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March 29, 2010

Mr. Larry Beck
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**RE: Groundwater and Surface Water Sampling At Red Devil Mine Site, Alaska,
October 2009**

This report presents the results of Ecology and Environment, Inc.'s (E & E's) October 2009 groundwater and surface water sampling at the Red Devil Mine (RDM) site. The RDM is located within Township 19 North, Range 44 West, Southeast ¼ of Section 6, Sleetmute D-4 Quadrangle, Seward Meridian. Its approximate coordinates are: 61°, 45', 38.1" N latitude, 157° 18' 42.7" W longitude, North American Datum 1927 (NAD 27).

E & E has been tasked by the Bureau of Land Management (BLM) to perform this work under Contract GS-10F-0160J, Order Number L09PD02160. The purpose of this sampling event is to collect groundwater and surface water data and to evaluate possible changes in groundwater and surface water quality in Red Devil Creek (RDC) over time.

Background

The RDM site is an abandoned cinnabar mine and mercury retorting site next to the Kuskokwim River, approximately 250 miles west of Anchorage. BLM has been conducting cleanup of this site since the late 1980's. As part of that cleanup effort, five groundwater monitoring wells were installed at the site during 2000. Annual groundwater monitoring is currently being conducted at the RDM site and analyzed for mercury, arsenic, lead, and antimony. Each round of sampling has occurred in late summer or early fall. In 2009, groundwater was monitored in June and September.

A diesel fuel release from a former above-ground storage tank #5 (AST5) occurred on the site. The site's ASTs were removed in 2003. In 2006, the contaminated soil beneath former AST #5 was partially excavated and stockpiled on site. The full extent of the plume has not been determined. Free-phase hydrocarbon product was observed on the surface of water that seeped into, and pooled within the excavation. The water infiltrating the excavation was believed to be precipitation following heavy rainfall. It was not determined if groundwater had been impacted by the hydrocarbon contamination.

Groundwater testing for hydrocarbon constituents, including gasoline range organics (GRO), diesel range organics (DRO), and benzene, toluene, ethylbenzene and xylenes

(BTEX), was initiated in 2007 to evaluate the potential impact to ground water down gradient of the AST5 release.

Field Activities

The field activities were conducted by E & E personnel on October 6 and 7, 2009. Field activities were conducted in accordance with the September 2009 work plan (E & E 2009) except as noted below. Field logbook notes are provided in Attachment 1.

Mapping Activities

Surface water sampling has been conducted previously at several sampling stations at the site (locations SW-1 through SW-5). The coordinates of these locations had not previously been surveyed, although the locations are staked and illustrated in site photographs. The field team located the historical sampling locations in the field based on this information. The team surveyed the surface water sampling station locations on October 7, 2009, using a Trimble Geo XH global positioning system (GPS). The coordinates are provided in Table 1 and illustrated in Figure 1.

Groundwater Sampling

Groundwater sampling was conducted by E & E personnel on October 6 and 7, 2009. All purging and sampling activities for all samples, regardless of whether the samples were collected for low-detection limit analyses or not, were conducted using ultraclean methods described in USEPA 1669 (EPA 1996a).

Prior to sample collection, each well was sounded with an electronic water level meter to determine static water level, measured to the nearest 0.01 foot. Each well was purged and sampled using a low-flow purging and sampling technique following EPA's *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, EPA/540/S-95/504, (EPA 1996b). For each well, a length of dedicated Teflon-lined tubing was lowered slowly into the well to minimize any potential disturbance of the water column. The tubing was lowered within the water column until the intake of the tubing was positioned slightly above the middle of the water column within the well. A battery-operated peristaltic pump outfitted with dedicated Teflon-lined tubing was used to purge and sample the wells. The wells were purged at rates of between 0.1 and 0.24 liters/minute, less than the target maximum rate of 0.5 liters/minute. During purging, water levels were monitored with the water level indicator. Drawdown levels during purging ranged from 0.05 to 1.11 feet. During purging, field water quality parameters including pH, temperature, specific conductance, turbidity, dissolved oxygen (DO), and reduction-oxidation (redox) potential were measured to determine when stabilization was achieved. Water quality parameters were measured using a YSI 6920 V2 water quality meter. Field parameters were measured every several minutes (typically every 2 or 3 minutes) during purging. Field parameters were considered stabilized after all parameters had stabilized for three successive readings. The purging details are presented in Table 2 and in the field logbook (Attachment 1).

Groundwater samples were collected from monitoring wells MW-1, MW-4, MW-3, and MW-6. MW-7 was not sampled because it was determined to be dry at the time of the

sampling event. Sample aliquots were collected in accordance with the September 2009 work plan (E & E 2009) except as noted in the laboratory analysis section below. Samples were collected directly into the appropriate pre-preserved sample containers. Dissolved metals aliquots were collected using an in-line 0.45 micron filter.

Following sample collection at each well, purge water was discharged directly to the ground surface.

Surface Water Sampling

The team collected surface water samples on October 7, 2009. Samples were collected from previously designated sampling locations along RDC (SW-1, SW-2, SW-4, and SW-5) and a spring/seep (SW-3) that flows into RDC between sampling stations SW-2 (upstream of confluence of spring/seep flow into RDC) and SW-4 (downstream of confluence of spring/seep flow into RDC). Samples were collected starting from near the confluence of RDC with the Kuskokwim River then working upstream to avoid stirring sediments that could impact turbidity and contaminant concentrations at downstream locations. All sampling activities for all samples, regardless of whether the samples were collected for low-detection limit analyses or not, were conducted using ultraclean methods described in USEPA 1669 (EPA 1996a). Sample aliquots were collected in accordance with the September 2009 work plan (E & E 2009).

Following sample collection at each location, field water quality parameters (pH, temperature, specific conductance, turbidity and redox potential) were measured using an YSI 6920 V2 water quality meter. Surface water quality field data is presented in Table 3.

Laboratory Analysis

The water samples were submitted, following chain-of-custody procedures, to Analytical Resources, Inc (ARI) and Brooks Rand Labs, LLC (BRL) both located in Seattle, Washington.

BRL analyzed for the following compounds:

- Total mercury (low detection limit) following Environmental Protection Agency (EPA) Method 1931, Revision E;
- Methyl mercury following EPA 1630; and
- Arsenic speciation following EPA1632.

ARI analyzed for the following compounds:

- Total target analyte list (TAL) metals following EPA 6010/6020 series;
- Total arsenic, lead, antimony, and iron (subset of TAL metals) following EPA 6020;
- Total mercury following EPA 7470;
- Dissolved TAL metals following EPA 6020A;
- Gasoline range organics (GRO)/ benzene, toluene, ethylbenzene, and xylenes (BTEX) following AK 101 and EPA 8021B; and

- Diesel range organics (DRO)/residual range organics (RRO) following AK 102 and AK 103.

Several sample aliquots that were planned for collection from MW-7 if that well contained water were alternatively planned for collection from well MW-6 if MW-7 was dry. As noted above, MW-7 was dry at the time of sampling. However, only the originally planned aliquots were collected from MW-6 (total metals, total low-level mercury, GRO/BTEX, and DRO/RRO). This omission was not realized until after conclusion of sampling. Given the tight schedule constraints to demobilize from the site, it was not feasible to re-purge and re-sample the well. Upon delivery of the samples to the respective laboratories, E & E directed BRL to utilize the total low-level mercury aliquot for methyl mercury analysis also. Because all aliquots submitted to both laboratories for all analyses were field-preserved (with either nitric acid or hydrochloric acid), it was not possible to analyze for dissolved metals with any of the water sample aliquots.

Copies of the laboratory reports are provided in Attachment 2.

Quality Assurance Summary

The laboratories used for this project follow on-going quality assurance/quality control procedures to evaluate conformance to applicable Alaska Department of Environmental Conservation (ADEC) data quality objectives (DQO). Internal laboratory controls to assess data quality for this project include method blank, matrix spike/matrix spike duplicates (MS/MSD), surrogate compound recovery, and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to determine precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the case narrative section of their report (See Attachment 2).

External quality controls include field duplicate samples and a water trip blank. One set of field primary and duplicate water samples (09RDMMW03 and 09RDMMW08) was submitted to the laboratory to assess sample homogeneity, and sampling and analytical precision. The trip blank accompanied the water sample bottles from the laboratory to the site during sampling activities and back again to the laboratories. The trip blank, 09RDMTB01, did not contain any detectable concentrations of volatile organics (GRO or BTEX), indicating that the samples were not cross contaminated or exposed to contamination from shipping, field sampling procedures, and storage process.

An E & E chemist reviewed the laboratory data deliverables and completed the ADEC's Laboratory Data Review Checklist, included in Attachment 2. No nonconformances that would adversely impact data usability were noted. Based on this quality assurance summary, we find the project data to be useable for the intended uses.

Analytical Results

Analytical results for groundwater samples and surface water samples are summarized in Tables 4 and 5, respectively. The analytical results for groundwater samples were

compared to the cleanup levels listed in Alaska Department of Environmental Conservation's (ADEC) Oil and Other Hazardous Substances Pollution Control Regulations of 18 Alaska Administrative Code (AAC) 75, Table C (ADEC 2008). The analytical results for surface water were compared to the cleanup levels listed in ADEC's Alaska Water Quality Criteria Manual for Toxic And Other Deleterious Organic And Inorganic Substances Tables 1, 2, 3, and 5 (ADEC 2003).

Groundwater

Total and dissolved metals were detected in all groundwater samples. The total antimony concentrations exceeded the cleanup in MW-3 (original and field duplicate) and MW-4, at maximum concentrations of 740 micrograms per liter ($\mu\text{g/L}$) and 38.9 $\mu\text{g/L}$, respectively. Total arsenic was detected above the cleanup level in samples from MW-1, MW-3 (original and field duplicate), and MW-6 at a maximum concentrations of 12.9 $\mu\text{g/L}$, 48.2 $\mu\text{g/L}$, and 28.9 $\mu\text{g/L}$, respectively. No other metal was detected in groundwater at concentrations above ADEC cleanup levels. Total mercury was detected below the cleanup level at concentrations ranging from 9.73 nanograms per liter (ng/L) at MW-3 to 41.3 ng/L at MW-1.

