	845		
Mercury	7471A	18.1	1.81	1000.0	09/14/11	09/14/11	219	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	64.3		
Potassium	6010B	60.0	20.0	2.0	09/22/11	10/11/11	1350	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	1.03	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.358		
Sodium	6010B	40.0	4.0	2.0	09/22/11	10/11/11	67.4		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.096		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	17.6	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	108	J	N

% Solids: 93.4

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP45SB10 **Lab Code:** K1108363-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.6	0.4	2.0	09/22/11	10/11/11	3240	J	
Antimony	6010B	1.9	0.5	2.0	09/22/11	10/11/11	104	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/23/11	10/26/11	282	J	
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	132		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.542	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.449		
Calcium	6010B	9.6	1.9	2.0	09/22/11	10/11/11	6650	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	12.8	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	16.5	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	51.6	J	N
Iron	6010B	1.9	0.7	2.0	09/22/11	10/11/11	38800		
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	12.4	J	
Magnesium	6010B	3.8	0.3	2.0	09/22/11	10/11/11	4650	J	N
Manganese	6010B	0.19	0.02	2.0	09/22/11	10/11/11	957		
Mercury	7471A	18.9	1.89	1000.0	09/22/11	09/23/11	265	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	46.6		
Potassium	6010B	57.6	19.2	2.0	09/22/11	10/11/11	1170	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.58	J	N
Silver	6020A	0.019	0.008	5.0	09/22/11	10/27/11	0.189		
Sodium	6010B	38.4	3.8	2.0	09/22/11	10/11/11	54.8		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.087		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	25.7	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	97.8	J	N

% Solids: 91.3

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/28/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP66SB24 **Lab Code:** K1108363-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	9330	J	
Antimony	6020A	0.050	0.009	5.0	09/22/11	10/25/11	17.8	J	N*
Arsenic	6020A	0.50	0.06	5.0	09/23/11	10/26/11	55.6	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	99.5		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.472	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.409		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1750	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	23.2	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	17.1	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	32.4	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	40600		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	9.300	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	3670	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	840		
Mercury	7471A	1.76	0.176	100.0	09/14/11	09/14/11	20.9	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	39.2		
Potassium	6010B	59.7	19.9	2.0	09/22/11	10/11/11	1040	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.32	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.112		
Sodium	6010B	39.8	4.0	2.0	09/22/11	10/11/11	72.8		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.064		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	31.5	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	105	J	N

% Solids: 88.2

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/22/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP28SB12 Lab Code: K1108363-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	09/22/11	10/11/11	11600	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	1350	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	1050	J	
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	244		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.414	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.309		
Calcium	6010B	9.9	2.0	2.0	09/22/11	10/11/11	2050	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	22.4	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	11.5	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	31.6	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	25900		
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	5.870	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	3120	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	603		
Mercury	7471A	19.5	1.95	1000.0	09/14/11	09/14/11	845	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	33.1		
Potassium	6010B	59.6	19.9	2.0	09/22/11	10/11/11	1240	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	0.37	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.139		
Sodium	6010B	39.7	4.0	2.0	09/22/11	10/11/11	109		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.150		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	32.6	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	75.5	J	N

% Solids: 77.5

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP45SB04 **Lab Code:** K1108363-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	9560	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	11800	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	3610	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	521		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.613	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.451		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	4370	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	18.7	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	9.170	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	54.6	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	30800		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	0.043	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	4590	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	536		
Mercury	7471A	35.3	3.53	2000.0	09/14/11	09/14/11	1310	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	36.7		
Potassium	6010B	60.0	20.0	2.0	09/22/11	10/11/11	2780	J	
Selenium	7742	0.10	0.03	2.0	10/31/11	11/01/11	0.38	J	
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.239		
Sodium	6010B	40.0	4.0	2.0	09/22/11	10/11/11	221		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.299		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	20.9	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	83.3	J	N

% Solids: 89.3

Comments:

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Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP47SB04 **Lab Code:** K1108363-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	2650	J	
Antimony	6010B	2.0	0.5	2.0	09/22/11	10/11/11	1750	J	N*
Arsenic	6010B	2.0	0.9	2.0	09/22/11	10/11/11	3840	J	
Barium	6020A	0.050	0.005	5.0	09/23/11	10/25/11	139		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.582	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.452		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	4400	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	11.9	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	17.4	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/25/11	61.3	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	40400		
Lead	6020A	0.050	0.009	5.0	09/23/11	10/25/11	6.990	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	8220	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	707		
Mercury	7471A	19.4	1.94	1000.0	09/14/11	09/14/11	939	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	61.0		
Potassium	6010B	59.7	19.9	2.0	09/22/11	10/11/11	1340	J	
Selenium	7742	0.50	0.15	10.0	10/23/11	10/27/11	1.49	J	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.324		
Sodium	6010B	39.8	4.0	2.0	09/22/11	10/11/11	68.6		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.134		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	21.4	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	98.2	J	N

% Solids: 91.4

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11MP61SB06 **Lab Code:** K1108363-024

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/22/11	10/11/11	14900	J	
Antimony	6020A	0.050	0.009	5.0	09/22/11	10/25/11	1.250	J	N*
Arsenic	6020A	0.49	0.06	5.0	09/23/11	10/26/11	19.7	J	
Barium	6020A	0.049	0.005	5.0	09/23/11	10/25/11	121		
Beryllium	6020A	0.020	0.003	5.0	09/23/11	10/26/11	0.353	J	
Cadmium	6020A	0.020	0.003	5.0	09/23/11	10/25/11	0.217		
Calcium	6010B	10.0	2.0	2.0	09/22/11	10/11/11	1950	J	N
Chromium	6020A	0.20	0.03	5.0	09/23/11	10/25/11	20.0	J	
Cobalt	6020A	0.020	0.003	5.0	09/23/11	10/25/11	6.550	J	
Copper	6020A	0.10	0.05	5.0	09/23/11	10/26/11	19.1	J	N
Iron	6010B	2.0	0.7	2.0	09/22/11	10/11/11	15000		
Lead	6020A	0.049	0.009	5.0	09/23/11	10/25/11	7.960	J	
Magnesium	6010B	4.0	0.3	2.0	09/22/11	10/11/11	3580	J	N
Manganese	6010B	0.20	0.02	2.0	09/22/11	10/11/11	173		
Mercury	7471A	0.019	0.002	1.0	09/14/11	09/14/11	0.702	J	*
Nickel	6020A	0.20	0.03	5.0	09/23/11	10/26/11	19.8		
Potassium	6010B	59.9	20.0	2.0	09/22/11	10/11/11	570	J	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.24	~~J~~	N
Silver	6020A	0.020	0.008	5.0	09/22/11	10/27/11	0.117		
Sodium	6010B	39.9	4.0	2.0	09/22/11	10/11/11	78.8		
Thallium	6020A	0.020	0.002	5.0	09/23/11	10/25/11	0.105		
Vanadium	6020A	0.20	0.02	5.0	09/23/11	10/25/11	33.0	J	
Zinc	6020A	0.5	0.2	5.0	09/23/11	10/25/11	54.4	J	N

% Solids: 76.5

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	
Project Name:	Red Devil Mine	Date Received:	
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: Method Blank Lab Code: K1108363-MB1

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	09/21/11	10/06/11	1.9	J	
Antimony	6010B	2.0	0.5	2.0	09/21/11	10/06/11	2.1		N
Antimony	6020A	0.050	0.009	5.0	09/21/11	10/25/11	0.009	U	N
Arsenic	6010B	2.0	0.9	2.0	09/21/11	10/06/11	0.9	U	N
Arsenic	6020A	0.50	0.06	5.0	09/21/11	10/25/11	0.24	J	N*
Barium	6020A	0.050	0.005	5.0	09/21/11	10/25/11	0.005	U	
Beryllium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.003	U	
Calcium	6010B	10.0	2.0	2.0	09/21/11	10/06/11	4.0	J	
Chromium	6020A	0.20	0.03	5.0	09/21/11	10/24/11	0.08	J	
Cobalt	6020A	0.020	0.003	5.0	09/21/11	10/24/11	0.006	J	
Copper	6020A	0.10	0.05	5.0	09/21/11	10/24/11	0.05	U	
Iron	6010B	4.0	0.7	2.0	09/21/11	10/06/11	7.7		
Lead	6020A	0.050	0.009	5.0	09/21/11	10/24/11	0.012	J	
Magnesium	6010B	0.60	0.06	2.0	09/21/11	10/06/11	0.82		
Manganese	6010B	0.20	0.02	2.0	09/21/11	10/06/11	0.12	J	
Mercury	7471A	0.020	0.002	1.0	09/14/11	09/14/11	0.002	U	*
Nickel	6020A	0.20	0.03	5.0	09/21/11	10/24/11	0.05	J	
Potassium	6010B	60.0	20.0	2.0	09/21/11	10/06/11	20.0	U	
Selenium	7742	0.10	0.03	2.0	10/23/11	10/25/11	0.03	U	N
Silver	6020A	0.020	0.008	5.0	09/21/11	10/20/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	09/21/11	10/06/11	4.0	U	
Thallium	6020A	0.020	0.002	5.0	09/21/11	10/24/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/21/11	10/24/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	09/21/11	10/24/11	0.2	U	

% Solids: 100.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108363**
Sampling Dates: 08/23/2011 to 08/29/2011	**Sample Matrix: Soil**
Analytical Method: SPLP Metals (1312/6010B/7470A)	**Data Reviewer: J.Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/8/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP48SB16	K1108363-002
2	11MP60SB14	K1108363-009

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits with the exception of Sodium, which exceeded the control limit. Associated sample results were qualified as estimated (J).

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP48SB16 was used for matrix spike for Mercury; recovery was within control limits. Sample 11MP60SB14 was used for matrix spike and matrix spike duplicate for total metals. Silver, Thallium, and Zinc were less than 75% recovery in the duplicate; however, Thallium and Zinc parent results were greater than four times the spike sample so no action was taken for those analytes. Associated Silver sample results were qualified as estimated (J) or rejected (R).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Value 1 + Value 2

Comments: Sample 11MP48SB16 was analyzed as a laboratory duplicate for Mercury. Sample 11MP60SB14 was analyzed as a laboratory duplicate for all total metals. All RPDs were within control limits with the exception of Aluminum; associated results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Not analyzed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as

estimated (J).

Comments: Not analyzed.

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP48SB16
Al: (0.9452 mg/L)*(50mL/50mL) = 0.9452 mg/L = 945.2 ug/L
Lab reported 945 ug/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1108363
Project No.:	NA	**Date Collected:**	08/29/11
Project Name:	Red Devil Mine	**Date Received:**	09/07/11
Matrix:	SPLP	**Units:**	ug/L
		Basis:	NA

Sample Name: 11MP48SB16 **Lab Code:** K1108363-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	945	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	763		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	169		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	18.3	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	2410		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.2	J	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2380		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	1200		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	8.8		
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	5.74		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	3.6	J	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	606		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	10.8	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	6920	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.2	J	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	16.0	J	N

% Solids: 0.0

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.:
Service Request: K1108363

Sample Name:	Lab Code:
11MP48SB16	K1108363-002
11MP48SB16D	K1108363-002D
11MP48SB16S	K1108363-002S
11MP60SB14	K1108363-009
11MP60SB14D	K1108363-009D
11MP60SB14S	K1108363-009S
11MP60SB14SD	K1108363-009SD
Method Blank	K1108363-MB

Comments:

Approved By: _____ **Date:** 11/2/11

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108363
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	SPLP	Units:	ug/L
		Basis:	NA

Sample Name: 11MP60SB14 Lab Code: K1108363-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	359	J	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	319		
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	452		
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	8.4	J	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	3330		
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	268		
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	4470		
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	2.6	J	
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	1.44		
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	730		
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	11.6	J	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	6510	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	55.0	J	N

% Solids: 0.0

Comments:

SPLP Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo Service Request: K1108363

Project No.: NA Date Collected:

Project Name: Red Devil Mine Date Received:

Matrix: SPLP Units: ug/L

Basis: NA

Sample Name: Method Blank Lab Code: K1108363-MB

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50	30	1.0	10/11/11	10/12/11	30	U	*
Antimony	6010B	50.0	20.0	1.0	10/11/11	10/12/11	20.6	J	
Arsenic	6010B	100	20	1.0	10/11/11	10/12/11	20	U	
Barium	6010B	1000	1.0	1.0	10/11/11	10/12/11	1.0	U	
Beryllium	6010B	5.0	0.20	1.0	10/11/11	10/12/11	0.20	U	
Cadmium	6010B	10	0.8	1.0	10/11/11	10/12/11	0.8	U	
Calcium	6010B	1000	10.0	1.0	10/11/11	10/12/11	561	J	
Chromium	6010B	10.0	3.0	1.0	10/11/11	10/12/11	3.0	U	
Cobalt	6010B	10	2.0	1.0	10/11/11	10/12/11	2.0	U	
Copper	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Iron	6010B	20.0	2.0	1.0	10/11/11	10/12/11	4.3	J	
Lead	6010B	50.0	8.0	1.0	10/11/11	10/12/11	8.0	U	
Magnesium	6010B	200	0.7	1.0	10/11/11	10/12/11	62.9	J	
Manganese	6010B	5.0	0.4	1.0	10/11/11	10/12/11	0.4	U	
Mercury	7470A	1.00	0.40	1.0	09/14/11	10/13/11	0.40	U	
Nickel	6010B	20.0	2.0	1.0	10/11/11	10/12/11	2.0	U	
Potassium	6010B	400	50	1.0	10/11/11	10/12/11	50	U	
Selenium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	
Silver	6010B	20.0	5.0	1.0	10/11/11	10/12/11	5.0	U	N
Sodium	6010B	10000	5.0	1.0	10/11/11	10/12/11	4840	J	
Thallium	6010B	100	30	1.0	10/11/11	10/12/11	30	U	N
Vanadium	6010B	10.0	5.0	1.0	10/11/11	10/12/11	5.0	U	
Zinc	6010B	500	2.0	1.0	10/11/11	10/12/11	26.9	J	N

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1108363**
Sampling Dates: 08/23/2011 to 8/29/11	**Sample Matrix: Soil**
Analytical Method: TCLP Metals (1311/6010B/7470A)	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/7/2011
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11MP48SB08	K1108363-001
2	11MP48SB18	K1108363-003
3	11MP60SB14	K1108363-009
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- NR — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: 11MP48SB08 was analyzed for matrix spike and matrix spike duplicate. All recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method and calibration blanks were free of contamination at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Sample 11MP48SB08 was analyzed as a laboratory duplicate. All RPDs were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: % Differences for all analytes were within control limits with the exception of Barium; however, initial sample result was less than 50x MDL so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments: Post digestion spike analysis was within QC criteria

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11MP48SB08
As: (0.116 mg/L)(50ml/50ml) = 0.116 mg/L
Lab reported 0.12 mg/L

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1109280**
Sampling Dates: 9/21/11 – 9/23/11	**Sample Matrix: Sediment**
Analytical Method: General Chemistry	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/5/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11KR44SD	K1109280-001
2	11KR45SD	K1109280-002
3	11KR40SD	K1109280-003
4	11KR41SD	K1109280-004
5	11KR42SD	K1109280-005
6	11KR36SD	K1109280-006
7	11KR37SD	K1109280-007
8	11KR34SD	K1109280-008
9	11KR26SD	K1109280-009
10	11KR27SD	K1109280-010
11	11KR19SD	K1109280-011
12	11KR20SD	K1109280-012
13	11KR21SD	K1109280-013
14	11KR22SD	K1109280-014
15	11KR35SD	K1109280-017
16	11KR30SD	K1109280-018
17	11KR29SD	K1109280-019
18	11KR28SD	K1109280-020

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Nitrate + Nitrite by EPA 353.2, Chloride, Fluoride, and Sulfate by EPA 300.0, Alkalinity, Carbonate, Bicarbonate, & Hydroxide by SM 2320, TDS by EPA 160.1 and TSS by EPA 160.2.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: Continuing calibration recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: All laboratory control sample recoveries were within control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: A Batch QC sample was used for matrix spike and matrix spike duplicate analyses. All percent recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_X_ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
_X_ Method (preparation) Blanks
_____ Field Blanks
_X_ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Method blanks did not contain contamination at the reporting level.

Continuing calibration blank percent recoveries were all within control limits.

6. DUPLICATE ANALYSES

_X_ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
_X_ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: A Batch QC sample was analyzed as a laboratory duplicate. All RPDs were within control limits.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW
Fluoride: 0.131 mg/L. Lab reported 0.1 mg/L.
Chloride: 0.460 mg/L. Lab reported 0.5 mg/L.
Sulfate: 180.281 mg/L. Lab reported 180 mg/L.
Nitrate+Nitrite: 0.0113 mg/L. Lab reported 0.011 mg/L.
Alkalinity: 92.8 mg/L CaCO3. Lab reported 92.8 mg/L CaCO3.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate

section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1109280**
Sampling Dates: 9/22/2011 – 9/25/2011	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 11/18/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	CAS ID
1	11KR44SD	K1109280-001
2	11KR45SD	K1109280-002
3	11KR40SD	K1109280-003
4	11KR41SD	K1109280-004
5	11KR42SD	K1109280-005
6	11KR36SD	K1109280-006
7	11KR37SD	K1109280-007
8	11KR34SD	K1109280-008
9	11KR26SD	K1109280-009
10	11KR27SD	K1109280-010
11	11KR19SD	K1109280-011
12	11KR20SD	K1109280-012
13	11KR21SD	K1109280-013
14	11KR22SD	K1109280-014
15	11KR35SD	K1109280-017
16	11KR30SD	K1109280-018
17	11KR29SD	K1109280-019
18	11KR28SD	K1109280-020

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- X — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**NO**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

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1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11KR44SD was used for matrix spike and matrix spike duplicate for mercury. Spike recovery was above control limits; associated samples were qualified as estimated (J). Sample 11KR40SD was used for matrix spike and matrix spike duplicate for all total metals. Antimony was below accepted control limits, and Arsenic was above accepted control limits; associated samples were qualified as estimated (J). These analytes were also outside control limits in the duplicate. Additionally, Chromium, Copper, and Zinc spike duplicate recoveries were below control limits; associated samples were qualified as estimated (J). A post spike was performed for a subset of total metals; all recoveries were within the control limits.

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(\text{Value 1} - \text{Value 2})}{} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Value 1 + Value 2

Comments: Laboratory duplicate analyses were performed on 11KR44SD and 11KR40SD. 11KR44SDD was a mercury duplicate with RPD greater than 35%; mercury results were qualified as estimated (J). 11KR40SDD was a duplicate of all total metals; Arsenic exceeded 35% RPD and the parent results were greater than five times the detection limit; associated results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11KR44SD was analyzed by serial dilution, Arsenic, Beryllium, Cadmium, Chromium, Lead, Thallium and Zinc had % Differences greater than 10%, however, initial sample results were not greater than 50x the MDL, so no action was taken. 11KR40SD was analyzed by serial dilution for a subset of total metals; Silver had % Differences greater than 10%, however initial sample results were not greater than 50x the MDL, so no action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11KR40SD

Mercury: (4.57 ug/L) (0.05L/0.785 g) (100) (100/72.7) = 40.03 ug/g 40.03 mg/kg
Lab reported 40.03 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/21/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR44SD Lab Code: K1109280-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.6	0.4	2.0	10/24/11	10/25/11	3450		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	21.6	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	0.57	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	4.12		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.008	J	
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.017	J	
Calcium	6010B	9.6	1.9	2.0	10/24/11	10/25/11	2110		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	0.65	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.369		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	0.68	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	55600		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	0.050		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	1760		
Manganese	6010B	1.93	0.02	2.0	10/24/11	10/25/11	1170		
Mercury	7471A	0.182	0.018	10.0	10/19/11	10/19/11	7.19	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	0.78		
Potassium	6010B	77.1	19.3	2.0	10/24/11	10/25/11	854		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.61		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.106		
Sodium	6010B	38.5	3.9	2.0	10/24/11	10/25/11	40.4		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.011	J	
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	1.72		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	1.2	J	N

% Solids: 83.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/21/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR45SD Lab Code: K1109280-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/25/11	9560		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.237	J	N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/28/11	4.41	J	N*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/28/11	89.8		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.505		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.153		
Calcium	6010B	9.7	2.0	2.0	10/24/11	10/25/11	10900		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	18.8	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	15.8		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	21.5	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	26200		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/28/11	8.970		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	4250		
Manganese	6010B	1.95	0.02	2.0	10/24/11	10/25/11	1730		
Mercury	7471A	0.017	0.002	1.0	10/19/11	10/19/11	0.199	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	31.1		
Potassium	6010B	77.9	19.5	2.0	10/24/11	10/25/11	922		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.17		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.086		
Sodium	6010B	39.0	3.9	2.0	10/24/11	10/25/11	61.6		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.060		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	30.8		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	81.8	J	N

% Solids: 85.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109280
Project No.:	001096.0X70	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR40SD **Lab Code:** K1109280-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/25/11	9750		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	57.1	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	123	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	132		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.363		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.308		
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/25/11	4250		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	17.6	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	9.080		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	21.3	J	N
Iron	6010B	4.0	0.7	2.0	10/24/11	10/25/11	26800		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	6.740		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/25/11	4600		
Manganese	6010B	1.99	0.02	2.0	10/24/11	10/25/11	567		
Mercury	7471A	1.75	0.175	100.0	10/19/11	10/19/11	40.0	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	25.5		
Potassium	6010B	79.5	19.9	2.0	10/24/11	10/25/11	990		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.36		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.127		
Sodium	6010B	39.7	4.0	2.0	10/24/11	10/25/11	119		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.107		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	24.1		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	65.4	J	N

% Solids: 72.7

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR41SD Lab Code: K1109280-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/25/11	6390		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	25.0	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	54.8	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	66.6		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.211		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.160		
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/25/11	2000		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	15.3	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	7.140		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	11.6	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	37900		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	3.130		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	2910		
Manganese	6010B	1.96	0.39	2.0	10/24/11	10/25/11	2530		
Mercury	7471A	1.89	0.189	100.0	10/19/11	10/19/11	14.2	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	21.3		
Potassium	6010B	78.4	19.6	2.0	10/24/11	10/25/11	764		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.30		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.118		
Sodium	6010B	39.2	3.9	2.0	10/24/11	10/25/11	74.7		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.056		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	19.5		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	50.1	J	N

% Solids: 82.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109280
Project No.:	001096.OX70	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR42SD **Lab Code:** K1109280-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.6	0.4	2.0	10/24/11	10/25/11	3850		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	64.1	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	254	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	193		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.546		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.657		
Calcium	6010B	9.6	1.9	2.0	10/24/11	10/25/11	1320		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	8.78	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	14.8		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	40.4	J	N
Iron	6010B	3.8	0.7	2.0	10/24/11	10/25/11	39400		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	9.280		
Magnesium	6010B	3.8	0.3	2.0	10/24/11	10/25/11	2050		
Manganese	6010B	1.92	0.02	2.0	10/24/11	10/25/11	1250		
Mercury	7471A	0.143	0.014	10.0	10/19/11	10/19/11	4.36	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	39.5		
Potassium	6010B	76.8	19.2	2.0	10/24/11	10/25/11	964		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.36		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.099		
Sodium	6010B	38.4	3.8	2.0	10/24/11	10/25/11	42.8		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.128		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	11.4		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	87.6	J	N

% Solids: 86.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR36SD Lab Code: K1109280-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	15.2	0.6	2.0	10/24/11	10/25/11	18400		
Antimony	6020A	0.076	0.014	5.0	10/24/11	10/31/11	7.720	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	19.2	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	131		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.347		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.256		
Calcium	6010B	15.2	3.0	2.0	10/24/11	10/25/11	8550		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	22.8	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	8.540		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	18.8	J	N
Iron	6010B	6.1	1.1	2.0	10/24/11	10/25/11	43300		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	7.030		
Magnesium	6010B	6.1	0.5	2.0	10/24/11	10/25/11	9370		
Manganese	6010B	3.04	0.03	2.0	10/24/11	10/25/11	849		
Mercury	7471A	0.019	0.002	1.0	10/19/11	10/19/11	0.827	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	25.6		
Potassium	6010B	121	30.4	2.0	10/24/11	10/25/11	1830		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.39		
Silver	6020A	0.030	0.012	5.0	10/24/11	10/31/11	0.201		
Sodium	6010B	60.7	6.1	2.0	10/24/11	10/25/11	262		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.109		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	29.5		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	72.1	J	N

% Solids: 61.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR37SD Lab Code: K1109280-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/25/11	12400		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	5.570	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	19.4	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	130		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.336		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.272		
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/25/11	7570		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	21.5	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	8.160		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	18.7	J	N
Iron	6010B	4.0	0.7	2.0	10/24/11	10/25/11	28700		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	6.700		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/25/11	6340		
Manganese	6010B	2.00	0.02	2.0	10/24/11	10/25/11	555		
Mercury	7471A	0.016	0.002	1.0	10/19/11	10/19/11	0.208	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	24.3		
Potassium	6010B	79.9	20.0	2.0	10/24/11	10/25/11	1390		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.35		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.145		
Sodium	6010B	40.0	4.0	2.0	10/24/11	10/25/11	193		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.125		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	28.3		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	69.9	J	N

% Solids: 63.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR34SD Lab Code: K1109280-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/25/11	7050		
Antimony	6010B	9.7	0.5	2.0	10/24/11	10/25/11	1060	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/28/11	958	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	220		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.470		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.301		
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/25/11	2770		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	16.5	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	11.1		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	29.5	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	28300		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	6.880		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	4890		
Manganese	6010B	1.94	0.02	2.0	10/24/11	10/25/11	908		
Mercury	7471A	3.68	0.368	200.0	10/19/11	10/19/11	104	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	37.8		
Potassium	6010B	77.4	19.4	2.0	10/24/11	10/25/11	1590		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.24		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.111		
Sodium	6010B	38.7	3.9	2.0	10/24/11	10/25/11	139		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.158		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	20.7		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	84.1	J	N

% Solids: 80.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR26SD Lab Code: K1109280-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/25/11	11000		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.450	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	4.93	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	113		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.314		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.231		
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/25/11	2930		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	21.4	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	8.200		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	16.9	J	N
Iron	6010B	4.0	0.7	2.0	10/24/11	10/25/11	20700		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	5.730		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/25/11	5000		
Manganese	6010B	1.98	0.02	2.0	10/24/11	10/25/11	261		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.044	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	23.9		
Potassium	6010B	79.2	19.8	2.0	10/24/11	10/25/11	961		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.28		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.105		
Sodium	6010B	39.6	4.0	2.0	10/24/11	10/25/11	125		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.089		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	29.8		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	62.0	J	N

% Solids: 72.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR27SD Lab Code: K1109280-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/25/11	6400		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.473	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/28/11	5.98	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	70.3		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.157		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.127		
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/25/11	1880		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	14.4	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	5.690		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	7.69	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	17200		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	2.410		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	3460		
Manganese	6010B	1.93	0.02	2.0	10/24/11	10/25/11	743		
Mercury	7471A	0.017	0.002	1.0	10/19/11	10/19/11	0.015	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	14.8		
Potassium	6010B	77.2	19.3	2.0	10/24/11	10/25/11	718		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.06	J	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.044		
Sodium	6010B	38.6	3.9	2.0	10/24/11	10/25/11	89.3		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.059		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	19.8		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	35.3	J	N

% Solids: 83.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1109280
Project No.: 001096.0X70
Date Collected: 09/23/11
Project Name: Red Devil Mine
Date Received: 09/29/11
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: 11KR19SD
Lab Code: K1109280-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.6	0.4	2.0	10/24/11	10/25/11	2160		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.133	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	6.06	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	77.5		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.352		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.820		
Calcium	6010B	9.6	1.9	2.0	10/24/11	10/25/11	762		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	13.6	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	11.5		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	36.9	J	N
Iron	6010B	3.8	0.7	2.0	10/24/11	10/25/11	8170		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	13.5		
Magnesium	6010B	3.83	0.06	2.0	10/24/11	10/25/11	1400		
Manganese	6010B	1.92	0.02	2.0	10/24/11	10/25/11	465		
Mercury	7471A	0.019	0.002	1.0	10/19/11	10/19/11	0.143	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	37.0		
Potassium	6010B	76.7	19.2	2.0	10/24/11	10/25/11	418		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	1.03		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.035		
Sodium	6010B	38.3	3.8	2.0	10/24/11	10/25/11	35.9	J	
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.105		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	23.8		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	174	J	N

% Solids: 84.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR20SD Lab Code: K1109280-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/25/11	5470		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.239	J	N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/28/11	3.67	J	N*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/28/11	58.6		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.146		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.099		
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/25/11	1610		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	11.1	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	4.540		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	7.15	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	13500		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/28/11	2.400		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	2860		
Manganese	6010B	1.94	0.02	2.0	10/24/11	10/25/11	246		
Mercury	7471A	0.017	0.002	1.0	10/19/11	10/19/11	0.013	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	13.0		
Potassium	6010B	77.6	19.4	2.0	10/24/11	10/25/11	637		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.08	J	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.043		
Sodium	6010B	38.8	3.9	2.0	10/24/11	10/25/11	70.3		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.051		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	15.7		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	30.9	J	N

% Solids: 80.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR21SD Lab Code: K1109280-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/25/11	5710		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.189	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/28/11	3.67	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	55.6		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.130		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.069		
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/25/11	1700		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	10.7	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	3.830		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	4.62	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	13400		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	1.820		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	3190		
Manganese	6010B	1.96	0.02	2.0	10/24/11	10/25/11	197		
Mercury	7471A	0.016	0.002	1.0	10/19/11	10/19/11	0.013	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	10.7		
Potassium	6010B	78.2	19.6	2.0	10/24/11	10/25/11	508		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.04	J	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.034		
Sodium	6010B	39.1	3.9	2.0	10/24/11	10/25/11	71.4		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.035		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	11.9		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	21.8	J	N

% Solids: 82.9

Comments:

Columbia Analytical Services

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR22SD Lab Code: K1109280-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/25/11	10200		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.220	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/28/11	12.7	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	79.5		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.196		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.120		
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/25/11	2930		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	15.8	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	4.940		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	10.4	J	N
Iron	6010B	4.0	0.7	2.0	10/24/11	10/25/11	21900		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	3.350		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/25/11	5900		
Manganese	6010B	1.98	0.02	2.0	10/24/11	10/25/11	366		
Mercury	7471A	0.019	0.002	1.0	10/19/11	10/19/11	0.030	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	14.4		
Potassium	6010B	79.1	19.8	2.0	10/24/11	10/25/11	614		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.22		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.062		
Sodium	6010B	39.5	4.0	2.0	10/24/11	10/25/11	86.5		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.075		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	27.3		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	36.2	J	N

% Solids: 76.7

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11HR01SD Lab Code: K1109280-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/25/11	7480		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.152	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	8.19	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	78.8		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.169		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.098		
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/25/11	1700		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	14.5	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	7.450	J	
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	5.20	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	19600		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	2.130		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	3640		
Manganese	6010B	1.94	0.02	2.0	10/24/11	10/25/11	1060		
Mercury	7471A	0.016	0.002	1.0	10/19/11	10/19/11	0.011	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	16.6		
Potassium	6010B	77.6	19.4	2.0	10/24/11	10/25/11	648		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.05	J	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.027		
Sodium	6010B	38.8	3.9	2.0	10/24/11	10/25/11	67.8		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.042		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	19.3		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	40.6	J	N

% Solids: 79.5

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11HR02SD Lab Code: K1109280-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/25/11	4250		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.128	J	N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/28/11	5.12	J	N*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/28/11	115		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.153		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.341		
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/25/11	1510		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	11.1	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	5.690		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	7.81	J	N
Iron	6010B	3.9	0.7	2.0	10/24/11	10/25/11	9810		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/28/11	2.120		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/25/11	2190		
Manganese	6010B	1.97	0.02	2.0	10/24/11	10/25/11	762		
Mercury	7471A	0.016	0.002	1.0	10/19/11	10/19/11	0.014	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	18.4		
Potassium	6010B	78.7	19.7	2.0	10/24/11	10/25/11	784		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.05	J	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.025		
Sodium	6010B	39.3	3.9	2.0	10/24/11	10/25/11	96.7		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.085		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	16.8		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	30.6	J	N

% Solids: 85.3

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR35SD Lab Code: K1109280-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	7020		
Antimony	6010B	2.0	0.5	2.0	10/24/11	10/26/11	1420	J	N
Arsenic	6010B	2.0	0.9	2.0	10/24/11	10/26/11	1280	J	N*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/28/11	398		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.438		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.294		
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	2740		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	18.4	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	10.6		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	28.2	J	N
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	31100		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/28/11	5.940		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	5100		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	666		
Mercury	7471A	1.69	0.169	100.0	10/19/11	10/19/11	46.1	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	31.1		
Potassium	6010B	59.4	19.8	2.0	10/24/11	10/26/11	1320		
Selenium	7742	0.49	0.15	10.0	10/24/11	10/26/11	0.16	J	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.097		
Sodium	6010B	39.6	4.0	2.0	10/24/11	10/26/11	125		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.229		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	15.1		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	68.6	J	N

% Solids: 86.1

Comments:

Metals

- I -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109280
Project No.:	001096.OX70	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR30SD **Lab Code:** K1109280-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	4530		
Antimony	6010B	2.0	0.5	2.0	10/24/11	10/26/11	894	J	N
Arsenic	6010B	2.0	0.9	2.0	10/24/11	10/26/11	938	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	242		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.374		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.204		
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	2270		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	19.7	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	8.640		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	23.5	J	N
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	24400		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	5.840		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3290		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	828		
Mercury	7471A	1.88	0.188	100.0	10/19/11	10/19/11	24.2	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	29.5		
Potassium	6010B	58.6	19.5	2.0	10/24/11	10/26/11	1150		
Selenium	7742	0.48	0.14	10.0	10/24/11	10/26/11	0.19	J	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.112		
Sodium	6010B	39.1	3.9	2.0	10/24/11	10/26/11	75.5		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.419		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	20.7		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	56.7	J	N

% Solids: 82.9

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.OX70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR29SD Lab Code: K1109280-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	4340		
Antimony	6010B	2.0	0.5	2.0	10/24/11	10/26/11	360	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	502	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	187		
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.357		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/28/11	0.222		
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	1960		
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/28/11	15.1	J	N
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/28/11	11.3		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	24.4	J	N
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	25700		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	5.790		
Magnesium	6010B	0.49	0.06	2.0	10/24/11	10/26/11	1660		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	522		
Mercury	7471A	1.87	0.187	100.0	10/19/11	10/19/11	38.9	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/28/11	31.5		
Potassium	6010B	58.8	19.6	2.0	10/24/11	10/26/11	791		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.22		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.156		
Sodium	6010B	39.2	3.9	2.0	10/24/11	10/26/11	48.0		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/28/11	0.084		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/28/11	19.5		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	67.6	J	N

% Solids: 84.4

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109280
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR28SD Lab Code: K1109280-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	7170		
Antimony	6010B	1.9	0.5	2.0	10/24/11	10/26/11	589	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/28/11	304	J	N*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/28/11	105		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.245		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/28/11	0.254		
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	19400		
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/28/11	6.22	J	N
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/28/11	9.020		
Copper	6020A	0.10	0.05	5.0	10/24/11	10/28/11	13.2	J	N
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	34900		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/28/11	5.500		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	11400		
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	949		
Mercury	7471A	1.78	0.178	100.0	10/19/11	10/19/11	33.6	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/28/11	21.1		
Potassium	6010B	58.1	19.4	2.0	10/24/11	10/26/11	803		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/26/11	0.33		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.111		
Sodium	6010B	38.7	3.9	2.0	10/24/11	10/26/11	62.6		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/28/11	0.653		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/28/11	10.9		
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/28/11	50.7	J	N

% Solids: 82.2

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	**Lab Project Number: K1109280**
Sampling Dates: 9/21/11	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/5/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11KR45SD	K1109280-002
2	11KR40SD	K1109280-003
3	11KR37SD	K1109280-007
4	11KR34SD	K1109280-008
5	11KR30SD	K1109280-018
6	11KR28SD	K1109280-020

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- NR — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- NR — ICP Interference Check Sample results
- NR — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- NR — ICP Interelement Correction Factors
- NR — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**N/A**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All sample jars were received outside of recommended preservation temperatures.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: A Batch QC sample was analyzed for matrix spike and matrix spike duplicate. Both analyses were within control limits.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The following blanks were analyzed:

__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:

_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: A Batch QC sample was analyzed as a laboratory duplicate. The RPD exceeded 35%; associated sample results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

1630, Sediment – dry-weight corrected

$$\frac{\frac{CDFE_{ext}}{AD_{rec}} - (B_f * I_d * 1000)}{I * 1000} \div \frac{\%TS}{100}$$

C – result produced at the instrument, pg

F – Final volume of the sample preparation, mL

D – Dilution factor of any dilution of the preparation made at the instrument

A – Analyzed volume of the prep or dilution of the prep, mL

E_{ext} – The mass of DCM added to the sample, g

E_{rec} – The mass of DCM recovered from the sample, g

B_f- the mean of the method blank final result, ng/g

I_d – The default aliquot prepared used for method blanks, 2.5g

I – aliquot of sample prepared, g.

Sample 11KR45SD
Methyl Hg:
((6.59 pg) (40 mL) (1000g/kg)) / ((2 mL) (1.022g) (1000pg/ng) (1000 ng/ug)) = 0.12896 ug/kg
(0.12896 ug/kg) (100/85.2 g) = 0.15136 ng/g

Lab reported 0.15 ng/g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Red Devil Mine/001096.0X70
Sample Matrix: Soil

Service Request: K1109280
Date Collected: 9/21/2011
Date Received: 9/29/2011

Methyl Mercury

Units: ng/g
Basis: Dry

Prep Method: CAS SOP
Analysis Method: CAS SOP
Test Notes:

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
11KR45SD	K1109280-002	0.5	0.05	1	10/11/2011	10/12/2011	0.15	J
11KR40SD	K1109280-003	0.5	0.05	1	10/11/2011	10/12/2011	1.45	
11KR37SD	K1109280-007	0.6	0.06	1	10/11/2011	10/12/2011	0.17	J
11KR34SD	K1109280-008	0.5	0.05	1	10/11/2011	10/12/2011	1.25	
11KR30SD	K1109280-018	0.5	0.05	1	10/11/2011	10/12/2011	0.64	
11KR28SD	K1109280-020	0.5	0.05	1	10/11/2011	10/12/2011	1.34	
Method Blank 1	K1109280-MB1	0.4	0.04	1	10/11/2011	10/12/2011	ND	
Method Blank 2	K1109280-MB2	0.4	0.04	1	10/11/2011	10/12/2011	ND	
Method Blank 3	K1109280-MB3	0.4	0.04	1	10/11/2011	10/12/2011	ND	

Page No

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1109282**
Sampling Dates: 9/22/11 – 9/25/11	**Sample Matrix: Sediment**
Analytical Method: General Chemistry	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/5/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11KR23SD	K1109282-001
2	11KR18SD	K1109282-002
3	11KR24SD	K1109282-003
4	11KR25SD	K1109282-004
5	11KR43SD	K1109282-013
6	11KR39SD	K1109282-014
7	11KR47SD	K1109282-015
8	11KR46SD	K1109282-016
9	11KR38SD	K1109282-017
10	11KR70SD	K1109282-018
11	11KR72SD	K1109282-019
12	11KR73SD	K1109282-020

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X Preparation Blank and Calibration Blank results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Instrument Detection Limits
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- NR Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- NR Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Nitrate + Nitrite by EPA 353.2, Chloride, Fluoride, and Sulfate by EPA 300.0, Alkalinity, Carbonate, Bicarbonate, & Hydroxide by SM 2320, TDS by EPA 160.1 and TSS by EPA 160.2.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: All continuing calibration verification recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: All laboratory control sample recoveries were within control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: A Batch QC sample was used for matrix spike and matrix spike duplicate analyses. All percent recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_X_ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
_X_ Method (preparation) Blanks
_____ Field Blanks
_X_ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Method blanks did not contain contamination at the reporting level.

Continuing calibration blank percent recoveries were all within control limits.