There was little difference between the total and dissolved metals concentrations. For example, at MW-3, the total antimony concentration (740 $\mu\text{g/L}$) was only slightly higher than the dissolved antimony concentration (736 $\mu\text{g/L}$), and the total arsenic result (48.2 $\mu\text{g/L}$) was only slightly higher than the dissolved arsenic result (46.7 $\mu\text{g/L}$). Total and dissolved concentrations of other metals were also similar. This is interpreted to indicate that the low-flow purging and sampling technique resulted in samples that are representative of actual dissolved-phase groundwater conditions. Although direct comparison of total and dissolved metals results are not available for direct comparison for other wells, it is likely that the total metals results for the other wells are equally representative of actual aquifer conditions at those sampling locations. This is supported by the low turbidity values measured during purging for all wells (see Attachment 1 and Table 2).

No methyl mercury was detected in any sample at a reporting limit of 0.020 ng/L .

Field duplicate concentrations for total metals, dissolved metals, and methyl mercury were similar to those of the original samples.

Three samples (MW-3 original sample, MW-3 field duplicate, and MW-4) were analyzed for three species of arsenic: arsenic (III), inorganic arsenic, and arsenic (V). Arsenic (III) results ranged from 0.861 $\mu\text{g/L}$ (MW-3) to 3.91 $\mu\text{g/L}$ (MW-4). Inorganic arsenic results ranged from 10.4 $\mu\text{g/L}$ in MW-4 to 45.3 in MW-3. Arsenic (V) results ranged from 6.49 $\mu\text{g/L}$ in MW-4 to 44.4 $\mu\text{g/L}$. The relative percent difference of detected inorganic arsenic and arsenic (V) between the original and field duplicate at MW-3 were outside the control limit. These data are therefore qualified as estimated results.

There were no detections of GRO, DRO, RRO or BTEX in any samples.

There were no detections of any chemical analyzed for in the equipment rinsate sample.

Surface Water

Surface water total metals sample results exceeded the ADEC water quality criteria in at least one sample for antimony, arsenic, iron and mercury. Total antimony exceedances ranged from 67.7 µg/L at SW-3 to 214 µg/L at SW-5. Total arsenic exceedances ranged from 62 µg/L at SW-4 to 1,020 µg/L at spring/seep location SW-3. There was one exceedance of the criteria for total iron, detected at spring/seep location SW-3 at 1,850 µg/L. Total mercury exceedances ranged from 60.7 ng/L at SW-2 to 683 ng/L at SW-4. Methyl mercury was detected at SW-5 at 0.168 ng/L.

Arsenic speciation analysis was performed on the sample from SW-5. Arsenic (III), inorganic arsenic, and arsenic (V) were detected at 2.57 µg/L, 108 µg/L, and 105 µg/L, respectively.

No GRO, DRO, RRO, or BTEX were detected in the surface water sample from SW-5.

Trend Analysis

Historical and October 2009 concentrations of total mercury, arsenic, antimony, lead, RRO, DRO, GRO, and BTEX in the groundwater samples are presented in Table 6. Results the 2000 through 2006 sampling events were obtained from the 2008 groundwater monitoring report (Shannon & Wilson 2008). Results from the June and September 2009 events were obtained from the laboratory reports (SGS North America Inc. 2009a and 2009b) and do not include a separate data validation or sampling report.

Trends of total mercury, arsenic, antimony and lead sample concentrations for the monitoring wells are presented in Figure 2. In October 2009 groundwater samples, detected concentrations of total antimony, arsenic and mercury were lower than the concentrations in all or most previous sampling events for all wells sampled. Total mercury concentrations in all October 2009 samples were significantly lower in October 2009 than in all historical samples. Total arsenic concentrations in October 2009 were significantly lower than all previous sampling events for all wells except MW-6; the October 2009 concentration in the MW-6 sample was near the low end of the historical range (between 25.4 and 512 µg/L). The total antimony concentrations in MW-1 and MW-6 were significantly lower than in all previous sampling events. The total antimony concentrations were near the low ends of the historical range in MW-3 (between 556 and 1,250 µg/L) and MW-4 (between 9.07 and 903 µg/L). Total lead was not detected above the detection limit of 0.5 µg/L in any monitoring well sampled in October 2009; total lead has been detected in historical samples from all wells at concentrations ranging from 8.07 µg/L (MW-4) to 55.6 µg/L (MW-6). No October 2009 results are available for MW-7 because the well was dry. Review of historical results indicates significant variability in total antimony, arsenic, mercury, and lead concentrations.

It should be noted that in historical sampling events, wells were purged and sampled using bailers. Use of bailers to purge and sample groundwater may cause adverse impacts on sample quality resulting from mobilization of otherwise immobile artificial

particles within the aquifer. The inclusion of such particles may result in an overestimation of certain analytes of interest, including metals or hydrophobic organic compounds (EPA 1996b). Such potential impacts on sample quality may be assessed by comparison of total metals results to dissolved metals results, evaluation of total suspended solids (TSS) sample results, or evaluation of field turbidity measurements. However, no dissolved metals or TSS sample results or field turbidity measurements for previous sampling events are available.

All groundwater samples collected in October 2009 were collected using a low-flow purging/sampling technique. Several key advantages of low-flow purging/sampling with respect to sample quality are listed below (EPA 1996b):

- Results in samples that are representative of the mobile load of contaminants present (dissolved and colloid-associated);
- Minimal disturbance of the sampling point, thereby minimizing sampling artifacts;
- Less operator variability and greater operator control;
- Reduced stress on the formation (minimal drawdown);
- Less mixing of stagnant casing water with formation water;
- Reduced need for filtration and, therefore, less time required for sampling;
- Better sample consistency and reduced artificial sample variability.

It appears likely that the concentrations of total metals in October 2009 groundwater samples are generally lower than in previous sampling events because a low-flow purging/sampling method was used rather than purging/sampling with bailers. Furthermore, it appears likely that much of the historical variability of sample concentrations may be an artifact of sampling methodology rather than an indication of actual groundwater conditions. However, this cannot be confirmed with available data. Possible seasonal or longer-term temporal trends in groundwater concentrations or other factors may have influenced historical groundwater sample results. Given the uncertainties described above, it is not possible to identify or evaluate possible temporal trends in groundwater concentrations based on the historical data.

Although surface water samples were collected and analyzed in June and September 2009, these data have not been validated and trends could not be determined.

Conclusions

Antimony was detected in October 2009 groundwater samples from MW-3 and MW-4 at concentrations greater than the ADEC groundwater cleanup level. Arsenic was detected in October 2009 groundwater samples from MW-1, MW-3, and MW-6 at concentrations greater than the ADEC groundwater cleanup level. No other metals were detected in October 2009 groundwater samples at concentrations exceeding ADEC groundwater cleanup levels. GRO, DRO, RRO or BTEX were not detected in any groundwater samples.

It appears likely that the concentrations of total metals in October 2009 groundwater samples are generally lower than in previous sampling events because a low-flow

purging/sampling method was used rather than purging/sampling with bailers. Furthermore, it appears likely that much of the historical variability of sample concentrations may be an artifact of sampling methodology rather than an indication of actual groundwater conditions. It is not possible to identify or evaluate possible temporal trends in groundwater concentrations based on the historical data.

In October 2009, surface water total metals results exceeded the ADEC water quality criteria for: antimony (RDC locations SW-2 and SW-5 and spring/seep location SW-3); arsenic (RDC locations SW-4 and SW-5 and spring/seep location SW-3); mercury (RDC locations SW-2, SW-4, and SW-5 and spring/seep location SW-3); and iron (spring/seep location SW-3). No GRO, DRO, RRO, or BTEX were detected in the surface water sample from SW-5.

Please contact me or Mark Longtine at (206) 624-9537 if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read "William Richards". The signature is cursive and somewhat stylized.

William Richards
Project Manager

References

Alaska Department of Environmental Conservation. May 15, 2003. *Alaska Water Quality Criteria Manual for Toxic And Other Deleterious Organic And Inorganic Substances Tables 1, 2, 3, and 5.*

Alaska Department of Environmental Conservation. October 9, 2008. *Oil and Other Hazardous Substances Pollution Control Regulations of 18 Alaska Administrative Code (AAC) 75, Table C.*

Ecology and Environment, Inc. (E & E). September 30, 2009. *Work Plan For Groundwater And Surface Water Sampling at Red Devil Mine, Alaska.*

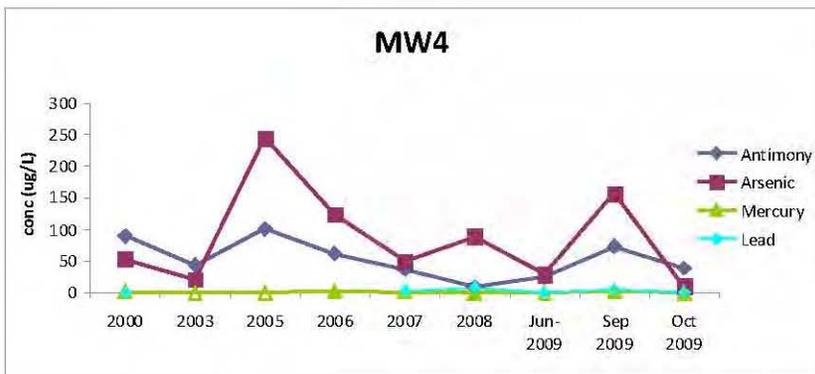
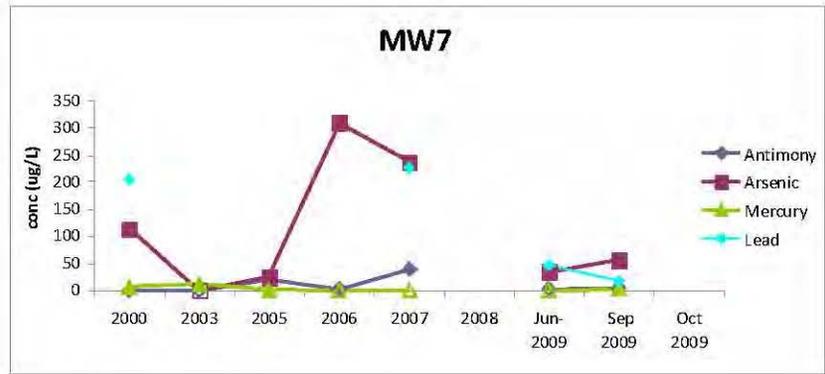
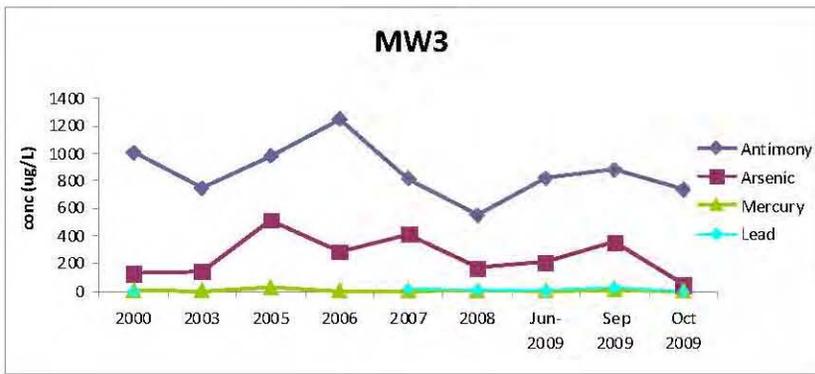
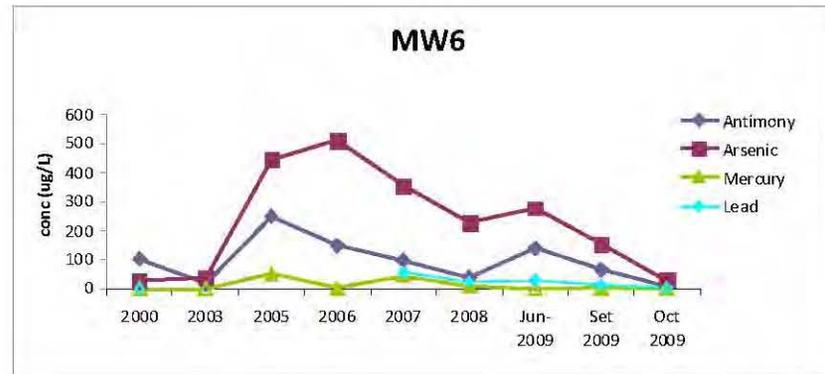
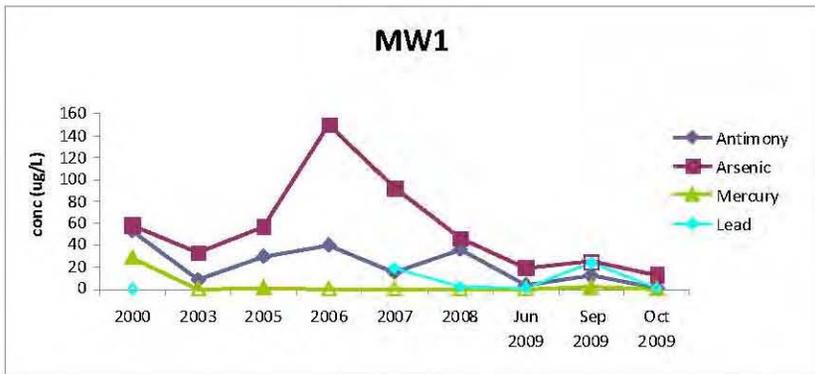
Shannon & Wilson, Inc. November 20, 2008. Letter Mr. Wayne Svejnoha, BLM-AK Alaska State Office regarding Groundwater Monitoring, Red Devil Mine, Red Devil, Alaska.

SGS North America Inc. July 26, 2009a. Level II Laboratory Data Report.

SGS North America Inc. September 25, 2009b. Preliminary Laboratory Analysis Report.

United States Environmental Protection Agency (EPA). 1996a. Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels.

United States Environmental Protection Agency (EPA). 1996b. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504.



Notes:
 June and September 2009 data not validated.
 2000 through 2008 results obtained from Shannon & Wilson, Inc. 2008.
 Non-detects are presented as open points at one-half the detection limit, if known, or at zero if the detection limit is not known.



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Red Devil Mine, Alaska

Figure 2
 GRAPHICAL REPRESENTATIVE OF
 HISTORICAL GROUNDWATER DATA

Date:
 4/2/10

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TABLE 1: MONITORING WELL AND SURFACE WATER SAMPLING LOCATIONS

Location ID	X Coordinate	Y Coordinate
SW-5	-157.3114612	61.76162232
SW-4	-157.3148678	61.75993447
SW-3	-157.3150821	61.7598255
SW-2	-157.3150531	61.75981787
SW-1	-157.3165975	61.75891367
MW-1	-157.3159074	61.75889886
MW-3	-157.3142957	61.75985009
MW-4	-157.3156782	61.75971608
MW-6	-157.3139708	61.76052201
MW-7	-157.3160487	61.75819095

Latitude and Longitude in WGS 84

* MW Locations from Harding Lawson Associates/Wilder Construction Company. March 2001. *Red Devil Mine Retort Building Demolition and Limited Site Investigation*.

* SW Locations taken during October 2009 sampling event using a Trimble Geo XH GPS unit

TABLE 2: MONITORING WELL SAMPLING LOG

MONITORING WELL PURGING AND SAMPLING DATA

Well Number	MW-1	MW-3	MW-4	MW-6	MW-7
Date Sampled	10/6/2009	10/7/2009	10/6/2009	10/7/2009	Well was dry on 10/7/2009
Time Sampled	17:30	13:20	18:55	17:25	-
Static Water Level (ft below top of casing)	22.27	23.01	27.77	19.29	-
Total Depth of Well (ft below top of casing) ^a	29.70	27.73	32.90	26.14	23.7
Water Column in Well (ft)	7.43	4.72	5.13	6.85	-
Diameter of Well Casing (inches)	2	2	2	2	-
Gallons per Foot	0.16	0.16	0.16	0.16	-
Water Column Volume (gallons)	1.21	0.77	0.84	1.12	-
Purging/Sampling Method	Low-flow with peristaltic pump	-			
Purge Rate (L/min)	0.2	0.2	0.1	0.24	-
Water Level Drawdown (ft)	1.11	0.17	0.05	0.11	-

FINAL WATER QUALITY FIELD MEASUREMENTS PRIOR TO SAMPLING

Well Number	MW-1	MW-3	MW-4	MW-6	MW-7
Temperature (°C)	4.50	5.38	4.81	4.54	-
Conductance (mS/cm)	0.430	0.428	0.450	0.509	-
pH	6.45	6.13	6.23	6.37	-
ORP (mV)	-15.7	217.8	143.8	13.6	-
Turbidity (NTU)	-1.6	15.2	-2.1	-0.7	-
Dissolved Oxygen (%DO)	14.7	16.0	32	5.7	-
Notes		air bubbles occasionally entered into flow - through cell and affected turbidity measurement			

Footnotes	Key	Description
a - For MW-1, MW-3, MW-4, and M-6 total depth was measured in 2008. For MW-7 depth was measured October 2009. Reported depth for MW-6 is the October 2009 value.	°C	Degrees Celsius
	ft	Feet
	L/min	Liters per Minute
	mS/cm	Millisiemens per Centimeter
	mV	Millivolt
	NTU	Nephelometric Turbidity Unit
	ORP	Oxidation reduction potential

TABLE 3: SURFACE WATER SAMPLING LOG

SURFACE WATER SAMPLING DATA

Surface Water Sample Location ID	SW-1	SW-2	SW-3	SW-4	SW-5
Date Sampled	10/7/2009	10/7/2009	10/7/2009	10/7/2009	10/7/2009
Time Sampled	16:10	15:55	15:50	15:30	14:50
Location Description	Above Beaver Pond.	In Red Devil Creek just upstream of road creek crossing.	From middle of spring located on west bank of Red Devil Creek. Noted yellowboy on bed of spring and in Red Devil Creek downstream of spring.	From middle of stream, in mixing zone of Red Devil Creek water and water impacted by spring (SW-3).	In Red Devil Creek near mouth of creek in Kuskokwim River.

WATER QUALITY FIELD DATA

Surface Water Sample Location ID	SW-1	SW-2	SW-3	SW-4	SW-5
Temperature (°C)	4.20	4.32	4.64	4.31	4.43
Conductance (mS/cm)	0.241	0.249	0.630	0.256	0.185
Conductance (µS/cm)	145	150	385	154	112
pH	7.21	7.05	6.68	6.82	6.96
ORP (mV)	41.1	3.2	-29.3	37.6	159.2
Turbidity (NTU)	-2.6	-2.3	0.0	-1.0	-2.6
Dissolved Oxygen (%DO)	91.7	91.1	30.7	92.6	93.4

Key	Description
°C	Degrees Celsius
ft	Feet
mS/cm	Millisiemens per Centimeter
µS/cm	Microsiemens per Centimeter
mV	Millivolt
NTU	Nephelometric Turbidity Unit
ORP	Oxidation reduction potential