6. DUPLICATE ANALYSES

_X_ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
_X_ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: A Batch QC sample was analyzed as a laboratory duplicate. All RPDs were within control limits.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW
Fluoride: 0.131 mg/L. Lab reported 0.1 mg/L.
Chloride: 0.460 mg/L. Lab reported 0.5 mg/L.
Sulfate: 180.281 mg/L. Lab reported 180 mg/L.
Nitrate+Nitrite: 0.0113 mg/L. Lab reported 0.011 mg/L.
Alkalinity: 92.8 mg/L CaCO3. Lab reported 92.8 mg/L CaCO3.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1109282**
Sampling Dates: 9/22/2011 – 9/25/2011	**Sample Matrix: Sediment**
Analytical Method: TAL Metals *(EPA 6010B/7471A)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 11/18/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11KR23SD	K1109282-001
2	11KR18SD	K1109282-002
3	11KR24SD	K1109282-003
4	11KR25SD	K1109282-004
5	11KR03SD	K1109282-005
6	11KR04SD	K1109282-006
7	11KR05SD	K1109282-007
8	11KR48SD	K1109282-008
9	11KR49SD	K1109282-009
10	11KR50SD	K1109282-010
11	11KR51SD	K1109282-011
12	11KR53SD	K1109282-012
13	11KR43SD	K1109282-013
14	11K39SD	K1109282-014
15	11KR47SD	K1109282-015
16	11KR46SD	K1109282-016
17	11KR38SD	K1109282-017
18	11KR70SD	K1109282-018
19	11KR72SD	K1109282-019
20	11KR73SD	K1109282-020

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- * ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**YES**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

\

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory. All sample jars were above recommended preservation temperature.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11KR23SD was used for matrix spike and matrix spike duplicate for mercury. Spike recoveries were within control limits. Sample 11KR24SD was used for matrix spike and matrix spike duplicate for all total metals. Antimony and Potassium were below accepted control limits; however Antimony parent result was greater than four times the spike result, so no action was taken for that analyte. Associated Potassium samples were qualified as estimated (J). Magnesium and Manganese were above control limits; associated samples were qualified as estimated (J). These analytes were also outside control limits in the duplicate. Additionally, Barium, Chromium, Nickel, and Zinc spike recoveries were below control limits; associated samples were qualified as estimated (J). Sample 11HR05SD was used for matrix spike and matrix spike duplicate for a subset of total metals; all recoveries were within control limits. A post spike was performed for a subset of total metals; all recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Two method blanks were run for this batch. The method blanks were free of contamination that would result in qualification.

Initial calibration blank and continuing calibration blanks were free of contamination that would result in qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for

soil samples.

$$\text{RPD} = \frac{2(\text{Value 1} - \text{Value 2})}{\text{Value 1} + \text{Value 2}} \times 100\%$$

Comments: Laboratory duplicates were performed on 11KR23SD, 11KR24SD, and 11HR05SD. 11KR23SDD was a mercury duplicate with RPD greater than 35%; mercury results were qualified as estimated. 11KR24SDD was a duplicate of all total metals; Cadmium, Copper, and Manganese exceeded 35% RPD and the parent results were greater than five times the detection limit; associated results were qualified as estimated (J). 11HR05SDD was a duplicate of a subset of total metals. All RPDs were below 35%.

11KR72SD and 11KR73SD were field duplicates of 11KR24SD and 11KR25SD, respectively. All RPDs were within 35%.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.

Serial Dilution: 11KR24SD was analyzed by serial dilution, Arsenic had % Difference greater than 10%, however, initial sample result was not greater than 50x the MDL, so no action was taken. 11HR05SD was analyzed by serial dilution for a subset of total metals, all % Differences were less than 10%. 11KR46SD was analyzed by serial dilution for mercury, % Difference was less than 10%.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11KR23SD
Aluminum: (51.43 mg/L) (0.1L / 1.281g) (2) (100/77.9) = 10.307 mg/g = 10307 mg/kg
Lab Reported 10300 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR23SD Lab Code: K1109282-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/26/11	10300		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.188	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	6.32		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	141	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.408		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.268	J	*
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/26/11	2670		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	20.2	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	13.5		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	28.0	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	32300		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	10.5		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	4400	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	536	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.126	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	36.2	J	N
Potassium	6010B	60.1	20.0	2.0	10/24/11	10/26/11	773	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.45		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.113		
Sodium	6010B	40.1	4.0	2.0	10/24/11	10/26/11	60.9		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.070		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	28.9		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	78.0	J	N*

% Solids: 77.9

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR18SD Lab Code: K1109282-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	10700		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.185	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	4.75		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	146	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.343		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.263	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	2960		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	22.2	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	8.910		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	20.9	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	21800		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	7.110		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4440	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	395	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.089	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	25.3	J	N
Potassium	6010B	58.9	19.6	2.0	10/24/11	10/26/11	668	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.42		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.124		
Sodium	6010B	39.3	3.9	2.0	10/24/11	10/26/11	79.3		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.096		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	29.8		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	69.5	J	N*

% Solids: 73.2

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR24SD Lab Code: K1109282-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/26/11	6180		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.137	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	6.21		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	95.5	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.265		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.164	J	*
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/26/11	1930		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	15.7	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	8.380		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	16.7	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	18000		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	4.430		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	3270	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	385	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.078	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	23.0	J	N
Potassium	6010B	60.1	20.0	2.0	10/24/11	10/26/11	899	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.17		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.046		
Sodium	6010B	40.0	4.0	2.0	10/24/11	10/26/11	42.5		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.052		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	21.8		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	52.4	J	N*

% Solids: 83.1

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1109282
Project No.: 001096.0X70
Date Collected: 09/23/11
Project Name: Red Devil Mine
Date Received: 09/29/11
Matrix: SEDIMENT
Units: mg/Kg
Basis: DRY

Sample Name: 11KR25SD
Lab Code: K1109282-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	9090		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.171	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	5.03		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	158	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.280		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.221	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	2220		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	20.1	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	7.470		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	14.5	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	18100		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	5.060		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4020	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	253	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.053	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	22.2	J	N
Potassium	6010B	58.8	19.6	2.0	10/24/11	10/26/11	685	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.19		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.084		
Sodium	6010B	39.2	3.9	2.0	10/24/11	10/26/11	83.1		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.092		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	27.1		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	56.4	J	N*

% Solids: 75.4

Comments:

Metals

- I -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11HR03SD Lab Code: K1109282-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	6520		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.059	J	N
Arsenic	6020A	0.50	0.06	5.0	10/22/11	10/28/11	12.5		
Barium	6020A	0.050	0.005	5.0	10/22/11	10/28/11	120	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.192		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.117	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	1440		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	16.5	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	7.260		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	6.48	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	16800		
Lead	6020A	0.050	0.009	5.0	10/22/11	10/28/11	2.150		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3390	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	834	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.009	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	16.6	J	N
Potassium	6010B	58.5	19.5	2.0	10/24/11	10/26/11	508	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.020		
Sodium	6010B	39.0	3.9	2.0	10/24/11	10/26/11	55.2		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.050		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	22.7		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	40.5	J	N*

% Solids: 79.7

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11HR04SD Lab Code: K1109282-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	1560		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.212	~~J~~	N
Arsenic	6020A	0.50	0.06	5.0	10/22/11	10/28/11	10.9		
Barium	6020A	0.050	0.005	5.0	10/22/11	10/28/11	41.0	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.380		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.434	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	26300		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	28.9	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	15.8		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	48.2	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	39900		
Lead	6020A	0.050	0.009	5.0	10/22/11	10/28/11	10.1		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	15200	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	696	J	N*
Mercury	7471A	0.184	0.018	10.0	10/20/11	10/21/11	3.18	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	58.5	J	N
Potassium	6010B	59.6	19.9	2.0	10/24/11	10/26/11	947	J	N
Selenium	7742	0.49	0.15	10.0	10/22/11	10/26/11	1.63		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.179		
Sodium	6010B	39.7	4.0	2.0	10/24/11	10/26/11	170		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.121		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	57.7		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	116	J	N*

% Solids: 82.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109282
Project No.:	001096.0X70	**Date Collected:**	09/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SEDIMENT	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11HR05SD **Lab Code:** K1109282-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/26/11	7040		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.119	J	N
Arsenic	6020A	0.48	0.06	5.0	10/25/11	10/28/11	8.20		
Barium	6020A	0.048	0.005	5.0	10/25/11	10/28/11	74.5	J	
Beryllium	6020A	0.019	0.003	5.0	10/25/11	10/28/11	0.170		
Cadmium	6020A	0.019	0.003	5.0	10/25/11	10/28/11	0.098	J	
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/26/11	1570		
Chromium	6020A	0.19	0.03	5.0	10/25/11	10/28/11	13.4	J	
Cobalt	6020A	0.019	0.003	5.0	10/25/11	10/28/11	6.920		
Copper	6020A	0.10	0.05	5.0	10/25/11	10/28/11	4.63	J	
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	19200		
Lead	6020A	0.048	0.009	5.0	10/25/11	10/28/11	2.200		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	3680	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	880	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.010	J	*
Nickel	6020A	0.19	0.03	5.0	10/25/11	10/28/11	14.6	J	
Potassium	6010B	59.7	19.9	2.0	10/24/11	10/26/11	530	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.10		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.020		
Sodium	6010B	39.8	4.0	2.0	10/24/11	10/26/11	49.0		
Thallium	6020A	0.019	0.002	5.0	10/25/11	10/28/11	0.054		
Vanadium	6020A	0.19	0.02	5.0	10/25/11	10/28/11	18.2		
Zinc	6020A	0.5	0.2	5.0	10/25/11	10/28/11	38.4	J	

% Solids: 80.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR48SD Lab Code: K1109282-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	6730		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.220	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	10.1		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	128	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.230		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.218	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	7100		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	15.9	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	5.920		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	13.9	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	16800		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	5.050		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	4060	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	424	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.024	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	18.7	J	N
Potassium	6010B	59.3	19.8	2.0	10/24/11	10/26/11	880	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.16		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.093		
Sodium	6010B	39.5	4.0	2.0	10/24/11	10/26/11	110		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.091		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	22.0		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	52.3	J	N*

% Solids: 76.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR49SD Lab Code: K1109282-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	5500		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.125	~~J~~	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	6.12		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	70.1	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.187		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.121	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	2760		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	13.8	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	4.570		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	6.98	J	*
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	13100		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	2.910		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3250	J	N
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	468	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.026	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	14.2	J	N
Potassium	6010B	58.0	19.3	2.0	10/24/11	10/26/11	638	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.06	J	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.044		
Sodium	6010B	38.7	3.9	2.0	10/24/11	10/26/11	76.1		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.069		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	17.4		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	33.1	J	N*

% Solids: 84.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109282
Project No.:	001096.0X70	**Date Collected:**	09/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SEDIMENT	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR50SD **Lab Code:** K1109282-010

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	4860		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.313	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	7.04		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	102	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.189		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.148	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	3620		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	16.2	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	5.360		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	11.4	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	14900		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	3.130		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	2610	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	1660	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.013	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	18.4	J	N
Potassium	6010B	58.7	19.6	2.0	10/24/11	10/26/11	661	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.09	J	
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.053		
Sodium	6010B	39.1	3.9	2.0	10/24/11	10/26/11	117		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.063		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	23.5		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	40.1	J	N*

% Solids: 80.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR51SD Lab Code: K1109282-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	8350		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.153	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	8.91		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	124	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.354		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.294	J	*
Calcium	6010B	9.7	2.0	2.0	10/24/11	10/26/11	2170		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	23.7	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	11.9		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	27.9	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	29300		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	7.580		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3700	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	875	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.086	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	33.5	J	N
Potassium	6010B	58.4	19.5	2.0	10/24/11	10/26/11	705	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.43		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.065		
Sodium	6010B	39.0	3.9	2.0	10/24/11	10/26/11	49.9		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.106		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	33.4		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	78.9	J	N*

% Solids: 80.9

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR53SD Lab Code: K1109282-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	9120		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.236	J	N
Arsenic	6020A	0.48	0.06	5.0	10/22/11	10/28/11	12.9		
Barium	6020A	0.048	0.005	5.0	10/22/11	10/28/11	116	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.276		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.241	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	8470		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	17.8	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	6.540		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	15.4	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	21700		
Lead	6020A	0.048	0.009	5.0	10/22/11	10/28/11	5.580		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	5060	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	523	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.028	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	19.6	J	N
Potassium	6010B	58.9	19.6	2.0	10/24/11	10/26/11	1160	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.24		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.125		
Sodium	6010B	39.3	3.9	2.0	10/24/11	10/26/11	148		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.106		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	23.9		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	59.3	J	N*

% Solids: 68.2

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/25/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR43SD Lab Code: K1109282-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	9110		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	40.2	J	N
Arsenic	6020A	0.48	0.06	5.0	10/22/11	10/28/11	55.0		
Barium	6020A	0.048	0.005	5.0	10/22/11	10/28/11	118	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.587		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.515	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	2090		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	27.7	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	11.4		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	48.5	J	*
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	31100		
Lead	6020A	0.048	0.009	5.0	10/22/11	10/28/11	14.8		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4550	J	N
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	1220	J	N*
Mercury	7471A	1.92	0.192	100.0	10/20/11	10/21/11	12.0	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	48.2	J	N
Potassium	6010B	58.2	19.4	2.0	10/24/11	10/26/11	784	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.87		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.122		
Sodium	6010B	38.8	3.9	2.0	10/24/11	10/26/11	52.8		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.096		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	29.3		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	119	J	N*

% Solids: 84.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/25/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR39SD Lab Code: K1109282-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	2050		
Antimony	6010B	1.9	0.5	2.0	10/24/11	10/26/11	149	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	79.3		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	88.4	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.469		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.663	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	2060		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	11.4	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	18.2		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	87.5	J	*
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	32300		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	14.1		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	6030	J	N
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	1220	J	N*
Mercury	7471A	0.191	0.019	10.0	10/20/11	10/21/11	1.73	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	65.1	J	N
Potassium	6010B	58.1	19.4	2.0	10/24/11	10/26/11	1280	J	N
Selenium	7742	0.49	0.15	10.0	10/22/11	10/26/11	2.11		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.410		
Sodium	6010B	38.7	3.9	2.0	10/24/11	10/26/11	56.1		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.107		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	25.8		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	132	J	N*

% Solids: 89.6

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/25/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR47SD Lab Code: K1109282-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	7380		
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	24.6	J	N
Arsenic	6020A	0.48	0.06	5.0	10/22/11	10/28/11	77.8		
Barium	6020A	0.048	0.005	5.0	10/22/11	10/28/11	70.1	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.289		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.202	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	1950		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	15.0	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	8.440		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	21.1	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	22800		
Lead	6020A	0.048	0.009	5.0	10/22/11	10/28/11	5.950		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	3960	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	626	J	N*
Mercury	7471A	0.193	0.019	10.0	10/20/11	10/21/11	7.18	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	23.2	J	N
Potassium	6010B	59.3	19.8	2.0	10/24/11	10/26/11	1080	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.46		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.087		
Sodium	6010B	39.5	4.0	2.0	10/24/11	10/26/11	66.2		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.070		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	21.2		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	54.1	J	N*

% Solids: 86.8

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/25/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR46SD Lab Code: K1109282-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/26/11	7600		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	31.9	J	N
Arsenic	6020A	0.50	0.06	5.0	10/22/11	10/28/11	87.2		
Barium	6020A	0.050	0.005	5.0	10/22/11	10/28/11	107	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.411		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.561	J	*
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/26/11	1710		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	25.0	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	13.9		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	41.5	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	25200		
Lead	6020A	0.050	0.009	5.0	10/22/11	10/28/11	9.780		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	3770	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	1060	J	N*
Mercury	7471A	0.186	0.019	10.0	10/20/11	10/21/11	4.75	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	50.4	J	N
Potassium	6010B	60.2	20.1	2.0	10/24/11	10/26/11	824	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.58		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.153		
Sodium	6010B	40.1	4.0	2.0	10/24/11	10/26/11	57.7		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.080		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	23.5		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	92.0	J	N*

% Solids: 84.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/25/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR38SD Lab Code: K1109282-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	6010		
Antimony	6010B	2.0	0.5	2.0	10/24/11	10/26/11	753	J	N
Arsenic	6010B	2.0	0.9	2.0	10/24/11	10/26/11	918		
Barium	6020A	0.050	0.005	5.0	10/22/11	10/28/11	179	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.367		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.213	J	*
Calcium	6010B	9.7	2.0	2.0	10/24/11	10/26/11	2280		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	18.9	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	7.300		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	23.0	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	19600		
Lead	6020A	0.050	0.009	5.0	10/22/11	10/28/11	3.940		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3090	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	466	J	N*
Mercury	7471A	1.91	0.191	100.0	10/20/11	10/21/11	19.0	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	27.5	J	N
Potassium	6010B	58.4	19.5	2.0	10/24/11	10/26/11	1500	J	N
Selenium	7742	0.49	0.15	10.0	10/22/11	10/26/11	0.15	U	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.108		
Sodium	6010B	39.0	3.9	2.0	10/24/11	10/26/11	163		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.145		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	16.0		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	50.8	J	N*

% Solids: 84.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/22/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR70SD Lab Code: K1109282-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.5	0.4	2.0	10/24/11	10/26/11	9350		
Antimony	6020A	0.047	0.009	5.0	10/24/11	10/31/11	2.730	J	N
Arsenic	6020A	0.51	0.06	5.0	10/22/11	10/28/11	19.9		
Barium	6020A	0.051	0.005	5.0	10/22/11	10/28/11	135	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.344		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.284	J	*
Calcium	6010B	9.5	1.9	2.0	10/24/11	10/26/11	6020		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	22.7	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	8.500		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	19.8	J	*
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	21700		
Lead	6020A	0.051	0.009	5.0	10/22/11	10/28/11	7.060		
Magnesium	6010B	3.8	0.3	2.0	10/24/11	10/26/11	4800	J	N
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	452	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.384	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	25.8	J	N
Potassium	6010B	56.8	18.9	2.0	10/24/11	10/26/11	1020	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.26		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.118		
Sodium	6010B	37.9	3.8	2.0	10/24/11	10/26/11	128		
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.118		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	29.5		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	76.2	J	N*

% Solids: 64.4

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR72SD Lab Code: K1109282-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/24/11	10/26/11	6250		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.114	J	N
Arsenic	6020A	0.49	0.06	5.0	10/22/11	10/28/11	5.60		
Barium	6020A	0.049	0.005	5.0	10/22/11	10/28/11	75.2	J	N
Beryllium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.291		
Cadmium	6020A	0.020	0.003	5.0	10/22/11	10/28/11	0.157	J	*
Calcium	6010B	10.0	2.0	2.0	10/24/11	10/26/11	1490		
Chromium	6020A	0.20	0.03	5.0	10/22/11	10/28/11	12.0	J	N
Cobalt	6020A	0.020	0.003	5.0	10/22/11	10/28/11	7.290		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	19.2	J	*
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	16500		
Lead	6020A	0.049	0.009	5.0	10/22/11	10/28/11	4.890		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	2830	J	N
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	281	J	N*
Mercury	7471A	0.020	0.002	1.0	10/20/11	10/21/11	0.050	J	*
Nickel	6020A	0.20	0.03	5.0	10/22/11	10/28/11	22.4	J	N
Potassium	6010B	60.1	20.0	2.0	10/24/11	10/26/11	521	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.12		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.058		
Sodium	6010B	40.1	4.0	2.0	10/24/11	10/26/11	37.2	J	
Thallium	6020A	0.020	0.002	5.0	10/22/11	10/28/11	0.049		
Vanadium	6020A	0.20	0.02	5.0	10/22/11	10/28/11	16.3		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	57.4	J	N*

% Solids: 85.3

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109282
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11KR73SD Lab Code: K1109282-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	8600		
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.155	J	N
Arsenic	6020A	0.48	0.06	5.0	10/22/11	10/28/11	3.95		
Barium	6020A	0.048	0.005	5.0	10/22/11	10/28/11	98.3	J	N
Beryllium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.255		
Cadmium	6020A	0.019	0.003	5.0	10/22/11	10/28/11	0.168	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	2440		
Chromium	6020A	0.19	0.03	5.0	10/22/11	10/28/11	16.2	J	N
Cobalt	6020A	0.019	0.003	5.0	10/22/11	10/28/11	6.300		
Copper	6020A	0.10	0.05	5.0	10/22/11	10/28/11	12.1	J	*
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	15100		
Lead	6020A	0.048	0.009	5.0	10/22/11	10/28/11	4.240		
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	3410	J	N
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	215	J	N*
Mercury	7471A	0.019	0.002	1.0	10/20/11	10/21/11	0.051	J	*
Nickel	6020A	0.19	0.03	5.0	10/22/11	10/28/11	18.4	J	N
Potassium	6010B	58.1	19.4	2.0	10/24/11	10/26/11	741	J	N
Selenium	7742	0.10	0.03	2.0	10/22/11	10/26/11	0.19		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.080		
Sodium	6010B	38.7	3.9	2.0	10/24/11	10/26/11	190		
Thallium	6020A	0.019	0.002	5.0	10/22/11	10/28/11	0.069		
Vanadium	6020A	0.19	0.02	5.0	10/22/11	10/28/11	23.1		
Zinc	6020A	0.5	0.2	5.0	10/22/11	10/28/11	48.1	J	N*

% Solids: 76.5

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	**Lab Project Number: K1109282**
Sampling Dates: 9/23/11	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 12/5/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11KR18SD	K1109282-002
2	11KR24SD	K1109282-003
3	11KR70SD	K1109282-018
4	11KR72SD	K1109282-019

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- NR — CRDL Standard results
- X — Preparation Blank and Calibration Blank results
- NR — ICP Interference Check Sample results
- NR — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- NR — ICP Serial Dilution results
- NR — Instrument Detection Limits
- NR — ICP Interelement Correction Factors
- NR — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**N/A**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All sample jars were received outside of recommended preservation temperatures.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: A Batch QC sample was analyzed for matrix spike and matrix spike duplicate. Percent recoveries were within control limits.

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The following blanks were analyzed:

__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:

_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: A Batch QC sample was also run as a laboratory duplicate. RPD exceeded 35%; associated sample results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

1630, Sediment – dry-weight corrected

$$\frac{\frac{CDFE_{ext}}{AD_{rec}} - (B_f * I_d * 1000)}{I * 1000} \div \frac{\%TS}{100}$$

C – result produced at the instrument, pg

F – Final volume of the sample preparation, mL

D – Dilution factor of any dilution of the preparation made at the instrument

A – Analyzed volume of the prep or dilution of the prep, mL

E_{ext} – The mass of DCM added to the sample, g

E_{rec} – The mass of DCM recovered from the sample, g

B_f- the mean of the method blank final result, ng/g

I_d – The default aliquot prepared used for method blanks, 2.5g

I – aliquot of sample prepared, g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical	**Lab Project Number: K1109283**
Sampling Dates: 9/21/11 – 9/23/11	**Sample Matrix: Sediment**
Analytical Method: General Chemistry	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/5/2011**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11KR15SD	K1109283-001
2	11KR14SD	K1109283-002
3	11KR12SD	K1109283-003
4	11KR01SD	K1109283-004
5	11KR71SD	K1109283-005
6	11KR09SD	K1109283-011
7	11KR08SD	K1109283-012
8	11KR06SD	K1109283-013
9	11KR05SD	K1109283-014
10	11KR17SD	K1109283-015
11	11KR16SD	K1109283-016

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — Preparation Blank and Calibration Blank results
- X — Matrix Spike recoveries
- X — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Instrument Detection Limits
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- NR — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- NR — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Analyte Quantitation**	**YES**
8	**Overall Assessment of Data**	**YES**
9	**Usability of Data**	**YES**

Comments: Following analytical methods were used: Nitrate + Nitrite by EPA 353.2, Chloride, Fluoride, and Sulfate by EPA 300.0, Alkalinity, Carbonate, Bicarbonate, & Hydroxide by SM 2320, TDS by EPA 160.1 and TSS by EPA 160.2.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the non-detected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Cyanide: 14 days (from collection) for analysis.
Nitrate (unpreserved water samples): 48 hours (from collection) for analysis.
All other anions: 28 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 90-110%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 75% or above 125%, all associated data are rejected (R).

Comments: Continuing calibration blank recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: All laboratory control sample recoveries were within control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: A Batch QC sample was used for matrix spike and matrix spike duplicate analyses. All percent recoveries were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Method blanks did not contain contamination at the reporting level.

Continuing calibration blank percent recoveries were all within control limits.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: A Batch QC sample was analyzed as a laboratory duplicate. All RPDs were within control limits.

7. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW
Fluoride: 0.131 mg/L. Lab reported 0.1 mg/L.
Chloride: 0.460 mg/L. Lab reported 0.5 mg/L.
Sulfate: 180.281 mg/L. Lab reported 180 mg/L.
Nitrate+Nitrite: 0.0113 mg/L. Lab reported 0.011 mg/L.
Alkalinity: 92.8 mg/L CaCO3. Lab reported 92.8 mg/L CaCO3.

8. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate

section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

9. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

10. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1109283**
Sampling Dates: 9/21/11thru 9/24/11	**Sample Matrix: Sediment**
Analytical Method: Metals *(EPA 6020A/6010B)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 11/14/11**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Total Metals:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11KR15SD	K1109283-001
2	11KR14SD	K1109283-002
3	11KR12SD	K1109283-003
4	11KR01SD	K1109283-004
5	11KR71SD	K1109283-005
6	11KR74SD	K1109283-009
7	11KR09SD	K1109283-011
8	11KR08SD	K1109283-012
9	11KR06SD	K1109283-013
10	11KR05SD	K1109283-014
11	11KR17SD	K1109283-015
12	11KR16SD	K1109283-016
13		
14		
15		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Dissolved Metals:

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**NO**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**NO**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**NO**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory. All sample jars were above recommended preservation temperature.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries for total metals and dissolved metals were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11KR14SD was used for matrix spike and matrix spike duplicate. All total metals recoveries except Antimony and Calcium were within the control limits; these analytes were below 75% recovery. However, Antimony parent result was greater than four times the spike sample, so no action was taken for that analyte. Associated Calcium results were qualified as estimated (J). For the duplicate, all total metals recoveries except Antimony were within control limits; this recovery was below 75%. However, Antimony parent result was greater than four times the spike sample, so no action was taken for that analyte.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blanks and initial and continuing calibration blanks were free of contamination that would require qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Sample 11KR15SDD was a lab duplicate of 11KR15SD for Mercury; the RPD was greater than 35%. Associated sample results were qualified as estimated (J). Sample 11KR14SDD was a lab duplicate of 11KR14SD. Arsenic, Cadmium, Chromium, Cobalt, Vanadium and Zinc had RPDs above the control limit (35%). All associated results were qualified as estimated (J).

Sample 11KR71SD was a field duplicate of 11KR01SD. All RPDs were below 35%.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Aluminum, Barium, and Lead had recoveries greater than 10%. All associated results were qualified as estimated (J).

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the

correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 10MW04GW (total metals):
Sb: (29.11 ug/L) Lab reported 29.1 ug/L.
As: (8.813 ug/L) Lab reported 8.8 ug/L
Ni: (35.395 ug/L) Lab reported 35.4 ug/L.
Zn: (12.998 ug/L) Lab reported 13 ug/L.
Ca: (32.78 mg/L) (1000ug/1mg) = 32,780 ug/L. Lab reported 33,000 ug/L.
Mg: (43.74 mg/L) (1000ug/1mg) = 43,740 ug/L. Lab reported 43,740 ug/L.
Mn: (1.022 mg/L) (1000ug/1mg) = 1,020 ug/L. Lab reported 1,040 ug/L.
K: (0.8752 mg/L) (1000ug/1mg) = 875.2 ug/L. Lab reported 880 ug/L.

Comment [JAS1]: This is leftover from Mindy's stuff…I just need a little primer on what's supposed to be in here for mine.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

__X__ Definitive, **Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR15SD **Lab Code:** K1109283-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	6810	J	
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	272	J	N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/26/11	414	J	*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/25/11	124	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.268		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.219	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	1550	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	11.1	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	7.690	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	20.3		
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	19800		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/25/11	6.060	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	2410		
Manganese	6010B	1.93	0.39	2.0	10/24/11	10/26/11	5410		
Mercury	7471A	1.86	0.186	100.0	10/19/11	10/19/11	39.2	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	21.0		
Potassium	6010B	57.9	19.3	2.0	10/24/11	10/26/11	1070		
Selenium	7742	0.59	0.18	10.0	10/24/11	10/27/11	0.55	J	
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.098		
Sodium	6010B	38.6	3.9	2.0	10/24/11	10/26/11	82.5		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.090		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	16.6	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	53.8	J	*

% Solids: 83.5

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR14SD **Lab Code:** K1109283-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	11300	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	5.410	J+	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	12.5	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	116	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.283		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.251	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	3930	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	19.7	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	6.930	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	15.0		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	24200		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	6.620	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	5330		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	404		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.387	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	19.4		
Potassium	6010B	59.0	19.7	2.0	10/24/11	10/26/11	1070		
Selenium	7742	0.12	0.04	2.0	10/24/11	10/25/11	0.42		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.141		
Sodium	6010B	39.3	3.9	2.0	10/24/11	10/26/11	143		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.104		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	25.5	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	65.3	J	*

% Solids: 66.9

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR12SD **Lab Code:** K1109283-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	6340	J	
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.271	~~J~~	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	8.77	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	138	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.538		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.420	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	2250	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	17.7	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	14.8	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	56.2		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	31200		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	12.3	J	
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	2950		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	280		
Mercury	7471A	0.017	0.002	1.0	10/19/11	10/19/11	0.374	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	51.7		
Potassium	6010B	59.6	19.9	2.0	10/24/11	10/26/11	853		
Selenium	7742	0.09	0.03	2.0	10/24/11	10/25/11	0.74		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.123		
Sodium	6010B	39.8	4.0	2.0	10/24/11	10/26/11	57.3		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.077		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	27.8	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	116	J	*

% Solids: 78.3

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR01SD **Lab Code:** K1109283-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	12500	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	0.234	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/26/11	10.4	J	*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/25/11	142	J	
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/26/11	0.383		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/25/11	0.288	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	2390	J	N
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/25/11	16.6	J	*
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/25/11	12.5	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	29.4		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	33900		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/25/11	11.4	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	5040		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	740		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.081	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/26/11	29.2		
Potassium	6010B	59.1	19.7	2.0	10/24/11	10/26/11	721		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.31		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.092		
Sodium	6010B	39.4	3.9	2.0	10/24/11	10/26/11	37.9	J	
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/25/11	0.075		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/25/11	21.9	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	74.3	J	*

% Solids: 82.7

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/23/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR71SD **Lab Code:** K1109283-005

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.7	0.4	2.0	10/24/11	10/26/11	14400	J	
Antimony	6020A	0.048	0.009	5.0	10/24/11	10/31/11	0.228	J	N
Arsenic	6020A	0.48	0.06	5.0	10/24/11	10/26/11	7.95	J	*
Barium	6020A	0.048	0.005	5.0	10/24/11	10/25/11	160	J	
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/26/11	0.384		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/25/11	0.364	J	*
Calcium	6010B	9.7	1.9	2.0	10/24/11	10/26/11	2850	J	N
Chromium	6020A	0.19	0.03	5.0	10/24/11	10/25/11	18.5	J	*
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/25/11	11.9	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	35.0		
Iron	6010B	1.9	0.7	2.0	10/24/11	10/26/11	33600		
Lead	6020A	0.048	0.009	5.0	10/24/11	10/25/11	10.2	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	5620		
Manganese	6010B	0.19	0.02	2.0	10/24/11	10/26/11	872		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.099	J	*
Nickel	6020A	0.19	0.03	5.0	10/24/11	10/26/11	32.7		
Potassium	6010B	57.9	19.3	2.0	10/24/11	10/26/11	862		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.42		
Silver	6020A	0.019	0.008	5.0	10/24/11	10/31/11	0.062		
Sodium	6010B	38.6	3.9	2.0	10/24/11	10/26/11	53.2		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/25/11	0.073		
Vanadium	6020A	0.19	0.02	5.0	10/24/11	10/25/11	22.6	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	76.3	J	*

% Solids: 83.2

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/24/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR74SD **Lab Code:** K1109283-009

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	5140		
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	0.250		N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/26/11	5.42		*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/25/11	53.1		
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.140		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.133		*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	4110		N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	12.4		*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	4.600		*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	9.31		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	16300		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/25/11	2.680		
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	2880		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	588		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.015	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	16.9		
Potassium	6010B	59.5	19.8	2.0	10/24/11	10/26/11	567		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.18		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.080		
Sodium	6010B	39.7	4.0	2.0	10/24/11	10/26/11	90.4		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.053		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	14.9		*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	35.9		*

% Solids: 80.9

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/21/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR09SD **Lab Code:** K1109283-011

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	9770	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	9.510	J	N
Arsenic	6020A	0.50	0.06	5.0	10/24/11	10/26/11	20.9	J	*
Barium	6020A	0.050	0.005	5.0	10/24/11	10/25/11	122	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.501		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.338	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	5670	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	21.1	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	10.8	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	26.8		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	32400		
Lead	6020A	0.050	0.009	5.0	10/24/11	10/25/11	9.340	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4800		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	649		
Mercury	7471A	0.019	0.002	1.0	10/19/11	10/19/11	0.566	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	30.9		
Potassium	6010B	59.2	19.7	2.0	10/24/11	10/26/11	1280		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.50		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.172		
Sodium	6010B	39.4	3.9	2.0	10/24/11	10/26/11	145		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.123		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	30.1	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	93.9	J	*

% Solids: 66.9

Comments:

Columbia Analytical Services

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR08SD **Lab Code:** K1109283-012

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	9550	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	5.480	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	52.0	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	120	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.297		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.282	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	5230	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	18.3	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	7.780	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	18.8		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	24000		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	6.710	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4910		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	505		
Mercury	7471A	0.038	0.004	2.0	10/19/11	10/19/11	1.15	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	23.8		
Potassium	6010B	59.0	19.7	2.0	10/24/11	10/26/11	1080		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.31		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.128		
Sodium	6010B	39.3	3.9	2.0	10/24/11	10/26/11	144		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.105	B	
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	23.6	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	67.9	J	*

% Solids: 70.5

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR06SD **Lab Code:** K1109283-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	12100	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	2.100	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	17.5	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	128	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.293		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.281	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	6830	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	20.1	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	7.140	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	19.0		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	25900		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	7.320	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	6150		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	557		
Mercury	7471A	0.018	0.002	1.0	10/19/11	10/19/11	0.169	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	23.1		
Potassium	6010B	58.7	19.6	2.0	10/24/11	10/26/11	1380		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.39		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.167		
Sodium	6010B	39.2	3.9	2.0	10/24/11	10/26/11	187		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.120		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	26.1	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	71.7	J	*

% Solids: 64.2

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR05SD **Lab Code:** K1109283-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	6460	J	
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	99.0	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	135	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	91.6	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.344		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.270	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	1810	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	14.2	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	9.360	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	25.1		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	33400		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	7.780	J	
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	2890		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	708		
Mercury	7471A	3.09	0.309	200.0	10/19/11	10/19/11	119	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	25.7		
Potassium	6010B	59.5	19.8	2.0	10/24/11	10/26/11	749		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.39		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.198		
Sodium	6010B	39.7	4.0	2.0	10/24/11	10/26/11	77.5		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.076		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	22.4	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	76.6	J	*

% Solids: 77.8

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR17SD **Lab Code:** K1109283-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.8	0.4	2.0	10/24/11	10/26/11	8610	J	
Antimony	6020A	0.049	0.009	5.0	10/24/11	10/31/11	4.260	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	17.5	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	111	J	
Beryllium	6020A	0.019	0.003	5.0	10/24/11	10/26/11	0.334		
Cadmium	6020A	0.019	0.003	5.0	10/24/11	10/25/11	0.345	J	*
Calcium	6010B	9.8	2.0	2.0	10/24/11	10/26/11	4390	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	17.7	J	*
Cobalt	6020A	0.019	0.003	5.0	10/24/11	10/25/11	10.0	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	24.9		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	26000		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	9.270	J	
Magnesium	6010B	3.9	0.3	2.0	10/24/11	10/26/11	4060		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	527		
Mercury	7471A	0.019	0.002	1.0	10/19/11	10/19/11	0.442	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	26.1		
Potassium	6010B	58.6	19.5	2.0	10/24/11	10/26/11	996		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/25/11	0.39		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.150		
Sodium	6010B	39.1	3.9	2.0	10/24/11	10/26/11	113		
Thallium	6020A	0.019	0.002	5.0	10/24/11	10/25/11	0.109		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	27.7	J	
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	82.1	J	

% Solids: 72.9

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	**Service Request:**	K1109283
Project No.:	NA	**Date Collected:**	09/22/11
Project Name:	Red Devil Mine	**Date Received:**	09/29/11
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 11KR16SD **Lab Code:** K1109283-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	9.9	0.4	2.0	10/24/11	10/26/11	13500	J	
Antimony	6020A	0.050	0.009	5.0	10/24/11	10/31/11	15.2	J	N
Arsenic	6020A	0.49	0.06	5.0	10/24/11	10/26/11	39.2	J	*
Barium	6020A	0.049	0.005	5.0	10/24/11	10/25/11	152	J	
Beryllium	6020A	0.020	0.003	5.0	10/24/11	10/26/11	0.339		
Cadmium	6020A	0.020	0.003	5.0	10/24/11	10/25/11	0.342	J	*
Calcium	6010B	9.9	2.0	2.0	10/24/11	10/26/11	7480	J	N
Chromium	6020A	0.20	0.03	5.0	10/24/11	10/25/11	21.9	J	*
Cobalt	6020A	0.020	0.003	5.0	10/24/11	10/25/11	8.140	J	*
Copper	6020A	0.10	0.05	5.0	10/24/11	10/26/11	23.2		
Iron	6010B	2.0	0.7	2.0	10/24/11	10/26/11	29900		
Lead	6020A	0.049	0.009	5.0	10/24/11	10/25/11	8.820	J	
Magnesium	6010B	4.0	0.3	2.0	10/24/11	10/26/11	6720		
Manganese	6010B	0.20	0.02	2.0	10/24/11	10/26/11	586		
Mercury	7471A	0.187	0.019	10.0	10/19/11	10/19/11	2.36	J	*
Nickel	6020A	0.20	0.03	5.0	10/24/11	10/26/11	25.3		
Potassium	6010B	59.5	19.8	2.0	10/24/11	10/26/11	1520		
Selenium	7742	0.10	0.03	2.0	10/24/11	10/27/11	0.52		
Silver	6020A	0.020	0.008	5.0	10/24/11	10/31/11	0.229		
Sodium	6010B	39.7	4.0	2.0	10/24/11	10/26/11	200		
Thallium	6020A	0.020	0.002	5.0	10/24/11	10/25/11	0.136		
Vanadium	6020A	0.20	0.02	5.0	10/24/11	10/25/11	28.6	J	*
Zinc	6020A	0.5	0.2	5.0	10/24/11	10/25/11	80.0	J	*

% Solids: 56.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Analytical Resources, Incorporated	**Lab Project Number: K1109283**
Sampling Dates: 9/21/11thru 9/24/11	**Sample Matrix: Water**
Analytical Method: Metals *(EPA 6020A/6010B)*	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date: 12/5/11**
Technical QA Reviewer: _____ **Date: _____**
Project Manager: Bill Richards **Date: _____**

SAMPLE IDENTIFICATION:

Total Metals:

Sample No.	Sample I.D.	ARI ID/ ARI LIMS ID
1	11RB01HA	K1109283-006
2	11RB02VV	K1109283-007
3	11RB03HA	K1109283-008

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Dissolved Metals:

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**NO**
7	**Interference Check Samples and Serial Dilution Analysis**	**YES**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**NO**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.
Al, Ca, Fe, Mg, K, and Na were analyzed by EPA 6010B (ICP) due to matrix interference.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met. For dissolved metals analysis, water samples were filtered in the field and preserved with HNO3 (pH<2) immediately upon receiving by the laboratory. All sample jars were above recommended preservation temperature.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries for total metals and dissolved metals were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11RB01HA was used for matrix spike and matrix spike duplicate for a subset of total metals. All total metals recoveries were within the control limits. Sample 11RB03HA was used for matrix spike and matrix spike duplicate for all total metals. All total metals recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
__X__ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The method blank and initial and continuing calibration blanks were free of contamination that would require qualification.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: Sample 11RB01HA was a lab duplicate for a subset of total metals; the RPDs for

Iron and Sodium were above the control limit of 35%; however, the parent results were less than five times the MDL so no action was taken. Sample 11RB03HA was a lab duplicate for a subset of total metals. Antimony, Barium, Lead, Manganese, and Zinc had RPDs above the control limit (35%); however, only Manganese had an original result greater than five times the MDL. All associated Manganese results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Antimony, Barium, Lead, Manganese, Nickel, Vanadium and Zinc had % Differences greater than 10%. However, no original results were greater than 50x the MDL. No action was taken.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
Sample 11KR15SD (Lab ID: K1109283-001)
Total Mercury: (4.22ug/L) (0.05L/0.644 g) (100) (100/83.5) = 39.238 ug/g = 39.238 mg/kg
Lab reported 39.2 mg/kg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109283
Project No.:	001096.0X70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	WATER	Units:	ug/L
		Basis:	NA

Sample Name: 11RB01HA Lab Code: K1109283-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	10/14/11	10/25/11	5.3	J	
Antimony	6020A	0.050	0.005	1.0	10/24/11	10/27/11	0.096		
Arsenic	6020A	0.5	0.1	1.0	10/24/11	10/27/11	0.1	U	
Barium	6020A	0.050	0.020	1.0	10/24/11	10/27/11	0.087		
Beryllium	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.019	J	
Calcium	6010B	50.0	6.0	1.0	10/14/11	10/25/11	23.4	J	
Chromium	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.33		
Cobalt	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.007	J	
Copper	6020A	0.10	0.02	1.0	10/24/11	10/27/11	0.09	J	
Iron	6010B	20.0	3.0	1.0	10/14/11	10/25/11	3.8	J	
Lead	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.032		
Magnesium	6010B	2.0	0.4	1.0	10/14/11	10/25/11	1.9	J	
Manganese	6020A	0.050	0.006	1.0	10/24/11	10/27/11	0.148	J	
Mercury	7470A	0.20	0.02	1.0	10/19/11	10/19/11	0.02	U	
Nickel	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.20		
Potassium	6010B	400	50.0	1.0	10/14/11	10/25/11	50.0	U	
Selenium	6020A	1.0	0.3	1.0	10/24/11	10/27/11	0.3	U	
Silver	6020A	0.020	0.004	1.0	10/24/11	10/27/11	0.008	J	
Sodium	6010B	200	20.0	1.0	10/14/11	10/25/11	45.0	J	
Thallium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.007	J	
Vanadium	6020A	0.20	0.03	1.0	10/24/11	10/27/11	0.03	J	
Zinc	6020A	0.5	0.2	1.0	10/24/11	10/27/11	0.3	J	

% Solids: 0.0

Comments:

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorporated
Project Name: Red Devil Mine
Project No.: 001096.OX70

Service Request: K1109283

Sample Name:	Lab Code:
11RB01HA	K1109283-006
11RB01HAD	K1109283-006D
11RB01HAS	K1109283-006S
11RB01HASD	K1109283-006SD
11RB02VV	K1109283-007
11RB03HA	K1109283-008
11RB03HAD	K1109283-008D
11RB03HAS	K1109283-008S
11RB03HASD	K1109283-008SD
Method Blank	K1109283-MB

Comments:

Approved By: _____ **Date:** 11/4/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109283
Project No.:	001096.OX70	Date Collected:	09/23/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	WATER	Units:	ug/L
		Basis:	NA

Sample Name: 11RB02VV Lab Code: K1109283-007

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	10/14/11	10/25/11	7.7	J	
Antimony	6020A	0.050	0.005	1.0	10/24/11	10/27/11	0.020	J	
Arsenic	6020A	0.5	0.1	1.0	10/24/11	10/27/11	0.1	U	
Barium	6020A	0.050	0.020	1.0	10/24/11	10/27/11	0.030	J	
Beryllium	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	10/14/11	10/25/11	31.8	J	
Chromium	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.20	J	
Cobalt	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.006	U	
Copper	6020A	0.10	0.02	1.0	10/24/11	10/27/11	0.13		
Iron	6010B	20.0	3.0	1.0	10/14/11	10/25/11	7.0	J	
Lead	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.011	J	
Magnesium	6010B	2.0	0.4	1.0	10/14/11	10/25/11	2.3		
Manganese	6020A	0.050	0.006	1.0	10/24/11	10/27/11	0.037	J	
Mercury	7470A	0.20	0.02	1.0	10/19/11	10/19/11	0.02	U	
Nickel	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.08	J	
Potassium	6010B	400	50.0	1.0	10/14/11	10/25/11	71.7	J	
Selenium	6020A	1.0	0.3	1.0	10/24/11	10/27/11	0.3	U	
Silver	6020A	0.020	0.004	1.0	10/24/11	10/27/11	0.004	U	
Sodium	6010B	200	20.0	1.0	10/14/11	10/25/11	505		
Thallium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	10/24/11	10/27/11	0.03	U	
Zinc	6020A	0.5	0.2	1.0	10/24/11	10/27/11	0.2	U	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1109283
Project No.:	001096.0X70	Date Collected:	09/24/11
Project Name:	Red Devil Mine	Date Received:	09/29/11
Matrix:	WATER	Units:	ug/L
		Basis:	NA

Sample Name: 11RB03HA Lab Code: K1109283-008

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	50.0	2.0	1.0	10/14/11	10/25/11	7.1	J	
Antimony	6020A	0.050	0.005	1.0	10/24/11	10/27/11	0.016	J	
Arsenic	6020A	0.5	0.1	1.0	10/24/11	10/27/11	0.1	U	
Barium	6020A	0.050	0.020	1.0	10/24/11	10/27/11	0.079		
Beryllium	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.006	U	
Cadmium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.005	U	
Calcium	6010B	50.0	6.0	1.0	10/14/11	10/25/11	19.9	J	
Chromium	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.21		
Cobalt	6020A	0.020	0.006	1.0	10/24/11	10/27/11	0.006	U	
Copper	6020A	0.10	0.02	1.0	10/24/11	10/27/11	0.13		
Iron	6010B	20.0	3.0	1.0	10/14/11	10/25/11	4.5	J	
Lead	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.014	J	
Magnesium	6010B	2.0	0.4	1.0	10/14/11	10/25/11	2.3		
Manganese	6020A	0.050	0.006	1.0	10/24/11	10/27/11	0.120	J	
Mercury	7470A	0.20	0.02	1.0	10/19/11	10/19/11	0.02	U	
Nickel	6020A	0.20	0.02	1.0	10/24/11	10/27/11	0.12	J	
Potassium	6010B	400	50.0	1.0	10/14/11	10/25/11	54.4	J	
Selenium	6020A	1.0	0.3	1.0	10/24/11	10/27/11	0.3	U	
Silver	6020A	0.020	0.004	1.0	10/24/11	10/27/11	0.004	U	
Sodium	6010B	200	20.0	1.0	10/14/11	10/25/11	39.9	J	
Thallium	6020A	0.020	0.005	1.0	10/24/11	10/27/11	0.005	U	
Vanadium	6020A	0.20	0.03	1.0	10/24/11	10/27/11	0.03	J	
Zinc	6020A	0.5	0.2	1.0	10/24/11	10/27/11	0.5	J	

% Solids: 0.0

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	**Lab Project Number: K1109283**
Sampling Dates: 9/21/11 to 9/24/11	**Sample Matrix: Sediment**
Analytical Method: Methyl Hg by EPA 1630	**Data Reviewer: J. Schmitz**

REVIEW AND APPROVAL:

Data Reviewer: Jen Schmitz **Date:** 11/15/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11KR15SD	K1109283-001
2	11KR14SD	K1109283-002
3	11KR12SD	K1109283-003
4	11KR01SD	K1109283-004
5	11KR71SD	K1109283-005
6	11KR09SD	K1109283-011
7	11KR08SD	K1109283-012
8	11KR06SD	K1109283-013
9	11KR05SD	K1109283-014
10	11KR17SD	K1109283-015
11	11KR16SD	K1109283-016
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- NR Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	**Holding Times**	**YES**
2	**Initial and Continuing Calibrations**	**YES**
3	**Laboratory Control Sample**	**YES**
4	**Matrix Spike**	**YES**
5	**Blanks and Background Samples**	**YES**
6	**Duplicate Analyses**	**YES**
7	**Interference Check Samples and Serial Dilution Analysis**	**N/A**
8	**Post Digestion Spike and Standard Addition Analysis**	**N/A**
9	**Analyte Quantitation**	**YES**
10	**Overall Assessment of Data**	**YES**
11	**Usability of Data**	**YES**

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All sample jars were received outside of recommended preservation temperatures.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments:

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The following blanks were analyzed:

__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:

__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$\text{RPD} = \frac{2(\text{Value 1} - \text{Value 2})}{\text{Value 1} + \text{Value 2}} \times 100\%$$

	10KR01SD	10KR71SD	RPD (%)
Methyl Mercury, ng/g	0.06	0.05	18

Comments: Sample 10RD71SD was a field duplicate of 10RD01S. The RPD was within the control limit (<35%).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL) / (Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL) / (weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

1630, Sediment – dry-weight corrected

$$\frac{\frac{CDFE_{ext}}{AD_{rec}} - (B_f * I_d * 1000)}{I * 1000} \div \frac{\%TS}{100}$$

C – result produced at the instrument, pg

F – Final volume of the sample preparation, mL

D – Dilution factor of any dilution of the preparation made at the instrument

A – Analyzed volume of the prep or dilution of the prep, mL

E_{ext} – The mass of DCM added to the sample, g

E_{rec} – The mass of DCM recovered from the sample, g

B_f- the mean of the method blank final result, ng/g

I_d – The default aliquot prepared used for method blanks, 2.5g

I – aliquot of sample prepared, g.

Sample 11KR15SD, Lab ID K1109283-001
Methyl Hg:
((117 pg) (40mL) (1000g/kg)) / ((2mL) (1.06g) (1000pg/ng) (1000ng/ug)) = 2.20755 ug/kg
(2.20755 ug/kg) (100/83.5) = 2.6438 ug/kg) = 2.6438 ng/g
Lab reported 2.6 ng/g

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *DRAFT QUALITY ASSURANCE PROJECT PLAN RED DEVIL MINE REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALASKA, JUNE 4, 2010 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

TO BE USED FOR EVALUATIONS OF THE SPATIAL DISTRIBUTION OF CONTAMINANTS.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 2-6 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	**Lab Project Number: 1109109**
Sampling Dates: 08/14/11 thru 8/29/11	**Sample Matrix: Soil/Sediment**
Analytical Method: Arsenic Speciation by EPA 1632	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/28/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP40SB08	1109109-01
2	11MP01SB16	1109109-02
3	11RD12SD	1109109-03
4	11MP23SB20	1109109-04
5	11MP28SB06	1109109-05
6	11RD13SB06	1109109-06
7	11RD13SB14	1109109-07
8	11RD13SB18	1109109-08
9	11MP19SB04	1109109-09
10	11MP32SB06	1109109-10
11	11MP29SB16	1109109-11
12	11RD13SB04	1109109-12
13	11MP11SB04	1109109-13
14	11MP11SB06	1109109-14
15	11RD10SD	1109109-15
16	11MP18SB20	1109109-16
17	11MP60SB14	1109109-17
18	11MP58SB04	1109109-18
19	11MP56SB06	1109109-19
20	11MP52SB06	1109109-20
21	11MP59SB18	1109109-21
22	11MP58SB16	1109109-22
23	11MP51SB06	1109109-23
24	11MP59SB04	1109109-24

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Inorganic arsenic (As), arsenite (As^{+3}), and arsenate (As^{+5}) were analyzed by hydride generation quartz furnace atomic absorption spectrometry, EPA Method 1632.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 1.2°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 11MP40SB08 and 11MP59SB18 were used for inorganic arsenic MS/MSD analysis and arsenite MS/MSD analysis. The recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blanks for inorganic arsenic and arsenite at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte (mg/kg)	11MP58SB04	11MP58SB16	RPD (%)
Arsenate	282	391	32
Arsenite	69.6	81.2	15
Inorganic Arsenic	352	473	29

Analyte (mg/kg)	11MP59SB04	11MP59SB18	RPD (%)
Arsenate	3020	3020	0
Arsenite	1200	364	107*
Inorganic Arsenic	4220	3380	22

Analyte (mg/kg)	11RD13SB14	11RD13SB18	RPD (%)
Arsenate	<1.52	2.76	5
Arsenite	3.80	3.84	10
Inorganic Arsenic	4.84	6.60	31

Comments:

*: The RPD was outside of control limits (>35%) and the detected arsenite results in 11MP59SB04 and 11MP59SB18 were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Sample 11MP40SB08

Inorganic Arsenic: (69962.09 ug/L) (0.02L/1.084g) (100/77.6) = 1663.4 ug/g = 1663.4 mg/kg.
Lab reported 1660 mg/kg.

Arsenite: (8034.744 ug/L) (0.02L/1.084g) (100/77.6) = 191.03 ug/g = 191.03 mg/kg.
Lab reported 191 mg/kg.

Arsenate: (1660 mg/kg) – (191 mg/kg) = 1469 mg/kg.
Lab reported 1470 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

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ANALYTICAL RESULTS

11MP40SB08

Matrix: Soil/Sediment **Laboratory ID:** 1109109-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1470	446	892	mg/kg dry	1	1109109-01	[CALC]	N/A	N/A	EPA 1632	
Arsenite	191	5.44	42.3	mg/kg dry	75000	1109109-01RE1	F109094	1I24005	09/24/11 00:13	EPA 1632	
Inorganic Arsenic	1660	446	892	mg/kg dry	750000	1109109-01RE1	F109093	1I25001	09/23/11 00:13	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	77.6	0.1	0.1	% by Weight	1	1109109-01	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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Curtis Armstrong, Project Manager

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ANALYTICAL RESULTS

11MP01SB16

Matrix: Soil/Sediment **Laboratory ID:** 1109109-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**42.6**	8.81	17.6	mg/kg dry	1	1109109-02	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.346**	0.027	0.209	mg/kg dry	375	1109109-02RE1	F109094	1I24005	09/24/11 00:21	EPA 1632	
Inorganic Arsenic	**43.0**	8.81	17.6	mg/kg dry	15000	1109109-02RE2	F109093	1I25001	09/23/11 00:22	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**85.1**	0.1	0.1	% by Weight	1	1109109-02	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11RD12SD

Matrix: Soil/Sediment **Laboratory ID:** 1109109-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	2160	810	1620	mg/kg dry	1	1109109-03	[CALC]	N/A	N/A	EPA 1632	
Arsenite	333	9.88	76.8	mg/kg dry	150000	1109109-03	F109094	1I24005	09/24/11 00:22	EPA 1632	
Inorganic Arsenic	2490	810	1620	mg/kg dry	1500000	1109109-03	F109093	1I25001	09/23/11 00:23	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	77.6	0.1	0.1	% by Weight	1	1109109-03	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11MP23SB20

Matrix: Soil/Sediment **Laboratory ID:** 1109109-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1590	1100	2190	mg/kg dry	1	1109109-04	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	1740	26.8	208	mg/kg dry	300000	1109109-04	F109094	1I24005	09/24/11 00:23	EPA 1632	
Inorganic Arsenic	3330	1100	2190	mg/kg dry	1500000	1109109-04	F109093	1I25001	09/23/11 00:24	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	67.5	0.1	0.1	% by Weight	1	1109109-04	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11MP28SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	4560	656	1310	mg/kg dry	1	1109109-05	[CALC]	N/A	N/A	EPA 1632	
Arsenite	257	16.0	124	mg/kg dry	300000	1109109-05	F109094	1I24005	09/24/11 00:24	EPA 1632	
Inorganic Arsenic	4810	656	1310	mg/kg dry	1500000	1109109-05	F109093	1I25001	09/23/11 00:25	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	87.6	0.1	0.1	% by Weight	1	1109109-05	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11RD13SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	3.05	6.10	mg/kg dry	1	1109109-06	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	5.69	0.074	0.578	mg/kg dry	1000	1109109-06	F109094	1I24005	09/24/11 00:25	EPA 1632	
Inorganic Arsenic	6.80	3.05	6.10	mg/kg dry	5000	1109109-06RE1	F109093	1I25001	09/23/11 00:27	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	70.9	0.1	0.1	% by Weight	1	1109109-06	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11RD13SB14

Matrix: Soil/Sediment **Laboratory ID:** 1109109-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	ND	1.52	3.04	mg/kg dry	1	1109109-07	[CALC]	N/A	N/A	EPA 1632	U
Arsenite	**3.80**	0.093	0.720	mg/kg dry	1500	1109109-07	F109094	1I24005	09/24/11 00:26	EPA 1632	
Inorganic Arsenic	**4.84**	1.52	3.04	mg/kg dry	3000	1109109-07RE1	F109093	1I25001	09/23/11 00:29	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**74.1**	0.1	0.1	% by Weight	1	1109109-07	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

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ANALYTICAL RESULTS

11RD13SB18

Matrix: Soil/Sediment **Laboratory ID:** 1109109-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**2.76**	1.78	3.57	mg/kg dry	1	1109109-08	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	**3.84**	0.109	0.845	mg/kg dry	1500	1109109-08	F109094	1I24005	09/24/11 00:27	EPA 1632	
Inorganic Arsenic	**6.60**	1.78	3.57	mg/kg dry	3000	1109109-08	F109093	1I25001	09/23/11 00:30	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**79.5**	0.1	0.1	% by Weight	1	1109109-08	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

11/28/11

Frontier Global Sciences, Inc.

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Curtis Armstrong, Project Manager

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ANALYTICAL RESULTS

11MP19SB04

Matrix: Soil/Sediment **Laboratory ID:** 1109109-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**36.5**	6.77	13.5	mg/kg dry	1	1109109-09	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.244**	0.017	0.128	mg/kg dry	300	1109109-09RE1	F109094	1I24005	09/24/11 00:30	EPA 1632	
Inorganic Arsenic	**36.7**	6.77	13.5	mg/kg dry	15000	1109109-09RE1	F109093	1I25001	09/23/11 00:34	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**83.2**	0.1	0.1	% by Weight	1	1109109-09	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP32SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-10

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	3520	643	1290	mg/kg dry	1	1109109-10	[CALC]	N/A	N/A	EPA 1632	
Arsenite	392	7.84	61.0	mg/kg dry	150000	1109109-10	F109094	1I24005	09/24/11 00:29	EPA 1632	
Inorganic Arsenic	3910	643	1290	mg/kg dry	1500000	1109109-10RE1	F109093	1I25001	09/23/11 00:37	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	79.4	0.1	0.1	% by Weight	1	1109109-10	F109117		09/14/11 12:27	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP29SB16

Matrix: Soil/Sediment **Laboratory ID:** 1109109-11

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	2840	1330	2660	mg/kg dry	1	1109109-11	[CALC]	N/A	N/A	EPA 1632	
Arsenite	375	32.5	252	mg/kg dry	600000	1109109-11RE1	F109146	1I26007	09/22/11 00:14	EPA 1632	
Inorganic Arsenic	3210	1330	2660	mg/kg dry	3000000	1109109-11RE2	F109145	1I22023	09/21/11 00:17	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	88.5	0.1	0.1	% by Weight	1	1109109-11	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD13SB04

Matrix: Soil/Sediment **Laboratory ID:** 1109109-12

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	8.62	1.67	3.33	mg/kg dry	1	1109109-12	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1.75	0.102	0.790	mg/kg dry	1500	1109109-12	F109146	1I26007	09/22/11 00:22	EPA 1632	
Inorganic Arsenic	10.4	1.67	3.33	mg/kg dry	3000	1109109-12RE3	F109145	1I22023	09/21/11 00:27	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	81.0	0.1	0.1	% by Weight	1	1109109-12	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP11SB04

Matrix: Soil/Sediment **Laboratory ID:** 1109109-13

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**2680**	665	1330	mg/kg dry	1	1109109-13	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**209**	16.2	126	mg/kg dry	300000	1109109-13RE1	F109146	1I26007	09/22/11 00:24	EPA 1632	
Inorganic Arsenic	**2890**	665	1330	mg/kg dry	1500000	1109109-13	F109145	1I22023	09/21/11 00:28	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**88.5**	0.1	0.1	% by Weight	1	1109109-13	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP39SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-14

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	3230	796	1590	mg/kg dry	1	1109109-14	[CALC]	N/A	N/A	EPA 1632	
Arsenite	506	19.4	151	mg/kg dry	300000	1109109-14	F109146	1I26007	09/22/11 00:25	EPA 1632	
Inorganic Arsenic	3730	796	1590	mg/kg dry	1500000	1109109-14	F109145	1I22023	09/21/11 00:29	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	88.6	0.1	0.1	% by Weight	1	1109109-14	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD10SD

Matrix: Soil/Sediment **Laboratory ID:** 1109109-15

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**53.9**	8.62	17.2	mg/kg dry	1	1109109-15	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**1.70**	0.105	0.817	mg/kg dry	1500	1109109-15RE1	F109146	1I26007	09/22/11 00:27	EPA 1632	
Inorganic Arsenic	**55.6**	8.62	17.2	mg/kg dry	15000	1109109-15RE1	F109145	1I22023	09/21/11 00:33	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**75.2**	0.1	0.1	% by Weight	1	1109109-15	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP18SB20

Matrix: Soil/Sediment **Laboratory ID:** 1109109-16

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	117	17.1	34.3	mg/kg dry	1	1109109-16	[CALC]	N/A	N/A	EPA 1632	
Arsenite	9.04	0.523	4.06	mg/kg dry	7500	1109109-16	F109146	1I26007	09/22/11 00:28	EPA 1632	
Inorganic Arsenic	126	17.1	34.3	mg/kg dry	30000	1109109-16RE1	F109145	1I22023	09/21/11 00:36	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	83.7	0.1	0.1	% by Weight	1	1109109-16	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP60SB14

Matrix: Soil/Sediment **Laboratory ID:** 1109109-17

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**1820**	762	1520	mg/kg dry	1	1109109-17	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**488**	18.6	144	mg/kg dry	300000	1109109-17	F109146	1I26007	09/22/11 00:29	EPA 1632	
Inorganic Arsenic	**2310**	762	1520	mg/kg dry	1500000	1109109-17	F109145	1I22023	09/21/11 00:37	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**91.5**	0.1	0.1	% by Weight	1	1109109-17	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP58SB04

Matrix: Soil/Sediment **Laboratory ID:** 1109109-18

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**282**	64.0	128	mg/kg dry	1	1109109-18	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**69.6**	3.91	30.4	mg/kg dry	75000	1109109-18	F109146	1I26007	09/22/11 00:30	EPA 1632	
Inorganic Arsenic	**352**	64.0	128	mg/kg dry	150000	1109109-18RE1	F109145	1I22023	09/21/11 00:39	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**94.0**	0.1	0.1	% by Weight	1	1109109-18	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP56SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-19

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**579**	89.9	180	mg/kg dry	1	1109109-19	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**69.1**	5.48	42.6	mg/kg dry	75000	1109109-19	F109146	1I26007	09/22/11 00:33	EPA 1632	
Inorganic Arsenic	**649**	89.9	180	mg/kg dry	150000	1109109-19RE1	F109145	1I22023	09/21/11 00:41	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**76.4**	0.1	0.1	% by Weight	1	1109109-19	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP52SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-20

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1720	286	572	mg/kg dry	1	1109109-20	[CALC]	N/A	N/A	EPA 1632	
Arsenite	213	17.4	135	mg/kg dry	300000	1109109-20	F109146	1I26007	09/22/11 00:34	EPA 1632	
Inorganic Arsenic	1940	286	572	mg/kg dry	600000	1109109-20RE2	F109145	1I22023	09/21/11 00:48	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	91.9	0.1	0.1	% by Weight	1	1109109-20	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP59SB18

Matrix: Soil/Sediment **Laboratory ID:** 1109109-21

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	3020	769	1540	mg/kg dry	1	1109109-21	[CALC]	N/A	N/A	EPA 1632	
Arsenite	364 J	18.8	146	mg/kg dry	300000	1109109-21	F109149	1I26007	09/22/11 00:39	EPA 1632	
Inorganic Arsenic	3380	769	1540	mg/kg dry	1500000	1109109-21	F109148	1I22023	09/21/11 00:52	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	91.6	0.1	0.1	% by Weight	1	1109109-21	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP58SB16

Matrix: Soil/Sediment **Laboratory ID:** 1109109-22

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**391**	114	228	mg/kg dry	1	1109109-22	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**81.2**	3.48	27.1	mg/kg dry	75000	1109109-22	F109149	1I26007	09/22/11 00:46	EPA 1632	
Inorganic Arsenic	**473**	114	228	mg/kg dry	300000	1109109-22RE1	F109148	1I22023	09/21/11 01:00	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**94.2**	0.1	0.1	% by Weight	1	1109109-22	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP51SB06

Matrix: Soil/Sediment **Laboratory ID:** 1109109-23

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1860	840	1680	mg/kg dry	1	1109109-23	[CALC]	N/A	N/A	EPA 1632	
Arsenite	637	20.5	159	mg/kg dry	300000	1109109-23	F109149	1I26007	09/22/11 00:47	EPA 1632	
Inorganic Arsenic	2500	840	1680	mg/kg dry	1500000	1109109-23	F109148	1I22023	09/21/11 01:01	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	85.7	0.1	0.1	% by Weight	1	1109109-23	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP59SB04

Matrix: Soil/Sediment **Laboratory ID:** 1109109-24

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	3020	813	1630	mg/kg dry	1	1109109-24	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1200 J	19.8	154	mg/kg dry	300000	1109109-24	F109149	1I26007	09/22/11 00:48	EPA 1632	
Inorganic Arsenic	4220	813	1630	mg/kg dry	1500000	1109109-24	F109148	1I22023	09/21/11 01:02	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	91.6	0.1	0.1	% by Weight	1	1109109-24	F109147		09/16/11 15:23	SM 2540B	O-04, O-09

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I22023

Instrument: AAS-1 **Preparation:** Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109145-BLK1	Inorganic Arsenic	0.0003	0.010	mg/kg wet	F109145	09/21/11 00:09	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I22023

Instrument: AAS-1 **Preparation:** Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109148-BLK1	Inorganic Arsenic	0.0009	0.010	mg/kg wet	F109148	09/21/11 00:49	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I24005

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109094-BLK1	Arsenite	0.0009	0.005	mg/kg wet	F109094	09/24/11 00:09	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I25001

Instrument: AAS-1 **Preparation:** Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109093-BLK1	Inorganic Arsenic	-0.00001	0.010	mg/kg wet	F109093	09/23/11 00:09	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I26007

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109146-BLK1	Arsenite	0.002	0.005	mg/kg wet	F109146	09/22/11 00:09	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I26007

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F109149-BLK2	Arsenite	0.002	0.005	mg/kg wet	F109149	09/22/11 00:36	EPA 1632	U

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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-6911.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 1 of 3
Company: Frontier Global Sciences, Inc				Job #: 580-28525-1
Address: 414 Pontius Ave North, ,	Due Date Requested: 9/27/2011			
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.OX70.01	Project #: 58005170			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wastewater, Soil, Groundwater, Sediment, Air)	Field Filtered Sample (Yes/No)	Perform MS/MSD (Yes/No)	SUBCONTRACT As Specified	Total Number of Containers	Special Instructions/Note:
			Preservation Code						
11MP40SB08	8/16/11	15:02 Alaskan		Solid			X	1	
11MP01SB16	8/14/11	11:55 Alaskan		Solid			X	1	
11RD12SD	8/20/11	16:20 Alaskan		Solid			X	1	
11MP23SB20	8/18/11	17:34 Alaskan		Solid			X	1	
11MP28SB06	8/22/11	09:33 Alaskan		Solid			X	1	
11RD13SB06	8/13/11	14:29 Alaskan		Solid			X	1	
11RD13SB14	8/13/11	15:35 Alaskan		Solid			X	1	
11RD13SB18	8/13/11	15:45 Alaskan		Solid			X	1	
11MP19SB04	8/16/11	13:43 Alaskan		Solid			X	1	
11MP32SB06	8/17/11	10:29 Alaskan		Solid			X	1	
11MP29SB16	8/17/11	13:57 Alaskan		Solid			X	1	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Tom [signature]	9/9/11 1100	TA-Sea	[signature]	9/9/11 1282	FGS

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 1.2°C, bottles preprescrved

Frontier Global Sciences, Inc.

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Curtis Armstrong, Project Manager

FRONTIER GLOBAL SCIENCES

414 Pontius Ave North
Seattle, WA 98109
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Fx: 206-622-6870

CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1109109

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-6911.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 2 of 3
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-26525-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001098.0X70.01	Project #: 58005170			
Site:	SSOW#:			Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, s=solid, o=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B_Specialize_As_SUBCONTRACT	Total Number of containers	Special Instructions/Note:
		Preservation Code:							
11RD13SB04	8/13/11	14:25 Alaskan		Solid			X		
11MP11SB04	8/21/11	10:04 Alaskan		Solid			X		
11MP39SB06	8/13/11	09:15 Alaskan		Solid			X		
11RD10SD	8/20/11	16:00 Alaskan		Solid			X		
11MP18SB20	8/15/11	15:57 Alaskan		Solid			X		
11MP60SB14	8/23/11	11:22 Alaskan		Solid			X		
11MP58SB04	8/29/11	09:45 Alaskan		Solid			X		
11MP56SB06	8/29/11	11:00 Alaskan		Solid			X		
11MP52SB06	8/26/11	13:22 Alaskan		Solid			X		
11MP59SB18	8/28/11	19:20 Alaskan		Solid			X		
11MP65SB18	8/29/11	10:30 Alaskan		Solid			X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Tom Hanford	9/9/11 1100			9/9/11 1232	FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Frontier Global Sciences, Inc.

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Curtis Armstrong, Project Manager

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CHAIN OF CUSTODY FORMS

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Phone (253) 922-2310 Fax (253) 922-5047

1109 109

Chain of Custody Record

TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-6911.3
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 3 of 3
Company: Frontier Global Sciences, Inc				Job #: 580-28525-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.0X70.01	Project #: 58005170			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Perform MS/MSD (Yes or No)	SUBCONTRACT As Speciation	Total Number of Containers	Special Instructions/Note:
11MP51SB08	8/24/11	16:48 Alaskan		Solid		X		
11MP59SB04	8/28/11	18:02 Alaskan		Solid		X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Tom [signature]	Date/Time: 9/9/11 1100	Company	Received by: [signature]	Date/Time: 9/9/11 1232	Company: EGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Frontier Global Sciences, Inc.

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Curtis Armstrong, Project Manager

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	Lab Project Number: 1108235
Sampling Dates: 08/03/11 thru 08/11/11	Sample Matrix: Soil/Sediment
Analytical Method: Arsenic Speciation by EPA 1632	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 12/8/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP38SB10	1108235-01
2	11MP36SB04	1108235-02
3	11MP34SB06	1108235-03
4	11RD05SB16	1108235-04
5	11DS01SB06	1108235-05
6	11RD20SB20	1108235-06
7	11RD02SB04	1108235-07
8	11RD03SB06	1108235-08
9	11UP11SB04	1108235-09
10	11SM10SB10	1108235-10
11	11MP41SB06	1108235-11
12	11RS02SB04	1108235-13
13	11SM31SB06	1108235-14
14	11RD05SB18	1108235-15
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- * Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Inorganic arsenic (As), arsenite (As^{+3}), and arsenate (As^{+5}) were analyzed by hydride generation quartz furnace atomic absorption spectrometry, EPA Method 1632.
No sample was received for 11RS01SB04 and for sample 11MP36SB06, the sample ID on the label listed 11MP36SB04 was used.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 0.6°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits generated by the laboratory.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 11MP38SB10 and 11MP41SB06 were used for inorganic arsenic MS/MSD analysis and arsenite MS/MSD analysis. The recovery of arsenite in 11MP41SB06 was outside of control limits and the detected arsenite results in 11MP41SB06, 11RS02SB04, 11SM31SB06, and 11RD05SB18 were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount of arsenite (0.0008 mg/kg in BLK1 and 0.003 mg/kg in BLK2) was detected in the method blanks. Finding does not require qualification since the amount of arsenite detected in the samples were greater than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte (mg/kg)	11RD05SB16	11RD05SB18	RPD (%)
Arsenate	66.9	44.8	40*
Arsenite	0.602	18.0	187*
Inorganic Arsenic	67.5	62.8	7

Comments:

*: The RPDs were outside of control limits (>35%) and the detected arsenite and arsenate results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

Sample 11RD02SB04

Inorganic Arsenic: (133008.828 ug/L) (0.02L/1.459g) (100/87.4) = 2086 ug/g = 2086 mg/kg.
Lab reported 2090 mg/kg.

Arsenite: (46512.091 ug/L) (0.02L/1.459g) (100/87.4) = 729.5 ug/g = 729.5 mg/kg.
Lab reported 730 mg/kg.

Arsenate: (2086 mg/kg) – (729.5 mg/kg) = 1356.5 mg/kg.
Lab reported 1360 mg/kg.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

FRONTIER
GLOBAL SCIENCES

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ANALYTICAL RESULTS

11MP38SB10

Matrix: Soil/Sediment **Laboratory ID:** 1108235-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	2000 J	680	1360	mg/kg dry	1	1108235-01	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1080 J	16.6	129	mg/kg dry	300000	1108235-01	F108293	1I08024	09/08/11 00:13	EPA 1632	
Inorganic Arsenic	3080	680	1360	mg/kg dry	1500000	1108235-01	F108292	1I07002	09/06/11 00:12	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	81.9	0.1	0.1	% by Weight	1	1108235-01	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

12/7/11

Frontier Global Sciences, Inc.

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Kate Haney, Client Services Manager

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ANALYTICAL RESULTS

11MP36SB04

Matrix: Soil/Sediment **Laboratory ID:** 1108235-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	7760 J	897	1790	mg/kg dry	1	1108235-02	[CALC]	N/A	N/A	EPA 1632	
Arsenite	74.6 J	3.65	28.3	mg/kg dry	50000	1108235-02RE1	F108293	1I08024	09/08/11 00:21	EPA 1632	
Inorganic Arsenic	7840	897	1790	mg/kg dry	1500000	1108235-02	F108292	1I07002	09/06/11 00:17	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	78.6	0.1	0.1	% by Weight	1	1108235-02	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

12/7/11

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Fx: 206-622-6870

ANALYTICAL RESULTS

11MP34SB06

Matrix: Soil/Sediment **Laboratory ID:** 1108235-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	4560 J	1030	2060	mg/kg dry	1	1108235-03	[CALC]	N/A	N/A	EPA 1632	
Arsenite	377 J	12.5	97.5	mg/kg dry	150000	1108235-03RE1	F108293	1I08024	09/08/11 00:23	EPA 1632	
Inorganic Arsenic	4930	1030	2060	mg/kg dry	1500000	1108235-03	F108292	1I07002	09/06/11 00:18	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	71.1	0.1	0.1	% by Weight	1	1108235-03	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

12/7/11

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ANALYTICAL RESULTS

11RD05SB16

Matrix: Soil/Sediment **Laboratory ID:** 1108235-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	66.9 J	11.6	23.2	mg/kg dry	1	1108235-04	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.602 J	0.014	0.110	mg/kg dry	300	1108235-04RE2	F108293	1I08024	09/08/11 00:26	EPA 1632	
Inorganic Arsenic	67.5	11.6	23.2	mg/kg dry	30000	1108235-04RE1	F108292	1I07002	09/06/11 00:22	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	88.9	0.1	0.1	% by Weight	1	1108235-04	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11DS01SB06

Matrix: Soil/Sediment **Laboratory ID:** 1108235-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1100 J	337	674	mg/kg dry	1	1108235-05	[CALC]	N/A	N/A	EPA 1632	
Arsenite	11.8 J	0.206	1.60	mg/kg dry	3000	1108235-05RE5	F108293	1I08024	09/08/11 00:36	EPA 1632	
Inorganic Arsenic	1110	337	674	mg/kg dry	600000	1108235-05RE2	F108292	1I07002	09/06/11 00:27	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	88.6	0.1	0.1	% by Weight	1	1108235-05	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD20SB20

Matrix: Soil/Sediment **Laboratory ID:** 1108235-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	50.6 J	43.8	87.6	mg/kg dry	1	1108235-06	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	87.0 J	2.14	16.6	mg/kg dry	30000	1108235-06	F108293	1I08024	09/08/11 00:37	EPA 1632	
Inorganic Arsenic	138	43.8	87.6	mg/kg dry	75000	1108235-06RE1	F108292	1I07002	09/06/11 00:29	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	85.1	0.1	0.1	% by Weight	1	1108235-06	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD02SB04

Matrix: Soil/Sediment **Laboratory ID:** 1108235-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1360 J	588	1180	mg/kg dry	1	1108235-07	[CALC]	N/A	N/A	EPA 1632	
Arsenite	730 J	14.4	112	mg/kg dry	300000	1108235-07	F108293	1I08024	09/08/11 00:38	EPA 1632	
Inorganic Arsenic	2090	588	1180	mg/kg dry	1500000	1108235-07RE1	F108292	1I07002	09/06/11 00:34	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	87.4	0.1	0.1	% by Weight	1	1108235-07	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD03SB06

Matrix: Soil/Sediment **Laboratory ID:** 1108235-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	3350 J	732	1460	mg/kg dry	1	1108235-08	[CALC]	N/A	N/A	EPA 1632	
Arsenite	2200 J	44.6	347	mg/kg dry	750000	1108235-08RE1	F108293	1I08024	09/08/11 00:41	EPA 1632	
Inorganic Arsenic	5550	732	1460	mg/kg dry	1500000	1108235-08RE1	F108292	1I07002	09/06/11 00:37	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	90.3	0.1	0.1	% by Weight	1	1108235-08	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11UP11SB04

Matrix: Soil/Sediment **Laboratory ID:** 1108235-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	9.52 J	4.01	8.02	mg/kg dry	1	1108235-09	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.190 J	0.010	0.076	mg/kg dry	150	1108235-09RE1	F108293	1I08024	09/08/11 00:45	EPA 1632	
Inorganic Arsenic	9.70	4.01	8.02	mg/kg dry	7500	1108235-09RE2	F108292	1I07002	09/06/11 00:40	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	82.2	0.1	0.1	% by Weight	1	1108235-09	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11SM10SB10

Matrix: Soil/Sediment **Laboratory ID:** 1108235-10

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	4120 J	482	964	mg/kg dry	1	1108235-10	[CALC]	N/A	N/A	EPA 1632	
Arsenite	50.9 J	1.18	9.14	mg/kg dry	30000	1108235-10RE2	F108293	1I08024	09/08/11 00:48	EPA 1632	
Inorganic Arsenic	4170	482	964	mg/kg dry	1500000	1108235-10	F108292	1I07002	09/06/11 00:41	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	92.6	0.1	0.1	% by Weight	1	1108235-10	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11MP41SB06

Matrix: Soil/Sediment **Laboratory ID:** 1108235-11

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	10.4 J	2.87	5.75	mg/kg dry	1	1108235-11	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.284 J	0.007	0.054	mg/kg dry	100	1108235-11RE2	F108296	1I08024	09/08/11 00:58	EPA 1632	
Inorganic Arsenic	10.7	2.87	5.75	mg/kg dry	5000	1108235-11RE2	F108295	1I07004	08/30/11 00:28	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	83.6	0.1	0.1	% by Weight	1	1108235-11	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RS02SB04

Matrix: Soil/Sediment **Laboratory ID:** 1108235-13

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	55.2 J	30.8	61.6	mg/kg dry	1	1108235-13	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	16.7 J	0.939	7.30	mg/kg dry	15000	1108235-13	F108296	1I08024	09/08/11 01:01	EPA 1632	
Inorganic Arsenic	71.9	30.8	61.6	mg/kg dry	60000	1108235-13RE1	F108295	1I07004	08/30/11 00:37	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	80.1	0.1	0.1	% by Weight	1	1108235-13	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11SM31SB06

Matrix: Soil/Sediment **Laboratory ID:** 1108235-14

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	468 J	67.2	134	mg/kg dry	1	1108235-14	[CALC]	N/A	N/A	EPA 1632	
Arsenite	8.44 J	0.547	4.25	mg/kg dry	10000	1108235-14RE1	F108296	1I08024	09/08/11 01:03	EPA 1632	
Inorganic Arsenic	476	67.2	134	mg/kg dry	150000	1108235-14RE1	F108295	1I07004	08/30/11 00:40	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	92.0	0.1	0.1	% by Weight	1	1108235-14	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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ANALYTICAL RESULTS

11RD05SB18

Matrix: Soil/Sediment **Laboratory ID:** 1108235-15

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	44.8 J	15.6	31.3	mg/kg dry	1	1108235-15	[CALC]	N/A	N/A	EPA 1632	
Arsenite	18.0 J	0.953	7.41	mg/kg dry	15000	1108235-15	F108296	1I08024	09/08/11 01:04	EPA 1632	
Inorganic Arsenic	62.8	15.6	31.3	mg/kg dry	30000	1108235-15RE1	F108295	1I07004	08/30/11 00:42	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	88.8	0.1	0.1	% by Weight	1	1108235-15	F108294		08/29/11 11:11	SM 2540B	O-04, O-09

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I07002

Instrument: AAS-1 **Preparation:** Leach for As Speciation in Tissue

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F108292-BLK1	Inorganic Arsenic	-0.00009	0.010	mg/kg wet	F108292	09/06/11 00:09	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I07004

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F108295-BLK1	Inorganic Arsenic	-0.0004	0.010	mg/kg wet	F108295	08/30/11 00:23	EPA 1632	U

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I08024

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F108293-BLK1	Arsenite	0.0008	0.0006	mg/kg wet	F108293	09/08/11 00:09	EPA 1632	J

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1I08024

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MDL	Units	Batch	Analyzed	Method	Notes
F108296-BLK2	Arsenite	0.003	0.0006	mg/kg wet	F108296	09/08/11 00:51	EPA 1632	J

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CHAIN OF CUSTODY FORMS

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Chain of Custody Record & Laboratory Analysis Request:
Air, Water, Sediments, Plant and Animal Tissue,
Hydrocarbon & Other Samples

1108235

Page 1 of 2

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Fax: 206-622-6870
Info@FrontierGS.com
http://www.FrontierGS.com

Client: Ecology & Environment	Contact: Bill Richards
Address:	Phone: 206-624-9537
	E-mail: wrichards@ene.com
Project Name: Red Devil Mine	Contract/PO:
Report To:	Invoice To:
Address: per contract	Address: per contract
Phone: Fax:	Phone: Fax:
E-mail:	E-mail:

FGS PM: Kate Haney
Date: 8-18-11
TAT (business days): 20 (std) 15 10 5 4 3 2 24 hrs. (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)
Saturday delivery? ☐ Y ☐ N (If yes, please contact PM)
EDD ☐ Y ☐ N
QA ☐ Standard ☐ High

No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved HNO3 HCl Other	Analyses Requested: Arsenic Speciation						Comments
1		11MP38SB10	1	SS	8/11/11 1450	BL			X						
2		11MP36SB06	1	SS	8/9/11 1534	BL			X						
3		11MP34SB06	1	SS	8/9/11 1607	BL			X						
4		11RD05SB06	1	SS	8/10/11 1854	BL			X						
5		11DS01SB06	1	SS	8/8/11 1559	BL			X						
6		11RD20SB20	1	SS	8/10/11 1626	BL			X						
7		11RD02SB04	1	SS	8/3/11 1450	BL			X						
8		11RD03SB06	1	SS	8/4/11 1145	BL			X						
9		11UP11SB04	1	SS	8/5/11 1537	BL			X						
10		11SM10SB10	1	SS	8/7/11 1851	BL			X						
11		11MP41SB06	1	SS	8/6/11 1526	BL			X						
12		11RS01SB04	1	SS	8/8/11 1122	BL			X						

For Laboratory Use Only		Matrix Codes	Relinquished By:	Received By:	Received By:
COC Seal: Intact	Comments:	FW: Fresh Water		[signature]	
Cooler Temp: 0.6°C	TID 4422	WW: Waste Water	Name:	Name: ALEXA BAHM	Name:
Carrier: FedEx		SB: Sea and Brackish Water	Organization:	Organization: FGS	Organization:
VTSR: 09.41		SS: Soil and Sediment	Date & Time:	Date & Time: 8-18-11 16:24	Date & Time:
# of Coolers: 1 (one)		TS: Plant and Animal Tissue	Tracking number: ~~8557~~ AMB 8758 3877 0582		
		HC: Hydrocarbons			
		TR: Trap			
		OT: Other			

Sample Disposal:
☐ Return (shipping fees may apply)
☒ Standard Disposal – 30 Days after report
☐ Retain for ____ weeks after report (storage fees may apply)

By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analyses.