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Analyte	Units	Method	Cleanup Level	MW-1 (09RDMMW01)	MW-3 (09RDMMW03)	MW-3 Field Duplicate (09RDMMW08)	MW-4 (09RDMMW04)	MW-6 (09RDMMW06)	Equipment Rinsate Blank (09RDMPR01)
Total Metals									
Aluminum	µg/L	EPA 6010B	NA	-	50 U	50 U	-	-	50 U
Antimony	µg/L	EPA 6020	6	1.3	740	727	38.9	5	0.2 U
Arsenic	µg/L	EPA 6020	10	12.9	48.2	46.9	9.6	28.9	0.2 U
Barium	µg/L	EPA 6020	2000	-	44	43.1	-	-	0.5 U
Beryllium	µg/L	EPA 6020	4	-	0.2 U	0.2 U	-	-	0.2 U
Cadmium	µg/L	EPA 6020	5	-	0.2 U	0.2 U	-	-	0.2 U
Calcium	µg/L	EPA 6010B	NA	-	26800	26300	-	-	50 U
Chromium	µg/L	EPA 6020	100	-	0.5 U	0.5 U	-	-	0.5 U
Cobalt	µg/L	EPA 6020	NA	-	0.2 U	0.2 U	-	-	0.2 U
Copper	µg/L	EPA 6020	1000	-	0.5 U	0.5 U	-	-	0.5 U
Iron	µg/L	EPA 6020	NA	20100	20 U	20 U	30	1060	20 U
Lead	µg/L	EPA 6020	15	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium	µg/L	EPA 6010B	NA	-	26300	26400	-	-	50 U
Manganese	µg/L	EPA 6020	NA	-	0.5 U	0.5 U	-	-	0.5 U
Mercury	µg/L	EPA 7470A	2	-	0.1 U	0.1 U	-	-	0.1 U
Nickel	µg/L	EPA 6020	100	-	1.3	1.3	-	-	0.5 U
Potassium	µg/L	EPA 6010B	NA	-	990	960	-	-	500 U
Selenium	µg/L	EPA 6020	50	-	2 U	1.2	-	-	0.5 U
Silver	µg/L	EPA 6020	100	-	0.2 U	0.2 U	-	-	0.2 U
Sodium	µg/L	EPA 6010B	NA	-	3370	3470	-	-	500 U
Thallium	µg/L	EPA 6020	2	-	0.2 U	0.2 U	-	-	0.2 U
Vanadium	µg/L	EPA 6020	260	-	0.2 U	0.2 U	-	-	0.2 U
Zinc	µg/L	EPA 6020	5000	-	4 U	4 U	-	-	4 U
Total Mercury (Low Detection Limit)	ng/L	EPA 1631	2000	41.3	9.73	9.77	81.0	11.8	0.15 U
Dissolved Metals									
Aluminum	µg/L	EPA 6010B	NA	-	50 U	50 U	-	-	50 U
Antimony	µg/L	EPA 6020	6	-	736	727	-	-	1 U
Arsenic	µg/L	EPA 6020	10	-	46.7	46.1	-	-	0.5 U
Barium	µg/L	EPA 6020	2000	-	42.2	42.5	-	-	0.5 U
Beryllium	µg/L	EPA 6020	4	-	0.2 U	0.2 U	-	-	0.2 U
Cadmium	µg/L	EPA 6020	5	-	0.2 U	0.2 U	-	-	0.2 U
Calcium	µg/L	EPA 6010B	NA	-	26400	27000	-	-	50 U
Chromium	µg/L	EPA 6020	100	-	0.5 U	0.5 U	-	-	0.5 U
Cobalt	µg/L	EPA 6020	NA	-	0.2 U	0.2 U	-	-	0.2 U
Copper	µg/L	EPA 6020	1000	-	0.5 U	0.5 U	-	-	1.6
Iron	µg/L	EPA 6020	NA	-	20 U	20 U	-	-	20 U
Lead	µg/L	EPA 6020	15	-	1 U	1 U	-	-	1 U
Magnesium	µg/L	EPA 6010B	NA	-	26300	26300	-	-	50 U
Manganese	µg/L	EPA 6020	NA	-	0.5 U	0.5 U	-	-	0.5 U
Mercury	µg/L	EPA 7470A	2	-	0.1 U	0.1 U	-	-	0.1 U
Nickel	µg/L	EPA 6020	100	-	1.1	1	-	-	0.5 U
Potassium	µg/L	EPA 6010B	NA	-	960	1020	-	-	500 U
Selenium	µg/L	EPA 6020	50	-	2 U	2 U	-	-	2 U
Silver	µg/L	EPA 6020	100	-	0.2 U	0.2 U	-	-	0.2 U
Sodium	µg/L	EPA 6010B	NA	-	3580	3530	-	-	500 U
Thallium	µg/L	EPA 6020	2	-	0.2 U	0.2 U	-	-	0.2 U
Vanadium	µg/L	EPA 6020	260	-	0.2 U	0.2 U	-	-	0.2 U
Zinc	µg/L	EPA 6020	5000	-	4 U	4 U	-	-	4 U
Methyl Mercury									
Methyl Mercury	ng/L	EPA 1630	NA	-	0.020 U	0.020 U	-	0.020 U	0.020 U
Arsenic Speciation									
Arsenic (III)	µg/L	EPA 1632	NA	-	0.861 M	0.906	3.91	-	0.008 U
Arsenic (inorganic)	µg/L	EPA 1632	NA	-	45.3 J	28.6 J	10.4 J	-	0.008 U
Arsenic (V)	µg/L	EPA 1632	NA	-	44.4 J	27.7 J	6.49 J	-	0.008 U

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Analyte	Units	Method	Cleanup Level	MW-1 (09RDMMW01)	MW-3 (09RDMMW03)	MW-3 Field Duplicate (09RDMMW08)	MW-4 (09RDMMW04)	MW-6 (09RDMMW06)	Equipment Rinsate Blank (09RDMPR01)
Organics									
Gasoline Range Organics (GRO)	mg/L	AK 101	2.2	-	0.10 U	0.10 U	-	0.10 U	0.10 U
Diesel Range Organics (DRO)	mg/L	AK 102	1.5	-	0.25 U	0.25 U	-	0.25 U	0.25 U
Residual Range Organics (RRO)	mg/L	AK 103	1.1	-	0.50 U	0.50 U	-	0.50 U	0.50 U
BTEX									
Benzene	µg/L	EPA 8012	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U
Toluene	µg/L	EPA 8012	1000	-	1.0 U	1.0 U	-	1.0 U	1.0 U
Ethylbenzene	µg/L	EPA 8012	700	-	1.0 U	1.0 U	-	1.0 U	1.0 U
m, p-Xylene	µg/L	EPA 8012	10,000 ^a	-	1.0 U	1.0 U	-	1.0 U	1.0 U
o-Xylene	µg/L	EPA 8012	10,000 ^a	-	1.0 U	1.0 U	-	1.0 U	1.0 U

Notes:

^a Cleanup level applies to total xylenes.

Bolded values indicate detected concentrations

Highlighted value indicates detected concentration exceeds cleanup level.

Key:

- Sample not tested for this analyte.

J Analyte detected but relative percent difference was outside control limits therefore concentration is estimated.

M Presence of material is verified but not quantified; the actual value is less than the value given. The level is too low to permit accurate quantification, but the estimated concentration is greater than the method detection limit.

µg/L Micrograms per liter.

mg/L Milligrams per liter.

ng/L Nanograms per liter.

NA Not applicable. No clean up level for given compound.

U Analyte was analyzed for but not detected. Value provided is reporting limit.

TABLE 5: SUMMARY OF SURFACE WATER ANALYTICAL RESULTS

Analyte	Units	Method	Water Quality Criteria	SW-1 (09RDMSW01)	SW-2 (09RDMSW02)	SW-3 (09RDMSW03)	SW-4 (09RDMSW04)	SW-5 (09RDMSW05)
Total Metals								
Aluminum	µg/L	EPA 6010B	87	-	-	-	-	49 U
Antimony	µg/L	EPA 6020	6	1.8	72.6	67.7	88.3	214
Arsenic	µg/L	EPA 6020	50	1.3	21.9	1,020	62.0	98.3
Barium	µg/L	EPA 6020	2000	-	-	-	-	31.4
Beryllium	µg/L	EPA 6020	4	-	-	-	-	0.2 U
Cadmium	µg/L	EPA 6020	5	-	-	-	-	0.2 U
Calcium	µg/L	EPA 6010B	NA	-	-	-	-	20,200
Chromium	µg/L	EPA 6020	11	-	-	-	-	0.5 U
Cobalt	µg/L	EPA 6020	50	-	-	-	-	0.2 U
Copper	µg/L	EPA 6020	3.1	-	-	-	-	0.9
Iron	µg/L	EPA 6020	1000	180	200	1,850	270	150
Lead	µg/L	EPA 6020	50	1 U	1 U	1 U	1 U	1 U
Magnesium	µg/L	EPA 6010B	NA	-	-	-	-	12,500
Manganese	µg/L	EPA 6020	50	-	-	-	-	17.7
Mercury	µg/L	EPA 7470A	0.050	-	-	-	-	0.2
Nickel	µg/L	EPA 6020	100	-	-	-	-	1.2
Potassium	µg/L	EPA 6010B	NA	-	-	-	-	500 U
Selenium	µg/L	EPA 6020	5.0	-	-	-	-	0.5 U
Silver	µg/L	EPA 6020	NA	-	-	-	-	0.2 U
Sodium	µg/L	EPA 6010B	NA	-	-	-	-	2,600
Thallium	µg/L	EPA 6020	1.7	-	-	-	-	0.2 U
Vanadium	µg/L	EPA 6020	100	-	-	-	-	0.2 U
Zinc	µg/L	EPA 6020	81	-	-	-	-	4 U
Total Mercury (Low Detection Limit)	ng/L	EPA 1631	50	24.8	60.7	209	683	163
Methyl Mercury								
Methyl Mercury	ng/L	EPA 1630	NA	-	-	-	-	0.168
Arsenic Speciation								
Arsenic (III)	µg/L	EPA 1632	NA	-	-	-	-	2.57
Arsenic (inorganic)	µg/L	EPA 1632	NA	-	-	-	-	108
Arsenic (V)	µg/L	EPA 1632	NA	-	-	-	-	105
Organics								
Gasoline Range Organics (GRO)	mg/L	AK 101	NA	-	-	-	-	0.10 U
Diesel Range Organics (DRO)	mg/L	AK 102	NA	-	-	-	-	0.25 U
Residual Range Organics (RRO)	mg/L	AK 103	NA	-	-	-	-	0.50 U
BTEX								
Benzene	µg/L	EPA 8012	5	-	-	-	-	1.0 U
Toluene	µg/L	EPA 8012	1000	-	-	-	-	1.0 U
Ethylbenzene	µg/L	EPA 8012	700	-	-	-	-	1.0 U
m, p-Xylene	µg/L	EPA 8012	10000	-	-	-	-	1.0 U
o-Xylene	µg/L	EPA 8012	10000	-	-	-	-	1.0 U

Notes:

Bolded values indicate detected concentrations

Highlighted value indicates detected concentration exceeds water quality criterion.

Key:

- Sample not tested for this analyte
- µg/L Micrograms per liter.
- mg/L Milligrams per liter.
- ng/L Nanograms per liter.
- NA Not applicable. No cleanup level for given compound.
- U Analyte was analyzed for but not detected. Value provided is reporting limit.