Customer Approval: [signature] Date: 8/16/11

Frontier Global Sciences, Inc.

[signature]

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CHAIN OF CUSTODY FORMS

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Chain of Custody Record & Laboratory Analysis Request:
Air, Water, Sediments, Plant and Animal Tissue;
Hydrocarbon & Other Samples

1108235

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Client: Ecology & Environment	Contact: Bill Richards		FGS PM:
Address:	Phone: 206-624-9537 Fax:		Date:
	E-mail: wrichards@ene.com		TAT (business days): 20 (std) 15 10 5 4 3 2 24 hrs. (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)
Project Name: Red Devil Mine	Contract/PO:		Saturday delivery? ☐ Y ☐ N (If yes, please contact PM)
Report To:	Invoice To:		EDD ☐ Y ☐ N
Address: per contract	Address: per contract		QA ☐ Standard ☐ High
Phone: Fax:	Phone: Fax:		
E-mail:	E-mail:		

No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Field Filtered	Lab Filtered	Preserved	Analysis Requested: Arsenic Speciation						Comments
1		11RS02SB04	1	SS	8/8/11 0955	BL			X						
2		11SM31SB06	1	SS	8/7/11 0907	BL			X						
3		11RD05SB18	1	SS	8/10/11 1900	BL			X						
4															
5															
6															
7															
8															
9															
10															
11															
12															

For Laboratory Use Only	Matrix Codes	Relinquished By:	Received By:	Received By:
COC Seal: Intact / Not Intact	Comments: FW: Fresh Water; WW: Waste Water; SB: Sea and Brackish Water; SS: Soil and Sediment; TS: Plant and Animal Tissue; HC: Hydrocarbons; IN: Ink; OT: Other			
Cooler Temp: 1.2 - 0.1 = 1.1 °C (Blank)		Name:	Name: ALEXABAHM	Name:
Carrier: FedEx		Organization:	Organization: FGS	Organization:
VTSR: 8/14/11		Date & Time:	Date & Time: 8-18-11 16:24	Date & Time:
No. coolers: 1 (Ice)		Tracking number: 8758 3877 0582		

Sample Disposal:
☐ Return (shipping fees may apply)
☒ Standard Disposal -- 30 Days after report
☐ Retain for ____ weeks after report (storage fees may apply)

By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analyses.

Customer Approval: _____ Date: 8/16/11

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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	Lab Project Number: 1110144
Sampling Dates: 09/22/11 & 09/23/11	Sample Matrix: Soil/Sediment
Analytical Method: Arsenic Speciation by EPA 1632	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 12/8/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11KR15SD	1110144-01
2	11KR14SD	1110144-02
3	11KR12SD	1110144-03
4	11KR01SD	1110144-04
5	11KR71SD	1110144-05
6	11KR09SD	1110144-06
7	11KR08SD	1110144-07
8	11KR06SD	1110144-08
9	11KR05SD	1110144-09
10	11KR17SD	1110144-10
11	11KR16SD	1110144-11
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Inorganic arsenic (As), arsenite (As^{+3}), and arsenate (As^{+5}) were analyzed by hydride generation quartz furnace atomic absorption spectrometry, EPA Method 1632.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 0.6°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits generated by the laboratory.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11KR15SD was used for inorganic arsenic MS/MSD analysis and arsenite MS/MSD analysis. The recoveries of arsenite in MS & MSD were outside of control limits. Qualification was not necessary since the amount of arsenite present in the parent sample was greater than 4X the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte (mg/kg)	11KR01SD	11KR71SD	RPD (%)
Arsenate	16.7	15.4	8
Arsenite	1.10	0.640	53*
Inorganic Arsenic	17.8	16.0	11

Comments:

*: The RPDs was outside of control limits (>35%) and the detected arsenite results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

Sample 11KR15SD

Inorganic Arsenic: (86161.495 ug/L) (0.02L/1.0703g) (100/86.4) = 1863 ug/g = 1863 mg/kg.
Lab reported 1860 mg/kg.

Arsenite: (7034.822 ug/L) (0.02L/1.0703g) (100/86.4) = 152.147 ug/g = 152.147 mg/kg.
Lab reported 152 mg/kg.

Arsenate: (1863 mg/kg) – (152.147 mg/kg) = 1710.853 mg/kg.
Lab reported 1710 mg/kg.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

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ANALYTICAL RESULTS

11KR15SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	1710	324	649	mg/kg dry	1	1110144-01	[CALC]	N/A	N/A	EPA 1632	
Arsenite	152 J	9.89	76.9	mg/kg dry	150000	1110144-01	F110200	1J20019	10/20/11 00:12	EPA 1632	
Inorganic Arsenic	1860	324	649	mg/kg dry	600000	1110144-01	F110198	1J20017	10/19/11 00:25	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	86.4	0.1	0.1	% by Weight	1	1110144-01	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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ANALYTICAL RESULTS

11KR14SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	54.7	20.2	40.4	mg/kg dry	1	1110144-02	[CALC]	N/A	N/A	EPA 1632	
Arsenite	12.7 J	0.820	6.38	mg/kg dry	10000	1110144-02	F110200	1J20019	10/20/11 00:18	EPA 1632	
Inorganic Arsenic	67.4	20.2	40.4	mg/kg dry	30000	1110144-02RE1	F110198	1J20017	10/19/11 00:33	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	71.7	0.1	0.1	% by Weight	1	1110144-02	F110407		11/01/11 14:39	SM 2540B	O-04

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ANALYTICAL RESULTS

11KR12SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	22.3	5.94	11.9	mg/kg dry	1	1110144-03	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1.62 J	0.109	0.845	mg/kg dry	1500	1110144-03RE1	F110200	1J20019	10/20/11 00:22	EPA 1632	
Inorganic Arsenic	24.0	5.94	11.9	mg/kg dry	10000	1110144-03RE1	F110198	1J20017	10/19/11 00:35	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	80.0	0.1	0.1	% by Weight	1	1110144-03	F110407		11/01/11 14:39	SM 2540B	O-04

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ANALYTICAL RESULTS

11KR01SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	16.7	5.31	10.6	mg/kg dry	1	1110144-04	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1.10 J	0.097	0.756	mg/kg dry	1500	1110144-04	F110200	1J20019	10/20/11 00:23	EPA 1632	
Inorganic Arsenic	17.8	5.31	10.6	mg/kg dry	10000	1110144-04RE1	F110198	1J20017	10/19/11 00:37	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	85.8	0.1	0.1	% by Weight	1	1110144-04	F110407		11/01/11 14:39	SM 2540B	O-04

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ANALYTICAL RESULTS

11KR71SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	15.4	5.91	11.8	mg/kg dry	1	1110144-05	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.640 J	0.054	0.420	mg/kg dry	750	1110144-05	F110200	1J20019	10/20/11 00:24	EPA 1632	
Inorganic Arsenic	16.0	5.91	11.8	mg/kg dry	10000	1110144-05	F110198	1J20017	10/19/11 00:38	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	82.0	0.1	0.1	% by Weight	1	1110144-05	F110407		11/01/11 14:39	SM 2540B	O-04

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ANALYTICAL RESULTS

11KR09SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	58.4	20.0	39.9	mg/kg dry	1	1110144-06	[CALC]	N/A	N/A	EPA 1632	
Arsenite	9.75 J	0.812	6.31	mg/kg dry	10000	1110144-06	F110200	1J20019	10/20/11 00:25	EPA 1632	
Inorganic Arsenic	68.2	20.0	39.9	mg/kg dry	30000	1110144-06RE1	F110198	1J20017	10/19/11 00:40	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	70.1	0.1	0.1	% by Weight	1	1110144-06	F110407		11/01/11 14:39	SM 2540B	O-04

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ANALYTICAL RESULTS

11KR08SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**47.5**	21.1	42.2	mg/kg dry	1	1110144-07	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**7.49** J	0.429	3.34	mg/kg dry	5000	1110144-07RE1	F110200	1J20019	10/20/11 00:27	EPA 1632	
Inorganic Arsenic	**55.0**	21.1	42.2	mg/kg dry	30000	1110144-07RE1	F110198	1J20017	10/19/11 00:42	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	**70.3**	0.1	0.1	% by Weight	1	1110144-07	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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ANALYTICAL RESULTS

11KR06SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	20.5	6.73	13.5	mg/kg dry	1	1110144-08	[CALC]	N/A	N/A	EPA 1632	
Arsenite	5.56 J	0.411	3.19	mg/kg dry	5000	1110144-08	F110200	1J20019	10/20/11 00:28	EPA 1632	
Inorganic Arsenic	26.0	6.73	13.5	mg/kg dry	10000	1110144-08RE1	F110198	1J20017	10/19/11 00:46	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	68.7	0.1	0.1	% by Weight	1	1110144-08	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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ANALYTICAL RESULTS

11KR05SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	184	36.5	73.1	mg/kg dry	1	1110144-09	[CALC]	N/A	N/A	EPA 1632	
Arsenite	47.3 J	2.23	17.3	mg/kg dry	30000	1110144-09	F110200	1J20019	10/20/11 00:29	EPA 1632	
Inorganic Arsenic	231	36.5	73.1	mg/kg dry	60000	1110144-09RE1	F110198	1J20017	10/19/11 00:49	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	81.0	0.1	0.1	% by Weight	1	1110144-09	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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ANALYTICAL RESULTS

11KR17SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-10

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	34.5	12.6	25.2	mg/kg dry	1	1110144-10	[CALC]	N/A	N/A	EPA 1632	
Arsenite	5.48 J	0.384	2.99	mg/kg dry	5000	1110144-10	F110200	1J20019	10/20/11 00:30	EPA 1632	
Inorganic Arsenic	39.9	12.6	25.2	mg/kg dry	20000	1110144-10RE1	F110198	1J20017	10/19/11 00:51	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	75.9	0.1	0.1	% by Weight	1	1110144-10	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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ANALYTICAL RESULTS

11KR16SD

Matrix: Soil/Sediment **Laboratory ID:** 1110144-11

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	38.7	12.6	25.2	mg/kg dry	1	1110144-11	[CALC]	N/A	N/A	EPA 1632	
Arsenite	31.8 J	1.54	11.9	mg/kg dry	15000	1110144-11RE1	F110201	1J14014	10/14/11 00:22	EPA 1632	
Inorganic Arsenic	70.5	12.6	25.2	mg/kg dry	15000	1110144-11RE2	F110199	1J13013	10/13/11 00:30	EPA 1632	

Other	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
% Solids	58.7	0.1	0.1	% by Weight	1	1110144-11	F110407		11/01/11 14:39	SM 2540B	O-04

12/8/11

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Curtis Armstrong, Project Manager

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PREPARATION BLANKS

Matrix: Soil/Sediment
Sequence: 1J13013
Instrument: AAS-1
Preparation: Leach for As (V) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F110199-BLK1	Inorganic Arsenic	0.0003	0.010	mg/kg wet	F110199	10/13/11 00:09	EPA 1632	U

12/8/11

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1J14014

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F110201-BLK1	Arsenite	0.002	0.005	mg/kg wet	F110201	10/14/11 00:09	EPA 1632	U

12/8/11

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1J20017

Instrument: AAS-1 **Preparation:** Leach for As (V) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F110198-BLK1	Inorganic Arsenic	0.005	0.010	mg/kg wet	F110198	10/19/11 00:22	EPA 1632	U

12/8/11

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PREPARATION BLANKS

Matrix: Soil/Sediment **Sequence:** 1J20019

Instrument: AAS-1 **Preparation:** Leach for As (III) in Soil/Sediment

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Analyzed	Method	Notes
F110200-BLK1	Arsenite	0.001	0.005	mg/kg wet	F110200	10/20/11 00:09	EPA 1632	U

12/8/11

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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1110144

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-7321.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 1 of 1
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-29194-1
Address: 414 Pontius Ave North,	Due Date Requested: 10/30/2011			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify), Other:
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.0X70.01	Project #: 58005170			
Site:	SSOW#:			

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=soil, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT	Special Instructions/Note:
		Preservation Code:						
11KR16SD	9/23/11	11:00 Pacific		Solid			X	
11KR14SD	9/23/11	11:40 Pacific		Solid			X	
11KR12SD	9/23/11	12:20 Pacific		Solid			X	
11KR01SD	9/23/11	13:00 Pacific		Solid			X	
11KR71SD	9/23/11	13:30 Pacific		Solid			X	
11KR09SD	9/21/11	11:50 Pacific		Solid			X	
11KR08SD	9/22/11	10:15 Pacific		Solid			X	
11KR06SD	9/22/11	11:00 Pacific		Solid			X	
11KR05SD	9/22/11	12:55 Pacific		Solid			X	
11KR17SD	9/22/11	16:45 Pacific		Solid			X	
11KR16SD	9/23/11	16:55 Pacific		Solid			X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: 115960 | Cooler Temperature(s) °C and Other Remarks: 2.0 C

Wilkinson Red @ 2.0°C
COC #1145880 Red @ 2.0°C
Initial

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Curtis Armstrong, Project Manager

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	Lab Project Number: 1109131
Sampling Dates: 08/26/11 thru 8/31/11	Sample Matrix: Water
Analytical Method: Arsenic Speciation by EPA 1632	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/28/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP62GW	1109131-01
2	11MP14GW	1109131-02
3	11MP29GW	1109131-03
4	11MP60GW	1109131-04
5	11MP88GW	1109131-05
6	11MP89GW	1109131-06
7	11MP01GW	1109131-07
8	11MP101GW	1109131-08
9	11MP39GW	1109131-09
10	11RD04SW	1109131-10
11	11RD06SW	1109131-11
12	11RD05GW	1109131-12
13	11UP11SW	1109131-13
14	11RD02SW	1109131-14
15	11RD01SW	1109131-15
16	11MP31GW	1109131-16
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	NO
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Inorganic arsenic (As), arsenite (As^{+3}), and arsenate (As^{+5}) were analyzed by hydride generation quartz furnace atomic absorption spectrometry, EPA Method 1632.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 1°C but samples 11RD04SW, 11RD02SW, and 11RD01SW were analyzed outside the method recommended 28-day holding time and the detected results were qualified as estimated (J).

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 11RD04SW and 11RD02SW were used for inorganic arsenic MS/MSD analysis and the recoveries were within the control limits. Sample 11RD04SW was used for arsenite MS/MSD analysis and the recoveries were outside of control limits. The detected arsenite results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blanks for inorganic arsenic and arsenite at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte (ug/L)	11MP101GW	11MP38GW	RPD (%)
Arsenate	184	188	2
Arsenite	0.962	1.10	13
Inorganic Arsenic	185	189	2

Comments:

*: The RPDs were within the control limits (<20%).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$ug/L = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$mg/kg = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

Sample 11MP60GW

Inorganic Arsenic: (0.0685 ug/L) (15mL/0.05 mL) = 20.55 ug/L.
Lab reported 20.6 ug/L.

Arsenite: (0.026 ug/L) (15mL/0.15mL) = 2.60 ug/L.
Lab reported 2.57 ug/L.

Arsenate: (20.55 ug/L) – (2.60 ug/L) = 17.95 ug/L.
Lab reported 18.0 ug/L.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ Acceptable
__X__ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:
_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

FRONTIER GLOBAL SCIENCES

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ANALYTICAL RESULTS

11MP62GW

Matrix: Water **Laboratory ID:** 1109131-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	6.05	0.300	1.00	µg/L	1	1109131-01	[CALC]	N/A	N/A	EPA 1632	
Arsenite	1.16 J	0.129	0.429	µg/L	42.8571	1109131-01	F109276	1I26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	7.21	0.300	1.00	µg/L	100	1109131-01	F109265	1I26006	09/25/11 09:53	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP14GW

Matrix: Water **Laboratory ID:** 1109131-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**2.61**	2.25	7.50	µg/L	1	1109131-02	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	**89.6** J	1.80	6.00	µg/L	600	1109131-02RE1	F109276	1I26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	**92.2**	2.25	7.50	µg/L	750	1109131-02RE1	F109265	1I26006	09/25/11 09:53	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP29GW

Matrix: Water **Laboratory ID:** 1109131-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**4520**	90.0	300	µg/L	1	1109131-03	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**13.0** J	0.300	1.00	µg/L	100	1109131-03RE1	F109276	I126019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	**4530**	90.0	300	µg/L	30000	1109131-03RE2	F109265	I126006	09/25/11 09:53	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP60GW

Matrix: Water **Laboratory ID:** 1109131-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**18.0**	0.900	3.00	µg/L	1	1109131-04	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**2.57** J	0.300	1.00	µg/L	100	1109131-04	F109276	1I26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	**20.6**	0.900	3.00	µg/L	300	1109131-04	F109266	1I26006	09/25/11 10:08	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP88GW

Matrix: Water **Laboratory ID:** 1109131-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	7.43	0.900	3.00	µg/L	1	1109131-05	[CALC]	N/A	N/A	EPA 1632	
Arsenite	6.75 J	0.300	1.00	µg/L	100	1109131-05	F109276	1I26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	14.2	0.900	3.00	µg/L	300	1109131-05	F109266	1I26006	09/25/11 10:08	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP89GW

Matrix: Water **Laboratory ID:** 1109131-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	5.00	0.900	3.00	µg/L	1	1109131-06	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.420 J	0.045	0.150	µg/L	15	1109131-06RE1	F109276	1I26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	5.42	0.900	3.00	µg/L	300	1109131-06	F109266	1I26006	09/25/11 10:08	EPA 1632	

11/28/11

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Curtis Armstrong, Project Manager

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Seattle, WA 98109
Ph: 206-622-6960
Fx: 206-622-6870

ANALYTICAL RESULTS

11MP01GW

Matrix: Water **Laboratory ID:** 1109131-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**0.161**	0.009	0.030	µg/L	1	1109131-07	[CALC]	N/A	N/A	EPA 1632	
Arsenite	ND	0.003	0.010	µg/L	1	1109131-07	F109276	1I26019	09/26/11 09:29	EPA 1632	U
Inorganic Arsenic	**0.170**	0.009	0.030	µg/L	3	1109131-07RE2	F109266	1I26006	09/25/11 10:08	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP101GW

Matrix: Water **Laboratory ID:** 1109131-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**184**	4.50	15.0	µg/L	1	1109131-08	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.962** J	0.045	0.150	µg/L	15	1109131-08RE1	F109277	I126019	09/26/11 09:41	EPA 1632	
Inorganic Arsenic	**185**	4.50	15.0	µg/L	1500	1109131-08RE1	F109266	I126006	09/25/11 10:08	EPA 1632	

11/28/11

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ANALYTICAL RESULTS

11MP39GW

Matrix: Water **Laboratory ID:** 1109131-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**1640**	45.0	150	µg/L	1	1109131-09	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**5.19** J	0.090	0.300	µg/L	30	1109131-09RE2	F109277	1I26019	09/26/11 09:41	EPA 1632	
Inorganic Arsenic	**1640**	45.0	150	µg/L	15000	1109131-09RE2	F109266	1I26006	09/25/11 10:08	EPA 1632	

9/28/11

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ANALYTICAL RESULTS

11RD04SW

Matrix: Water **Laboratory ID:** 1109131-10

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**8.36** J	0.900	3.00	µg/L	1	1109131-10	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	**0.961** J	0.129	0.429	µg/L	42.8571	1109131-10	F109277	1I26019	09/26/11 09:41	EPA 1632	O-04
Inorganic Arsenic	**9.32** J	0.900	3.00	µg/L	300	1109131-10	F109266	1I26006	09/25/11 10:08	EPA 1632	O-04

11/28/11

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ANALYTICAL RESULTS

11RD06SW

Matrix: Water **Laboratory ID:** 1109131-11

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**55.7**	0.900	3.00	µg/L	1	1109131-11	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	**19.5** J	0.450	1.50	µg/L	150	1109131-11	F109277	1I26019	09/26/11 09:41	EPA 1632	O-04
Inorganic Arsenic	**75.1**	0.900	3.00	µg/L	300	1109131-11	F109266	1I26006	09/25/11 10:08	EPA 1632	O-04

11/28/11

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ANALYTICAL RESULTS

11RD05GW

Matrix: Water **Laboratory ID:** 1109131-12

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**1.70**	0.900	3.00	µg/L	1	1109131-12	[CALC]	N/A	N/A	EPA 1632	J
Arsenite	**5.23** J	0.225	0.750	µg/L	75	1109131-12	F109277	1I26019	09/26/11 09:41	EPA 1632	
Inorganic Arsenic	**6.92**	0.900	3.00	µg/L	300	1109131-12	F109266	1I26006	09/25/11 10:08	EPA 1632	

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ANALYTICAL RESULTS

11UP11GW

Matrix: Water **Laboratory ID:** 1109131-13

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**0.057**	0.003	0.010	µg/L	1	1109131-13	[CALC]	N/A	N/A	EPA 1632	
Arsenite	ND	0.003	0.010	µg/L	1	1109131-13	F109277	1I26019	09/26/11 09:41	EPA 1632	U
Inorganic Arsenic	**0.061**	0.003	0.010	µg/L	1	1109131-13RE2	F109266	1I26006	09/25/11 10:08	EPA 1632	

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ANALYTICAL RESULTS

11RD02SW

Matrix: Water **Laboratory ID:** 1109131-14

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	0.828 J	0.045	0.150	µg/L	1	1109131-14	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	0.089 J	0.015	0.050	µg/L	5	1109131-14	F109277	1I26019	09/26/11 09:41	EPA 1632	O-04
Inorganic Arsenic	0.917 J	0.045	0.150	µg/L	15	1109131-14RE1	F109267	1I26006	09/25/11 10:17	EPA 1632	O-04

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ANALYTICAL RESULTS

11RD01SW

Matrix: Water **Laboratory ID:** 1109131-15

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	0.774 J	0.022	0.075	µg/L	1	1109131-15	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	0.089 J	0.009	0.030	µg/L	3	1109131-15	F109277	1I26019	09/26/11 09:41	EPA 1632	O-04
Inorganic Arsenic	0.863 J	0.022	0.075	µg/L	7.5	1109131-15RE1	F109267	1I26006	09/25/11 10:17	EPA 1632	O-04

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ANALYTICAL RESULTS

11MP31GW

Matrix: Water **Laboratory ID:** 1109131-16

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	0.415	0.022	0.075	µg/L	1	1109131-16	[CALC]	N/A	N/A	EPA 1632	
Arsenite	0.306 J	0.009	0.030	µg/L	3	1109131-16	F109277	1I26019	09/26/11 09:41	EPA 1632	
Inorganic Arsenic	0.721	0.022	0.075	µg/L	7.5	1109131-16RE1	F109267	1I26006	09/25/11 10:17	EPA 1632	

11/28/11

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Curtis Armstrong, Project Manager

09/29/2011

BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I26006
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I26006-CCB1	Inorganic Arsenic	0.0004	0.010	µg/L		EPA 1632
1I26006-CCB2	Inorganic Arsenic	0.00003	0.010	µg/L		EPA 1632
1I26006-CCB3	Inorganic Arsenic	-0.001	0.010	µg/L		EPA 1632
1I26006-CCB4	Inorganic Arsenic	0.0009	0.010	µg/L		EPA 1632
1I26006-CCB5	Inorganic Arsenic	-0.002	0.010	µg/L		EPA 1632
1I26006-CCB6	Inorganic Arsenic	-0.002	0.010	µg/L		EPA 1632
1I26006-ICB1	Inorganic Arsenic	-0.0007	0.010	µg/L		EPA 1632

11/28/11

BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I26019
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I26019-CCB1	Arsenite	0.001	0.010	µg/L		EPA 1632
1I26019-CCB2	Arsenite	0.0006	0.010	µg/L		EPA 1632
1I26019-CCB3	Arsenite	0.00006	0.010	µg/L		EPA 1632
1I26019-CCB4	Arsenite	0.0005	0.010	µg/L		EPA 1632
1I26019-ICB1	Arsenite	0.0007	0.010	µg/L		EPA 1632

11/28/11

FRONTIER GLOBAL SCIENCES

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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1109131

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L.	Carrier Tracking No(s):	COC No: 580-6912.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 1 of 2
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-28527-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.0X70.01	Project #: 58005170			
Site:	SSOW#:			Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	580/CONTRACT As Speciation	Total Number of containers	Special Instructions/Note:
		Preservation Code:							
11MP62GW	8/30/11	15:52 Alaskan		Water			X		
11MP14GW	8/29/11	17:18 Alaskan		Water			X		
11MP29GW	8/30/11	10:52 Alaskan		Water			X		
11MP60GW	8/30/11	17:16 Alaskan		Water			X		
11MP88GW	8/30/11	15:58 Alaskan		Water			X		
11MP89GW	8/30/11	18:40 Alaskan		Water			X		
11MP01GW	8/30/11	09:44 Alaskan		Water			X		
11MP101GW	8/31/11	16:09 Alaskan		Water			X		
11MP39GW	8/31/11	10:29 Alaskan		Water			X		
11RD04SW	8/27/11	10:14 Alaskan		Water			X		
11RD04SW	8/27/11	10:14 Alaskan	MS	Water			X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: Tom Hunt	Date/Time: 9/9/11 1100	Company: TA Sea	Received by: Chris McKellar	Date/Time: 9/9/11 1252	Company: FGS		
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:		
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:		
Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 11.0° bottles preserved				

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CHAIN OF CUSTODY FORMS

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Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1109131

Chain of Custody Record

TestAmerica
THE LEADER in ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-6912.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 2 of 2
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-28527-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify), Other
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.0X70.01	Project #: 58005170			
Site:	SSOW#:			

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT As Speciation	Total Number of containers	Special Instructions/Note:
		Preservation Code:							
11RD05SW	8/26/11	14:57 Alaskan		Water			X		
11RD05GW	8/31/11	16:57 Alaskan		Water			X		
11UP11GW	8/29/11	14:50 Alaskan		Water			X		
11RD02SW	8/27/11	14:29 Alaskan		Water			X		
11RD01SW	8/27/11	14:58 Alaskan		Water			X		
11MP31GW	8/31/11	17:19 Alaskan		Water			X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Tom Hanlon	9/9/11 1100			9/9/11 1232	FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Frontier Global Sciences	Lab Project Number: 1109107
Sampling Dates: 08/27/11 thru 9/1/11	Sample Matrix: Water
Analytical Method: Arsenic Speciation by EPA 1632	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/28/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11RD10SW	1109107-01
2	11RD05SW	1109107-02
3	11RD21GW	1109107-03
4	11RD10GW	1109107-04
5	11MP38GW	1109107-05
6	11RD12SW	1109107-06
7	11RD20SW	1109107-07
8	11MW01GW	1109107-08
9	11MP41GW	1109107-09
10	11MP31GW	1109107-10
11	11MP33GW	1109107-11
12	11RD20GW	1109107-12
13	11RD08SW	1109107-13
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	NO
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Inorganic arsenic (As), arsenite (As^{+3}), and arsenate (As^{+5}) were analyzed by hydride generation quartz furnace atomic absorption spectrometry, EPA Method 1632.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 1.2°C but samples 11RD20SW, 11MW01GW, and 11RD08SW were analyzed outside the method recommended 28-day holding time and the detected results were qualified as estimated (J).

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 11RD10SW and 11RD20SW were used for inorganic arsenic MS/MSD analysis and the recoveries were within the control limits. Samples 11RD10SW and 11MP33GW were used for arsenite MS/MSD analysis and the recovery of arsenite in 11MP33GWMS was outside of control limits. The detected arsenite result in 11MP33GW was qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blanks for inorganic arsenic and arsenite at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte (ug/L)	11RD21GW	11RD20GW	RPD (%)
Arsenate	2.93	4.56	44*
Arsenite	12.6	10.2	21
Inorganic Arsenic	15.6	14.7	6

Analyte (ug/L)	11RD20SW	11RD08SW	RPD (%)
Arsenate	72.8	76.9	5
Arsenite	8.52	10.2	18
Inorganic Arsenic	81.3	87.1	7

Comments:

*: The RPD was outside of control limits (>20%) and the detected arsenate results in 11RD21GW and 11RD20GW were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

Sample 11RD21GW

Inorganic Arsenic: (0.1557 ug/L) (15mL/0.15mL) = 15.57 ug/L.
Lab reported 15.6 ug/L.

Arsenite: (0.126 ug/L) (15mL/0.15mL) = 12.6 ug/L.
Lab reported 12.6 ug/L.

Arsenate: (15.57ug/L) – (12.6 ug/L) = 2.97 ug/L.
Lab reported 2.93 ug/L.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

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ANALYTICAL RESULTS

11RD10SW

Matrix: Water **Laboratory ID:** 1109107-01

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**0.595**	0.129	0.429	µg/L	1	1109107-01	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.227**	0.022	0.075	µg/L	7.5	1109107-01	F109264	1I24006	09/24/11 00:34	EPA 1632	
Inorganic Arsenic	**0.822**	0.129	0.429	µg/L	12.8571	1109107-01RE1	F109261	1I25002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11RD05SW

Matrix: Water **Laboratory ID:** 1109107-02

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**234**	9.00	30.0	µg/L	1	1109107-02	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**510**	9.00	30.0	µg/L	3000	1109107-02	F109264	1I24006	09/24/11 00:37	EPA 1632	
Inorganic Arsenic	**745**	9.00	30.0	µg/L	3000	1109107-02RE1	F109261	1I25002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11RD21GW

Matrix: Water **Laboratory ID:** 1109107-03

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	2.93 J	0.300	1.00	µg/L	1	1109107-03	[CALC]	N/A	N/A	EPA 1632	
Arsenite	12.6	0.300	1.00	µg/L	100	1109107-03	F109264	1I24006	09/24/11 00:38	EPA 1632	
Inorganic Arsenic	15.6	0.300	1.00	µg/L	100	1109107-03	F109261	1I25002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11RD10GW

Matrix: Water **Laboratory ID:** 1109107-04

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**15.2**	0.300	1.00	µg/L	1	1109107-04	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.245**	0.022	0.075	µg/L	7.5	1109107-04RE1	F109264	1I24006	09/24/11 00:40	EPA 1632	
Inorganic Arsenic	**15.4**	0.300	1.00	µg/L	100	1109107-04	F109261	1I25002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11MP38GW

Matrix: Water **Laboratory ID:** 1109107-05

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**188**	9.00	30.0	µg/L	1	1109107-05	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**1.10**	0.022	0.075	µg/L	7.5	1109107-05RE1	F109264	I124006	09/24/11 00:45	EPA 1632	
Inorganic Arsenic	**189**	9.00	30.0	µg/L	3000	1109107-05RE1	F109261	I125002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11RD12SW

Matrix: Water **Laboratory ID:** 1109107-06

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**21.3**	0.300	1.00	µg/L	1	1109107-06	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.714**	0.022	0.075	µg/L	7.5	1109107-06RE1	F109264	1I24006	09/24/11 00:46	EPA 1632	
Inorganic Arsenic	**22.0**	0.300	1.00	µg/L	100	1109107-06	F109261	1I25002	09/23/11 14:03	EPA 1632	

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ANALYTICAL RESULTS

11RD20SW

Matrix: Water **Laboratory ID:** 1109107-07

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	72.8 J	4.50	15.0	µg/L	1	1109107-07	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	8.52 J	0.900	3.00	µg/L	300	1109107-07	F109264	1I24006	09/24/11 00:47	EPA 1632	O-04
Inorganic Arsenic	81.3 J	4.50	15.0	µg/L	1500	1109107-07	F109265	1I26006	09/25/11 09:53	EPA 1632	O-04

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ANALYTICAL RESULTS

11MW01GW

Matrix: Water **Laboratory ID:** 1109107-08

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**1.93** J	0.300	1.00	µg/L	1	1109107-08	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	**1.44** J	0.022	0.075	µg/L	7.5	1109107-08RE1	F109264	1I24006	09/24/11 00:49	EPA 1632	O-04
Inorganic Arsenic	**3.37** J	0.300	1.00	µg/L	100	1109107-08	F109265	1I26006	09/25/11 09:53	EPA 1632	O-04

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ANALYTICAL RESULTS

11MP41GW

Matrix: Water **Laboratory ID:** 1109107-09

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**28.2**	0.900	3.00	µg/L	1	1109107-09	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**10.9**	0.225	0.750	µg/L	75	1109107-09RE1	F109264	1I24006	09/24/11 00:52	EPA 1632	
Inorganic Arsenic	**39.1**	0.900	3.00	µg/L	300	1109107-09	F109265	1I26006	09/25/11 09:53	EPA 1632	

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ANALYTICAL RESULTS

11MP31GW

Matrix: Water **Laboratory ID:** 1109107-10

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**0.546**	0.129	0.429	µg/L	1	1109107-10	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**0.260**	0.045	0.150	µg/L	15	1109107-10RE1	F109264	1I24006	09/24/11 00:54	EPA 1632	
Inorganic Arsenic	**0.806**	0.129	0.429	µg/L	42.85714	1109107-10RE1	F109265	1I26006	09/25/11 09:53	EPA 1632	

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ANALYTICAL RESULTS

11MP33GW

Matrix: Water **Laboratory ID:** 1109107-11

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**3.08**	0.300	1.00	µg/L	1	1109107-11	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**2.07** J	0.129	0.429	µg/L	12.8571	1109107-11	F109276	I126019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	**5.15**	0.300	1.00	µg/L	100	1109107-11	F109265	I126006	09/25/11 09:53	EPA 1632	

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ANALYTICAL RESULTS

11RD20GW

Matrix: Water **Laboratory ID:** 1109107-12

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	**4.56** J	0.300	1.00	µg/L	1	1109107-12	[CALC]	N/A	N/A	EPA 1632	
Arsenite	**10.2**	0.180	0.600	µg/L	60	1109107-12	F109276	II26019	09/26/11 09:29	EPA 1632	
Inorganic Arsenic	**14.7**	0.300	1.00	µg/L	100	1109107-12	F109265	II26006	09/25/11 09:53	EPA 1632	

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ANALYTICAL RESULTS

11RD08SW

Matrix: Water **Laboratory ID:** 1109107-13

Arsenic Species	Result	MDL	MRL	Units	Dilution	Laboratory ID	Batch	Sequence	Analyzed	Method	Notes
Arsenate	76.9 J	2.25	7.50	µg/L	1	1109107-13	[CALC]	N/A	N/A	EPA 1632	O-04
Arsenite	10.2 J	0.900	3.00	µg/L	300	1109107-13	F109276	I126019	09/26/11 09:29	EPA 1632	O-04
Inorganic Arsenic	87.1 J	2.25	7.50	µg/L	750	1109107-13RE1	F109265	I126006	09/25/11 09:53	EPA 1632	O-04

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BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I25002
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I25002-CCB1	Inorganic Arsenic	-0.003	0.010	µg/L		EPA 1632
1I25002-CCB2	Inorganic Arsenic	-0.003	0.010	µg/L		EPA 1632
1I25002-CCB3	Inorganic Arsenic	-0.001	0.010	µg/L		EPA 1632
1I25002-CCB4	Inorganic Arsenic	0.004	0.010	µg/L		EPA 1632
1I25002-ICB1	Inorganic Arsenic	-0.002	0.010	µg/L		EPA 1632

11/28/11

BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I26006
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I26006-CCB1	Inorganic Arsenic	0.0004	0.010	µg/L		EPA 1632
1I26006-CCB2	Inorganic Arsenic	0.00003	0.010	µg/L		EPA 1632
1I26006-CCB3	Inorganic Arsenic	-0.001	0.010	µg/L		EPA 1632
1I26006-CCB4	Inorganic Arsenic	0.0009	0.010	µg/L		EPA 1632
1I26006-CCB5	Inorganic Arsenic	-0.002	0.010	µg/L		EPA 1632
1I26006-CCB6	Inorganic Arsenic	-0.002	0.010	µg/L		EPA 1632
1I26006-ICB1	Inorganic Arsenic	-0.0007	0.010	µg/L		EPA 1632

11/28/11

BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I24006
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I24006-ICB1	Arsenite	0.0008	0.010	µg/L		EPA 1632
1I24006-CCB1	Arsenite	0.002	0.010	µg/L		EPA 1632
1I24006-CCB2	Arsenite	0.003	0.010	µg/L		EPA 1632
1I24006-CCB3	Arsenite	0.002	0.010	µg/L		EPA 1632
1I24006-CCB4	Arsenite	0.001	0.010	µg/L		EPA 1632

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BLANKS
EPA 1632

Laboratory: Frontier Global Sciences, Inc.
SDG:
Client: TestAmerica - Seattle
Instrument ID: AAS-1
Project: Red Devil Mine
Sequence: 1I26019
Calibration: UNASSIGNED

Lab Sample ID	Analyte	Found	MRL	Units	C	Method
1I26019-CCB1	Arsenite	0.001	0.010	µg/L		EPA 1632
1I26019-CCB2	Arsenite	0.0006	0.010	µg/L		EPA 1632
1I26019-CCB3	Arsenite	0.00006	0.010	µg/L		EPA 1632
1I26019-CCB4	Arsenite	0.0005	0.010	µg/L		EPA 1632
1I26019-ICB1	Arsenite	0.0007	0.010	µg/L		EPA 1632

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CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1109107

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L.	Carrier Tracking No(s):	COC No: 580-6910.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 1 of 2
Company: Frontier Global Sciences, Inc		Analysis Requested		Job #: 580-28522-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109	PO #:			
Phone:	WO #:			Other:
Email:	Project #: 58005170			
Project Name: Red Devil Mine, 001096.0X70.01	SSOW#:			
Site:				

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT AS Speciation	Total Number of containers	Special Instructions/Note:
		Preservation Code:							
11RD10SW	8/27/11	11:06 Alaskan		Water			X		
11RD05SW	8/27/11	09:40 Alaskan		Water			X		
11RD21GW	8/31/11	15:31 Alaskan		Water			X		
11RD10GW	8/31/11	18:56 Alaskan		Water			X		
11MP38GW	8/31/11	09:15 Alaskan		Water			X		
11RD12SW	8/27/11	09:14 Alaskan		Water			X		
11RD20SW	8/26/11	16:00 Alaskan		Water			X		
11MW01GW	8/24/11	17:59 Alaskan		Water			X		
11MP41GW	9/1/11	14:30 Alaskan		Water			X		
11MP31GW	8/31/11	17:19 Alaskan		Water			X		
11MP33GW	9/1/11	10:30 Alaskan		Water			X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: Tom Blankenship	Date/Time: 9/9/11 1100	Company: TA Sea	Received by: Chris Mitchell	Date/Time: 9/9/11 1232	Company: FGS		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		
Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 1.2° C, bottles arrived w/ ice				

Frontier Global Sciences, Inc.

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

Curtis Armstrong, Project Manager

FRONTIER GLOBAL SCIENCES

414 Pontius Ave North
Seattle, WA 98109
Ph: 206-622-6960
Fx: 206-622-6870

CHAIN OF CUSTODY FORMS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

1109107

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Torres, Terri L	Carrier Tracking No(s):	COC No: 580-5910.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: terri.torres@testamericainc.com		Page: Page 2 of 2
Company: Frontier Global Sciences, Inc				Job #: 580-28522-1
Address: 414 Pontius Ave North,	Due Date Requested: 9/27/2011			
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98109				
Phone:	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine, 001096.OX70.01	Project #: 58005170			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, AIR)	Field Filtered Sample (Yes or No)	Perform Field Filtered Sample (Yes or No)	SUBCONTRACT As Speciation	Total Number of Containers	Special Instructions/Note:
			Preservation Code:						
11RD20GW	8/31/11	14:20 Alaskan		Water			X	1	
11RD08SW	8/26/11	13:16 Alaskan		Water			X	1	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Tom [signature]	Date/Time: 9/9/11 1100	Company	Received by: [signature]	Date/Time: 9/9/11 1232	Company: FGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Frontier Global Sciences, Inc.

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

Curtis Armstrong, Project Manager

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: ACZ Laboratories, Inc	Lab Project Number: L90363
Sampling Dates: 08/02/2011	Sample Matrix: Soil
Analytical Method: Arsenic Bioavailability	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/18/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP90SS	L90363-01
2	11MP36SS	L90363-02
3	11RD30SS	L90363-03
4	11RD18SS	L90363-04
5	11MP32SS	L90363-05
6	11MP52SS	L90363-06
7	11MP25SS	L90363-07
8	11MP59SS	L90363-08
9	11MP34SS	L90363-09
10	11MP17SS	L90363-10
11	11UP09SS	L90363-11
12	11SM13SS	L90363-12
13	11SM28SS	L90363-13
14	11SM18SS	L90363-14
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Total Arsenic was analyzed by ICP-MS, EPA Method 6020.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria and all samples were received in a cooler with ice and at a temperature of 3.7°C.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

___X___ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of arsenic in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample with Lab ID L90905-01 was used for total As in MS/MSD analysis and the recoveries were within the control limits. Sample 11MP90SS was used for As (IVBA) matrix spike analysis and the recovery was outside of control limits. Qualification was not required since the amount of As (IVBA) present in the parent sample was greater than 4X the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blanks for total As and As (IVBA) at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte	11MP17SS	11MP90SS	RPD (%)
As, total, mg/kg	1480	1490	1
As (IVBA), mg/L	14.60	6.02	83*
As IVBA% (In Vitro RBA), %	98.6	40.4	84*

Comments:

*: The RPDs were outside of control limits (>35%) and the detected As (IVBA) and As IVBA% (In vitro RBA) results were qualified as estimated (J).

Analyte	11RD18SS	11RD30SS	RPD (%)
As, total, mg/kg	20.8	23.1	11
As (IVBA), mg/L	0.0725	0.0835	14
As IVBA% (In Vitro RBA), %	34.9	23.1	41*

Comments:

*: The RPD was outside of control limits (>35%) and the detected As IVBA% (In vitro RBA) results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.
Sample 11MP90SS
Arsenic, Total: (294.7 ug/kg) (5050) = 1488235 ug/kg = 1488.235 mg/kg.
Lab reported 1490 mg/kg.
Arsenic (IVBA): (120.3 ug/L) (50) = 6015 ug/L = 6.015 mg/L.
Lab reported 6.02 mg/L.

Arsenic IVBA%(In Vitro RBA) corresponds to RBAvitro
RBAvitro = (Me/Mt) x 100
Where
Me= mass of metal detected in the extract (mg)
Mt= mass of metal added to the extract (mg)
100= conversion factor to %
For sample 11MP90SS
Me**= 0.602 mg

Mt***= 1.49 mg

RBAvitro = (0.602 mg/1.49 mg) x 100 = 40.4%
Lab reported 40.4%.

**: Me=IVBA x Ve
Where IVBA = In Vitro Bioavailability Assay (IVBA) result in mg/L
Ve= Volume of IVBA extract in L
For sample 11MP90SS
IVBA= 6.02 mg/L
Ve= 0.1L
Me= (6.02mg/L) (0.1L) = 0.602 mg

***: Mt= Tm X Wsx
Where
Tm= concentration of metal observed in the 3050B digestate
Wsx= weight of sample used for IVBA extraction (kg)
For sample 11MP90SS
Tm= 1490 mg/kg
Wsx= 0.001 kg
Mt= (1490 mg/kg) (0.001kg) = 1.49mg

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP90SS

ACZ Sample ID: *L90363-01*
Date Sampled: *08/02/11 12:30*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	6.02	J	*	mg/L	0.03	0.1	10/12/11 9:24	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	40.4	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	1490			mg/Kg	3	10	10/01/11 3:32	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	82.8		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 12:00	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 10:34	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 4:02	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:00	thf

11/18/11

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP36SS

ACZ Sample ID: *L90363-02*
Date Sampled: *08/02/11 11:55*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	7.32	J	*	mg/L	0.03	0.1	10/12/11 9:27	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	19.9	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	3680			mg/Kg	5	20	10/01/11 3:35	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	78.6		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 12:17	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 10:55	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 10:23	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:05	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11RD30SS

ACZ Sample ID: *L90363-03*
Date Sampled: *08/02/11 16:30*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.0835	J (NU)	*	mg/L	0.0005	0.002	10/12/11 9:29	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	36.1	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	23.1			mg/Kg	0.3	1	10/01/11 3:38	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	45.3		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 12:35	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 11:17	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 13:33	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:11	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11RD18SS

ACZ Sample ID: ***L90363-04***
Date Sampled: *08/02/11 16:07*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.0725		*	mg/L	0.0005	0.002	10/12/11 9:31	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	34.9	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	20.8			mg/Kg	0.3	1	10/01/11 3:50	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	54.0		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 12:52	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 11:38	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 16:44	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:17	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP32SS

ACZ Sample ID: *L90363-05*
Date Sampled: *08/02/11 11:35*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	12.90	J	*	mg/L	0.05	0.2	10/12/11 9:37	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	15.2	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	8500			mg/Kg	10	40	10/01/11 3:53	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	77.5		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 13:10	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 12:00	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 19:54	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:23	thf

11/18/11

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP52SS

ACZ Sample ID: ***L90363-06***
Date Sampled: *08/02/11 10:30*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	15.30	J	*	mg/L	0.05	0.2	10/12/11 9:38	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	39.1	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	3910			mg/Kg	5	20	10/01/11 3:56	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	88.0		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 13:28	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 12:21	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/08/11 23:05	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:28	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP25SS

ACZ Sample ID: *L90363-07*
Date Sampled: *08/02/11 12:10*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	30.5	J	*	mg/L	0.1	0.4	10/12/11 9:40	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	47.3	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	6450			mg/Kg	10	40	10/01/11 3:59	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	88.7		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 13:45	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 12:42	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 2:15	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:34	thf

11/18/11

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP59SS

ACZ Sample ID: *L90363-08*
Date Sampled: *08/02/11 11:00*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.695	J	*	mg/L	0.003	0.01	10/12/11 9:42	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	12.9	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	538			mg/Kg	1	4	10/01/11 4:02	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.2		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 14:03	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 13:04	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 8:36	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:40	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP34SS

ACZ Sample ID: ***L90363-09***
Date Sampled: *08/02/11 11:45*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	2.29	J	*	mg/L	0.01	0.04	10/12/11 9:44	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	2.7	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	8270			mg/Kg	10	40	10/01/11 4:05	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	85.1		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 14:21	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 13:25	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 11:46	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:46	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11MP17SS

ACZ Sample ID: ***L90363-10***
Date Sampled: *08/02/11 12:20*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	14.60	J	*	mg/L	0.03	0.1	10/12/11 9:46	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	98.6	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	1480			mg/Kg	3	10	10/01/11 4:08	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	82.6		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 14:38	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 13:47	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 14:57	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:51	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11UP09SS

ACZ Sample ID: *L90363-11*
Date Sampled: *08/02/11 14:50*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.2194	J	*	mg/L	0.0005	0.002	10/12/11 9:48	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	68.1	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	32.2			mg/Kg	0.3	1	10/01/11 4:11	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	51.0		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 14:56	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 14:08	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 18:07	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 9:57	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11SM13SS

ACZ Sample ID: ***L90363-12***
Date Sampled: *08/02/11 13:55*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.4242	J	*	mg/L	0.0005	0.002	10/12/11 9:50	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	7.6	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	558			mg/Kg	1	4	10/01/11 4:15	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	77.9		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 15:14	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 14:30	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/09/11 21:18	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 10:03	thf

11/18/11

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11SM28SS

ACZ Sample ID: ***L90363-13***
Date Sampled: *08/02/11 13:25*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.1963	J	*	mg/L	0.0005	0.002	10/12/11 9:51	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	43.0	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	45.7			mg/Kg	0.3	1	10/01/11 4:18	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	74.9		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 15:31	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 14:51	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/10/11 0:28	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 10:09	thf

11/18/11

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Ecology & Environment, Inc.
Project ID: Red Devil Mine
Sample ID: 11SM18SS

ACZ Sample ID: ***L90363-14***
Date Sampled: *08/02/11 14:27*
Date Received: *09/09/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (IVBA)	M6020 ICP-MS	0.1611	J	*	mg/L	0.0005	0.002	10/12/11 9:59	msh
Arsenic IVBA% (In Vitro RBA)	Calculation (EPA 9200.1-86)	3.9	J		%			10/14/11 14:33	calc
Arsenic, total (3050)	M6020 ICP-MS	407			mg/Kg	1	4	10/01/11 4:27	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	83.5		*	%	0.1	0.5	09/30/11 7:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/23/11 15:49	brd
Digestion - Hot Plate	M3050B ICP							09/29/11 15:12	mss2
In Vitro Bioaccessibility Assay	EPA 9200.1-86			*				10/10/11 3:39	brd
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 10:14	thf

11/18/11

Ecology & Environment, Inc. ACZ Project ID: *L90363*
Project ID: Red Devil Mine

Arsenic (IVBA) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG311262													
WG311262ICV	ICV	10/12/11 9:11	MS111007-2	.05		.05086	mg/L	101.7	90	110			
WG311262ICB	ICB	10/12/11 9:13				U	mg/L		-0.0015	0.0015			
WG311262ICSA	ICSA	10/12/11 9:14				U	mg/L		-0.002	0.002			
WG311262ICSAB	ICSAB	10/12/11 9:16	MS111006-5	.02002		.0204	mg/L	101.9	80	120			
WG311121PBS	PBS	10/12/11 9:20				U	mg/Kg		-0.0015	0.0015			
WG311121LFB	LFB	10/12/11 9:22	SI111005-1	1		1.09	mg/L	109	80	120			
L90363-01MS	MS	10/12/11 9:26	50XRBLP	1	6.02	6.515	mg/Kg	49.5	75	125			M3
WG311262CCV1	CCV	10/12/11 9:33	MS110919-5	.25025		.2438	mg/L	97.4	90	110			
WG311262CCB1	CCB	10/12/11 9:35				U	mg/L		-0.0015	0.0015			
L90363-13SDL	SDL	10/12/11 9:53			.1963	.09945	mg/Kg				49.3	10	ZH
WG311262CCV2	CCV	10/12/11 9:55	MS110919-5	.25025		.2415	mg/L	96.5	90	110			
WG311262CCB2	CCB	10/12/11 9:57				U	mg/L		-0.0015	0.0015			
L90363-14DUP	DUP	10/12/11 10:00			.1611	.1585	mg/Kg				1.6	20	
WG311262CCV3	CCV	10/12/11 10:02	MS110919-5	.25025		.2403	mg/L	96	90	110			
WG311262CCB3	CCB	10/12/11 10:04				U	mg/L		-0.0015	0.0015			

Arsenic, total (3050) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG310663													
WG310663ICV	ICV	10/01/11 3:07	MS110912-5	.05		.04902	mg/L	98	90	110			
WG310663ICB	ICB	10/01/11 3:10				U	mg/L		-0.0015	0.0015			
WG310663ICSA	ICSA	10/01/11 3:13				U	mg/L		-0.002	0.002			
WG310663ICSAB	ICSAB	10/01/11 3:16	MS110913-4	.02002		.02051	mg/L	102.4	80	120			
WG310492PBS	PBS	10/01/11 3:23				U	mg/Kg		-0.9	0.9			
WG310492LCSS	LCSS	10/01/11 3:26	PCN38228	109		99.6	mg/Kg		90.4	128			
WG310492LCSSD	LCSSD	10/01/11 3:29	PCN38228	109		103.4	mg/Kg		90.4	128	3.7	20	
L90363-03SDL	SDL	10/01/11 3:41			23.1	23.85	mg/Kg				3.2	10	
WG310663CCV1	CCV	10/01/11 3:44	MS110919-5	.25025		.2533	mg/L	101.2	90	110			
WG310663CCB1	CCB	10/01/11 3:47				U	mg/L		-0.0015	0.0015			
WG310663CCV2	CCV	10/01/11 4:21	MS110919-5	.25025		.264	mg/L	105.5	90	110			
WG310663CCB2	CCB	10/01/11 4:24				U	mg/L		-0.0015	0.0015			
L90905-01MS	MS	10/01/11 4:33	MS20XSOIL	25.25	4	27.8	mg/Kg	94.3	75	125			
L90905-01MSD	MSD	10/01/11 4:36	MS20XSOIL	25.25	4	26.4	mg/Kg	88.7	75	125	5.17	20	
WG310663CCV3	CCV	10/01/11 4:39	MS110919-5	.25025		.2533	mg/L	101.2	90	110			
WG310663CCB3	CCB	10/01/11 4:42				U	mg/L		-0.0015	0.0015			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG310557													
WG310557PBS	PBS	09/30/11 7:00				U	%		99.9	100.1			
L90363-14DUP	DUP	09/30/11 7:00			83.5	84.25	%				0.9	20	

11/18/11

L90363 Chain of Custody

L90363

ACZ

Client: Ecology and Environment
720 3rd. Avenue, Suite 17
Seattle, WA 98104

Project Manager: Bill Richards (E & E)

CHAIN of CUSTODY

Project: Red Devil Mine

Telephone No. 206-624-9537

Fax No.

Method of Shipment

Cooler # 4J

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Dissolved TAL Metals	SVOC's with TICs	DRO/RRO	TSS/TDS	Inorganic Ions	Carbobate/Bicarbonate	GRO/BTEX	Arsenic Bioavailability						Turn Around Time (working days)
11MP90SS			X					X	8/02/11	1230									X						
11MP36SS			X					X	8/02/11	1155									X						
11RD30SS			X					X	8/02/11	1630									X						
11RD18SS			X					X	8/02/11	1607									X						
11MP32SS			X					X	8/02/11	1135									X						
11MP52SS			X					X	8/02/11	1030									X						
11MP25SS			X					X	8/02/11	1210									X						
11MP59SS			X					X	8/02/11	1100									X						
11MP34SS			X					X	8/02/11	1145									X						
11MP17SS			X					X	8/02/11	1220									X						
11UP09SS			X					X	8/02/11	1450									X						
11SM13SS			X					X	8/02/11	1355									X						
11SM28SS			X					X	8/02/11	1325									X						
11SM18SS			X					X	8/02/11	1427									X						

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

	Date	Time		Date	Time
Relinq. by sampler (Sign & Print Name): Lucas Merk	9/3/11	11 am	Received by (Sign & Print Name):		
Relinquished by: Custody Sealed	9/6/11	14:16	Received by:		
Relinquished by:			Received by:	9-9-11	10:00
Relinquished by:	Date	Time	Received by laboratory:	Date	Time

Lab Work No.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	Lab Project Number: K1108356
Sampling Dates: 08/20/11	Sample Matrix: Tissue
Analytical Method: Arsenic Speciation by EPA 1632	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/30/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11UP04BF	K1108356-008
2		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- NR Matrix Spike recoveries
- NR Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NA
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NA
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable. NA: Not Analyzed

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: All samples were received at 0.1°C and the holding time was met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of inorganic arsenic and arsenite in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS for inorganic arsenic and arsenite were within the control limits generated by the laboratory.

4. MATRIX SPIKE

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: No MS/MSD analysis was performed from this SDG.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blanks for inorganic arsenic and arsenite at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.
The validator contacted the laboratory and verified followings: With the exception of CVAA Hg (7471B), all of the analyses were performed on dried sample (oven dried for ICP/ICP-MS/Se-Hydride, freeze dried for Me-Hg and As speciation) and the reported results were dry weight basis.
Sample 11UP04BF

Inorganic Arsenic: (57.8 ng/g) (1ug/1000 ng) = 0.0578 ug/g.
Lab reported 0.06 ug/g.

Arsenite: (26.7 ng/g) (1 ug/1000 ng) = 0.0267 ug/g.
Lab reported 0.03 ug/g.

Arsenate: (0.0578 ug/g) – (0.0267 ug/g) = 0.0311 ug/g.
Lab reported 0.03 ug/g.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC

criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108356
Project:	Red Devil Mine	**Date Collected:**	08/20/11
Sample Matrix:	Plant tissue	**Date Received:**	09/07/11

Total Metals

Sample Name:	11UP04BF	Units:	ug/g
Lab Code:	K1108356-008	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	Method	1632 Rev. A	0.05	0.02	1	09/23/11	09/24/11	0.03	J
Arsenic (V)	Method	1632 Rev. A	0.05	0.02	1	NA	NA	0.03	J
Inorganic Arsenic	Method	1632 Rev. A	0.04	0.02	1	09/22/11	09/23/11	0.06	

11/30/11

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108356
Project:	Red Devil Mine	**Date Collected:**	NA
Sample Matrix:	Plant tissue	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank	Units:	ug/g
Lab Code:	K1108356-MB3	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	Method	1632 Rev. A	0.05	0.02	1	09/23/11	09/24/11	ND	
Arsenic (V)	Method	1632 Rev. A	0.05	0.02	1	NA	NA	ND	
Inorganic Arsenic	Method	1632 Rev. A	0.04	0.02	1	09/22/11	09/23/11	ND	

4/30/11

Columbia Analytical Services
800.695.7222
www.caslab.com

Client: Ecology and Environment

CHAIN of CUSTODY

Page 1 of 2

Project: Red Devil Mine

Method of Shipment

Project Manager: Ed Wallace (CAS) Bill Richards (E&E)

Telephone No.: (206) 624-9537

Fax No.:

Cooler 45

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Percent Moisture	Methyl Hg	As Speciation												Turn Around Time (working days)
11MP38WS		1				x		x	8/18/11	1728	x	x														
11SM18WS		1				x		x	8/19/11	1812	x	x														
11SM81GA		1				x		x	8/19/11	1928	x	x	x													
11MP27GA		1				x		x	8/19/11	0942	x	x	x													
11SM82WS		1				x		x	8/20/11	1058	x	x	x													
11RD11GA		1				x		x	8/22/11	1207	x	x	x													
11MP20GA		1				x		x	8/19/11	1211	x	x														
11UP04BF		1				x		x	8/20/11	1817	x	x	x	x												
11RD15WS		1				x		x	8/22/11	1739	x	x	x													
11RD18BL		1				x		x	8/23/11	1320	x	x														
11MP38GA		1				x		x	8/18/11	1614	x	x														
11SM07WS		1				x		x	8/20/11	1511	x	x	x													
11UP04BL		1				x		x	8/20/11	1847	x	x	x													
11UP02BL		1				x		x	8/21/11	1017	x	x														

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name) Lucas Meek CO	Date 9/3/11	Time 11am	Received by (Sign & Print Name) Carl Overpeck
Relinquished by Custody Sealed	Date 9/4/11	Time 1400	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory Date 9/7/11 Time 0845

Lab Work No. K1108356

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Brooks Rand Labs	Lab Project Number: 1141007
Sampling Dates: 9/22/11 thru 9/23/11	Sample Matrix: Soil
Analytical Method: Hg SSE by EPA 1631	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 12/5/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11KR15SD	1141007-01
2	11KR14SD	1141007-02
3	11KR12SD	1141007-03
4	11KR08SD	1141007-04
5	11KR17SD	1141007-05
6	11KR16SD	1141007-06
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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- * Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	NO
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Mercury speciation in soil/sediment by 5-Step Extraction per SOP BR-0013 was performed and analyzed by cold vapor atomic fluorescence spectroscopy mercury analyzer.
The extractants used are: De-ionized water (F0 & F1), a synthetic "stomach acid" (F2), 1M KOH (F3), 12M HNO3 (F4), and aqua regia (F5). All samples were analyzed in accordance with EPA Method 1631.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria and all samples were received in a cooler with ice and at a temperature of 2.6°C.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11KR14SD was used for total Hg in MS/MSD analysis and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: Trace amount (0.17 ng/g) of mercury was detected in the BLANK7. Qualification was not required since mercury concentration in the samples was a lot more than 5X the blank concentration. Also, trace amount (0.16 ng/g) of Hg(F2) was detected in the BLANK5 and the detected Hg(F2) results in samples 11KR08SD, 11KR12SD, 11KR16SD, and 11KR17SD were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Value 1 + Value 2

Analyte, ng/g	11KR14SD	11KR14SD DUP	RPD (%)
Hg(F2)	<0.27	<0.27	0
Hg(F3)	121	393	106*
Hg(F4)	63.0	95.74	41*
Hg(F5)	25.4	799	188*

Analyte, ng/g	11KR15SD	11KR15SD DUP	RPD (%)
Hg	218.6	164	29

Analyte, ng/g	1140004-01	1140004-01 DUP	RPD (%)
Hg(F1)	3748	3322	12

Comments:

*: The RPDs were outside of control limits (>35%) and the detected Hg(F3), Hg(F4), and Hg(F5) results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than

50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{\text{(Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)}}{\text{(Initial volume of extract, mL)}}$$

Soil samples:

$$\text{mg/kg} = \frac{\text{(Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)}}{\text{(weight of sample extracted, g)(0.001 kg/g)(fraction solids)}}$$

Comments: Analyte quantitation was acceptable.

Total Hg, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks, 40 mL

A_d – default analyzed volume for the method used for the method blanks, 10 mL

I – aliquot of sample prepared, g.

Sample 11KR08SD, Lab ID 1141007-04
Total Hg: ((1260) (40) (1) / (0.02)) – ((1.483) (40)/ (10)) / (1.03) (1000) = 2446.5 ng/g
(2446.5 ng/g) (100/70.48) = 3471 ng/g. Lab reported 3460 ng/g dry.

Hg SSE – F1 through F5, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks

A_d – default analyzed volume for the method used for the method blanks

I – aliquot of sample prepared, g.

Sample 11MP12SB06, Lab ID 1137002-05
Hg(F1): ((311) (125) (1))/ (25.48)) - ((4.96) (125))/(25) / ((0.399) (1000)) = 3.76 ng/g
(3.76 ng/g) (100/70.48) = 5.33 ng/g dry. Lab reported 5.33 ng/g dry.

Hg(F2): ((26.7) (125) (1))/ (24.99) – ((5.40) (125)/ (25)) / (0.399) (1000) = 0.267 ng/g
(0.267 ng/g) (100/70.48) = 0.378 ng/g dry. Lab reported 0.33 ng/g dry.

Hg(F3): ((316) (125) (1))/ (0.5) – ((7.0225) (125)/ (10) / (0.399) (1000) =197.8 ng/g
(197.8 ng/g) (100/70.48) = 280.6 ng/g dry. Lab reported 280 ng/g dry.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Hg(F4): ((127) (125) (1))/ (0.5) – ((7.02) (125)/ (5)) / (0.399) (1000) = 79.486 ng/g
(79.486 ng/g) (100/70.48) = 112.8 ng/g dry. Lab reported 112 ng/g dry.

Hg(F5): ((1140) (40) (1))/ (0.05) – ((1.8) (40)/ (2)) / (0.399) (1000) = 2285.7 ng/g
(2285.7 ng/g) (100/70.48) = 3243 ng/g dry. Lab reported 3260 ng/g dry.

0. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid. The laboratory compared the sum of the fractions to the total Hg results for all samples and four samples (11KR15SD, 11KR12SD, 11KR17SD, and 11KR16SD produced elevated RPDs (Criteria: RPD≤35%).

Sample ID	Sum of 5-step SSE (ng/g)	Total Hg (ng/g)	RPD (%)
11KR15SD	76179	38700	65*
11KR12SD	207	453	74*
11KR17SD	710	1510	72*
11KR16SD	1667	2550	40*

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

*: Based on this comparison, the F1 through F5 results of these samples were qualified as estimated (J).

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Project ID: COL-KE1101
PM: Tiffany Stilwater

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1141007
Client PM: Ed Wallace
Client PO: K1107701

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11KR08SD										
1141007-04	%TS	Soil	N/A	70.48		0.07	0.24	%	B111646	N/A
1141007-04	Hg	Soil	N/A	3460		131	386	ng/g dry	B111645	1100744
1141007-04	Hg(F1)	Soil	N/A	5.33		0.28	0.70	ng/g dry	B111563	1100760
1141007-04	Hg(F2)	Soil	N/A	0.33	U B	0.28	0.71	ng/g dry	B111564	1100762
1141007-04	Hg(F3)	Soil	N/A	280	J	56.9	142	ng/g dry	B111565	1100775
1141007-04	Hg(F4)	Soil	N/A	112	J	28.4	71.1	ng/g dry	B111566	1100775
1141007-04	Hg(F5)	Soil	N/A	3260	J	45.5	114	ng/g dry	B111567	1100761
11KR12SD										
1141007-03	%TS	Soil	N/A	78.57		0.07	0.24	%	B111646	N/A
1141007-03	Hg	Soil	N/A	453		109	321	ng/g dry	B111645	1100744
1141007-03	Hg(F1)	Soil	N/A	3.35	J	0.23	0.57	ng/g dry	B111563	1100760
1141007-03	Hg(F2)	Soil	N/A	0.51	U B	0.23	0.57	ng/g dry	B111564	1100762
1141007-03	Hg(F3)	Soil	N/A	123	J J	11.5	28.9	ng/g dry	B111565	1100775
1141007-03	Hg(F4)	Soil	N/A	45.7	J J	5.77	14.4	ng/g dry	B111566	1100775
1141007-03	Hg(F5)	Soil	N/A	34.7	J J (MS)	1.85	4.62	ng/g dry	B111567	1100763
11KR14SD										
1141007-02	%TS	Soil	N/A	70.02		0.07	0.24	%	B111646	N/A
1141007-02	Hg	Soil	N/A	219		12.4	36.5	ng/g dry	B111645	1100744
1141007-02	Hg(F1)	Soil	N/A	2.03		0.28	0.69	ng/g dry	B111887	1100820
1141007-02	Hg(F2)	Soil	N/A	0.27	U	0.27	0.66	ng/g dry	B111564	1100762
1141007-02	Hg(F3)	Soil	N/A	121	J M	13.4	33.5	ng/g dry	B111565	1100775
1141007-02	Hg(F4)	Soil	N/A	63.0	J M (MS)	6.71	16.8	ng/g dry	B111566	1100775
1141007-02	Hg(F5)	Soil	N/A	25.4	J M	2.15	5.36	ng/g dry	B111567	1100763
11KR15SD										
1141007-01	%TS	Soil	N/A	87.46		0.07	0.24	%	B111646	N/A
1141007-01	Hg	Soil	N/A	38700		993	2930	ng/g dry	B111645	1100744
1141007-01	Hg(F1)	Soil	N/A	1360	J	5.62	14.0	ng/g dry	B111563	1100760
1141007-01	Hg(F2)	Soil	N/A	48.8	J	0.56	1.40	ng/g dry	B111564	1100762
1141007-01	Hg(F3)	Soil	N/A	4970	J J	449	1120	ng/g dry	B111565	1100775
1141007-01	Hg(F4)	Soil	N/A	14600	J J	225	562	ng/g dry	B111566	1100775
1141007-01	Hg(F5)	Soil	N/A	55200	J J (MS)	899	2250	ng/g dry	B111567	1100761

12/2/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11KR16SD										
1141007-06	%TS	Soil	N/A	58.63		0.07	0.24	%	B111646	N/A
1141007-06	Hg	Soil	N/A	2500		148	437	ng/g dry	B111645	1100744
1141007-06	Hg(F1)	Soil	N/A	8.54	J	0.35	0.89	ng/g dry	B111563	1100760
1141007-06	Hg(F2)	Soil	N/A	0.58	U ~~B~~	0.34	0.86	ng/g dry	B111564	1100762
1141007-06	Hg(F3)	Soil	N/A	880	J J	34.6	86.6	ng/g dry	B111565	1100775
1141007-06	Hg(F4)	Soil	N/A	359	J	17.3	43.3	ng/g dry	B111566	1100775
1141007-06	Hg(F5)	Soil	N/A	419	J	55.4	139	ng/g dry	B111567	1100761
11KR17SD										
1141007-05	%TS	Soil	N/A	77.27		0.07	0.24	%	B111646	N/A
1141007-05	Hg	Soil	N/A	1510		117	346	ng/g dry	B111645	1100744
1141007-05	Hg(F1)	Soil	N/A	7.16	J	0.21	0.53	ng/g dry	B111563	1100760
1141007-05	Hg(F2)	Soil	N/A	0.53	U ~~B~~	0.21	0.53	ng/g dry	B111564	1100762
1141007-05	Hg(F3)	Soil	N/A	361	J	21.6	54.0	ng/g dry	B111565	1100775
1141007-05	Hg(F4)	Soil	N/A	124	J	10.8	27.0	ng/g dry	B111566	1100775
1141007-05	Hg(F5)	Soil	N/A	217	J	34.6	86.5	ng/g dry	B111567	1100761

12/2/11

Project ID: COL-KE1101
PM: Tiffany Stilwater

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1141007
Client PM: Ed Wallace
Client PO: K1107701

Method Blanks & Reporting Limits

Batch: B111645
Matrix: Soil/Sediment
Method: EPA 1631 Appendix
Analyte: Hg

Sample	Result	Units
B111645-BLK5	0.03	ng/g
B111645-BLK6	0.05	ng/g
B111645-BLK7	0.17	ng/g
B111645-BLK8	0.08	ng/g

Average: 0.08 **Standard Deviation:** 0.06 **MDL:** 0.19
Limit: 0.38 **Limit:** 0.13 **MRL:** 0.56

12/2/11

Project ID: COL-KE1101
PM: Tiffany Stilwater

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1141007
Client PM: Ed Wallace
Client PO: K1107701

Method Blanks & Reporting Limits

Batch: B111563
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F1)

Sample	Result	Units
B111563-BLK1	0.02	ng/g
B111563-BLK2	0.09	ng/g
B111563-BLK3	0.08	ng/g
B111563-BLK4	0.06	ng/g

Average: 0.06 **Standard Deviation:** 0.03 **MDL:** 0.20
Limit: 0.40 **Limit:** 0.13 **MRL:** 0.51

12/2/11

Method Blanks & Reporting Limits

Batch: B111564
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F2)

Sample	Result	Units
B111564-BLK2	0.09	ng/g
B111564-BLK3	0.07	ng/g
B111564-BLK4	0.09	ng/g
B111564-BLK5	0.16	ng/g

Average: 0.10 **Standard Deviation:** 0.04 **MDL:** 0.20
Limit: 0.40 **Limit:** 0.13 **MRL:** 0.50

12/2/11

Method Blanks & Reporting Limits

Batch: B111565
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F3)

Sample	Result	Units
B111565-BLK1	0.24	ng/g
B111565-BLK2	0.25	ng/g
B111565-BLK3	0.13	ng/g
B111565-BLK4	0.26	ng/g

Average: 0.22 **Standard Deviation:** 0.06 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

12/2/11

Method Blanks & Reporting Limits

Batch: B111567
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F5)

Sample	Result	Units
B111567-BLK1	0.08	ng/g
B111567-BLK2	0.17	ng/g
B111567-BLK3	0.10	ng/g
B111567-BLK4	0.42	ng/g

Average: 0.19 **Standard Deviation:** 0.16 **MDL:** 0.80
Limit: 1.60 **Limit:** 0.53 **MRL:** 2.00

12/2/11

Method Blanks & Reporting Limits

Batch: B111566
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F4)

Sample	Result	Units
B111566-BLK1	0.30	ng/g
B111566-BLK2	0.35	ng/g
B111566-BLK3	0.16	ng/g
B111566-BLK4	0.91	ng/g

Average: 0.43 **Standard Deviation:** 0.33 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

12/2/11

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace
BRL Report 1141007

1141007

Project Number: K1109283
Project Manager: Ed Wallace

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1109283-001	11KR15SD	1	Soil	9/23/11	1100	Brooks Rand	✓
K1109283-002	11KR14SD	1	Soil	9/23/11	1140	Brooks Rand	✓
K1109283-003	11KR12SD	1	Soil	9/23/11	1220	Brooks Rand	✓
K1109283-012	11KR08SD	1	Soil	9/22/11	1015	Brooks Rand	✓
K1109283-015	11KR17SD	1	Soil	9/22/11	1545	Brooks Rand	✓
K1109283-016	11KR16SD	1	Soil	9/22/11	1655	Brooks Rand	✓

Test Comments
MISC_OUT_1 - None K1109283-001,2,3,12,15,16 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Email 9/30/11

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic (PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: _____ Requested Report Date: 10/16/11	____ I. Results Only ____ II. Results + QC Summaries ____ III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data PQL/MDL/J EDD Y	PO# K1109283 Bill to

Relinquished By: JAW 10/3/11 1130 Received By: 10/4/11 0930 Airbill Number: _____

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	Lab Project Number: K1108356
Sampling Dates: 8/18/11 thru 8/23/11	Sample Matrix: Tissue
Analytical Method: Methyl Hg by EPA 1630M	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/30/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11SM81GA	K1108356-003
2	11MP27GA	K1108356-004
3	11SM82WS	K1108356-005
4	11RD11GA	K1108356-006
5	11UP04BF	K1108356-008
6	11RD14WS	K1108356-009
7	11SM07WS	K1108356-012
8	11UP04BL	K1108356-013
9	11SM11GA	K1108356-017
10	11UP08BL	K1108356-018
11	11RD14BL	K1108356-019
12	11RD18GA	K1108356-021
13	11RD14GA	K1108356-022
14	11RD12WS	K1108356-023
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of methyl mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11SM81GA was used for matrix spike and matrix spike duplicate analysis of methyl Hg and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
__X__ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

	11SM11GA	11SM81GA	RPD (%)
Methyl Mercury, ng/g	<9.7	<9.9	0

Comments: Sample 11SM81GA was a field duplicate of 11SM11GA and the RPD was within the control limit (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Not applicable since no methyl mercury was detected in the samples.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108356
Project:	Red Devil Mine	**Date Collected:**	8/19/2011
Sample Matrix:	Tissue	**Date Received:**	9/7/2011

Methyl Mercury

Prep Method:	CAS SOP	Units:	ng/g
Analysis Method:	CAS SOP	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
11SM81GA	K1108356-003	9.7	3.9	1	10/18/2011	10/19/2011	ND	
11MP27GA	K1108356-004	9.3	3.7	1	10/18/2011	10/19/2011	ND	
11SM82WS	K1108356-005	9.5	3.8	1	10/18/2011	10/19/2011	ND	
11RD11GA	K1108356-006	9.6	3.8	1	10/18/2011	10/19/2011	ND	
11UP04BF	K1108356-008	19.8	7.9	1	10/18/2011	10/19/2011	ND	
11RD14WS	K1108356-009	9.6	3.8	1	10/18/2011	10/19/2011	ND	
11SM07WS	K1108356-012	9.3	3.7	1	10/18/2011	10/19/2011	ND	
11UP04BL	K1108356-013	9.7	3.9	1	10/18/2011	10/19/2011	ND	
11SM11GA	K1108356-017	9.9	4.0	1	10/18/2011	10/19/2011	ND	
11UP08BL	K1108356-018	9.9	4.0	1	10/18/2011	10/19/2011	ND	
11RD14BL	K1108356-019	9.8	3.9	1	10/18/2011	10/19/2011	ND	
11RD18GA	K1108356-021	9.8	3.9	1	10/18/2011	10/19/2011	ND	
11RD14GA	K1108356-022	9.5	3.8	1	10/18/2011	10/19/2011	ND	
11RD12WS	K1108356-023	9.5	3.8	1	10/18/2011	10/19/2011	ND	
Method Blank 1	K1108356-MB1	10	4.0	1	10/18/2011	10/19/2011	ND	
Method Blank 2	K1108356-MB2	10	4.0	1	10/18/2011	10/19/2011	ND	
Method Blank 3	K1108356-MB3	10	4.0	1	10/18/2011	10/19/2011	ND	

11/30/11

Columbia Analytical Services™

800.695.7222
www.caslab.com

Client: Ecology and Environment

CHAIN of CUSTODY

Project: Red Devil Mine

Method of Shipment

Project Manager: Ed Wallace (CAS) Bill Richards (E&E)

Telephone No.: (206) 624-9537

Fax No.:

Cooler 45

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Percent Moisture	Methyl Hg	As Speciation										Turn Around Time (working days)
11UP07BL		1				X		X	8/21/11	1423	X	X												
11MP31WS		1				X		X	8/18/11	1907	X	X												
11SM11GA		1				X		X	8/19/11	1815	X	X	X											
11UP08BL		1				X		X	8/21/11	1600	X	X	X											
11RD14BL		1				X		X	8/22/11	1814	X	X	X											
11RD18WS		1				X		X	8/23/11	1321	X	X												
11RD18GA		1				X		X	8/23/11	1218	X	X	X											
11RD14GA		1				X		X	8/22/11	1717	X	X	X											
11RD12WS		1				X		X	8/22/11	1514	X	X	X											

MARKS 10

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] CAS Date 9/7/11 Time 0845

Lab Work No.

K1108356

Columbia Analytical Services™

800.695.7222
www.caslab.com

Client: Ecology and Environment

CHAIN of CUSTODY

Page 1 of 2

Project: Red Devil Mine

Method of Shipment

Project Manager: Ed Wallace (CAS) Bill Richards (E&E)

Telephone No.: (206) 624-9537

Fax No.:

Cooler 45

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Percent Moisture	Methyl Hg	As Speciation											Turn Around Time (working days)
11MP38WS		1				x		x	8/18/11	1728	x	x													
11SM18WS		1				x		x	8/19/11	1612	x	x													
11SM81GA		1				x		x	8/19/11	1928	x	x	x												
11MP27GA		1				x		x	8/19/11	0942	x	x	x												
11SM82WS		1				x		x	8/20/11	1058	x	x	x												
11RD11GA		1				x		x	8/22/11	1207	x	x	x												
11MP20GA		1				x		x	8/19/11	1211	x	x													
11UP04BF		1				x		x	8/20/11	1817	x	x	x	x											
11RD15WS		1				x		x	8/22/11	1739	x	x	x												
11RD18BL		1				x		x	8/23/11	1320	x	x													
11MP38GA		1				x		x	8/18/11	1614	x	x													
11SM07WS		1				x		x	8/20/11	1511	x	x	x												
11UP04BL		1				x		x	8/20/11	1847	x	x	x												
11UP02BL		1				x		x	8/21/11	1017	x	x													

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

	Date	Time		Lab Work No.
Relinq. by sampler (Sign & Print Name) Lucas Meek CO	9/3/11	1145	Received by (Sign & Print Name) Carl Overpeck	
Relinquished by Custody Sealed	9/4/11	1400	Received by	K1108356
Relinquished by			Received by	
Relinquished by			Received by laboratory CAS	Date 9/7/11 Time 0845

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	Lab Project Number: K1108032
Sampling Dates: 8/20/11	Sample Matrix: Soil
Analytical Method: *PCBs by EPA 8082*	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 12/2/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP82SS	K1108032-001
2	11MP87SS	K1108032-005
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Matrix Spike/Spike Duplicate Recoveries
- X Laboratory Control Sample Recoveries
- X Method Blank Summaries
- X Initial Calibration Data
- X Continuing Calibration Data
- X Surrogate Compound Recovery Summary
- NR DDT and Endrin Degradation Check Data
- NR Internal Standard Area Summary

Sample and Blank Data Package Section

- X Chromatograms
- X Quantitation Reports

Raw QC Data Package Section

- X Quantitation Reports for Standards, LCS, and MS/MSD
- X List of Instrument Detection Limits
- X Chain-of-Custody Records
- X Sample Preparation and Analysis Run Logs

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were reviewed following procedures and limits specified in the EPA OSWER directive, *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures* (EPA/540/G-90/004, OSWER Directive 9360.4-01, dated April 1990).