TABLE 6: HISTORICAL GROUNDWATER DATA

Sample Location	Year	Antimony (6)	Arsenic (10)	Mercury (2)	Lead (15)	RRO (1100)	DRO (1500)	GRO (2200)	BTEX ^a	
MW-1	2000	52.8	58.2	28.6	ND	-	-	-	-	
	2003	8*	33*	ND	-	-	-	-	-	
	2005	29.9	57.1	0.81	-	-	-	-	-	
	2006	40.3	150	ND	-	-	-	-	-	
	2007	15.6	92.7	0.200 U	19.1	-	-	-	-	
	2008	36.2	46.1	0.200 U	2.12	-	-	-	-	
	Jun-2009	3.5	19	0.200 U	1.14	-	-	-	-	
	Sep-2009	12	ND	1.87	23.7	-	-	-	-	
	Oct-2009	1.3	12.9	0.0413	1 U	-	-	-	-	
MW-3	2000	1010	129	5.31	ND	-	-	-	-	
	2003	751	148	1	-	-	-	-	-	
	2005	982	515	29	-	-	-	-	-	
	2006	1250	288	3.5	-	-	-	-	-	
	2007	819	416	0.26	19.7	ND	ND	ND	ND	
	2008	556	171	4.49	8.86	307 J	143 J	100 U	ND	
	Jun-2009	824	211	0.200 U	7.07	801	833 U	100 U	ND	
	Sep-2009	883*	358*	11.8*	24.8*	556 U	889 U	100 U	ND	
	Oct-2009	740*	48.2*	0.00973*	1 U	500 U	250 U	100 U	ND	
MW-4	2000	90.3	52.3	0.83	ND	-	-	-	-	
	2003	43.5	20.9	ND	-	-	-	-	-	
	2005	101	245	ND	-	-	-	-	-	
	2006	61.4	124	2	-	-	-	-	-	
	2007	37.1	49.5	1.25	3.38	-	-	-	-	
	2008	9.07	88.8	0.387	8.07	-	-	-	-	
	Jun-2009	24.8	29.2	0.200 U	1.06	-	-	-	-	
	Sep-2009	72.9	157	2.05	10 U	-	-	-	-	
	Oct-2009	38.9	9.6	0.081	1 U	-	-	-	-	
MW-6	2000	103	25.4	ND	ND	-	-	-	-	
	2003	15	36	ND	-	-	-	-	-	
	2005	250*	446*	49.6*	-	-	-	-	-	
	2006	150	512	2.38	-	-	-	-	-	
	2007	96.8	354	43.6	55.6	ND	ND	ND	ND	
	2008	39*	226*	9.32*	21.5*	301 J	174	100 U	ND	
	Jun-2009	139	278	0.200 U	29.2	500 U	800 U	100 U	ND	
	Sep-2009	64.1	153	1.02	12.2	521 U	822 U	100 U	ND	
	Oct-2009	5	28.9	0.0118	1 U	500 U	250 U	100 U	ND	
MW-7	2000	ND	114	5.48	205	-	-	-	-	
	2003	ND	ND	11	-	-	-	-	-	
	2005	20.2	23.9	1.06	-	-	-	-	-	
	2006	2.84	310	ND	-	-	-	-	-	
	2007	38.4	237	ND	227	-	-	-	-	
	2008	Not Sampled - Dry Well								
	Jun-2009	5 U	34	0.200 U	46.6	-	-	-	-	
	Sep-2009	10 U	55.5	2.09	17.0	-	-	-	-	
	Oct-2009	Not Sampled - Dry Well								

Key	Description
ND	Not detected, no detection limit available
-	Not applicable or sample not tested for this analyte
J	Analyte detected, but at a concentration less than the laboratory's reporting limit
U	Analyte was analyzed for but not detected. Detection limit provided.
*	Includes highest value of primary and duplicate sample
a	Benzene 5 Toluene 1000 Ethylbenzene 700 m, p-Xylene 10,000 o-Xylene 10,000
528	Reported concentration exceeds the regulated cleanup level

Notes:

all units in µg/L

June and September 2009 laboratory data not validated

2000 through 2008 data obtained from Shannon & Wilson 2008

ATTACHMENT 1

FIELD LOG BOOK FROM ECOLOGY AND ENVIRONMENT, INC. FIELD

SAMPLING EVENT

OCTOBER 2009

"Rite in the Rain"
ALL-WEATHER WRITING PAPER



Name ECOLOGY AND ENVIRONMENT, INC

Address 720 THIRD AVE STE 1700
SEATTLE WA 98104

Phone 206 624 9537

Project 001096.OX70.04

"Rite in the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

a product of

J. L. DARLING CORPORATION
TACOMA, WA 98424-1017 USA
www.RiteintheRain.com

RED DEVIL MINE BW + SW 10/6/09

MEASURED WATER QUALITY PARAMETERS:

TIME	TEMP	COND ^{MS/cm}	pH	ORP	TURB	DO%	WL
1630	5.55	0.503	5.82	55	36.0	9.8	23.48
1634	5.30	0.506	6.09	-13.1	9.4	7.6	23.75
1637	5.11	0.506	6.28	-27.9	4.1	7.7	23.69
1642	5.03	0.501	6.35	-32.5	5.1	7.7	23.61
1646	4.94	0.485	6.44	-29.8	1.5	9.9	23.52
1649	4.90	0.478	6.44	-27.9	1.3	11.2	23.52
1653	4.87	0.472	6.45	-28.0	0.7	12.3	23.47

1654 MEASURED FLOW RATE USING

CONTAINER AND WATCH: 0.2 L/MIN

1656	4.84	0.469	6.46	-27.0	0.1	12.0	23.47
1659	4.81	0.466	6.46	-27.2	0.3	12.5	23.47
1703	4.76	0.459	6.46	-26.4	-0.8	11.7	23.45
1706	4.74	0.456	6.47	-25.4	-0.9	11.5	23.45
1710	4.68	0.448	6.45	-23.7	-1.1	11.8	23.41
1713	4.64	0.442	6.46	-21.5	-1.3	12.5	23.40

1715 RAINING FAIRLY HEAVILY NOW, EARLIER

THIS AFTER NOON WEATHER WAS DRY,
OVERCAST, STILL ~40°F.

1716	4.61	0.438	6.45	-18.8	-1.6	14.1	23.39
1719	4.55	0.434	6.44	-17.1	-1.4	14.4	23.39
1722	4.52	0.431	6.45	-16.3	-1.2	14.9	23.38
1725	4.50	0.430	6.45	-15.7	-1.6	14.7	23.38

MW 10/6/09

RED DEVIL MINE BW + SW 10/6/09

1725 PARAMETERS STABILIZED. COLLECT
SAMPLE

1730 SAMPLE MWOL ^{ME} MW-1

TOTAL AS SH PL Se 500 mL

TOTAL H₂O 250 mL

SAMPLE OF RDM MWOL

1800 FINISHED SAMPLING MW-1. PICKUP

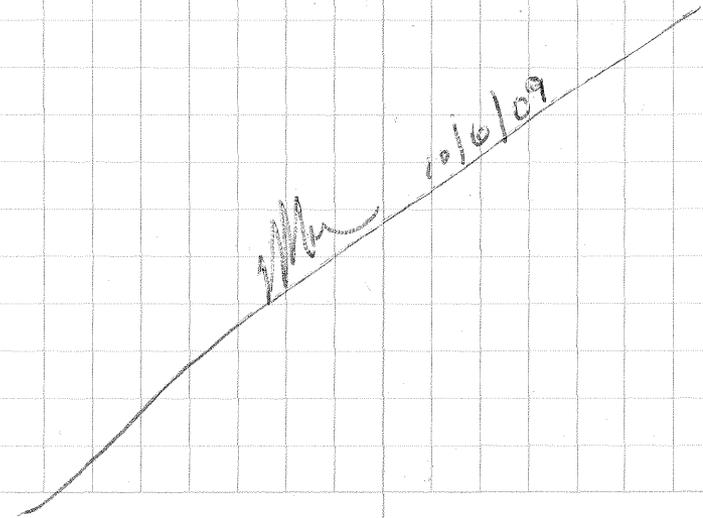
AND MOVE TO MW-4

1809 STATIC WATER LEVEL AT

MW-4: 27, 77 BELOW TOC.

1823 PUMPING STARTED AT MW-4

SEE WATER QUALITY PARAMETER
MEASUREMENTS NEXT PAGE.



"Return the Rain"

RED DEVIL GW + SW 10/6/09

TIME	TEL	COND	mc/cm	pH	ORP	TURB	DO%	WL
1826	-	-	-	-	-	-	-	27.82
1829	-	-	-	-	-	-	-	27.80
1832	4.87	0.447	6.21	134.8	-0.9	23.2		27.80
1835	4.82	0.450	6.28	136.7	-1.4	27.7		27.30
1838	4.80	0.450	6.37	139.6	-1.8	27.7		
1842	4.80	0.451	6.23	141.9	-1.6	38.9		
1845	4.80	0.451	6.22	142.8	-1.9	32.1		27.73
1846	FLOW RATE MEASURED: 0.1 L/MIN							
1849	4.81	0.450	6.23	143.8	-2.1	32.0		27.52
1850	PARAMETERS STABILIZED. ^{10/6/09}							
PREPARE TO SAMPLE WELL MW-7.								

1855 SAMPLE 09 RDM MWOB 4 ^{10/6/09}

MW-34 ^{10/6/09}
TOTAL METALS (As, Sb, Pb, Fe)
TOTAL Itg
As SPECIATION

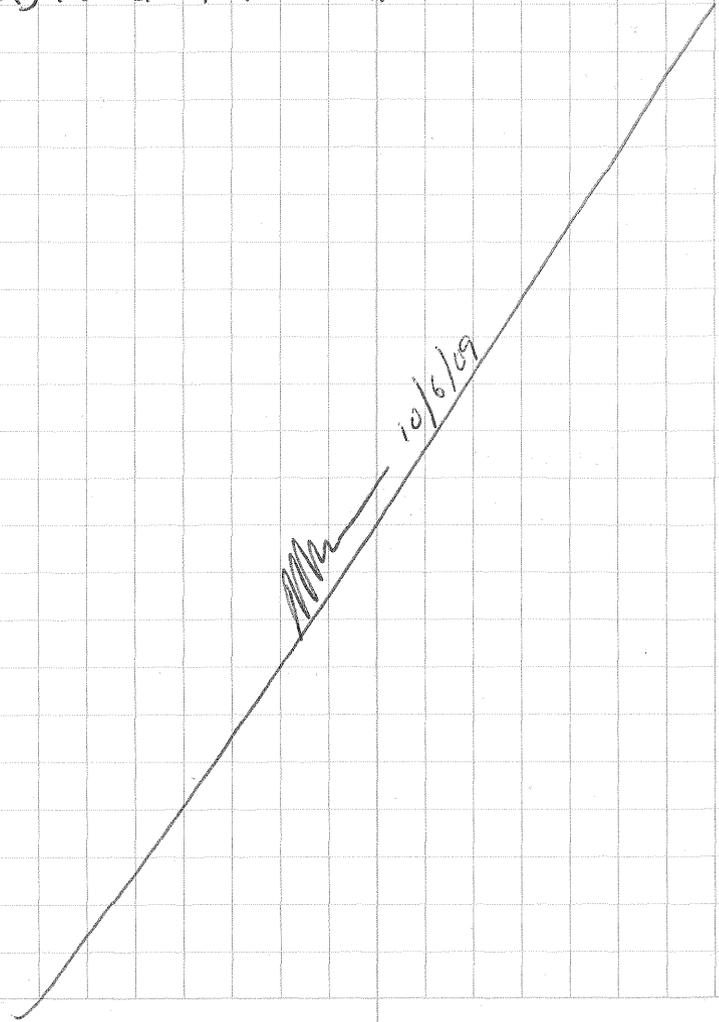
1925 FINISHED COLLECTING SAMPLE,
PUT GEAR AWAY IN COVERS AND
PICK UP.