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Instrument Performance Criteria	YES
3	Initial Calibrations	YES
4	Continuing Calibrations	YES
5	Laboratory Control Sample	YES
6	Matrix Spike/Matrix Spike Duplicate	YES
7	Blanks and Background Samples	YES
8	Surrogate Compounds	YES
9	Internal Standards	N/A
10	Duplicate Analyses	YES
11	Analyte Identification	YES
12	Analyte Quantitation	YES
13	Overall Assessment of Data	YES
14	Usability of Data	YES

Comments: N/A: Not Applicable

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

Water Samples
Extractable analyses: 7 days (from collection) to extraction; 40 days (from extraction) to analysis.
Soil or Other Matrices:
Extractable analyses: 14 days (from collection) to extraction; 40 days (from extraction) to analysis.

Comments: The recently-updated holding time of soil samples for PCB analysis by EPA 8082 is none per USEPA SW-846, Table 4-1 in Chapter 4.

2. INSTRUMENT PERFORMANCE CRITERIA

__N/A__ Raw data has been checked to verify that the DDT retention time is greater than 12 minutes and that there is adequate resolution (>25%) between peaks of the other standard compounds.
__X__ Raw data has been checked to verify that retention time windows are reported and that all standard compounds are within the windows.
__N/A__ Raw data has been checked to verify that the percent breakdown for DDT and endrin does not exceed 20% in the degradation check standard.
__X__ Raw data has been checked to verify that the percent difference in retention time for the surrogate in all standards and samples does not exceed 0.3% (capillary columns) or 1.5% (wide-bore capillary columns).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. INITIAL CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, a 5-point initial calibration was run. In addition, average Relative Response Factor (RRF), and percent relative Standard Deviation (%RSD) values were within control limits (%RSD <= 20). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the low calibration level was not detected, the nondetected results are qualified (UJ).

Comments: PCB 1016/1260 was used for a 5-point initial calibration and percent relative standard deviation values were within the control limits.

4. CONTINUING CALIBRATIONS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, continuing calibrations were performed at the beginning and at the end of any group of samples and at least every 12 hours. In addition, Relative Response Factors (RRF), and Percent Difference (%D) values were within control limits (%D <= 15). For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the %D is very high and indicates a severe loss of instrument sensitivity, the associated nondetected results may be qualified as estimated (UJ) or rejected (R) based on the professional judgement of the reviewer.

Comments: Percent Difference (%D) values were within control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: LCS recoveries for PCB 1016 and PCB 1260 were within control limits generated by the laboratory.

6. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spike/Matrix Spike Duplicates Analyzed

Matrix spike and matrix spike duplicate recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. The RPD between the recoveries is used for a qualitative indication of precision. Spike recovery limits of 80% to 120% are specified in EPA/540/G-90/004. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). At the discretion of the reviewer, other limits may be used only if justification can be provided.

Comments: Sample with Lab ID K1108035-028 was used for MS/MSD analysis and the recoveries of Aroclor 1016 and Aroclor 1260 were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Instrument Blanks
_____ Rinsate Blanks
_____ Background Samples
_____ VOA Trip Blanks

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

8. SURROGATE COMPOUNDS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No surrogates analyzed

Surrogate compound recoveries for samples analyzed within a sample group must be within the limits specified in the method. If the surrogate recovery is between 10% and the lower limit, the associated detected results are qualified as estimated (J) and the nondetected results are qualified as estimated (UJ). If the surrogate recovery is <10%, the associated detected results are qualified as estimated (J) and the nondetected results are rejected (R). If the surrogate recovery is above the upper limit, the associated detected results are qualified as estimated (J). Surrogate recoveries which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms. If there are no limits specified in the method, laboratory limits based on historical performance may be used at the discretion of the reviewer.

Comments: Surrogate recoveries were within the control limits generated by the laboratory.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. INTERNAL STANDARDS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No internal standards analyzed

Internal Standard area counts for samples analyzed within a sample group must be within the range of 50% to 200% of the internal standard area for the continuing calibration. If the internal standard area is between 10% and 50% of this value, the associated detected results are qualified as estimated (J) and the non-detected results are qualified as estimated (UJ). If the internal standard area is <10% of the calibration area, both the detected and non-detected results are rejected (R). If the internal standard area is >200% of the calibration area, the associated detected results are qualified as estimated (J). Internal standards which exceeded these limits are noted below and the associated results are qualified on the attached sample report forms.

Comments: External standards were used.

10. DUPLICATE ANALYSES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the results as estimated (J) for any analyte whose RPD exceeds that specified in the Sampling and Analysis Plan.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: The RPDs of MS&MSD<35%.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. ANALYTE IDENTIFICATION

Verify that positive results have been confirmed on a dissimilar second column, that the sample chromatograms agree with the correct daily standard chromatograms, and that the retention time windows match. When sample results are confirmed by a second column, the relative percent difference (RPD) between the two results is calculated. If the RPD is less than 40% and there is no evidence of chromatographic problems, the higher result is reported. If the RPD is greater than 40%, the chromatogram is checked for anomalies and results are selected based on the best professional judgment of the reviewer. If there is no evidence of any chromatographic problems, the higher result is reported.

Comments: Not applicable.

12. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Extractable analyses, water samples:

ug/L = (analyte area)(amount of external standard, ng)(total volume of extract, uL)
(external standard area)(volume of sample extracted, mL)(injection volume, uL)

Extractable analyses, soil samples:

ug/kg = (analyte area)(amount of external standard, ng)(total volume of extract, uL)
(external standard area)(weight of sample extracted, g)(fraction solids)(injection volume, uL)

Comments: Not applicable since no detection of Aroclors in the samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

13. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ **Acceptable**
_____ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

14. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

15. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data (a qualifiers indicated, and a copy of the chain of custody for the samples.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108032
Project:	Red Devil Mine	**Date Collected:**	08/20/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP82SS	**Units:**	mg/Kg
Lab Code:	K1108032-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1221	ND	U	0.12	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1232	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1242	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1248	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1254	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1260	ND	U	0.060	0.019	1	08/30/11	09/03/11	KWG1108652	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	95	35-133	09/03/11	Acceptable

12/2/11

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108032
Project:	Red Devil Mine	**Date Collected:**	08/20/2011
Sample Matrix:	Soil	**Date Received:**	08/30/2011

Polychlorinated Biphenyls (PCBs)

Sample Name:	11MP87SS	**Units:**	mg/Kg
Lab Code:	K1108032-005	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1221	ND	U	0.12	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1232	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1242	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1248	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1254	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1260	ND	U	0.058	0.019	1	08/30/11	09/03/11	KWG1108652	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	94	35-133	09/03/11	Acceptable

12/2/11

Comments:

Client:	Ecology And Environment, Incorporated	**Service Request:**	K1108032
Project:	Red Devil Mine	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Polychlorinated Biphenyls (PCBs)

Sample Name:	Method Blank	**Units:**	mg/Kg
Lab Code:	KWG1108652-4	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1221	ND	U	0.098	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1232	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1242	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1248	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1254	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	
Aroclor 1260	ND	U	0.049	0.019	1	08/30/11	09/03/11	KWG1108652	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	90	35-133	09/03/11	Acceptable

12/2/11

Comments:

K1108032

Columbia Analytical Services
800.695.7222
www.caslab.com

CHAIN of CUSTODY

Page 1 of 2

Client: Ecology and Environment
720 3rd. Avenue, Suite 17
Seattle, WA 98104

Project: Red Devil Mine

Project Manager: Ed Wallace (CAS) Bill Richards (E & E)

Telephone No. 206-624-9537 Fax No.

Method of Shipment

Special Detection Limit/Reporting

Cooler #11

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	SPLP TAL Metals	SVOC's with TICs	DRO/RRO	PCB's	Mercury SSE	Grainsize	TCLP RCRA Metals	Atterberg Limits	Moisture Content	Methyl Mercury	TOC			Turn Around Time (working days)
11RD11SD		3	X						8/20/11	1610	X		X									X			
11RD12SD		4	X						8/20/11	1620	X					X					X	X			
11MP82SS		1	X						8/20/11	1702					X										
2 11MP17SB04		1	X						8/19/11	1409	X														
3 11MP16SB08		1	X						8/20/11	0921	X														
4 11MP14SB14		1	X						8/20/11	1340	X														
5 11MP87SS		1	X						8/20/11	1650					X										
6 11MP16SB10		1	X						8/20/11	0924	X														
11MP17SB14		1	X						8/19/11	1500						X									
11MP14SB04		1	X						8/20/11	1128						X									
8 11RD10SD		1	X						8/20/11	1600						X									
11MP18SB04		1	X						8/15/11	1446						X									
11MP19SB06		1	X						8/15/11	1345						X			X						
11MP12SB06		1	X						8/21/11	1357						X									

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)
R.J. SEKERKA	8-29-11	1600	Karla Smith 8/30/11 0900
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory

Lab Work No.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	**Lab Project Number: K1108032**
Sampling Dates: 8/19/11 and 8/20/2011	**Sample Matrix: Soil**
Analytical Method: TAL Metals *(EPA 6010B/6020/7471A)*	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song — **Date:** 12/2/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	11MP17SB04	K1108032-002
2	11MP16SB08	K1108032-003
3	11MP14SB14	K1108032-004
4	11MP16SB10	K1108032-006
5		
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20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- X CRDL Standard results
- * Preparation Blank and Calibration Blank results
- X ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- X ICP Serial Dilution results
- X Instrument Detection Limits
- X ICP Interelement Correction Factors
- X ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP82SS was used for Hg MS/MSD analysis and the recoveries were outside of control limits. Qualification was not necessary because the amount of Hg present in the parent sample was greater than four times the amount spiked. Sample 11MP14SB14 was used for MS/MSD analysis and the recoveries of Al, Sb, As, Ca, Fe, and K were outside of control limits. Qualification was not necessary because the amount of these metals present in the parent sample was greater than four times the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The following analytes were detected in the method blank: Finding does not require qualification since the concentration of these metals present in the samples was a lot more than 5x the blank concentration.

Analyte, Total (mg/kg)	Method Blank
Barium	0.034
Chromium	0.09
Iron	1.7
Magnesium	0.05
Nickel	0.07

6. DUPLICATE ANALYSES

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
_____ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for

soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

Comments: No duplicate analysis was performed from this SDG.

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample with Lab ID K1108028-005 was and the percent differences (%D) were within the range.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).
Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Sample 11MP16SB08
Sb: (8.236 ug/L) (0.1 L/2.12 g) (5) (100/87.6)= 2.217 ug/g = 2.217 mg/kg.
Lab reported 2.22 mg/kg.
As: (0.4333 mg/L) (0.1L/2.12 g) (2) (1000g/1kg) (100/87.6) = 46.66 mg/kg.
Lab reported 46.7 mg/kg.
Mg: (9.294 mg/L) (0.1L/2.12 g) (2) (1000g/1kg) (100/87.6) = 1000.9 mg/kg.
Lab reported 1000 mg/kg.
Se: (3.061 ug/L) (0.1 L/1.14 g) (2) (100/87.6) = 0.613 ug/g= 0.613 mg/kg.
Lab reported 0.61 mg/kg.
Hg: (6.58 ug/L) (0.05L/0.58 g) (10) (100/87.6) = 6.475 ug/g= 6.475 mg/kg.
Lab reported 6.50 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

__X__ Acceptable
_____ Acceptable with Qualification
_____ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

_____ ERS Screening
_____ Non-definitive with 10 % Conformation by Definitive Methodology
_____ Definitive, Comprehensive Statistical Error Determination was performed.
__X__ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: The laboratory was requested to double check mercury result in sample 11MP16SB08.

Resolution: Mercury result was changed from 0.625 mg/kg to 6.50 mg/kg and the revised summary data was reported.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108032
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP17SB04 Lab Code: K1108032-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.0	3.6	2.0	09/07/11	09/14/11	4430		
Antimony	6010B	6.0	1.8	2.0	09/07/11	09/14/11	255		N*
Arsenic	6010B	12.0	2.4	2.0	09/07/11	09/14/11	1170		*
Barium	6020A	0.030	0.003	5.0	09/07/11	10/18/11	149		N
Beryllium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.515		
Cadmium	6020A	0.012	0.002	5.0	09/07/11	10/18/11	0.419		*
Calcium	6010B	6.0	1.2	2.0	09/07/11	09/14/11	1430		N
Chromium	6020A	0.12	0.02	5.0	09/07/11	10/18/11	15.0		N*
Cobalt	6020A	0.012	0.002	5.0	09/07/11	10/18/11	15.9		
Copper	6020A	0.06	0.03	5.0	09/07/11	10/18/11	107		N
Iron	6010B	2.4	0.2	2.0	09/07/11	09/14/11	53200		
Lead	6020A	0.030	0.005	5.0	09/07/11	10/18/11	229		N*
Magnesium	6010B	2.40	0.02	2.0	09/07/11	09/14/11	1630		N
Manganese	6010B	1.20	0.02	2.0	09/07/11	09/14/11	1630		
Mercury	7471A	18.0	1.80	1000.0	09/09/11	09/10/11	274		*
Nickel	6020A	0.12	0.02	5.0	09/07/11	10/18/11	49.1		N
Potassium	6010B	48	3.0	2.0	09/07/11	09/14/11	1040		N
Selenium	7742	0.49	0.15	10.0	09/29/11	10/15/11	0.53		
Silver	6020A	0.012	0.005	5.0	09/07/11	09/22/11	0.204		*
Sodium	6010B	12.0	2.4	2.0	09/07/11	09/14/11	38.4		
Thallium	6020A	0.012	0.001	5.0	09/07/11	10/18/11	0.259		
Vanadium	6020A	0.12	0.01	5.0	09/07/11	10/18/11	31.1		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	106		N

% Solids: 87.7

Comments:

12/2/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108032
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP16SB08 Lab Code: K1108032-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	5.4	3.2	2.0	09/07/11	09/14/11	3830		
Antimony	6020A	0.027	0.005	5.0	09/07/11	10/05/11	2.220		*
Arsenic	6010B	10.8	2.2	2.0	09/07/11	09/14/11	46.7		*
Barium	6020A	0.027	0.003	5.0	09/07/11	10/18/11	228		N
Beryllium	6020A	0.011	0.002	5.0	09/07/11	10/18/11	0.566		
Cadmium	6020A	0.011	0.002	5.0	09/07/11	10/18/11	0.720		*
Calcium	6010B	5.4	1.1	2.0	09/07/11	09/14/11	2280		N
Chromium	6020A	0.11	0.02	5.0	09/07/11	10/18/11	16.7		N*
Cobalt	6020A	0.011	0.002	5.0	09/07/11	10/18/11	23.5		
Copper	6020A	0.05	0.03	5.0	09/07/11	10/18/11	67.4		N
Iron	6010B	2.2	0.2	2.0	09/07/11	09/14/11	42200		
Lead	6020A	0.027	0.005	5.0	09/07/11	10/18/11	15.4		N*
Magnesium	6010B	2.15	0.02	2.0	09/07/11	09/14/11	1000		N
Manganese	6010B	1.08	0.02	2.0	09/07/11	09/14/11	1380		
Mercury	7471A	0.198	0.020	10.0	09/09/11	09/10/11	6.50		*
Nickel	6020A	0.11	0.02	5.0	09/07/11	10/18/11	65.0		N
Potassium	6010B	43	2.7	2.0	09/07/11	09/14/11	995		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/06/11	0.61		
Silver	6020A	0.011	0.004	5.0	09/07/11	09/22/11	0.218		*
Sodium	6010B	10.8	2.2	2.0	09/07/11	09/14/11	30.5		
Thallium	6020A	0.011	0.001	5.0	09/07/11	10/18/11	0.096		
Vanadium	6020A	0.11	0.01	5.0	09/07/11	10/18/11	34.8		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	125		N

% Solids: 87.6

Comments:

12/2/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108032
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP14SB14 Lab Code: K1108032-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	7.1	4.3	2.0	09/07/11	09/14/11	5650		
Antimony	6010B	7.1	2.1	2.0	09/07/11	09/14/11	300		N*
Arsenic	6010B	14.2	2.9	2.0	09/07/11	09/14/11	427		*
Barium	6020A	0.035	0.004	5.0	09/07/11	10/18/11	195		N
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.535		
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.572		*
Calcium	6010B	7.1	1.4	2.0	09/07/11	09/14/11	1090		N
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	18.8		N*
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	16.5		
Copper	6020A	0.07	0.04	5.0	09/07/11	10/18/11	50.1		N
Iron	6010B	2.9	0.2	2.0	09/07/11	09/14/11	38200		
Lead	6020A	0.035	0.006	5.0	09/07/11	10/18/11	24.1		N*
Magnesium	6010B	2.85	0.03	2.0	09/07/11	09/14/11	1900		N
Manganese	6010B	1.42	0.03	2.0	09/07/11	09/14/11	885		
Mercury	7471A	1.81	0.181	100.0	09/09/11	09/10/11	70.1		*
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	47.7		N
Potassium	6010B	57	3.6	2.0	09/07/11	09/14/11	1090		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/06/11	0.36		
Silver	6020A	0.014	0.006	5.0	09/07/11	09/22/11	0.161		*
Sodium	6010B	14.2	2.9	2.0	09/07/11	09/14/11	37.0		
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.124		
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	34.1		
Zinc	6020A	0.4	0.1	5.0	09/07/11	10/18/11	99.9		N

% Solids: 87.8

Comments:

12/2/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108032
Project No.:	NA	Date Collected:	08/20/11
Project Name:	Red Devil Mine	Date Received:	08/30/11
Matrix:	SOIL	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP16SB10 Lab Code: K1108032-006

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	6.7	4.0	2.0	09/07/11	09/14/11	4670		
Antimony	6020A	0.034	0.006	5.0	09/07/11	10/05/11	1.150		*
Arsenic	6010B	13.5	2.7	2.0	09/07/11	09/14/11	35.0		*
Barium	6020A	0.034	0.003	5.0	09/07/11	10/18/11	165		N
Beryllium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.581		
Cadmium	6020A	0.014	0.002	5.0	09/07/11	10/18/11	0.578		*
Calcium	6010B	6.7	1.4	2.0	09/07/11	09/14/11	2140		N
Chromium	6020A	0.14	0.02	5.0	09/07/11	10/18/11	14.2		N*
Cobalt	6020A	0.014	0.002	5.0	09/07/11	10/18/11	21.7		
Copper	6020A	0.07	0.03	5.0	09/07/11	10/18/11	68.9		N
Iron	6010B	2.7	0.2	2.0	09/07/11	09/14/11	41400		
Lead	6020A	0.034	0.006	5.0	09/07/11	10/18/11	15.7		N*
Magnesium	6010B	2.69	0.03	2.0	09/07/11	09/14/11	1100		N
Manganese	6010B	1.35	0.03	2.0	09/07/11	09/14/11	1200		
Mercury	7471A	1.71	0.171	100.0	09/09/11	09/10/11	14.9		*
Nickel	6020A	0.14	0.02	5.0	09/07/11	10/18/11	52.4		N
Potassium	6010B	54	3.4	2.0	09/07/11	09/14/11	1180		N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/06/11	0.33		
Silver	6020A	0.013	0.005	5.0	09/07/11	09/22/11	0.209		*
Sodium	6010B	13.5	2.7	2.0	09/07/11	09/14/11	36.6		
Thallium	6020A	0.014	0.001	5.0	09/07/11	10/18/11	0.110		
Vanadium	6020A	0.14	0.01	5.0	09/07/11	10/18/11	32.0		
Zinc	6020A	0.3	0.1	5.0	09/07/11	10/18/11	105		N

% Solids: 86.8

Comments:

12/2/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo Service Request: K1108032

Project No.: NA Date Collected:

Project Name: Red Devil Mine Date Received:

Matrix: SOIL Units: mg/Kg

Basis: DRY

Sample Name: Method Blank Lab Code: K1108032-MB

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	6.0	2.0	09/07/11	09/14/11	6.0	U	
Antimony	6010B	10.0	3.0	2.0	09/07/11	09/14/11	3.0	U	N*
Antimony	6020A	0.050	0.009	5.0	09/07/11	10/05/11	0.009	U	*
Arsenic	6010B	20.0	4.0	2.0	09/07/11	09/14/11	4.0	U	*
Arsenic	6020A	0.50	0.06	5.0	09/07/11	10/18/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	09/07/11	10/18/11	0.034	J	N
Beryllium	6020A	0.020	0.003	5.0	09/07/11	10/18/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	09/07/11	10/18/11	0.003	U	*
Calcium	6010B	10.0	2.0	2.0	09/07/11	09/14/11	2.0	U	N
Chromium	6020A	0.20	0.03	5.0	09/07/11	10/18/11	0.09	J	N*
Cobalt	6020A	0.020	0.003	5.0	09/07/11	10/18/11	0.003	U	
Copper	6020A	0.10	0.05	5.0	09/07/11	10/18/11	0.05	U	N
Iron	6010B	4.0	0.3	2.0	09/07/11	09/14/11	1.7	J	
Lead	6020A	0.050	0.009	5.0	09/07/11	10/18/11	0.009	U	N*
Magnesium	6010B	4.00	0.04	2.0	09/07/11	09/14/11	0.05	J	N
Manganese	6010B	2.00	0.04	2.0	09/07/11	09/14/11	0.04	U	
Mercury	7471A	0.020	0.002	1.0	09/09/11	09/10/11	0.002	U	*
Nickel	6020A	0.20	0.03	5.0	09/07/11	10/18/11	0.07	J	N
Potassium	6010B	80	5.0	2.0	09/07/11	09/14/11	5.0	U	N
Selenium	7742	0.10	0.03	2.0	09/29/11	10/06/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	09/07/11	09/22/11	0.008	U	*
Sodium	6010B	20.0	4.0	2.0	09/07/11	09/14/11	4.0	U	
Thallium	6020A	0.020	0.002	5.0	09/07/11	10/18/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	09/07/11	10/18/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	09/07/11	10/18/11	0.2	U	N

% Solids: 100.0

Comments:

12/2/11

K1108032

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CHAIN of CUSTODY

Page 1 of 2

Client: Ecology and Environment
720 3rd. Avenue, Suite 17
Seattle, WA 98104

Project: Red Devil Mine

Project Manager: Ed Wallace (CAS) Bill Richards (E & E)

Telephone No. 206-624-9537

Fax No.

Method of Shipment

Cooler #11

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	SPLP TAL Metals	SVOC's with TICs	DRO/RRO	PCB's	Mercury SSE	Grainsize	TCLP RCRA Metals	Atterberg Limits	Moisture Content	Methyl Mercury	TOC			Turn Around Time (working days)
11RD11SD		3	X						8/20/11	1610	X		X									X			
11RD12SD		4	X						8/20/11	1620	X					X					X	X			
11MP82SS		1	X						8/20/11	1702					X										
2 11MP17SB04		1	X						8/19/11	1409	X														
3 11MP16SB08		1	X						8/20/11	0921	X														
4 11MP14SB14		1	X						8/20/11	1340	X														
5 11MP87SS		1	X						8/20/11	1650					X										
6 11MP16SB10		1	X						8/20/11	0924	X														
11MP17SB14		1	X						8/19/11	1500						X									
11MP14SB04		1	X						8/20/11	1128						X									
8 11RD10SD		1	X						8/20/11	1600						X									
11MP18SB04		1	X						8/15/11	1448						X									
11MP19SB06		1	X						8/15/11	1345						X			X						
11MP12SB06		1	X						8/21/11	1357						X									

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No Ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)
R.J. SEKERKA	8-29-11	1600	Karla Smith 8/30/11 0900
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

Lab Work No.

9

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Columbia Analytical Services	Lab Project Number: K1108356
Sampling Dates: 8/18/11 thru 8/23/11	Sample Matrix: Tissue
Analytical Method: TAL Metals *(EPA 6010B/6020/7471A)*	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/30/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Lab ID
1	11MP38WS	K1108356-001
2	11SM18WS	K1108356-002
3	11SM81GA	K1108356-003
4	11MP27GA	K1108356-004
5	11SM82WS	K1108356-005
6	11RD11GA	K1108356-006
7	11MP20GA	K1108356-007
8	11UP04BF	K1108356-008
9	11RD14WS	K1108356-009
10	11RD18BL	K1108356-010
11	11MP38GA	K1108356-011
12	11SM07WS	K1108356-012
13	11UP04BL	K1108356-013
14	11UP02BL	K1108356-014
15	11UP07BL	K1108356-015
16	11MP31WS	K1108356-016
17	11SM11GA	K1108356-017
18	11UP08BL	K1108356-018
19	11RD14BL	K1108356-019
20	11RD18WS	K1108356-020
21	11RD18GA	K1108356-021
22	11RD14GA	K1108356-022
23	11RD12WS	K1108356-023

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X — Included: no problems
- * — Included: problems noted in review
- O — Not Included and/or Not Available
- NR — Not Required
- RS — Provided As Re-submission

Case Narrative:

- X — Case Narrative present

Quality Control Summary Package:

- X — Data Summary sheets
- X — Initial and Continuing Calibration results
- X — CRDL Standard results
- * — Preparation Blank and Calibration Blank results
- X — ICP Interference Check Sample results
- * — Matrix Spike recoveries
- * — Matrix Duplicate results
- X — Laboratory Control Sample recoveries
- NR — Method of Standard Additions results
- * — ICP Serial Dilution results
- X — Instrument Detection Limits
- X — ICP Interelement Correction Factors
- X — ICP Linear Ranges
- X — Preparation Log
- X — Analysis Run Log

Raw QC Data Package Section

- X — Chain-of-Custody Records
- X — Instrument Printouts
- X — Sample Preparation Notebook Pages
- X — Logbook and Worksheet Pages
- X — Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	NO
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	NO
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Sample ID 11RD15WS on COC was reported as 11RD14WS since sample ID on the bottle was 11RD14WS.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Method required holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: The LCS percent recoveries were within the control limits.

4. MATRIX SPIKE

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Samples 11MP38WS, 11RD11GA, 11RD14GA were used MS/MSD analysis and the recovery of Hg in 11MP38WSMS, Ca in 11RD11GAMS, and K in 11RD14GAMS were outside of control limits. Qualification was not necessary because the amount of these metals present in the parent sample was greater than four times the amount spiked. Sample 11RD18BL was used for Hg MS/MSD analysis and the recovery was higher than the control limit and the detected Hg result in 11RD18BL was qualified as estimated (J). Sample 11RD12WS was used for MS/MSD analysis and the recovery of Zn was higher than the control limit and the detected Zn result in 11RD12WS was qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

_____ Acceptable
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: The following analytes were detected in the method blanks:

Analyte, Total (mg/kg)	Method Blank 1	Method blank 2
Aluminum	1.6	0.6
Antimony	0.011	0.037
Barium	0.022	0.017
Beryllium	0.004	<0.003
Cadmium	0.003	<0.003
Calcium	6.8	3.6
Cobalt	0.004	<0.003
Iron	0.8	<0.7
Magnesium	3.36	0.46
Manganese	0.16	0.18
Nickel	0.04	0.04
Thallium	0.004	<0.002

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

The detected Al results in 11UP04BF, 11RD14WS, 11SM07WS, 11RD18WS, 11RD18GA, and 11RD14GA were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

The detected Sb results in 11SM82WS, 11RD11GA, 11UP04BF, 11RD14WS, 11UP07BL, 11SM11GA, 11UP08BL, 11RD14BL, 11RD18WS, 11RD18GA, and 11RD12WS were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

The detected Be results in 11MP38WS, 11SM18WS, 11SM81GA, 11MP27GA, 11MP38GA, 11SM07WS, 11UP07BL, 11UP31WS, and 11SM11GA were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration

The detected Cd results in 11MP27GA, 11SM82WS, 11MP38GA, 11RD18GA, 11RD14GA, and 11RD12WS were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration

The detected Co results in 11UP04BF, 11RD18WS, and 11RD12WS were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration

The detected Ni result in 11RD18WS was qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration

The detected Tl results in 11SM18WS, 11SM81GA, 11MP27GA, 11MP20GA, 11UP04BL, 11UP02BL, 11UP07BL, 11MP31WS, and 11SM11GA were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration

6. DUPLICATE ANALYSES

_____ **Acceptable**
__X__ **Acceptable with qualification**
_____ **Unacceptable**
_____ **No Duplicates Analyzed**

Type of duplicates analyzed:
__X__ **Field Duplicates**
_____ **Laboratory Duplicates**

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, Total (mg/kg)	11SM11GA	11SM81GA	RPD (%)
Aluminum	24.2	21.6	11
Antimony	0.171	0.390	78*
Arsenic	<0.06	0.06	Not calculated
Barium	203	187	8
Beryllium	0.004	0.005	22
Cadmium	0.061	0.056	9
Calcium	5980	5330	11
Chromium	<0.2	1.0	*
Cobalt	0.177	0.178	1
Copper	5.59	5.51	1
Iron	18.7	22.4	18
Lead	0.068	0.076	11
Magnesium	630	642	2
Manganese	245	223	9
Nickel	0.96	0.82	16
Potassium	2070	1790	15
Selenium	<0.003	<0.15	Not calculated
Silver	<0.008	<0.016	Not calculated
Sodium	17.0	11.0	43*
Thallium	0.016	0.007	78*
Vanadium	0.07	0.05	33
Zinc	43.4	50.9	16
Mercury	0.036	0.034	6

*: RPD>35%

Comments: Sample 11SM81GA was a field duplicate of 11SM11GA and the detected Sb, Cr, Na, and Tl results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_X_ Acceptable with qualification
_____ Unacceptable
_____ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution: Sample 11MP38WS was used, the percent difference (%D) of Co was outside of range, and the detected Co result was qualified as estimated (J).
Samples 11RD11GA and 11RD14GA were used, the percent difference (%D) of Fe was outside of range, and the detected Fe result was qualified as estimated (J).

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_X_ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable. The validator contacted the laboratory and verified followings: With the exception of CVAA Hg (7471B), all of the analysis were performed on dried sample (oven dried for ICP/ICP-MS/Se-Hydride, freeze dried for Me-Hg and As speciation), so all of the ICP and ICP-MS raw data is on a dry weight basis. Correction for solids from raw data to final dry weight result was only required for Mercury.

Sample 11MP31WS
Sb: (2.51 ug/L) (0.1 L/1.029g) (5) = 1.2196 ug/g = 1.2196 mg/kg.
Lab reported 1.22 mg/kg.
As: (1.486 ug/L) (01L/1.029 g) (5) = 0.722 ug/g = 0.722 mg/kg.
Lab reported 0.71 mg/kg.
Mg: (2.785 ug/mL) (100 mL/1.029 g) (2) = 541.3 ug/g = 541.3 mg/kg.
Lab reported 548 mg/kg.
Ni: (8.6842 ug/L) (0.1 L/1.029g) (5) = 4.22 ug/g= 4.22 mg/kg.
Lab reported 4.28 mg/kg.
Hg: (7.97 ug/L) (0.05L/2.606g) (2) (100/31.7) = 0.9648 ug/g= 0.9648 mg/kg.
Lab reported 0.965 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:

_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate

section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP).*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108356
Project No.:	NA	Date Collected:	08/18/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11MP38WS Lab Code: K1108356-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	10.0	0.4	2.0	10/03/11	10/13/11	52.8		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	15.1	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	11.1		
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	36.2		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.006	J	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.017	J	
Calcium	6010B	10.0	2.0	2.0	10/03/11	10/13/11	4650		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	1.3	J	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.217		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	2.26		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	206		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.128		
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	894		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	162		
Mercury	7471B	0.393	0.039	40.0	09/15/11	09/15/11	5.64		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	4.35		
Potassium	6010B	59.8	19.9	2.0	10/03/11	10/13/11	7000		
Selenium	7742	0.49	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.114		
Sodium	6010B	39.9	4.0	2.0	10/03/11	10/13/11	6.2	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.021	J	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.21		
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	44.7		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/19/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11SM18WS
Lab Code: K1108356-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	8.6		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.573	J	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.13	J	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	85.3		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.015	J	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.043		
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	6610		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.8	J	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.106		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	1.22		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	20.1		
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.034	J	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	600		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	589		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/15/11	0.050		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	6.35		
Potassium	6010B	59.6	19.9	2.0	10/03/11	10/13/11	4500		
Selenium	7742	0.49	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.043		
Sodium	6010B	39.7	4.0	2.0	10/03/11	10/13/11	5.0	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.011	J	U
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	48.5		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/19/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11SM81GA
Lab Code: K1108356-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	21.6		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.390	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	J (MB)	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	187		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.005	B	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.056		
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	5330		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	1.0	J	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.178		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.51		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	22.4		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.076		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	642		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	223		
Mercury	7471B	0.018	0.002	2.0	09/15/11	09/15/11	0.034		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.82		
Potassium	6010B	59.2	19.7	2.0	10/03/11	10/13/11	1790		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.016	J (MB)	
Sodium	6010B	39.4	3.9	2.0	10/03/11	10/13/11	11.0	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.007	J	U
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	J (MB)	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	50.9		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/19/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP27GA
Lab Code: K1108356-004

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	8.4		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	3.350	J	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.43	J	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	51.1		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	J	U MS
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.009	J	U MS
Calcium	6010B	10.0	2.0	2.0	10/03/11	10/13/11	5050		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	1.4	J	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.064		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	4.62		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	34.9		
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.067		
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	871		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	91.2		
Mercury	7471B	0.022	0.002	2.0	09/15/11	09/15/11	0.243		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.72		
Potassium	6010B	59.8	19.9	2.0	10/03/11	10/13/11	2090		
Selenium	7742	0.49	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.8	4.0	2.0	10/03/11	10/13/11	15.4	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.011	J	U MS
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	J	MS
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	42.4		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/20/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11SM82WS
Lab Code: K1108356-005

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	54.0		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.153	U	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	9.63		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.007	J	U
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	3320		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.4	J	J
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.050		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	0.93		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	29.1		
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.009	J	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	783		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	130		
Mercury	7471B	0.021	0.002	2.0	09/08/11	09/16/11	0.030		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.75		
Potassium	6010B	59.5	19.8	2.0	10/03/11	10/13/11	5060		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.7	4.0	2.0	10/03/11	10/13/11	4.1	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	13.9		

Comments:

11/30/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/22/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11RD11GA
Lab Code: K1108356-006

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	8.7		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.139	U (MB)	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.10	U (MB)	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	27.3		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.017	J (MB)	
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	5030		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	1.1	J	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.049		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.51		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	27.9	J (MB)	
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.070		
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	637		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	59.0		
Mercury	7471B	0.018	0.002	2.0	09/08/11	09/16/11	0.056		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.25		
Potassium	6010B	59.4	19.8	2.0	10/03/11	10/13/11	2600		
Selenium	7742	0.49	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.6	4.0	2.0	10/03/11	10/13/11	14.2	J (MB)	
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	J (MB)	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	23.8		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/19/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11MP20GA
Lab Code: K1108356-007

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.2	0.4	2.0	10/03/11	10/13/11	8.0		
Antimony	6020A	0.054	0.010	5.0	10/03/11	10/26/11	1.960	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.26	J	(19)
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	117		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.036		
Calcium	6010B	10.9	2.2	2.0	10/03/11	10/13/11	5350		
Chromium	6010B	0.9	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.148		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	6.28		
Iron	6010B	2.2	0.8	2.0	10/03/11	10/13/11	19.3		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.066		
Magnesium	6010B	0.55	0.07	2.0	10/03/11	10/13/11	537		
Manganese	6010B	0.22	0.02	2.0	10/03/11	10/13/11	602		
Mercury	7471B	0.019	0.002	2.0	09/15/11	09/15/11	0.157		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	2.17		
Potassium	6010B	65.3	21.8	2.0	10/03/11	10/13/11	1680		N
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.022	0.009	5.0	10/03/11	10/26/11	0.193		
Sodium	6010B	43.6	4.4	2.0	10/03/11	10/13/11	12.7	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.008	J	U
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.06	J	(19)
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	43.7		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/20/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11UP04BF
Lab Code: K1108356-008

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	7.7	U (Al)	
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.085	U (Sb)	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.13	J	mg
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	9.03		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.082		
Calcium	6010B	2.0	0.6	2.0	10/03/11	10/13/11	1110		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.013	J	mg
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	2.49		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	10.8		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.032	J	mg
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	582		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	294		
Mercury	7471B	0.088	0.009	2.0	09/08/11	09/16/11	0.026	J	mg N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.53		
Potassium	6010B	59.5	19.8	2.0	10/03/11	10/13/11	5030		
Selenium	7742	1.98	0.59	10.0	09/30/11	10/18/11	0.59	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.7	4.0	2.0	10/03/11	10/13/11	21.8	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.06	J	mg
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	15.7		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/22/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11RD14WS
Lab Code: K1108356-009

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	4.6	U	(UB)
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.083	U	(UB)
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.09	J	UJ
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	46.2		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	6550		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.024		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	1.90		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	15.8		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.021	J	UJ
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	769		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	232		
Mercury	7471B	0.021	0.002	2.0	09/08/11	09/16/11	0.039		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.58		
Potassium	6010B	59.0	19.7	2.0	10/03/11	10/13/11	5310		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.3	3.9	2.0	10/03/11	10/13/11	9.8	J	J (UJ)
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.04	J	UJ
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	46.0		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/23/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11RD18BL
Lab Code: K1108356-010

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	15.0		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.214	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.15	J	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	42.8		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.093		
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	2870		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.021		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.75		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	31.1		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.021	J	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	1360		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	328		
Mercury	7471B	0.025	0.003	2.0	09/08/11	09/16/11	0.039	J	N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.58		
Potassium	6010B	59.4	19.8	2.0	10/03/11	10/13/11	5080		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.6	4.0	2.0	10/03/11	10/13/11	25.3	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.04	J	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	43.3		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/18/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11MP38GA
Lab Code: K1108356-011

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	12.2		
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	2.580	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.35	J	J
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	86.1		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	J	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.010	J	U
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	4650		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.3	J	J
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.267	J	
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.52		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	30.6		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.108		
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	965		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	197		
Mercury	7471B	0.020	0.002	2.0	09/15/11	09/15/11	0.252		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	1.93		
Potassium	6010B	59.6	19.9	2.0	10/03/11	10/13/11	2010		
Selenium	7742	0.49	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.8	4.0	2.0	10/03/11	10/13/11	12.9	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.07	J	J
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	43.5		

Comments:

11/30/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/20/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11SM07WS
Lab Code: K1108356-012

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	7.4	U	
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.226	J	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.31	J	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	57.1		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.004		U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.053		
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	6810		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.7	J	J
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.140		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	2.04		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	29.4		
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.020	J	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	637		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	810		
Mercury	7471B	0.021	0.002	2.0	09/08/11	09/16/11	0.040		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	4.02		
Potassium	6010B	59.5	19.8	2.0	10/03/11	10/13/11	4030		
Selenium	7742	0.50	0.15	10.0	09/30/11	10/18/11	0.15	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.034		
Sodium	6010B	39.7	4.0	2.0	10/03/11	10/13/11	7.1	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	35.6		

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/20/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11UP04BL
Lab Code: K1108356-013

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.9	0.4	2.0	10/03/11	10/13/11	19.5		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.441	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	18.8		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.154		
Calcium	6010B	1.9	0.6	2.0	10/03/11	10/13/11	1660		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.023	U	
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	2.74		
Iron	6010B	1.9	0.7	2.0	10/03/11	10/13/11	13.5		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.022		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	706		
Manganese	6010B	0.19	0.02	2.0	10/03/11	10/13/11	960		
Mercury	7471B	0.020	0.002	2.0	09/08/11	09/16/11	0.025		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.51		
Potassium	6010B	58.3	19.4	2.0	10/03/11	10/13/11	2060		N
Selenium	7742	0.49	0.15	10.0	10/03/11	10/17/11	0.15	U	
Silver	6020A	0.019	0.008	5.0	10/03/11	10/26/11	0.035		
Sodium	6010B	38.9	3.9	2.0	10/03/11	10/13/11	5.0		
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.005		
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03		
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	29.6		

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/21/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11UP02BL
Lab Code: K1108356-014

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.9	0.4	2.0	10/03/11	10/13/11	56.7		
Antimony	6020A	0.048	0.009	5.0	10/03/11	10/26/11	0.225	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	34.4		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.174		
Calcium	6010B	9.7	1.9	2.0	10/03/11	10/13/11	2600		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.041		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.32		
Iron	6010B	1.9	0.7	2.0	10/03/11	10/13/11	30.3		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.032	J mg	
Magnesium	6010B	0.48	0.06	2.0	10/03/11	10/13/11	1030		
Manganese	6010B	0.19	0.02	2.0	10/03/11	10/13/11	1530		
Mercury	7471B	0.021	0.002	2.0	09/08/11	09/16/11	0.023		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	1.68		
Potassium	6010B	58.0	19.3	2.0	10/03/11	10/13/11	3550		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.019	0.008	5.0	10/03/11	10/26/11	0.012	U mg	
Sodium	6010B	38.7	3.9	2.0	10/03/11	10/13/11	7.5	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.012	J	U mg
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03	U mg	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	21.9		N