1940 DEPART SITE, TO RED DEVIL
LODGE

2005 AT RED DEVIL LODGE, BREAK
 10/6/09

RED DEVIL GW + SW 10/6/09

2140 LONGTINE AND DOBSON PREPARE
FOR TOMORROW'S SAMPLING ACTIVITIES.
2345 QUIT FOR DAY



RED DEVIL GW + SW WED 10/7/09

0700 LONGTINE AND DOBSON PREPARING FOR FIELD SAMPLING. DOBSON CALIBRATES YSI 6920 WATER QUALITY METER.

0830 KURTAK WALKING FROM LODGE TO RDM. LONGTINE AND DOBSON CONTINUE PREP FOR SAMPLING (LABELING BOTTLES, ETC.)

0930 LONGTINE AND DOBSON WALK AND DRIVE ATV, RESPECTIVELY, TO RDM.

1010 LONGTINE AND DOBSON AT MW-7. MEET KURTAK. SET UP TO COLLECT EQWT RINSATE SAMPLE. RANK AND

1030 SAMPLE
09RDMPRO1

RINSATE, CLEAN WELL PURGE/
SAMPLE TUBING.

1105 DECON WL INDICATOR, SOUND WELL MW-7 FOR STATIC WATER LEVEL.

1110 MW07 SWL: 23.61'
FROM TOP N SIDE OF 2"
CASING.

1114 SET UP TO BEGIN PURGING MW-7

M 10/7/09

RED DEVIL MINE GW + SW 10/7/09

TIME WL TC ^{CONDS} MS/LCM PIT ORP TURB DO%

1016 23.61 NO WATER TO SURFACE

1118 23.61 NO WATER TO SURFACE, INCREASE PUMP RATE

1125 NO WATER RECOVERED, BELIEVED WELL IS DRY. WELL CONSTRUCTION INFO FOR MW-7 NOT INCLUDED IN 2008 REPORT, SO WELL TOTAL DEPTH NOT KNOWN. DECIDE TO SOUND WELL FOR TOTAL DEPTH TO TEST.

TOTAL DEPTH AT 23.70'.
WELL IS DETERMINED TO BE DRY. NO SAMPLE.

1155 AT WELL MW-3. SET UP TO SAMPLE

1203 SWL AT MW-3: 23.01
FROM TC, N. SIDE

1209 SET UP TO BEGIN PURGING MW-3. SEE NEXT PAGE.

M 10/7/09

RED DEVIL GW + SW 10/7/09

TIME	WL (ft)	COND	ms/cm	PH	ORP	TURB	DO%
1212	23.09	WATER TO SURFACE.					
1213	23.09						
1216	23.11	FLOW THROUGH CELL JUST FILLING-UP NOW					
1223	23.13	5.89	0.436	6.03	231.4	4.0	19.6
1225	MEASURED FLOW RATE EST 200 mL/MIN						
1228	23.15	5.69	0.438	6.03	230.1	4.6	19.2
1231	23.18	5.60	0.439	6.05	225.6	6.4	17.8
1234	—	5.53	0.443	6.11	225.4	42.0	17.3
1237	23.18	5.51	0.444	6.05	224.5	29.5	17.2
1240	23.18	5.48	0.445	6.08	223.2	39.1	17.1
1243	23.18	5.43	0.444	6.08	223.7	17.4	16.8
1248	23.18	5.38	0.437	6.27	217.2	17.2	16.5
1251	23.18	5.37	0.436	6.02	217.7	16.8	16.5
1255	23.18	5.35	0.431	6.12	219.1	15.1	16.3
1257	FLOW RATE STEADY AT 200 mL/MIN						
1258	23.18	5.40	0.430	6.12	216.6	15.9	16.3
1301	23.18	5.41	0.431	6.12	217.4	15.8	15.8
1304	23.18	5.39	0.429	6.12	217.7	11.7	15.7
1305	TOTAL WATER PURGED EST. 3 GALLONS						
1307	23.18	5.38	0.426	6.13	217.9	14.7	15.7
1310	23.18	5.38	0.428	6.13	217.8	15.2	16.0

NOTE: AIR BUBBLES OCCASIONALLY ENTER INTO FLOW-THRU CELL AND APPARENTLY AFFECTING TURBIDITY MEASUREMENT.

ML 10/7/09

RED DEVIL GW + SW 10/7/09

1312 DETERMINE PARAMETERS ARE STABILIZED. PURGING COMPLETE. PREPARE TO SAMPLE WELL.

1320 SAMPLE
09RDM MW03
 MW-3 GROUNDWATER SAMPLE

1345 SAMPLE
09RDM MW08
 MW-3 DUPLICATE GW SAMPLE

1405 FINISHED COLLECTING GW AT MW-3.

1407 TAGGED BOTTOM OF WELL MW-3 WITH WL INDICATOR: TD = 27.88 FT BELOW TOC

1415 FINISHED PUTTING AWAY GEAR AND SECURING MW-3. PREPARE TO COLLECT SURFACE WATER SAMPLES.

1435 AT SW-5, LOCATED ON RED DEVIL CREEK NEAR MOUTH OF CREEK IN KUSKOKWIM RIVER

1450 SAMPLE
09RDM SW05
 SURFACE WATER AT SW-5 LOCATION.

ML 10/7/09

RED DEVIL GW + SW 10/7/09

1455 DOBSON COLLECTING SURVEY
GRADE GPS HORIZONTAL COORDINATES
WITH TRIMBLE GEO XH UNIT.

1504 LONGTINE MEASURE WATER QUALITY
PARAMETERS WITH YSI 6920 V2
WATER QUALITY METER AT SW-5

T °C : 4.43

COND : 0.185 mS/cm^c

112 μS/cm

pH : 6.96

ORP : 159.2

TURB : -2.6 NTU

DO : 93.4 %

1530 SAMPLE
09RDMSW04

SURFACE WATER AT SW-4
LOCATION. WATER COLLECTED FROM
MIDDLE OF STREAM, AT APPARENT
MIXING ZONE OF RDC WATER AND
WATER IMPACTED BY YELLOWBOY
ASSOCIATED WITH SPRING.

1535 DOBSON GPS SW-4

1536 PHOTO BY KURTAK OF
LONGTINE POINTING TO SW-4

[Signature] 10/7/09

RED DEVIL MINE GW + SW 10/7/09
SAMPLE LOCATION, NORTHWARD.

1540 MEASURE WATER QUALITY
PARAMETERS AT SW-4

T : 4.31 °C

COND : 0.256 mS/cm

154 μS/cm

pH : 6.82

ORP : 37.6

TURB : -1.0 NTU

DO : 92.6 %

1550 SAMPLE
09RDMSW03

SURFACE WATER FROM SPRING
ON WEST SIDE OF RDC.
NOTE YELLOWBOY ON BED
OF SPRING AND RDC DOWN
STREAM OF SPRING. SW-3 WA:

T : 4.64

COND : 0.630 mS/cm²

385 μS/cm

pH : 6.68

ORP : -29.3

TURB : 0.0

DO : 30.7 %

[Signature] 10/7/09 "Rite in the Rain"

RED DEVIL MINE GW + SW 10/7/09
1555

SAMPLE

09RDMSU102

SURFACE WATER SAMPLE AT
SW-2 LOCATION IN RDC
JUST UPSTREAM OF CREEK
CROSSING.

1603 SW-2 WATER QUALITY PARAMETERS

T: 4.32°C

COND: 0.249 ms/cm⁻¹
150 μS/cm

pH: 7.05

ORP: 3.2

TURB: -2.3

DO: 91.1 %

1610

SAMPLE

09RDMSW01

SURFACE WATER SAMPLE
AT SW-1 LOCATION ABOVE
BEAVER POND.

SW-1 WATER QUALITY PARAMETERS

T: 4.20°C

COND: 0.241 ms/cm⁻¹
145 μS/cm

pH: 7.21

MW 10/7/09

RED DEVIL MINE GW + SW 10/7/09

ORP: 41.1

TURB: -2.6 NTU

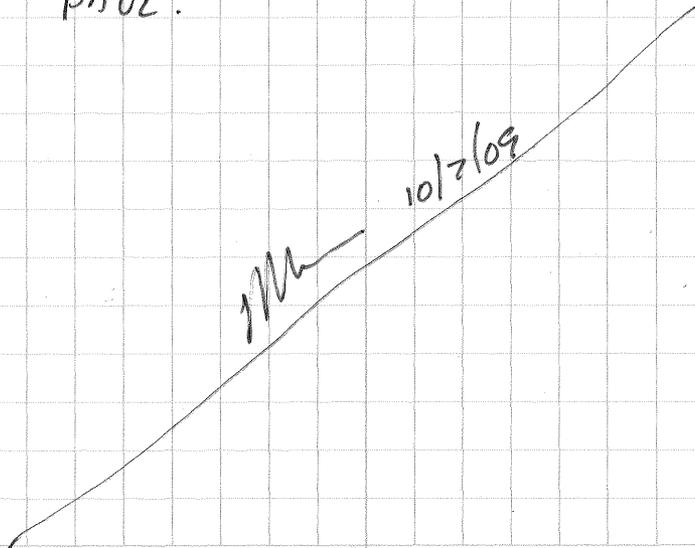
DO: 91.7 %

1630 AT WELL MW-6. SET UP TO
PURGE AND SAMPLE.

1638 STATIC WATER LEVEL AT MW-6
19.29 FT BELOW TOL.

1645 BEGIN PUMPING MW-6. KORTAK
DEPARTING SITE FOR RED DEVIL
LODGE.

1646 WATER TO SURFACE. WATER
QUALITY PARAMETERS ON NEXT
PAGE.



RED DEVIL MINE GW + SW 10/7/09

TIME	W.L.	T(°C)	COND ms/cm/µS/cm	pH	ORP	TURB	DO
------	------	-------	---------------------	----	-----	------	----

1648 19.35

1651 19.36 5.51 0.495 311 6.78 31.4 -1.4 16.1

1655 19.37 4.88 0.507 312 6.32 30.6 -1.9 11.8

1658 19.37 4.64 0.509 311 6.33 22.6 -0.4 9.7

1659 MEASURED FLOW RATE: 240 mL/MIN

1701 19.39 4.60 0.510 311 6.36 17.3 3.7 8.7

1705 19.39 4.55 0.510 311 6.38 13.9 5.0 8.0

1708 19.39 4.51 0.510 311 6.37 14.6 3.0 7.1

1712 19.40 4.53 0.507 310 6.38 13.7 0.8 6.6

1715 19.40 4.54 0.509 310 6.37 13.4 0.1 6.2

1718 19.40 4.54 0.509 310 6.37 13.6 -0.7 5.7

1720 PARAMETERS STABILIZED. PREPARE TO SAMPLE.

1725 SAMPLE
09 RDM MW06

1745 FINISHED SAMPLING MW06.
MEASURE TD: 26.14 FT BELOW TX.

1750 DOBSON DRIVE ATV, LONGTINE WALK
BACK TO RED DEVIL LODGE.

1830 AT LODGE. ADD ICE TO COOLERS.
GATHER GEAR.

1900 ARRIVE AIR STRIP, MEET ALASKA
AIR TAXI PLANE, WHICH LANDED

[Signature] 10/7/09

RED DEVIL MINE GW + SW 10/7/09

ESTIMATED 20-30 MINUTES PREVIOUSLY.

1910 TAKE OFF FROM RED DEVIL AIRSTRIP

WITH DOBSON, LONGTINE, AND
SAMPLES AND GEAR. KURTAK

UNABLE TO FLY BECAUSE INADEQUATE
DOCUMENTATION OF CERTIFICATION

ON PLANE. KURTAK WILL ARRANGE
FOR COMMERCIAL FLIGHT TOMORROW.

2100 ARRIVE ANCHORAGE AIRPORT.

DOBSON GET FOVS TO BRING
GEAR AND SAMPLES TO RTI

WAREHOUSE.

2205 GEAR AND SAMPLES AT WAREHOUSE.

SAMPLES PLACED IN REFRIGERATOR
QUOT FUNDAY.

[Signature] 10/7/09

ATTACHMENT 2

LABORATORY RESULTS OF ANALYTICAL TESTING

ANALYTICAL RESOURCES, INC., OF SEATTLE, WASHINGTON

AND

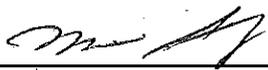
BROOKS RAND LABS OF SEATTLE, WASHINGTON

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine TDD Number:	Location: Alaska Project Number: 001096.0X70
Laboratory(s): Analytical Resources, Inc.	Lab Project Number: PS24
Sampling Dates: 10/7/09	Sample Matrix: Water
Analytical Method(s): TPH-D by AK102/AK103	Data Reviewer: Mindy Song

The data were reviewed following guidelines specified in the Draft EPA Region 9 Quality Assurance Office Guidance, *Region 9 Superfund Data Evaluation/Validation Guidance* (R9QA/006.1, dated December 2001).

Reviewer (Signature):  Date: 3/16/10

PACKAGE IDENTIFICATION

In the table below, list each data package by Package ID, sample ID, and Analytical Method:

Package ID	Sample ID	Analytical Method
PS24	09RDMSW05, 09RDMPR01, 09RDMMW08, 09RDMMW03, 09RDMMW06, and 09RDMTB01	TPHD by AK102/AK103

Note(s):

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine	Location: Alaska
TDD Number:	Project Number: 001096.0X70

1. COMPLETENESS REVIEW BY DATA PACKAGE

X			Package Inventory
X			Case Narrative
X			Data Summary Sheets
X			Chain-of-Custody Records
			QC Summary Sheets including (if applicable to the method):
X			-Matrix Spike/Matrix Spike Duplicate Summary
X			-Laboratory Control Sample Summary
X			-Preparation/Method Blank Summary
NR			-Instrument Performance Data Summary
X			-Initial and Continuing Calibration Data Summary
NR			-GC/MS Tuning and Mass Calibration
X			-Surrogate Compound Recovery Summary
NR			-Internal Standard Area Summary
NR			-CRDL Standard Results
NR			-ICP Interference Check Sample Results
NR			-ICP Serial Dilutions
NR			-ICP Inter-element Correction Factors
NR			-ICP Linear Ranges
			-Method of Standard Addition Results
			Raw Data (for calibration, quality control and field samples if applicable to the method):
X			-Chromatograms
NR			-Reconstructed Ion Current (RIC) Chromatograms
X			-GC Quantitation Reports
NR			-Raw and Enhanced Mass Spectra
NR			-Reference Mass Spectra for Target Compounds
NR			-Mass Spectral Library Search for TICs
NR			-DFTPP and/or BFB mass spectra and mass listings
NR			-DDT and Endrin Degradation Check Data
X			-Instrument Print Outs
X			-Logbook and worksheet pages
NR			-Percent Solids Determination
NR			-List of Instrument Detection Limits
X			-Sample Preparation/Extraction Logs
X			-Analysis Run Logs

Inventory Code:

 X Included: no problems
 O Not included and/or Not Available

 NR Not Required
 * Included if required: problems noted in review

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

2. HOLDING TIMES AND CUSTODY

Instructions: Review chain of custody forms against laboratory reported information, presence of appropriate signatures, sample condition upon receipt by the laboratory, and sample preservation. Also review if method holding times were met.

For ARI Job #PS24, the analytical holding times were met.

3. QA REVIEWS

Instructions: Review all Quality Control Summaries including blanks, laboratory control samples, matrix spike/matrix spike duplicate, etc. Use criteria specified in EPA Functional Guidelines and in the Sample and Analysis Plan if applicable.

Blanks: No target analyte was detected above the reporting limit in the method blank.

LCS: The recoveries of LCS and LCDS were within the control limit.

MS/MSD: Samples 09RDMSW05 and 09RDMMW03 were designated used for MS/MSD analysis. The recoveries except the matrix spike for sample 09RDMMW03 were within the control limit. Finding does not require qualification since no diesel was found in the sample.

Initial and Continuing Calibration Data Summary: TPH as diesel and motor oil standards were used. Percent RSDs and percent differences were within the control limits.

Surrogate Recovery Summary: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

4. FIELD DUPLICATE ANALYSES

Instructions: Calculate the Relative Percent Difference between field duplicate pairs and report based on control criteria listed in the Sample and Analysis Plan.

Analyte, mg/L	09RDMMW03	09RDMMW08	RPD (%)
Diesel	<0.25	<0.25	0
Motor Oil	<0.50	<0.50	0

The RPD was within the control limit (less than 30%).

5. OVERALL DATA QUALITY

Instructions: Generally assess the overall data quality. Perform random checks of reported results against raw data and of raw data for interference problems and/or system control problems (e.g., baseline anomalies, baseline drifts, etc.).

Not applicable since no analytes were found in the samples.

The data from ARI Job #PS24 were acceptable for use.

Attached are reviewed summary tables.

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
AK102/AK103 TPHd by GC/FID
Page 1 of 1
Matrix: Water

QC Report No: PS24-Ecology and Environmental,
Project: RED DEVIL MINE
001096.OX70
Date Received: 10/10/09

Data Release Authorized: 
Reported: 10/19/09

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-101309 09-23972	Method Blank HC ID: ---	10/13/09	10/14/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 98.8% 86.3%
PS24A 09-23972	09RDMSW05 HC ID: ---	10/13/09	10/14/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 114% 95.8%
PS24B 09-23973	09RDMPR01 HC ID: ---	10/13/09	10/14/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 116% 91.9%
PS24C 09-23974	09RDMMW08 HC ID: ---	10/13/09	10/14/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 106% 90.5%
PS24D 09-23975	09RDMMW03 HC ID: ---	10/13/09	10/14/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 108% 94.6%
PS24E 09-23976	09RDMMW06 HC ID: ---	10/13/09	10/15/09 FID9	1.00 1.0	Diesel Motor Oil n-Triacontane o-Terphenyl	0.25 0.50	< 0.25 U < 0.50 U 116% 92.2%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C10 to C25.
Motor Oil quantitation on total peaks in the range from C25 to C36.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons.
*DRO/*RRO indicates that, in the opinion of the analyst, results are a good pattern match to standards.


3116/10

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: PS24	Turn-around Requested: 21 days	Page: 1 of 1
ARI Client Company: Ecology & Environment	Phone: 206-624-9537	Date: 10/9/09
Client Contact: Tim Dobson	Address: 3301 2nd TRD, Suite 209, Mark Longline	Ice Present? Gel
Client Project Name:		No. of Coolers: 1
		Cooler Temps: 1.2

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested						Notes/Comments	
					AK101/1901	AK102/1901	AK103/1901	AK104/1901	AK105/1901	AK106/1901		
¹⁰⁰ SW05 09RDM SW05	10/7/09	1450	Liquid Water	6 9	✓	✓						ALSO ms/msp
09RDM SW01	10/7/09	1030	Liquid Water	4	✓	✓						
09RDM MW08	10/7/09	1345	Liquid Water	4	✓	✓						
09RDM MW03	10/7/09	1370	Liquid Water	9	✓	✓						ALSO ms/msp
09RDM MW06	10/7/09	1725	Liquid Water	4	✓	✓						
09RDM TB01	10/9/09	0957	Liquid Water	4	✓							
Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)								
	Printed Name: Timothy P. Dobson	Printed Name: Mirka Mulumba	Printed Name:	Printed Name:								
	Company: Ecology & Environment	Company: ARI	Company:	Company:								
	Date & Time: 10/09/09 12:00 pm	Date & Time: 10/10/09 11:5	Date & Time:	Date & Time:								

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

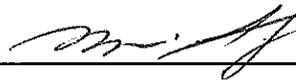
Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine TDD Number:	Location: Alaska Project Number: 001096.0X70
Laboratory(s): Analytical Resources, Inc.	Lab Project Number: PS24
Sampling Dates: 10/7/09	Sample Matrix: Water
Analytical Method(s): TPH-G by AK101 and BETX by EPA Method 8021M	Data Reviewer: Mindy Song

The data were reviewed following guidelines specified in the Draft EPA Region 9 Quality Assurance Office Guidance, *Region 9 Superfund Data Evaluation/Validation Guidance* (R9QA/006.1, dated December 2001).