% Solids: NA

Comments:

11/30/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/21/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11UP07BL
Lab Code: K1108356-015

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	42.2		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.172	U	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.11	J	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	49.4		
Beryllium	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.014	J	U
Cadmium	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.304		
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	2030		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.091		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	7.87		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	26.2		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.078		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	770		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	1120		
Mercury	7471B	0.018	0.002	2.0	09/08/11	09/16/11	0.030		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	1.58		
Potassium	6010B	58.7	19.6	2.0	10/03/11	10/13/11	2670		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.1	3.9	2.0	10/03/11	10/13/11	7.8	J	
Thallium	6020A	0.019	0.002	5.0	10/03/11	10/27/11	0.011	J	U
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.07	J	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	44.0		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/18/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11MP31WS
Lab Code: K1108356-016

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	15.0		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	1.220	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.71		
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	14.4		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.006	~~J~~	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.191		
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	5790		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.258		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	2.41		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	31.8		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.050		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	548		
Manganese	6010B	1.97	0.39	2.0	10/03/11	10/13/11	2990		
Mercury	7471B	0.024	0.002	2.0	09/15/11	09/15/11	0.965		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	4.28		
Potassium	6010B	59.1	19.7	2.0	10/03/11	10/13/11	5700		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.029		
Sodium	6010B	39.4	3.9	2.0	10/03/11	10/13/11	13.9	~~J~~	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.011	~~J~~	U 11/3
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	J 11/3	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	19.4		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108356
Project No.:	NA	Date Collected:	08/19/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11SM11GA Lab Code: K1108356-017

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.9	0.4	2.0	10/03/11	10/13/11	24.2		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.171	U MS	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	203		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.004	~~J~~	U
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.061		
Calcium	6010B	9.7	1.9	2.0	10/03/11	10/13/11	5980		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.177		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.59		
Iron	6010B	1.9	0.7	2.0	10/03/11	10/13/11	18.7		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.068		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	630		
Manganese	6010B	0.19	0.02	2.0	10/03/11	10/13/11	245		
Mercury	7471B	0.024	0.002	2.0	09/15/11	09/15/11	0.036		
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.96		
Potassium	6010B	58.3	19.4	2.0	10/03/11	10/13/11	2070		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.019	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	38.8	3.9	2.0	10/03/11	10/13/11	17.0	~~J~~	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.016	~~J~~	U MS
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.07	~~J~~ MS	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	43.4		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/21/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11UP08BL
Lab Code: K1108356-018

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	28.9		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.110	U	UJ
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.09	~~U~~	UJ
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	48.1		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.192		
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	2150		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.030		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	5.73		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	26.9		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.035	~~U~~	UJ
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	1140		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	1250		
Mercury	7471B	0.020	0.002	2.0	09/08/11	09/16/11	0.044		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	1.00		
Potassium	6010B	58.9	19.6	2.0	10/03/11	10/13/11	3900		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.3	3.9	2.0	10/03/11	10/13/11	7.1	~~U~~	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.04	~~U~~	UJ
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	22.4		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/22/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11RD14BL
Lab Code: K1108356-019

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.9	0.4	2.0	10/03/11	10/13/11	25.4		
Antimony	6020A	0.048	0.009	5.0	10/03/11	10/26/11	0.164	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.13	J	J
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	56.4		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.195		
Calcium	6010B	9.7	1.9	2.0	10/03/11	10/13/11	2290		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.034		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	3.70		
Iron	6010B	1.9	0.7	2.0	10/03/11	10/13/11	37.3		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.041	J	J
Magnesium	6010B	0.48	0.06	2.0	10/03/11	10/13/11	867		
Manganese	6010B	0.19	0.02	2.0	10/03/11	10/13/11	652		
Mercury	7471B	0.022	0.002	2.0	09/08/11	09/16/11	0.050		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.96		
Potassium	6010B	58.0	19.3	2.0	10/03/11	10/13/11	3390		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.019	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	38.6	3.9	2.0	10/03/11	10/13/11	9.5	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	J	J
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	35.8		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/23/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11RD18WS
Lab Code: K1108356-020

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	1.9	0.4	2.0	10/03/11	10/13/11	4.0	U	
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.104	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	80.4		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Calcium	6010B	9.7	1.9	2.0	10/03/11	10/13/11	7590		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.019	J	U
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	1.61		
Iron	6010B	1.9	0.7	2.0	10/03/11	10/13/11	25.2		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.015	J	
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	596		
Manganese	6010B	0.19	0.02	2.0	10/03/11	10/13/11	135		
Mercury	7471B	0.023	0.002	2.0	09/08/11	09/16/11	0.036		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.18	J	U
Potassium	6010B	58.3	19.4	2.0	10/03/11	10/13/11	4530		N
Selenium	7742	0.48	0.15	10.0	10/03/11	10/17/11	0.15	U	
Silver	6020A	0.019	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	38.8	3.9	2.0	10/03/11	10/13/11	6.4	J	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03	J	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	23.3		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Ecology And Environment, Incorpo	Service Request:	K1108356
Project No.:	NA	Date Collected:	08/23/11
Project Name:	Red Devil Mine	Date Received:	09/07/11
Matrix:	PLANT TISSUE	Units:	mg/Kg
		Basis:	DRY

Sample Name: 11RD18GA Lab Code: K1108356-021

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	3.8		
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.116	J	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	~~J~~	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	28.4		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.009	~~J~~	U
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	3790		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.051		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	6.19		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	14.9		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.034	~~J~~	
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	571		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	75.1		
Mercury	7471B	0.022	0.002	2.0	09/08/11	09/16/11	0.014	J	N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.32		
Potassium	6010B	58.9	19.6	2.0	10/03/11	10/13/11	2760		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.3	3.9	2.0	10/03/11	10/13/11	13.3	~~J~~	J
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.04	~~J~~	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	22.5		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Project No.: NA
Project Name: Red Devil Mine
Matrix: PLANT TISSUE

Service Request: K1108356
Date Collected: 08/22/11
Date Received: 09/07/11
Units: mg/Kg
Basis: DRY

Sample Name: 11RD14GA
Lab Code: K1108356-022

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	7.2	U (a)	
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.225	U (a)	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	34.0		
Beryllium	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.018	~~J~~	U M
Calcium	6010B	9.8	2.0	2.0	10/03/11	10/13/11	5070		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.019	0.003	5.0	10/03/11	10/27/11	0.079		
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	6.40		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	22.5	J (a)	
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.058		
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	637		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	94.7		
Mercury	7471B	0.023	0.002	2.0	09/08/11	09/16/11	0.014	~~J~~	N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.25		
Potassium	6010B	58.7	19.6	2.0	10/03/11	10/13/11	2120		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.1	3.9	2.0	10/03/11	10/13/11	51.3	J	
Thallium	6020A	0.019	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.05	~~J~~ M	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	26.9		N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected: 08/22/11
Project Name: Red Devil Mine
Date Received: 09/07/11
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: 11RD12WS
Lab Code: K1108356-023

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	2.3	U (ub)	
Antimony	6020A	0.049	0.009	5.0	10/03/11	10/26/11	0.101	U ub	
Arsenic	6020A	0.49	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.049	0.005	5.0	10/03/11	10/27/11	51.9		
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.005	J	U ub
Calcium	6010B	9.9	2.0	2.0	10/03/11	10/13/11	5320		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.017	J	U ub
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	1.54		
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	19.3		
Lead	6020A	0.049	0.009	5.0	10/03/11	10/27/11	0.019	J mg	
Magnesium	6010B	0.49	0.06	2.0	10/03/11	10/13/11	847		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	162		
Mercury	7471B	0.021	0.002	2.0	09/08/11	09/16/11	0.027		N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.29		
Potassium	6010B	59.2	19.7	2.0	10/03/11	10/13/11	4060		N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	39.4	3.9	2.0	10/03/11	10/13/11	7.9	J (mg)	J.
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.03	J (ub)	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	54.8	J (ub)	N

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo
Service Request: K1108356
Project No.: NA
Date Collected:
Project Name: Red Devil Mine
Date Received:
Matrix: PLANT TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank
Lab Code: K1108356-MB1

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/14/11	1.6	J	
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.011	J	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	0.022	J	
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.004	J	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	J	
Calcium	6010B	2.0	0.6	2.0	10/03/11	10/13/11	6.8		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.004	J	
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	0.05	U	
Iron	6010B	2.0	0.7	2.0	10/03/11	10/14/11	0.8	J	
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.009	U	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	3.36		
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	0.16	J	
Mercury	7471B	0.040	0.004	2.0	09/15/11	09/15/11	0.004	U	
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.04	J	
Potassium	6010B	60.0	20.0	2.0	10/03/11	10/13/11	20.0	U	
Selenium	7742	0.10	0.03	2.0	09/30/11	10/18/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	10/03/11	10/13/11	4.0	U	
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.004	J	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	0.2	U	

% Solids: NA

Comments:

11/30/11

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Ecology And Environment, Incorpo Service Request: K1108356

Project No.: NA Date Collected:

Project Name: Red Devil Mine Date Received:

Matrix: PLANT TISSUE Units: mg/Kg

Basis: DRY

Sample Name: Method Blank Lab Code: K1108356-MB2

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Aluminum	6010B	2.0	0.4	2.0	10/03/11	10/13/11	0.6	J	
Antimony	6020A	0.050	0.009	5.0	10/03/11	10/26/11	0.037	J	
Arsenic	6020A	0.50	0.06	5.0	10/03/11	10/27/11	0.06	U	
Barium	6020A	0.050	0.005	5.0	10/03/11	10/27/11	0.017	J	
Beryllium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Cadmium	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Calcium	6010B	2.0	0.6	2.0	10/03/11	10/13/11	3.6		
Chromium	6010B	0.8	0.2	2.0	10/03/11	10/13/11	0.2	U	
Cobalt	6020A	0.020	0.003	5.0	10/03/11	10/27/11	0.003	U	
Copper	6020A	0.10	0.05	5.0	10/03/11	10/27/11	0.05	U	
Iron	6010B	2.0	0.7	2.0	10/03/11	10/13/11	0.7	U	
Lead	6020A	0.050	0.009	5.0	10/03/11	10/27/11	0.009	U	
Magnesium	6010B	0.50	0.06	2.0	10/03/11	10/13/11	0.46	J	
Manganese	6010B	0.20	0.02	2.0	10/03/11	10/13/11	0.18	J	
Mercury	7471B	0.040	0.004	2.0	09/08/11	09/16/11	0.004	U	N*
Nickel	6020A	0.20	0.03	5.0	10/03/11	10/27/11	0.04	J	
Potassium	6010B	60.0	20.0	2.0	10/03/11	10/13/11	20.0	U	N
Selenium	7742	0.10	0.03	2.0	10/03/11	10/17/11	0.03	U	
Silver	6020A	0.020	0.008	5.0	10/03/11	10/26/11	0.008	U	
Sodium	6010B	40.0	4.0	2.0	10/03/11	10/13/11	4.0	U	
Thallium	6020A	0.020	0.002	5.0	10/03/11	10/27/11	0.002	U	
Vanadium	6020A	0.20	0.02	5.0	10/03/11	10/27/11	0.02	U	
Zinc	6020A	0.5	0.2	5.0	10/03/11	10/27/11	0.2	U	N

% Solids: NA

Comments:

11/30/11

Columbia Analytical Services
800.695.7222
www.caslab.com

Client: Ecology and Environment

CHAIN of CUSTODY

Page 2 of 2

Project: Red Devil Mine

Method of Shipment

Project Manager: Ed Wallace (CAS) Bill Richards (E&E)

Telephone No.: (206) 624-9537

Fax No.:

Cooler 45

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Percent Moisture	Methyl Hg	As Speciation												Turn Around Time (working days)
11UP07BL		1				x		x	8/21/11	1423	x	x														
11MP31WS		1				x		x	8/18/11	1907	x	x														
11SM11GA		1				x		x	8/19/11	1815	x	x	x													
11UP08BL		1				x		x	8/21/11	1600	x	x	x													
11RD14BL		1				x		x	8/22/11	1814	x	x	x													
11RD18WS		1				x		x	8/23/11	1321	x	x														
11RD18GA		1				x		x	8/23/11	1218	x	x	x													
11RD14GA		1				x		x	8/22/11	1717	x	x	x													
11RD12WS		1				x		x	8/22/11	1514	x	x	x													

MARKS

10

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date Time	Received by (Sign & Print Name)
Relinquished by	Date Time	Received by
Relinquished by	Date Time	Received by
Relinquished by	Date Time	Received by laboratory Date 9/7/11 Time 0845

Lab Work No.

K1108356

Columbia Analytical Services
800.695.7222
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CHAIN of CUSTODY

Page 1 of 2

Client: Ecology and Environment

Project: Red Devil Mine

Method of Shipment

Project Manager: Ed Wallace (CAS) Bill Richards (E&E)

Telephone No.: (206) 624-9537

Fax No.:

Cooler 45

Special Detection Limit/Reporting

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total TAL Metals	Percent Moisture	Methyl Hg	As Speciation	Turn Around Time (working days)
11MP38WS		1				x		x	8/18/11	1728	x	x			
11SM18WS		1				x		x	8/19/11	1612	x	x			
11SM81GA		1				x		x	8/19/11	1928	x	x	x		
11MP27GA		1				x		x	8/19/11	0942	x	x	x		
11SM82WS		1				x		x	8/20/11	1058	x	x	x		
11RD11GA		1				x		x	8/22/11	1207	x	x	x		
11MP20GA		1				x		x	8/19/11	1211	x	x			
11UP04BF		1				x		x	8/20/11	1817	x	x	x	x	
11RD15WS		1				x		x	8/22/11	1739	x	x	x		
11RD18BL		1				x		x	8/23/11	1320	x	x			
11MP38GA		1				x		x	8/18/11	1814	x	x			
11SM07WS		1				x		x	8/20/11	1511	x	x	x		
11UP04BL		1				x		x	8/20/11	1847	x	x	x		
11UP02BL		1				x		x	8/21/11	1017	x	x			

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

	Date	Time		
Relinq. by sampler (Sign & Print Name) Lucas Meek CO	9/3/11	11am	Received by (Sign & Print Name) Carl Overpeck	
Relinquished by Custody Sealed	9/4/11	1400	Received by	
Relinquished by	Date	Time	Received by	
Relinquished by	Date	Time	Received by laboratory CAS	Date 9/2/11 Time 0845

Lab Work No. K1108356

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Brooks Rand Labs	Lab Project Number: 1137038
Sampling Dates: 8/2/11 thru 8/29/11	Sample Matrix: Soil
Analytical Method: Hg SSE by EPA 1631	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/15/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP51SB04	1137038-01
2	11MP52SB06	1137038-02
3	11MP52SB10	1137038-03
4	11MP56SB06	1137038-04
5	11MP26SB10	1137038-05
6	11MP58SB08	1137038-06
7	11MP60SB14	1137038-07
8	11MP59SB12	1137038-08
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- * Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- X Matrix Spike recoveries
- X Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	NO
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Mercury speciation in soil/sediment by 5-Step Extraction per SOP BR-0013 was performed and analyzed by cold vapor atomic fluorescence spectroscopy mercury analyzer.
The extractants used are: De-ionized water (F0 & F1), a synthetic "stomach acid" (F2), 1M KOH (F3), 12M HNO3 (F4), and aqua regia (F5). All samples were analyzed in accordance with EPA Method 1631.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria and samples were received in a cooler with ice and at a temperature of 0.1°C.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP52SB10 was used for total Hg in MS/MSD analysis and the recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable with qualification
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level except the method blank (0.16ng/g) for Hg (F2). The detected Hg (F2) result in sample 11MP52SB10 was qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, ng/g	11MP52SB06	11MP52SB06 DUP	RPD (%)
Hg(F1)	6465	8014	21
Hg(F2)	230600	178000	26
Hg(F3)	25850	30240	16
Hg(F4)	21890	27490	23
Hg(F5)	2502000	1247000	67*

Analyte, ng/g	11MP52SB10	11MP52SB10 DUP	RPD (%)
Hg	306	2050	148*

Comments:

*: The RPD was outside of control limits (>35%) and the detected Hg and Hg (F5) results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Total Hg, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks, 40 mL

A_d – default analyzed volume for the method used for the method blanks, 10 mL

I – aliquot of sample prepared, g.

Sample 11DS01SB06, Lab ID 1135016-13
Total Hg: ((1310) (40) (100) / (0.025)) – ((1.01725) (40)/ (10)) / (1.0285) (1000) = 203791.9 ng/g
(203791.9 ng/g) (100/89.9) = 226687 ng/g. Lab reported 227000 ng/g dry.

Hg SSE – F1 through F5, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks

A_d – default analyzed volume for the method used for the method blanks

I – aliquot of sample prepared, g.

Sample 11DS01SB06, Lab ID 1135016-13
Hg(F1): ((778) (125) (1))/ (0.5)) - ((7.55) (125))/(25) / ((0.4107) (1000)) = 473.49 ng/g
(473.49 ng/g) (100/89.9) = 526.7 ng/g dry. Lab reported 527 ng/g dry.

Hg(F2): ((8560) (125) (1))/ (1) – ((11.9225) (125)/ (25)) / (0.4107) (1000) = 2605 ng/g
(2605 ng/g) (100/89.9) = 2899 ng/g dry. Lab reported 2900 ng/g dry.

Hg(F3): ((1230) (125) (1))/ (0.2) – ((19.575) (125)/ (10) / (0.4107) (1000) =1871.21 ng/g
(1871.21 ng/g) (100/89.9) = 2081 ng/g dry. Lab reported 2090 ng/g dry.

Hg(F4): ((822) (125) (1))/ (0.05) – ((7.085) (125)/ (25)) / (0.4107) (1000) = 5003.6 ng/g
(5003.6 ng/g) (100/89.9) = 5565.7 ng/g dry. Lab reported 5560 ng/g dry.

Hg(F5): ((939) (40) (100))/ (0.05) – ((0.51625) (40)/ (2)) / (0.4107) (1000) = 182907 ng/g
(182907 ng/g) (100/89.9) = 203456 ng/g dry. Lab reported 204000 ng/g dry.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid. The laboratory compared the sum of the fractions to the total Hg results for all samples and three samples (11MP26SB10 and 11MP58SB08) produced elevated RPDs (Criteria: RPD≤35%).

Sample ID	Sum of 5-step SSE (ng/g)	Total Hg (ng/g)	RPD (%)
11MP26SB10	31069	11300	93*
11MP58SB08	718480	1220000	52*

*: Based on this comparison, the F1 through F5 results of these samples were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP)*.

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP26SB10										
1137038-05	%TS	Soil	N/A	92.34		0.07	0.25	%	B111456	N/A
1137038-05	Hg	Soil	N/A	11300	J	25.3	75.8	ng/g dry	B111455	1100681
1137038-05	Hg(F1)	Soil	N/A	2420	J	4.83	12.1	ng/g dry	B111457	1100661
1137038-05	Hg(F2)	Soil	N/A	754	J	9.67	24.2	ng/g dry	B111458	1100686
1137038-05	Hg(F3)	Soil	N/A	675	J	19.3	48.3	ng/g dry	B111459	1100693
1137038-05	Hg(F4)	Soil	N/A	5920	J	387	967	ng/g dry	B111460	1100700
1137038-05	Hg(F5)	Soil	N/A	21300	J	193	483	ng/g dry	B111461	1100691
11MP51SB04										
1137038-01	%TS	Soil	N/A	89.11		0.07	0.25	%	B111456	N/A
1137038-01	Hg	Soil	N/A	50800	J	272	815	ng/g dry	B111455	1100681
1137038-01	Hg(F1)	Soil	N/A	508		10.4	26.1	ng/g dry	B111457	1100661
1137038-01	Hg(F2)	Soil	N/A	41.7		0.52	1.30	ng/g dry	B111458	1100686
1137038-01	Hg(F3)	Soil	N/A	605		20.9	52.2	ng/g dry	B111459	1100693
1137038-01	Hg(F4)	Soil	N/A	5770		418	1040	ng/g dry	B111460	1100700
1137038-01	Hg(F5)	Soil	N/A	53800	J	2090	5220	ng/g dry	B111461	1100691
11MP52SB06										
1137038-02	%TS	Soil	N/A	74.98		0.07	0.25	%	B111456	N/A
1137038-02	Hg	Soil	N/A	1580000	J	3350	10000	ng/g dry	B111455	1100681
1137038-02	Hg(F1)	Soil	N/A	8010		126	314	ng/g dry	B111457	1100661
1137038-02	Hg(F2)	Soil	N/A	178000		1260	3140	ng/g dry	B111458	1100686
1137038-02	Hg(F3)	Soil	N/A	30200		1260	3140	ng/g dry	B111459	1100693
1137038-02	Hg(F4)	Soil	N/A	109000	M	502	1260	ng/g dry	B111460	1100700
1137038-02	Hg(F5)	Soil	N/A	1250000	J M	25100	62800	ng/g dry	B111461	1100691
11MP52SB10										
1137038-03	%TS	Soil	N/A	92.48		0.07	0.25	%	B111456	N/A
1137038-03	Hg	Soil	N/A	306	J M	25.5	76.4	ng/g dry	B111455	1100681
1137038-03	Hg(F1)	Soil	N/A	22.5		0.20	0.51	ng/g dry	B111457	1100661
1137038-03	Hg(F2)	Soil	N/A	0.49	U B	0.20	0.50	ng/g dry	B111458	1100686
1137038-03	Hg(F3)	Soil	N/A	109		20.4	51.0	ng/g dry	B111459	1100693
1137038-03	Hg(F4)	Soil	N/A	125		2.04	5.10	ng/g dry	B111460	1100700
1137038-03	Hg(F5)	Soil	N/A	172	J	8.16	20.4	ng/g dry	B111461	1100691

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP56SB06										
1137038-04	%TS	Soil	N/A	91.47		0.07	0.25	%	B111456	N/A
1137038-04	Hg	Soil	N/A	126000	J	2660	7980	ng/g dry	B111455	1100681
1137038-04	Hg(F1)	Soil	N/A	534		97.2	243	ng/g dry	B111457	1100661
1137038-04	Hg(F2)	Soil	N/A	92.7		9.72	24.3	ng/g dry	B111458	1100686
1137038-04	Hg(F3)	Soil	N/A	2420		777	1940	ng/g dry	B111459	1100693
1137038-04	Hg(F4)	Soil	N/A	12500		389	972	ng/g dry	B111460	1100700
1137038-04	Hg(F5)	Soil	N/A	103000	J	3890	9720	ng/g dry	B111461	1100691
11MP58SB08										
1137038-06	%TS	Soil	N/A	86.66		0.07	0.25	%	B111456	N/A
1137038-06	Hg	Soil	N/A	1220000	J	2670	8010	ng/g dry	B111455	1100681
1137038-06	Hg(F1)	Soil	N/A	4860	J	108	270	ng/g dry	B111457	1100661
1137038-06	Hg(F2)	Soil	N/A	120	J	10.8	27.0	ng/g dry	B111458	1100686
1137038-06	Hg(F3)	Soil	N/A	12200	J	431	1080	ng/g dry	B111459	1100693
1137038-06	Hg(F4)	Soil	N/A	31300	J	431	1080	ng/g dry	B111460	1100700
1137038-06	Hg(F5)	Soil	N/A	670000	J	21600	53900	ng/g dry	B111461	1100691
11MP59SB12										
1137038-08	%TS	Soil	N/A	83.37		0.07	0.25	%	B111456	N/A
1137038-08	Hg	Soil	N/A	6330	J	28.2	84.5	ng/g dry	B111455	1100681
1137038-08	Hg(F1)	Soil	N/A	102		5.32	13.3	ng/g dry	B111457	1100661
1137038-08	Hg(F2)	Soil	N/A	2.92		0.21	0.52	ng/g dry	B111458	1100686
1137038-08	Hg(F3)	Soil	N/A	2800		426	1060	ng/g dry	B111459	1100693
1137038-08	Hg(F4)	Soil	N/A	51.4		21.3	53.2	ng/g dry	B111460	1100711
1137038-08	Hg(F5)	Soil	N/A	2660	J	213	532	ng/g dry	B111461	1100691
11MP60SB14										
1137038-07	%TS	Soil	N/A	91.16		0.07	0.25	%	B111456	N/A
1137038-07	Hg	Soil	N/A	456000	J	2670	8020	ng/g dry	B111455	1100681
1137038-07	Hg(F1)	Soil	N/A	311		5.58	14.0	ng/g dry	B111457	1100661
1137038-07	Hg(F2)	Soil	N/A	1.34		0.23	0.57	ng/g dry	B111458	1100686
1137038-07	Hg(F3)	Soil	N/A	4370		893	2230	ng/g dry	B111459	1100693
1137038-07	Hg(F4)	Soil	N/A	15200		447	1120	ng/g dry	B111460	1100700
1137038-07	Hg(F5)	Soil	N/A	423000	J	22300	55800	ng/g dry	B111461	1100691

11/15/11

BROOKS RAND LABS
MEANINGFUL METALS DATA

Method Blanks & Reporting Limits

Batch: B111455
Matrix: Soil/Sediment
Method: EPA 1631 Appendix
Analyte: Hg

Sample	Result	Units
B111455-BLK1	0.01	ng/g
B111455-BLK2	0.02	ng/g
B111455-BLK3	0.02	ng/g
B111455-BLK4	0.02	ng/g

Average: 0.02 **Standard Deviation:** 0.01 **MDL:** 0.05
Limit: 0.10 **Limit:** 0.03 **MRL:** 0.15

11/15/11

Method Blanks & Reporting Limits

Batch: B111457
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F1)

Sample	Result	Units
B111457-BLK1	0.25	ng/g
B111457-BLK2	0.11	ng/g
B111457-BLK3	0.13	ng/g
B111457-BLK4	0.03	ng/g

Average: 0.13 **Standard Deviation:** 0.09 **MDL:** 0.20
Limit: 0.39 **Limit:** 0.13 **MRL:** 0.49

11/15/11

Method Blanks & Reporting Limits

Batch: B111458
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F2)

Sample	Result	Units
B111458-BLK1	0.24	ng/g
B111458-BLK2	0.10	ng/g
B111458-BLK3	0.14	ng/g
B111458-BLK4	0.14	ng/g

Average: 0.16 **Standard Deviation:** 0.06 **MDL:** 0.20
Limit: 0.41 **Limit:** 0.14 **MRL:** 0.51

11/15/11

Method Blanks & Reporting Limits

Batch: B111459
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F3)

Sample	Result	Units
B111459-BLK1	0.54	ng/g
B111459-BLK2	0.32	ng/g
B111459-BLK3	0.30	ng/g
B111459-BLK4	0.75	ng/g

Average: 0.48 **Standard Deviation:** 0.21 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Method Blanks & Reporting Limits

Batch: B111460
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F4)

Sample	Result	Units
B111460-BLK1	0.51	ng/g
B111460-BLK2	0.38	ng/g
B111460-BLK3	0.21	ng/g
B111460-BLK4	0.16	ng/g

Average: 0.32 **Standard Deviation:** 0.16 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Method Blanks & Reporting Limits

Batch: B111461
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F5)

Sample	Result	Units
B111461-BLK1	0.19	ng/g
B111461-BLK2	0.23	ng/g
B111461-BLK3	0.42	ng/g
B111461-BLK4	0.09	ng/g

Average: 0.23 **Standard Deviation:** 0.14 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

BRL Report 1137038

Project Number: K1108359
Project Manager: Ed Wallace

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108359-002	11MP51SB04	1	Soil	8/24/11	1642	Brooks Rand	X
K1108359-004	11MP52SB06	1	Soil	8/26/11	1322	Brooks Rand	X
K1108359-005	11MP52SB10	1	Soil	8/26/11	1336	Brooks Rand	X
K1108359-008	11MP56SB06	1	Soil	8/29/11	1100	Brooks Rand	X
K1108359-009	11MP26SB10	1	Soil	8/29/11	1122	Brooks Rand	X
K1108359-011	11MP58SB08	1	Soil	8/29/11	0951	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1108359-002,4,5,8,9,11 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Special Instructions/Comments
Please provide the electronic (PDF and EDD) report to the following e-mail address:
kelso_data@caslab.com

Turnaround Requirements
____RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
____STANDARD
Requested FAX Date: _____
Requested Report Date: 09/25/11

Report Requirements
____I. Results Only
____II. Results + QC Summaries
____III. Results + QC and Calibration Summaries
____IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD

Invoice Information
PO# K1108359
Bill to

Relinquished By: [signature] CAS 9/8/11 1000 Received By: [signature] Airbill Number: _____

9/9/11 900

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

BRL Report 1137038

1137038

Project Number: K1108365
Project Manager: Ed Wallace

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108365-015	11MP60SB14	1	Soil	8/23/11	1122	Brooks Rand	X
K1108365-021	11MP59SB12	1	Soil	8/28/11	1843	Brooks Rand	X

Test Comments

MISC_OUT_1 - None K1108365-015,21 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic (PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ____STANDARD Requested FAX Date: _____ Requested Report Date: 09/25/11	____I. Results Only ____II. Results + QC Summaries ____III. Results + QC and Calibration Summaries ____IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD	PO# K1108365 Bill to

Relinquished By: [signature] CAS 9/8/11 1000 Received By: [signature] 9/9/11 700 Airbill Number: _____

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ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	**Location: West of Anchorage, Alaska**
Project Number: 001096.OX70	

Laboratory: Brooks Rand Labs	**Lab Project Number: 1137002**
Sampling Dates: 8/13/11 thru 8/22/11	**Sample Matrix: Soil**
Analytical Method: Hg SSE by EPA 1631	**Data Reviewer: M. Song**

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song **Date:** 11/15/11
Technical QA Reviewer: _____ **Date:** _____
Project Manager: Bill Richards **Date:** _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11MP40SB08	1137002-01
2	11MP28SB06	1137002-02
3	11MP30SB06	1137002-03
4	11MP23SB20	1137002-04
5	11MP12SB06	1137002-05
6	11MP19SB06	1137002-06
7	11RD10SD	1137002-07
8	11MP39SB08	1137002-08
9	11MP24SB12	1137002-09
10	11MP28SB08	1137002-10
11	11MP32SB08	1137002-11
12	11MP14SB04	1137002-12
13	11MP18SB04	1137002-13
14	11RD12SD	1137002-14
15	11MP17SB14	1137002-15
16		
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- X Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	YES
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Mercury speciation in soil/sediment by 5-Step Extraction per SOP BR-0013 was performed and analyzed by cold vapor atomic fluorescence spectroscopy mercury analyzer.
The extractants used are: De-ionized water (F0 & F1), a synthetic "stomach acid" (F2), 1M KOH (F3), 12M HNO3 (F4), and aqua regia (F5). All samples were analyzed in accordance with EPA Method 1631.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria and all samples were received in a cooler with ice and at a temperature of 0.3°C.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11MP30SB06 was used for total Hg in MS/MSD analysis and the recoveries were outside of control limits. Qualification was not required since the amount of total Hg present in the parent sample was greater than 4X the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable
_____ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, ng/g	11MP28SB06	11MP28SB06 DUP	RPD (%)
Hg(F1)	6830	5462	22
Hg(F2)	1996	625	105*
Hg(F3)	3950	1165	109*
Hg(F4)	27490	21890	23
Hg(F5)	261400	202000	26

Analyte, ng/g	11MP30SB06	11MP30SB06 DUP	RPD (%)
Hg	2242000	2043000	9

Comments:

*: The RPDs were outside of control limits (>35%) and the detected Hg(F2) and Hg(F3) results were qualified as estimated (J).

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ **Acceptable**
_____ **Acceptable with qualification**
_____ **Unacceptable**
__X__ **Not required**

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(Initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Total Hg, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks, 40 mL

A_d – default analyzed volume for the method used for the method blanks, 10 mL

I – aliquot of sample prepared, g.

Sample 11MP12SB06, Lab ID 1137002-05
Total Hg: ((2920) (40) (1) / (0.025)) – ((1.995) (40)/ (10)) / (1.049) (1000) = 4453.76 ng/g
(4453.76 ng/g) (100/87.26) = 5104 ng/g. Lab reported 5100 ng/g dry.

Hg SSE – F1 through F5, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks

A_d – default analyzed volume for the method used for the method blanks

I – aliquot of sample prepared, g.

Sample 11MP12SB06, Lab ID 1137002-05
Hg(F1): ((271) (125) (1))/ (0.5)) - ((10.47) (125))/(25) / ((0.479) (1000)) = 141.3 ng/g
(141.3 ng/g) (100/87.26) = 161.97 ng/g dry. Lab reported 162 ng/g dry.

Hg(F2): ((603) (125) (1))/ (0.5) – ((4.9575) (125)/ (25)) / (0.479) (1000) = 314.67 ng/g
(314.67 ng/g) (100/87.26) = 360.6 ng/g dry. Lab reported 360 ng/g dry.

Hg(F3): ((1080) (125) (1))/ (1) – ((15.305) (125)/ (10) / (0.479) (1000) =281.44 ng/g
(281.44 ng/g) (100/87.26) = 322.53 ng/g dry. Lab reported 323 ng/g dry.

Hg(F4): ((87.6) (125) (1))/ (0.025) – ((5.0325) (125)/ (25)) / (0.479) (1000) = 914.35 ng/g
(914.35 ng/g) (100/87.26) = 1047.8 ng/g dry. Lab reported 1050 ng/g dry.

Hg(F5): ((602) (40) (1))/ (0.025) – ((4.625) (40)/ (2)) / (0.479) (1000) = 2010.7 ng/g
(2010.7 ng/g) (100/87.26) = 2304 ng/g dry. Lab reported 2300 ng/g dry.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

0. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid. The laboratory compared the sum of the fractions to the total Hg results for all samples and seven samples (11MP40SB08, 11MP39SB08, 11MP28SB08, 11MP32SB08, 11MP18SB04, 11RD12SD, and 11MP17SB14) produced elevated RPDs (Criteria: RPD≤35%).

Sample ID	Sum of 5-step SSE (ng/g)	Total Hg (ng/g)	RPD (%)
11MP40SB08	267462	161000	50*
11MP39SB08	59680	39700	40*
11MP28SB08	11104	23000	70*
11MP32SB08	407172	1010000	85*
11MP18SB04	41428	67600	48*
11RD12SD	23264	41500	56*
11MP17SB14	8350	2340	112*

*: Based on this comparison, the F1 through F5 results of these samples were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP) .*

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP12SB06										
1137002-05	%TS	Soil	N/A	87.26		0.30	1.00	%	B111393	N/A
1137002-05	Hg	Soil	N/A	5100		21.8	65.5	ng/g dry	B111392	1100649
1137002-05	Hg(F1)	Soil	N/A	162		9.57	23.9	ng/g dry	B111457	1100661
1137002-05	Hg(F2)	Soil	N/A	360	J	9.57	23.9	ng/g dry	B111458	1100686
1137002-05	Hg(F3)	Soil	N/A	323	J	19.1	47.8	ng/g dry	B111459	1100693
1137002-05	Hg(F4)	Soil	N/A	1050		383	957	ng/g dry	B111460	1100700
1137002-05	Hg(F5)	Soil	N/A	2300		153	383	ng/g dry	B111461	1100691
11MP14SB04										
1137002-12	%TS	Soil	N/A	87.67		0.30	1.00	%	B111393	N/A
1137002-12	Hg	Soil	N/A	1170000		2210	6640	ng/g dry	B111392	1100649
1137002-12	Hg(F1)	Soil	N/A	26400		97.7	244	ng/g dry	B111457	1100661
1137002-12	Hg(F2)	Soil	N/A	133000	J	977	2440	ng/g dry	B111458	1100686
1137002-12	Hg(F3)	Soil	N/A	15200	J	977	2440	ng/g dry	B111459	1100693
1137002-12	Hg(F4)	Soil	N/A	107000		391	977	ng/g dry	B111460	1100700
1137002-12	Hg(F5)	Soil	N/A	1040000		15600	39100	ng/g dry	B111461	1100691
11MP17SB14										
1137002-15	%TS	Soil	N/A	70.91		0.30	1.00	%	B111393	N/A
1137002-15	Hg	Soil	N/A	2340		24.1	72.4	ng/g dry	B111392	1100649
1137002-15	Hg(F1)	Soil	N/A	28.0	J	0.58	1.44	ng/g dry	B111457	1100661
1137002-15	Hg(F2)	Soil	N/A	4.53	J	0.23	0.58	ng/g dry	B111458	1100686
1137002-15	Hg(F3)	Soil	N/A	2350	J	23.1	57.8	ng/g dry	B111459	1100693
1137002-15	Hg(F4)	Soil	N/A	277	J	57.8	144	ng/g dry	B111460	1100700
1137002-15	Hg(F5)	Soil	N/A	5690	J	185	462	ng/g dry	B111461	1100691
11MP18SB04										
1137002-13	%TS	Soil	N/A	84.52		0.30	1.00	%	B111393	N/A
1137002-13	Hg	Soil	N/A	67600		2100	6300	ng/g dry	B111392	1100649
1137002-13	Hg(F1)	Soil	N/A	677	J	12.1	30.2	ng/g dry	B111457	1100661
1137002-13	Hg(F2)	Soil	N/A	518	J	12.1	30.2	ng/g dry	B111458	1100686
1137002-13	Hg(F3)	Soil	N/A	483	J, UJ	483	1210	ng/g dry	B111459	1100693
1137002-13	Hg(F4)	Soil	N/A	3550	J	483	1210	ng/g dry	B111460	1100700
1137002-13	Hg(F5)	Soil	N/A	36200	J	966	2410	ng/g dry	B111461	1100691

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP19SB06										
1137002-06	%TS	Soil	N/A	87.85		0.30	1.00	%	B111393	N/A
1137002-06	Hg	Soil	N/A	4940		22.0	66.0	ng/g dry	B111392	1100649
1137002-06	Hg(F1)	Soil	N/A	66.8		9.43	23.6	ng/g dry	B111457	1100661
1137002-06	Hg(F2)	Soil	N/A	50.0	J	4.71	11.8	ng/g dry	B111458	1100686
1137002-06	Hg(F3)	Soil	N/A	213	J	18.9	47.1	ng/g dry	B111459	1100693
1137002-06	Hg(F4)	Soil	N/A	625		94.3	236	ng/g dry	B111460	1100700
1137002-06	Hg(F5)	Soil	N/A	4490		151	377	ng/g dry	B111461	1100691
11MP23SB20										
1137002-04	%TS	Soil	N/A	56.86		0.30	1.00	%	B111393	N/A
1137002-04	Hg	Soil	N/A	1390000		3490	10500	ng/g dry	B111392	1100649
1137002-04	Hg(F1)	Soil	N/A	6570		170	426	ng/g dry	B111457	1100661
1137002-04	Hg(F2)	Soil	N/A	20.8	J	0.85	2.13	ng/g dry	B111458	1100686
1137002-04	Hg(F3)	Soil	N/A	84100	J	1360	3410	ng/g dry	B111459	1100693
1137002-04	Hg(F4)	Soil	N/A	47500		681	1700	ng/g dry	B111460	1100700
1137002-04	Hg(F5)	Soil	N/A	1120000		27300	68100	ng/g dry	B111461	1100691
11MP24SB12										
1137002-09	%TS	Soil	N/A	90.39		0.30	1.00	%	B111393	N/A
1137002-09	Hg	Soil	N/A	983000		2080	6230	ng/g dry	B111392	1100649
1137002-09	Hg(F1)	Soil	N/A	23100		89.2	223	ng/g dry	B111457	1100661
1137002-09	Hg(F2)	Soil	N/A	814	J	8.92	22.3	ng/g dry	B111458	1100686
1137002-09	Hg(F3)	Soil	N/A	11300	J	892	2230	ng/g dry	B111459	1100693
1137002-09	Hg(F4)	Soil	N/A	39400		357	892	ng/g dry	B111460	1100700
1137002-09	Hg(F5)	Soil	N/A	941000		14300	35700	ng/g dry	B111461	1100691
11MP28SB06										
1137002-02	%TS	Soil	N/A	85.98		0.30	1.00	%	B111393	N/A
1137002-02	Hg	Soil	N/A	231000		2140	6430	ng/g dry	B111392	1100649
1137002-02	Hg(F1)	Soil	N/A	6830		99.0	247	ng/g dry	B111457	1100661
1137002-02	Hg(F2)	Soil	N/A	2000	J M	19.8	49.5	ng/g dry	B111458	1100686
1137002-02	Hg(F3)	Soil	N/A	3950	J M(RS)	792	1980	ng/g dry	B111459	1100693
1137002-02	Hg(F4)	Soil	N/A	27500		396	990	ng/g dry	B111460	1100700
1137002-02	Hg(F5)	Soil	N/A	261000		1580	3960	ng/g dry	B111461	1100691