Reviewer (Signature):  Date: 3/16/10

PACKAGE IDENTIFICATION

In the table below, list each data package by Package ID, sample ID, and Analytical Method:

Package ID	Sample ID	Analytical Method
PS24	09RDMSW05, 09RDMPR01, 09RDMMW08, 09RDMMW03, 09RDMMW06, and 09RDMTB01	TPHG/BETX by AK101

Note(s):

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine	Location: Alaska
TDD Number:	Project Number: 001096.0X70

1. COMPLETENESS REVIEW BY DATA PACKAGE

X			Package Inventory
X			Case Narrative
X			Data Summary Sheets
X			Chain-of-Custody Records
			QC Summary Sheets including (if applicable to the method):
X			-Matrix Spike/Matrix Spike Duplicate Summary
X			-Laboratory Control Sample Summary
X			-Preparation/Method Blank Summary
NR			-Instrument Performance Data Summary
X			-Initial and Continuing Calibration Data Summary
NR			-GC/MS Tuning and Mass Calibration
X			-Surrogate Compound Recovery Summary
NR			-Internal Standard Area Summary
NR			-CRDL Standard Results
NR			-ICP Interference Check Sample Results
NR			-ICP Serial Dilutions
NR			-ICP Inter-element Correction Factors
NR			-ICP Linear Ranges
			-Method of Standard Addition Results
			Raw Data (for calibration, quality control and field samples if applicable to the method):
X			-Chromatograms
NR			-Reconstructed Ion Current (RIC) Chromatograms
X			-GC Quantitation Reports
NR			-Raw and Enhanced Mass Spectra
NR			-Reference Mass Spectra for Target Compounds
NR			-Mass Spectral Library Search for TICs
NR			-DFTPP and/or BFB mass spectra and mass listings
NR			-DDT and Endrin Degradation Check Data
X			-Instrument Print Outs
X			-Logbook and worksheet pages
NR			-Percent Solids Determination
NR			-List of Instrument Detection Limits
X			-Sample Preparation/Extraction Logs
X			-Analysis Run Logs

Inventory Code:

 X Included: no problems
 O Not Included and/or Not Available

 NR Not Required
 * Included if required: problems noted in review

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

2. HOLDING TIMES AND CUSTODY

Instructions: Review chain of custody forms against laboratory reported information, presence of appropriate signatures, sample condition upon receipt by the laboratory, and sample preservation. Also review if method holding times were met.

For ARI Job #PS24, the analytical holding times were met.

3. QA REVIEWS

Instructions: Review all Quality Control Summaries including blanks, laboratory control samples, matrix spike/matrix spike duplicate, etc. Use criteria specified in EPA Functional Guidelines and in the Sample and Analysis Plan if applicable.

Blanks: No target analyte was detected above the reporting limit in the method blank or trip blank.

LCS: The recoveries of LCS and LCDS were within the control limit.

MS/MSD: Samples 09RDMSW05 and 09RDMMW03 were designated for MS/MSD analysis. The recoveries were within the control limit.

Initial and Continuing Calibration Data Summary: BTEX and TPH as Gasoline standards were used. Percent RSDs and percent differences were within the control limits.

Surrogate Recovery Summary: The surrogate recoveries were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

4. FIELD DUPLICATE ANALYSES

Instructions: Calculate the Relative Percent Difference between field duplicate pairs and report based on control criteria listed in the Sample and Analysis Plan.

Analyte, ug/L	09RDMMW03	09RDMMW08	RPD (%)
Benzene	<1.0	<1.0	0
Toluene	<1.0	<1.0	0
Ethylbenzene	<1.0	<1.0	0
m+p- Xylenes	<1.0	<1.0	0
o-Xylene	<1.0	<1.0	0
TPH as Gasoline	<100	<100	0

The RPD was within the control limit (less than 30%).

5. OVERALL DATA QUALITY

Instructions: Generally assess the overall data quality. Perform random checks of reported results against raw data and of raw data for interference problems and/or system control problems (e.g., baseline anomalies, baseline drifts, etc.).

Not applicable since no analytes were found in the samples.

The data from ARI Job #PS24 were acceptable for use.

Attached are reviewed summary tables.

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: 09RDMSW05

SAMPLE

Lab Sample ID: PS24A

LIMS ID: 09-23972

Matrix: Water

Data Release Authorized:

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

Event: 001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Date Analyzed: 10/15/09 18:53

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

			GAS ID
Gasoline Range Hydrocarbons	0.10	< 0.10 U	---

BETX Surrogate Recovery

Trifluorotoluene	85.9%
Bromobenzene	86.2%

Gasoline Surrogate Recovery

Trifluorotoluene	87.2%
Bromobenzene	88.0%

BETX values reported in $\mu\text{g/L}$ (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

Mr. J
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: 09RDMPR01

SAMPLE

Lab Sample ID: PS24B

LIMS ID: 09-23973

Matrix: Water

Data Release Authorized: *AB*

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

Event: 001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Date Analyzed: 10/15/09 20:06

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

	RL	Result	GAS ID
Gasoline Range Hydrocarbons	0.10	< 0.10 U	---

BETX Surrogate Recovery

Trifluorotoluene	86.7%
Bromobenzene	86.4%

Gasoline Surrogate Recovery

Trifluorotoluene	87.5%
Bromobenzene	87.4%

BETX values reported in $\mu\text{g/L}$ (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

m-lj
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: 09RDMMW08

SAMPLE

Lab Sample ID: PS24C

LIMS ID: 09-23974

Matrix: Water

Data Release Authorized: *B*

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

Event: 001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Date Analyzed: 10/15/09 20:31

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

Gasoline Range Hydrocarbons	0.10	< 0.10 U	GAS ID ---
-----------------------------	------	----------	---------------

BETX Surrogate Recovery

Trifluorotoluene	87.6%
Bromobenzene	89.8%

Gasoline Surrogate Recovery

Trifluorotoluene	89.3%
Bromobenzene	90.0%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

M. J.
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: 09RDMMW03
SAMPLE

Lab Sample ID: PS24D

LIMS ID: 09-23975

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: 001096.0X70

Event: NA

Date Sampled: 10/07/09

Date Received: 10/10/09

Date Analyzed: 10/15/09 20:55

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

Gasoline Range Hydrocarbons 0.10 < 0.10 U GAS ID ---

BETX Surrogate Recovery

Trifluorotoluene	87.7%
Bromobenzene	86.9%

Gasoline Surrogate Recovery

Trifluorotoluene	88.9%
Bromobenzene	88.5%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

[Signature]
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: 09RDMMW06

SAMPLE

Lab Sample ID: PS24E

LIMS ID: 09-23976

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

Event: 001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Date Analyzed: 10/20/09 13:40

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

			GAS ID
Gasoline Range Hydrocarbons	0.10	< 0.10 U	---

BETX Surrogate Recovery

Trifluorotoluene	105%
Bromobenzene	97.9%

Gasoline Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	97.3%

BETX values reported in $\mu\text{g/L}$ (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

[Signature]
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod
TPHG by Method AK101
Page 1 of 1

Sample ID: 09RDMTB01
SAMPLE

Lab Sample ID: PS24F
LIMS ID: 09-23977
Matrix: Water
Data Release Authorized:
Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
Event: 001096.0X70
Date Sampled: 10/07/09
Date Received: 10/10/09

Date Analyzed: 10/15/09 17:39
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

	RL	Result	GAS ID
Gasoline Range Hydrocarbons	0.10	< 0.10 U	---

BETX Surrogate Recovery

Trifluorotoluene	91.0%
Bromobenzene	89.0%

Gasoline Surrogate Recovery

Trifluorotoluene	88.9%
Bromobenzene	86.7%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

M. A.
3/16/10

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method AK101

Page 1 of 1

Sample ID: MB-101509

METHOD BLANK

Lab Sample ID: MB-101509

LIMS ID: 09-23972

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 10/21/09

QC Report No: PS24-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

Event: 001096.0X70

Date Sampled: NA

Date Received: NA

Date Analyzed: 10/15/09 13:43

Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

	GAS ID
Gasoline Range Hydrocarbons	0.10 < 0.10 U ---

BETX Surrogate Recovery

Trifluorotoluene	84.3%
Bromobenzene	84.9%

Gasoline Surrogate Recovery

Trifluorotoluene	82.9%
Bromobenzene	83.4%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.

GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from C6 to C10.

[Signature]
3/16/10

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: PS24	Turn-around Requested: 21 days	Page: 1 of 1
ARI Client Company: Ecology & Environment	Phone: 206-604-9537 977-257-2000 TPO	Date: 10/9/09
Client Contact: Tim Dobson	3301 C²¹ TPO Suite 209, Mark Conline	Ice Present? Yes
Client Project Name:		No. of Coolers: 1
		Cooler Temps: 1, 2

Client Project #:	Samplers:	Analysis Requested						Notes/Comments
		AK101/1001	AK102/1002	AK103				
Sample ID	Date	Time	Matrix	No. Containers				
SW05 09RDM SW05	10/7/09	1450	Liquid Water	TPD 6 9	✓	✓		ALSO MS/MSD PERMANENT
09RDMR01	10/7/09	1030	Liquid Water	4	✓	✓		
09RDM MW03	10/7/09	1345	Liquid Water	4	✓	✓		
09RDM MW03	10/7/09	1370	Liquid Water	9	✓	✓		ALSO MS/MSD
09RDM MW06	10/7/09	1725	Liquid Water	4	✓	✓		
09RDM TBO1	TPD 10/9/2009	0957	Liquid Water	4	✓			
Comments/Special Instructions								
Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)		
Printed Name: Timothy D. Dobson		Printed Name: Mirka Malumba		Printed Name:		Printed Name:		
Company: Ecology & Environment		Company: ARI		Company:		Company:		
Date & Time: 10/09/09 12:00pm		Date & Time: 10/10/09 115		Date & Time:		Date & Time:		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

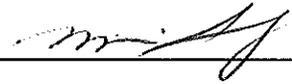
Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine TDD Number:	Location: Alaska Project Number: 001096.0X70
Laboratory(s): Analytical Resources, Inc.	Lab Project Number: PS25
Sampling Dates: 10/6/09 & 10/7/09	Sample Matrix: Water
Analytical Method(s): Metals (total and dissolved) by EPA Method 6010B/6020/7470A	Data Reviewer: Mindy Song

The data were reviewed following guidelines specified in the Draft EPA Region 9 Quality Assurance Office Guidance, *Region 9 Superfund Data Evaluation/Validation Guidance* (R9QA/006.1, dated December 2001).

Reviewer (Signature):  _____

Date: 3/16/10

PACKAGE IDENTIFICATION

In the table below, list each data package by Package ID, sample ID, and Analytical Method:

Package ID	Sample ID	Analytical Method
PS25	09RDMMW01, 09RDMMW03, 09RDMMW04, 09RDMMW06, 09RDMMW08, 09RDMPR01, 09RDMSW01, 09RDMSW02, 09RDMSW03, 09RDMSW04, and 09RDMSW05	Total and Dissolved Metals by SW-846 6010B/6020/7470A

Note(s):

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine	Location: Alaska
TDD Number:	Project Number: 001096.0X70

1. COMPLETENESS REVIEW BY DATA PACKAGE

X			Package Inventory
X			Case Narrative
X			Data Summary Sheets
X			Chain-of-Custody Records
			QC Summary Sheets including (if applicable to the method