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP28SB08										
1137002-10	%TS	Soil	N/A	83.09		0.30	1.00	%	B111393	N/A
1137002-10	Hg	Soil	N/A	23000		2050	6150	ng/g dry	B111392	1100649
1137002-10	Hg(F1)	Soil	N/A	253	J	5.31	13.3	ng/g dry	B111457	1100661
1137002-10	Hg(F2)	Soil	N/A	13.5	J	0.21	0.53	ng/g dry	B111458	1100686
1137002-10	Hg(F3)	Soil	N/A	4360	J	425	1060	ng/g dry	B111459	1100693
1137002-10	Hg(F4)	Soil	N/A	777	J	106	266	ng/g dry	B111460	1100700
1137002-10	Hg(F5)	Soil	N/A	5700	J	425	1060	ng/g dry	B111461	1100691
11MP30SB06										
1137002-03	%TS	Soil	N/A	87.96		0.30	1.00	%	B111393	N/A
1137002-03	Hg	Soil	N/A	2040000		21400	64100	ng/g dry	B111392	1100649
1137002-03	Hg(F1)	Soil	N/A	36600		281	702	ng/g dry	B111457	1100661
1137002-03	Hg(F2)	Soil	N/A	96300	J M	2810	7020	ng/g dry	B111458	1100686
1137002-03	Hg(F3)	Soil	N/A	96900	J M	11200	28100	ng/g dry	B111459	1100693
1137002-03	Hg(F4)	Soil	N/A	106000	M	449	1120	ng/g dry	B111460	1100700
1137002-03	Hg(F5)	Soil	N/A	2020000		18000	44900	ng/g dry	B111461	1100691
11MP32SB08										
1137002-11	%TS	Soil	N/A	77.38		0.30	1.00	%	B111393	N/A
1137002-11	Hg	Soil	N/A	1010000		2400	7200	ng/g dry	B111392	1100649
1137002-11	Hg(F1)	Soil	N/A	1070	J	123	308	ng/g dry	B111457	1100661
1137002-11	Hg(F2)	Soil	N/A	1.72	J	0.24	0.61	ng/g dry	B111458	1100686
1137002-11	Hg(F3)	Soil	N/A	28800	J	1230	3080	ng/g dry	B111459	1100693
1137002-11	Hg(F4)	Soil	N/A	29300	J	493	1230	ng/g dry	B111460	1100700
1137002-11	Hg(F5)	Soil	N/A	348000	J	19700	49300	ng/g dry	B111461	1100691
11MP39SB08										
1137002-08	%TS	Soil	N/A	66.11		0.30	1.00	%	B111393	N/A
1137002-08	Hg	Soil	N/A	39700		2660	7970	ng/g dry	B111392	1100649
1137002-08	Hg(F1)	Soil	N/A	648	J	7.22	18.0	ng/g dry	B111457	1100661
1137002-08	Hg(F2)	Soil	N/A	2.23	J	0.29	0.71	ng/g dry	B111458	1100686
1137002-08	Hg(F3)	Soil	N/A	33200	J	578	1440	ng/g dry	B111459	1100693
1137002-08	Hg(F4)	Soil	N/A	2130	J	578	1440	ng/g dry	B111460	1100700
1137002-08	Hg(F5)	Soil	N/A	23700	J	578	1440	ng/g dry	B111461	1100691

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP40SB08										
1137002-01	%TS	Soil	N/A	79.64		0.30	1.00	%	B111393	N/A
1137002-01	Hg	Soil	N/A	161000		2200	6590	ng/g dry	B111392	1100649
1137002-01	Hg(F1)	Soil	N/A	2570	J	12.7	31.9	ng/g dry	B111457	1100661
1137002-01	Hg(F2)	Soil	N/A	322	J	12.7	31.9	ng/g dry	B111458	1100686
1137002-01	Hg(F3)	Soil	N/A	2770	J	1020	2550	ng/g dry	B111459	1100693
1137002-01	Hg(F4)	Soil	N/A	21800	J	510	1270	ng/g dry	B111460	1100700
1137002-01	Hg(F5)	Soil	N/A	240000	J	20400	51000	ng/g dry	B111461	1100691
11RD10SD										
1137002-07	%TS	Soil	N/A	79.38		0.30	1.00	%	B111393	N/A
1137002-07	Hg	Soil	N/A	297		24.2	72.7	ng/g dry	B111392	1100649
1137002-07	Hg(F1)	Soil	N/A	3.00		0.22	0.55	ng/g dry	B111457	1100661
1137002-07	Hg(F2)	Soil	N/A	1.14	J	0.22	0.56	ng/g dry	B111458	1100686
1137002-07	Hg(F3)	Soil	N/A	194	J	22.2	55.6	ng/g dry	B111459	1100693
1137002-07	Hg(F4)	Soil	N/A	37.3		2.22	5.56	ng/g dry	B111460	1100700
1137002-07	Hg(F5)	Soil	N/A	166		4.45	11.1	ng/g dry	B111461	1100691
11RD12SD										
1137002-14	%TS	Soil	N/A	79.18		0.30	1.00	%	B111393	N/A
1137002-14	Hg	Soil	N/A	41500		2260	6770	ng/g dry	B111392	1100649
1137002-14	Hg(F1)	Soil	N/A	79.4	J	6.38	15.9	ng/g dry	B111457	1100661
1137002-14	Hg(F2)	Soil	N/A	4.94	J	0.26	0.64	ng/g dry	B111458	1100686
1137002-14	Hg(F3)	Soil	N/A	1890	J	510	1280	ng/g dry	B111459	1100693
1137002-14	Hg(F4)	Soil	N/A	4090	J	510	1280	ng/g dry	B111460	1100700
1137002-14	Hg(F5)	Soil	N/A	17200	J	510	1280	ng/g dry	B111461	1100691

11/15/11

Method Blanks & Reporting Limits

Batch: B111392
Matrix: Soil/Sediment
Method: EPA 1631 Appendix
Analyte: Hg

Sample	Result	Units
B111392-BLK1	0.009	ng/g
B111392-BLK2	0.006	ng/g
B111392-BLK3	0.005	ng/g
B111392-BLK4	0.01	ng/g

Average: 0.01 **Standard Deviation:** 0.00 **MDL:** 0.05
Limit: 0.10 **Limit:** 0.03 **MRL:** 0.15

11/15/11

Method Blanks & Reporting Limits

Batch: B111457
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F1)

Sample	Result	Units
B111457-BLK1	0.25	ng/g
B111457-BLK2	0.11	ng/g
B111457-BLK3	0.13	ng/g
B111457-BLK4	0.03	ng/g

Average: 0.13 **Standard Deviation:** 0.09 **MDL:** 0.20
Limit: 0.39 **Limit:** 0.13 **MRL:** 0.49

11/15/11

Method Blanks & Reporting Limits

Batch: B111458
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F2)

Sample	Result	Units
B111458-BLK1	0.24	ng/g
B111458-BLK2	0.10	ng/g
B111458-BLK3	0.14	ng/g
B111458-BLK4	0.14	ng/g

Average: 0.16 **Standard Deviation:** 0.06 **MDL:** 0.20
Limit: 0.41 **Limit:** 0.14 **MRL:** 0.51

11/15/11

Method Blanks & Reporting Limits

Batch: B111459
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F3)

Sample	Result	Units
B111459-BLK1	0.54	ng/g
B111459-BLK2	0.32	ng/g
B111459-BLK3	0.30	ng/g
B111459-BLK4	0.75	ng/g

Average: 0.48 **Standard Deviation:** 0.21 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Method Blanks & Reporting Limits

Batch: B111460
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F4)

Sample	Result	Units
B111460-BLK1	0.51	ng/g
B111460-BLK2	0.38	ng/g
B111460-BLK3	0.21	ng/g
B111460-BLK4	0.16	ng/g

Average: 0.32 **Standard Deviation:** 0.16 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Project ID: COL-KE1101
PM: Tiffany Stilwater

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1137002
Client PM: Ed Wallace
Client PO: K1107701

Method Blanks & Reporting Limits

Batch: B111461
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F5)

Sample	Result	Units
B111461-BLK1	0.19	ng/g
B111461-BLK2	0.23	ng/g
B111461-BLK3	0.42	ng/g
B111461-BLK4	0.09	ng/g

Average: 0.23 **Standard Deviation:** 0.14 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace BRL Report 1137002

Project Number: K1108035
Project Manager: Ed Wallace

1137002

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108035-003	11MP40SB08	1	Soil	8/16/11	1502	Brooks Rand	X
K1108035-005	11MP28SB06	1	Soil	8/22/11	0933	Brooks Rand	X
K1108035-008	11MP30SB06	1	Soil	8/16/11	1749	Brooks Rand	X
K1108035-009	11MP23SB20	1	Soil	8/18/11	1734	Brooks Rand	X
K1108035-014	11MP12SB06	1	Soil	8/21/11	1357	Brooks Rand	X
K1108035-015	11MP19SB06	1	Soil	8/15/11	1345	Brooks Rand	X
K1108035-016	11RD10SD	1	Soil	8/20/11	1600	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1108035-003,5,8,9,14,15,16 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Emco 8/31/11

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic (PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: _____ Requested Report Date: 09/16/11	____ I. Results Only ____ II. Results + QC Summaries ____ III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# K1108035 Bill to

Relinquished By: [signature] 9/1/11 Received By: [signature] 9/2/2011 0930 Airbill Number: _____

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

~~BRL Report #137002~~

Project Number: K1108032
Project Manager: Ed Wallace

1137002

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108032-007	11MP39SB08	1	Soil	8/13/11	0926	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1108032-007 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Emw 8/31/11

Special Instructions/Comments
Please provide the electronic(PDF and EDD) report to the following e-mail address: kelso_data@caslab.com

Turnaround Requirements
____RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
X STANDARD
Requested FAX Date: _____
Requested Report Date: 09/16/11

Report Requirements
X I. Results Only
____II. Results + QC Summaries
____III. Results + QC and Calibration Summaries
____IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

Invoice Information
PO# K1108032
Bill to

Relinquished By: [signature] 9/1/11 Received By: [signature] 9/2/11 0930 Airbill Number: _____

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace
BRL Report 1137002

Project Number: K1108031
Project Manager: Ed Wallace

1137002

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108031-001	11MP24SB12	1	Soil	8/18/11	1515	Brooks Rand	X
K1108031-002	11MP28SB08	1	Soil	8/22/11	1012	Brooks Rand	X
K1108031-021	11MP32SB08	1	Soil	8/17/11	1038	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1108031-001,2,21 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

EDD 8/31/11

Special Instructions/Comments
Please provide the electronic (PDF and EDD) report to the following e-mail address:
kelso_data@caslab.com

Turnaround Requirements
___ RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
+ STANDARD
Requested FAX Date: _____
Requested Report Date: 09/16/11

Report Requirements
___ I. Results Only
___ II. Results + QC Summaries
___ III. Results + QC and Calibration Summaries
+ IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

Invoice Information
PO# K1108031
Bill to

Relinquished By: [signature] 9/1/11 Received By: [signature] 9/2/11 0930 Airbill Number: _____

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Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

BRL Report 1137002

Project Number: K1108028
Project Manager: Ed Wallace

1137002

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1108028-005	11MP14SB04	1	Soil	8/20/11	1128	Brooks Rand	X
K1108028-010	11MP18SB04	1	Soil	8/15/11	1446	Brooks Rand	X
K1108028-011	11RD12SD	1	Soil	8/20/11	1620	Brooks Rand	X
K1108028-018	11MP17SB14	1	Soil	8/19/11	1500	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1108028-005,10,11,18 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

EWB 9/31/11

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic (PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Data: _____ Requested Report Date: 09/16/11	____ I. Results Only ____ II. Results + QC Summaries ____ III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# K1108028 Bill to

Relinquished By: [signature] 9/1/11 Received By: [signature] 9/2/11 0930 Airbill Number: _____

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Laboratory: Brooks Rand Labs	Lab Project Number: 1135016
Sampling Dates: 8/4/11 thru 8/11/11	Sample Matrix: Soil
Analytical Method: Hg SSE by EPA 1631	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song Date: 11/15/11
Technical QA Reviewer: _____ Date: _____
Project Manager: Bill Richards Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	11RD03SB10	1135016-01
2	11RD03SB08	1135016-02
3	10RD03SB06	1135016-03
4	11UP11SB04	1135016-04
5	11SM10SB10	1135016-05
6	11MP41SB06	1135016-06
7	11RS01SB12	1135016-07
8	11MP71SS	1135016-08
9	11SM31SB06	1135016-09
10	11MP38SB10	1135016-10
11	11MP36SB04	1135016-11
12	11MP34SB04	1135016-12
13	11DS01SB06	1135016-13
14	11RD07SB12	1135016-14
15	11RD20SB18	1135016-15
16	11RD20SB20	1135016-16
17		
18		
19		
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

- X Included: no problems
- * Included: problems noted in review
- O Not Included and/or Not Available
- NR Not Required
- RS Provided As Re-submission

Case Narrative:

- X Case Narrative present

Quality Control Summary Package:

- X Data Summary sheets
- X Initial and Continuing Calibration results
- NR CRDL Standard results
- * Preparation Blank and Calibration Blank results
- NR ICP Interference Check Sample results
- * Matrix Spike recoveries
- * Matrix Duplicate results
- X Laboratory Control Sample recoveries
- NR Method of Standard Additions results
- NR ICP Serial Dilution results
- NR Instrument Detection Limits
- NR ICP Interelement Correction Factors
- NR ICP Linear Ranges
- X Preparation Log
- X Analysis Run Log

Raw QC Data Package Section

- X Chain-of-Custody Records
- X Instrument Printouts
- X Sample Preparation Notebook Pages
- X Logbook and Worksheet Pages
- X Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

DATA VALIDATION SUMMARY

The data were validated in accordance with the National Functional Guidelines for Inorganic Data Review (EPA 2010), National Functional Guidelines for Organic Data Review (EPA 2008), Guidelines for Data Reporting , Data Reduction, and Treatment of Non-Detect Values (ADEC 2008) in conjunction with the QA/QC requirements specified in each specific analytical method and any project-specific QC defined in the QAPP.

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times & Preservation	NO
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	YES
5	Blanks and Background Samples	NO
6	Duplicate Analyses	NO
7	Interference Check Samples and Serial Dilution Analysis	N/A
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	YES

Comments: N/A: Not Applicable.
Mercury speciation in soil/sediment by 5-Step Extraction per SOP BR-0013 was performed and analyzed by cold vapor atomic fluorescence spectroscopy mercury analyzer.
The extractants used are: De-ionized water (F0 & F1), a synthetic "stomach acid" (F2), 1M KOH (F3), 12M HNO3 (F4), and aqua regia (F5). All samples were analyzed in accordance with EPA Method 1631.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

1. HOLDING TIMES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:
Mercury: 28 days (from collection) for analysis.
Hexavalent chromium: 24 hours (from collection) for analysis.
All other metals: 180 days (from collection) for analysis.

Comments: Analysis met holding time criteria. Samples were received in two coolers at temperature of 7.8°C and 3.6°C. The results of samples (11MP41SB06, 11MP71SS, 11RD03SB06, 11RD03SB08, 11RD03SB10, 11RS01SB12, 11SM10SB10, 11SM31SB06, and 11UP11SB04) received at 7.8°C were qualified as estimated (J) for exceeding temperature. EPA Method 1631 and BRL SOP BR-0013 stipulate samples must be maintained at temperatures of 0 to 4 °C until samples can be frozen.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% all associated data are rejected (R).

Comments: All recoveries of mercury in initial and continuing calibration verifications were within the control limits

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

3. LABORATORY CONTROL SAMPLE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

__X__ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
_____ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample 11RS01SB12 was used for total Hg in MS/MSD analysis and the recoveries were outside of control limits. Qualification was not required since the amount of total Hg present in the parent sample was greater than 4X the amount spiked.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

5. BLANKS AND BACKGROUND SAMPLES

__X__ Acceptable with qualification
__X__ Detection Limits Adjusted

The following blanks were analyzed:
__X__ Method (preparation) Blanks
_____ Field Blanks
_____ Calibration Blanks
_____ Rinsate Blanks
_____ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was found in the method blank at reporting limit level except the method blank (0.15 ng/g) for Hg (F2). The detected Hg (F2) results in sample 11RS01SB12 and 11UP11SB04 were qualified as non-detect (U) since the sample concentration was less than 5x the blank concentration.

6. DUPLICATE ANALYSES

_____ Acceptable
__X__ Acceptable with qualification
_____ Unacceptable
_____ No Duplicates Analyzed

Type of duplicates analyzed:
_____ Field Duplicates
__X__ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(Value\ 1 - Value\ 2)}{Value\ 1 + Value\ 2} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Analyte, ng/g	11RS01SB12	11RS01SB12 DUP	RPD (%)
Hg	5292	7261	31
Hg(F1)	17.98	13.75	27
Hg(F2)	0.70	0.45	44*
Hg(F3)	776.3	539.7	36*
Hg(F4)	1947	1187	49*
Hg(F5)	1681	895.5	61*

Analyte, ng/g	11RD20SB20	11RD20SB20 DUP	RPD (%)
Hg	10300	Not performed	Not calculated
Hg(F1)	35.94	43.00	18
Hg(F2)	0.82	0.32	88*
Hg(F3)	82.72	63.46	26
Hg(F4)	1379	1156	18
Hg(F5)	6592	3054	73*

Comments:

*: The RPDs were outside of control limits (>35%) and the detected Hg(F2), Hg(F3), Hg(F4), and Hg(F5) results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments:

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

_____ Acceptable
_____ Acceptable with qualification
_____ Unacceptable
__X__ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

ug/L = (Instrument printout concentration, mg/L)(1000 ug/mg)(final volume of extract, mL)
(initial volume of extract, mL)

Soil samples:

mg/kg = (Instrument printout concentration, mg/L)(final volume of extract, mL)(0.001 L/mL)
(weight of sample extracted, g)(0.001 kg/g)(fraction solids)

Comments: Analyte quantitation was acceptable.

Total Hg, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks, 40 mL

A_d – default analyzed volume for the method used for the method blanks, 10 mL

I – aliquot of sample prepared, g.

Sample 11DS01SB06, Lab ID 1135016-13
Total Hg: ((1310) (40) (100) / (0.025)) – ((1.01725) (40)/ (10)) / (1.0285) (1000) = 203791.9 ng/g
(203791.9 ng/g) (100/89.9) = 226687 ng/g. Lab reported 227000 ng/g dry.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

Hg SSE – F1 through F5, Sediment

$$\frac{\frac{CFD}{A} - \frac{BF_d}{A_d}}{I * 1000}$$

C – result produced at the instrument, pg

F – final volume of the sample preparation, mL

D – dilution factor of any dilution of the preparation made at the instrument

A – analyzed volume of the prep or dilution of the prep, mL

B- the mean of the method blank instrument result, pg

F_d – default final prep volume for the method used for the method blanks

A_d – default analyzed volume for the method used for the method blanks

I – aliquot of sample prepared, g.

Sample 11DS01SB06, Lab ID 1135016-13
Hg(F1): ((778) (125) (1))/ (0.5)) - ((7.55) (125))/(25) / ((0.4107) (1000)) = 473.49 ng/g
(473.49 ng/g) (100/89.9) = 526.7 ng/g dry. Lab reported 527 ng/g dry.

Hg(F2): ((8560) (125) (1))/ (1) – ((11.9225) (125)/ (25)) / (0.4107) (1000) = 2605 ng/g
(2605 ng/g) (100/89.9) = 2899 ng/g dry. Lab reported 2900 ng/g dry.

Hg(F3): ((1230) (125) (1))/ (0.2) – ((19.575) (125)/ (10) / (0.4107) (1000) =1871.21 ng/g
(1871.21 ng/g) (100/89.9) = 2081 ng/g dry. Lab reported 2090 ng/g dry.

Hg(F4): ((822) (125) (1))/ (0.05) – ((7.085) (125)/ (25)) / (0.4107) (1000) = 5003.6 ng/g
(5003.6 ng/g) (100/89.9) = 5565.7 ng/g dry. Lab reported 5560 ng/g dry.

Hg(F5): ((939) (40) (100))/ (0.05) – ((0.51625) (40)/ (2)) / (0.4107) (1000) = 182907 ng/g
(182907 ng/g) (100/89.9) = 203456 ng/g dry. Lab reported 204000 ng/g dry.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

_____ **Acceptable**
__X__ **Acceptable with Qualification**
_____ **Rejected**

Accepted data meet the minimum requirements for the following EPA data category:
_____ **ERS Screening**
_____ **Non-definitive with 10 % Conformation by Definitive Methodology**
_____ **Definitive, Comprehensive Statistical Error Determination was performed.**
__X__ **Definitive, Comprehensive Statistical Error Determination was not performed.**

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid. The laboratory compared the sum of the fractions to the total Hg results for all samples and three samples (11UP11SB04, 11SM10SB10, and 11RD07SB12) produced elevated RPDs (Criteria: RPD≤35%).

Sample ID	Sum of 5-step SSE (ng/g)	Total Hg (ng/g)	RPD (%)
11UP11SB04	70.45	123	54*
11SM10SB10	20113	31300	44*
11RD07SB12	3960	10800	93*

*: Based on this comparison, the F1 through F5 results of these samples were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Red Devil Mine	Location: West of Anchorage, Alaska
Project Number: 001096.OX70	

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the *FINAL QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY RED DEVIL MINE, ALASKA, JUNE 2011 (QAPP)*.

The following data use objective was indicated in the *QAPP:*

TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION ASSOCIATED WITH FORMER MINING AND MILLING OPERATIONS, ESTIMATE POTENTIAL RISKS TO HUMAN HEALTH AND ECOLOGICAL RECEPTORS, AND EVALUATE REMEDIAL ALTERNATIVES ON A TECHNICAL AND COST BASIS.

TO PROVIDE SUFFICIENT DATA TO SUPPORT RISK MANAGEMENT DECISIONS AND REMEDY SELECTION RELATED TO THE OBJECTIVES.

TO BE USED TO EVAULATE RISKS ASSOCIATED WITH SITE CONTAMINANTS FOR BOTH HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS.

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the *QAPP.*

AS INDICATED IN SECTION 2 OF THE QAPP, THE INVESTIGATION WILL GENERATE BOTH SCREENING AND DEFINITIVE DATA AND TABLE 1-2 OF THE QAPP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11DS01SB06										
1135016-13	%TS	Soil	N/A	89.90		0.01	0.02	%	B111254	N/A
1135016-13	Hg	Soil	N/A	227000		2160	6490	ng/g dry	B111322	1100626
1135016-13	Hg(F1)	Soil	N/A	527		10.8	27.1	ng/g dry	B111252	1100608
1135016-13	Hg(F2)	Soil	N/A	2900	J	5.42	13.5	ng/g dry	B111319	1100624
1135016-13	Hg(F3)	Soil	N/A	2090	J	108	271	ng/g dry	B111320	1100635
1135016-13	Hg(F4)	Soil	N/A	5560	J	217	542	ng/g dry	B111253	1100615
1135016-13	Hg(F5)	Soil	N/A	204000	J	3470	8670	ng/g dry	B111321	1100639
11MP34SB04										
1135016-12	%TS	Soil	N/A	75.39		0.01	0.02	%	B111254	N/A
1135016-12	Hg	Soil	N/A	302000		2630	7900	ng/g dry	B111322	1100626
1135016-12	Hg(F1)	Soil	N/A	2860		13.2	33.1	ng/g dry	B111252	1100608
1135016-12	Hg(F2)	Soil	N/A	7.27	J	0.27	0.67	ng/g dry	B111319	1100624
1135016-12	Hg(F3)	Soil	N/A	11200	J	1060	2640	ng/g dry	B111320	1100635
1135016-12	Hg(F4)	Soil	N/A	42900	J	264	661	ng/g dry	B111253	1100615
1135016-12	Hg(F5)	Soil	N/A	178000	J	4230	10600	ng/g dry	B111321	1100639
11MP36SB04										
1135016-11	%TS	Soil	N/A	76.85		0.01	0.02	%	B111254	N/A
1135016-11	Hg	Soil	N/A	207000		1220	3650	ng/g dry	B111322	1100626
1135016-11	Hg(F1)	Soil	N/A	1400		12.3	30.9	ng/g dry	B111252	1100608
1135016-11	Hg(F2)	Soil	N/A	141	J	6.17	15.4	ng/g dry	B111319	1100624
1135016-11	Hg(F3)	Soil	N/A	1860	J	123	309	ng/g dry	B111320	1100635
1135016-11	Hg(F4)	Soil	N/A	14300	J	247	617	ng/g dry	B111253	1100615
1135016-11	Hg(F5)	Soil	N/A	146000	J	1980	4940	ng/g dry	B111321	1100639
11MP38SB10										
1135016-10	%TS	Soil	N/A	88.72		0.01	0.02	%	B111254	N/A
1135016-10	Hg	Soil	N/A	519000		2640	7910	ng/g dry	B111322	1100605
1135016-10	Hg(F1)	Soil	N/A	3990		10.7	26.9	ng/g dry	B111252	1100608
1135016-10	Hg(F2)	Soil	N/A	18.9	J	0.21	0.53	ng/g dry	B111319	1100624
1135016-10	Hg(F3)	Soil	N/A	9210	J	860	2150	ng/g dry	B111320	1100635
1135016-10	Hg(F4)	Soil	N/A	43800	J	215	537	ng/g dry	B111253	1100615
1135016-10	Hg(F5)	Soil	N/A	475000	J	3440	8600	ng/g dry	B111321	1100639

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11MP41SB06										
1135016-06	%TS	Soil	N/A	92.85		0.01	0.02	%	B111254	N/A
1135016-06	Hg	Soil	N/A	3140	J H	21.1	63.3	ng/g dry	B111322	1100605
1135016-06	Hg(F1)	Soil	N/A	26.7	H	0.20	0.51	ng/g dry	B111252	1100608
1135016-06	Hg(F2)	Soil	N/A	55.7	H	0.20	0.50	ng/g dry	B111319	1100624
1135016-06	Hg(F3)	Soil	N/A	113	H	2.05	5.13	ng/g dry	B111320	1100635
1135016-06	Hg(F4)	Soil	N/A	1240	H	205	513	ng/g dry	B111253	1100615
1135016-06	Hg(F5)	Soil	N/A	1580	H	65.6	164	ng/g dry	B111321	1100639
11MP71SS										
1135016-08	%TS	Soil	N/A	82.17		0.01	0.02	%	B111254	N/A
1135016-08	Hg	Soil	N/A	379	J H	11.8	35.4	ng/g dry	B111322	1100605
1135016-08	Hg(F1)	Soil	N/A	5.48	H	0.23	0.58	ng/g dry	B111252	1100608
1135016-08	Hg(F2)	Soil	N/A	1.59	H	0.24	0.60	ng/g dry	B111319	1100624
1135016-08	Hg(F3)	Soil	N/A	246	H	23.4	58.6	ng/g dry	B111320	1100635
1135016-08	Hg(F4)	Soil	N/A	31.7	H	5.86	14.6	ng/g dry	B111253	1100615
1135016-08	Hg(F5)	Soil	N/A	162	H	1.88	4.69	ng/g dry	B111321	1100639
11RD03SB06										
1135016-03	%TS	Soil	N/A	90.27		0.01	0.02	%	B111254	N/A
1135016-03	Hg	Soil	N/A	364000	J H	2090	6280	ng/g dry	B111322	1100605
1135016-03	Hg(F1)	Soil	N/A	7080	H	103	258	ng/g dry	B111252	1100608
1135016-03	Hg(F2)	Soil	N/A	44.7	H, B	25.8	64.6	ng/g dry	B111319	1100624
1135016-03	Hg(F3)	Soil	N/A	8010	H	827	2070	ng/g dry	B111320	1100635
1135016-03	Hg(F4)	Soil	N/A	52900	H	414	1030	ng/g dry	B111253	1100615
1135016-03	Hg(F5)	Soil	N/A	250000	H	6620	16500	ng/g dry	B111321	1100639
11RD03SB08										
1135016-02	%TS	Soil	N/A	88.53		0.01	0.02	%	B111254	N/A
1135016-02	Hg	Soil	N/A	332000	J H	1040	3120	ng/g dry	B111322	1100605
1135016-02	Hg(F1)	Soil	N/A	15000	H	113	282	ng/g dry	B111252	1100608
1135016-02	Hg(F2)	Soil	N/A	8040	H	28.2	70.5	ng/g dry	B111319	1100624
1135016-02	Hg(F3)	Soil	N/A	8520	H	902	2250	ng/g dry	B111320	1100635
1135016-02	Hg(F4)	Soil	N/A	51900	H	451	1130	ng/g dry	B111253	1100615
1135016-02	Hg(F5)	Soil	N/A	225000	H	3610	9020	ng/g dry	B111321	1100639

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11RD03SB10										
1135016-01	%TS	Soil	N/A	87.66		0.01	0.02	%	B111254	N/A
1135016-01	Hg	Soil	N/A	54100	J H	1070	3200	ng/g dry	B111322	1100605
1135016-01	Hg(F1)	Soil	N/A	1950	H	11.4	28.6	ng/g dry	B111252	1100608
1135016-01	Hg(F2)	Soil	N/A	30.7	H, B	28.6	71.5	ng/g dry	B111319	1100624
1135016-01	Hg(F3)	Soil	N/A	1490	H	114	286	ng/g dry	B111320	1100635
1135016-01	Hg(F4)	Soil	N/A	12200	H	458	1140	ng/g dry	B111253	1100615
1135016-01	Hg(F5)	Soil	N/A	40900	H (MS)	3660	9160	ng/g dry	B111321	1100639
11RD07SB12										
1135016-14	%TS	Soil	N/A	86.75		0.01	0.02	%	B111254	N/A
1135016-14	Hg	Soil	N/A	10800		108	324	ng/g dry	B111322	1100626
1135016-14	Hg(F1)	Soil	N/A	97.1	J J	11.7	29.3	ng/g dry	B111252	1100608
1135016-14	Hg(F2)	Soil	N/A	33.3	J J	1.17	2.93	ng/g dry	B111319	1100624
1135016-14	Hg(F3)	Soil	N/A	510	J J	23.4	58.6	ng/g dry	B111320	1100635
1135016-14	Hg(F4)	Soil	N/A	1060	J J	58.6	147	ng/g dry	B111253	1100615
1135016-14	Hg(F5)	Soil	N/A	2260	J J (MS)	37.5	93.8	ng/g dry	B111321	1100639
11RD20SB18										
1135016-15	%TS	Soil	N/A	84.19		0.01	0.02	%	B111254	N/A
1135016-15	Hg	Soil	N/A	44600		219	656	ng/g dry	B111322	1100626
1135016-15	Hg(F1)	Soil	N/A	71.2		12.2	30.4	ng/g dry	B111252	1100608
1135016-15	Hg(F2)	Soil	N/A	2.25	J	0.24	0.60	ng/g dry	B111319	1100624
1135016-15	Hg(F3)	Soil	N/A	647	J	24.4	60.9	ng/g dry	B111320	1100635
1135016-15	Hg(F4)	Soil	N/A	894	J	24.4	60.9	ng/g dry	B111253	1100615
1135016-15	Hg(F5)	Soil	N/A	29600	J	195	487	ng/g dry	B111321	1100639
11RD20SB20										
1135016-16	%TS	Soil	N/A	83.92		0.01	0.02	%	B111254	N/A
1135016-16	Hg	Soil	N/A	10300		110	330	ng/g dry	B111322	1100626
1135016-16	Hg(F1)	Soil	N/A	35.9		5.86	14.7	ng/g dry	B111252	1100608
1135016-16	Hg(F2)	Soil	N/A	0.82	J	0.23	0.57	ng/g dry	B111319	1100624
1135016-16	Hg(F3)	Soil	N/A	82.7	J	11.7	29.3	ng/g dry	B111320	1100635
1135016-16	Hg(F4)	Soil	N/A	1380	J	58.6	147	ng/g dry	B111253	1100615
1135016-16	Hg(F5)	Soil	N/A	6590	J (MS)	375	938	ng/g dry	B111321	1100639

11/15/11

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
11RS01SB12										
1135016-07	%TS	Soil	N/A	75.95		0.01	0.02	%	B111254	N/A
1135016-07	Hg	Soil	N/A	5290	J H, M	30.1	90.4	ng/g dry	B111322	1100605
1135016-07	Hg(F1)	Soil	N/A	18.0	J H	0.41	1.03	ng/g dry	B111252	1100608
1135016-07	Hg(F2)	Soil	N/A	0.70	UJ H (M)	0.25	0.63	ng/g dry	B111319	1100624
1135016-07	Hg(F3)	Soil	N/A	776	J H, M	125	314	ng/g dry	B111320	1100635
1135016-07	Hg(F4)	Soil	N/A	1950	J H, M	62.7	157	ng/g dry	B111253	1100615
1135016-07	Hg(F5)	Soil	N/A	1680	J H, M	100	251	ng/g dry	B111321	1100639
11SM10SB10										
1135016-05	%TS	Soil	N/A	89.74		0.01	0.02	%	B111254	N/A
1135016-05	Hg	Soil	N/A	31300	J H	217	650	ng/g dry	B111322	1100605
1135016-05	Hg(F1)	Soil	N/A	403	J H, J	11.0	27.4	ng/g dry	B111252	1100608
1135016-05	Hg(F2)	Soil	N/A	2390	J H, J	11.0	27.4	ng/g dry	B111319	1100624
1135016-05	Hg(F3)	Soil	N/A	1100	J H, J	110	274	ng/g dry	B111320	1100635
1135016-05	Hg(F4)	Soil	N/A	7450	J H, J (M)	438	1100	ng/g dry	B111253	1100615
1135016-05	Hg(F5)	Soil	N/A	8770	J H, J	701	1750	ng/g dry	B111321	1100639
11SM31SB06										
1135016-09	%TS	Soil	N/A	91.43		0.01	0.02	%	B111254	N/A
1135016-09	Hg	Soil	N/A	24800	J H	210	629	ng/g dry	B111322	1100605
1135016-09	Hg(F1)	Soil	N/A	514	H	11.2	27.9	ng/g dry	B111252	1100608
1135016-09	Hg(F2)	Soil	N/A	1700	H	11.2	27.9	ng/g dry	B111319	1100624
1135016-09	Hg(F3)	Soil	N/A	1290	H	112	279	ng/g dry	B111320	1100635
1135016-09	Hg(F4)	Soil	N/A	5930	H (M)	223	558	ng/g dry	B111253	1100615
1135016-09	Hg(F5)	Soil	N/A	11200	H	715	1790	ng/g dry	B111321	1100639
11UP11SB04										
1135016-04	%TS	Soil	N/A	80.26		0.01	0.02	%	B111254	N/A
1135016-04	Hg	Soil	N/A	123	J H	12.1	36.2	ng/g dry	B111322	1100605
1135016-04	Hg(F1)	Soil	N/A	2.08	~~J H~~ UJ (M)	0.24	0.60	ng/g dry	B111252	1100608
1135016-04	Hg(F2)	Soil	N/A	0.24	J H, J, V	0.24	0.61	ng/g dry	B111319	1100624
1135016-04	Hg(F3)	Soil	N/A	40.8	J H, J	2.42	6.05	ng/g dry	B111320	1100635
1135016-04	Hg(F4)	Soil	N/A	20.0	J H, J	2.42	6.05	ng/g dry	B111253	1100615
1135016-04	Hg(F5)	Soil	N/A	7.41	J H, J (M)	0.97	2.42	ng/g dry	B111321	1100639

9/15/11

Method Blanks & Reporting Limits

Batch: B111322
Matrix: Soil/Sediment
Method: EPA 1631 Appendix
Analyte: Hg

Sample	Result	Units
B111322-BLK1	0.003	ng/g
B111322-BLK2	0.003	ng/g
B111322-BLK3	0.006	ng/g
B111322-BLK4	0.004	ng/g

Average: 0.00 **Standard Deviation:** 0.00 **MDL:** 0.05
Limit: 0.10 **Limit:** 0.03 **MRL:** 0.15

11/15/11

Method Blanks & Reporting Limits

Batch: B111252
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F1)

Sample	Result	Units
B111252-BLK1	0.13	ng/g
B111252-BLK2	0.08	ng/g
B111252-BLK3	0.05	ng/g
B111252-BLK4	0.11	ng/g

Average: 0.09 **Standard Deviation:** 0.04 **MDL:** 0.19
Limit: 0.39 **Limit:** 0.13 **MRL:** 0.48

11/15/11

Method Blanks & Reporting Limits

Batch: B111319
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F2)

Sample	Result	Units
B111319-BLK1	0.17	ng/g
B111319-BLK2	0.16	ng/g
B111319-BLK3	0.17	ng/g
B111319-BLK4	0.09	ng/g

Average: 0.15 **Standard Deviation:** 0.04 **MDL:** 0.20
Limit: 0.39 **Limit:** 0.13 **MRL:** 0.49

11/15/11

Method Blanks & Reporting Limits

Batch: B111320
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F3)

Sample	Result	Units
B111320-BLK1	0.67	ng/g
B111320-BLK2	0.58	ng/g
B111320-BLK3	0.65	ng/g
B111320-BLK4	0.55	ng/g

Average: 0.61 **Standard Deviation:** 0.06 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Method Blanks & Reporting Limits

Batch: B111253
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F4)

Sample	Result	Units
B111253-BLK1	0.37	ng/g
B111253-BLK2	0.53	ng/g
B111253-BLK3	0.50	ng/g
B111253-BLK4	0.38	ng/g

Average: 0.45 **Standard Deviation:** 0.08 **MDL:** 2.00
Limit: 4.00 **Limit:** 1.33 **MRL:** 5.00

11/15/11

Project ID: COL-KE1101
PM: Tiffany Stilwater

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1135016
Client PM: Ed Wallace
Client PO: K1107701

Method Blanks & Reporting Limits

Batch: B111321
Matrix: Soil/Sediment
Method: SOP BR-0013
Analyte: Hg(F5)

Sample	Result	Units
B111321-BLK1	0.09	ng/g
B111321-BLK2	-0.06	ng/g
B111321-BLK3	0.10	ng/g
B111321-BLK4	-0.03	ng/g

Average: 0.03 **Standard Deviation:** 0.08 **MDL:** 0.80
Limit: 1.60 **Limit:** 0.53 **MRL:** 2.00

11/15/11

C1

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

BRL Report 1135016

Project Number: K1107701
Project Manager: Ed Wallace

1135016

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1107701-001	11RD03SB10	1	Soil	8/4/11	1216	Brooks Rand	X
K1107701-002	11RD03SB08	1	Soil	8/4/11	1209	Brooks Rand	X
K1107701-003	11RD03SB06	1	Soil	8/4/11	1145	Brooks Rand	X
K1107701-007	11UP11SB04	1	Soil	8/5/11	1537	Brooks Rand	X
K1107701-013	11SM10SB10	1	Soil	8/7/11	1851	Brooks Rand	X
K1107701-020	11MP41SB06	1	Soil	8/6/11	1526	Brooks Rand	X
K1107701-022	11RS01SB12	1	Soil	8/8/11	1155	Brooks Rand	X
K1107701-028	11MP71SS	1	Soil	8/2/11	1650	Brooks Rand	X
K1107701-031	11SM31SB06	1	Soil	8/7/11	0907	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1107701-001,2,3,7,13,20,22,28,31 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Emw 8/19/11

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic(PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	___RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: _____ Requested Report Date: 09/04/11	___ I. Results Only ___ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD X	PO# K1107701 Bill to

Relinquished By: [signature] 8/22/11 1345 Received By: [signature] 8/22/11 1000 Airbill Number:

Columbia Analytical Services, Inc. Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

CAS Contact: Ed Wallace

BRL Report 1135016

Project Number: K1107697
Project Manager: Ed Wallace

1135016

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	MISC_OUT_1 None
K1107697-001	11MP38SB10		Soil	8/11/11	1450	Brooks Rand	X
K1107697-010	11MP36SB04		Soil	8/9/11	1431	Brooks Rand	X
K1107697-011	11MP34SB04		Soil	8/9/11	1559	Brooks Rand	X
K1107697-022	11DS01SB06		Soil	8/8/11	1559	Brooks Rand	X
K1107697-025	11RD07SB12		Soil	8/8/11	1752	Brooks Rand	X
K1107697-028	11RD20SB18		Soil	8/10/11	1619	Brooks Rand	X
K1107697-029	11RD20SB20		Soil	8/10/11	1626	Brooks Rand	X

Test Comments
MISC_OUT_1 - None K1107697-001,10,11,22,25,28,29 BRL SOP #BR-0013 -Mercury SSE Send to Brooks Rand,Seattle

Emw
8/22/11

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Please provide the electronic (PDF and EDD) report to the following e-mail address: kelso_data@caslab.com	___RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: ___ Requested Report Date: 09/04/11	___ I. Results Only ___ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries X IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Yes	PO# K1107697 Bill to

Relinquished By: [signature] 8/22/11 1345 Received By: [signature] 8/23/11 1000 Airbill Number: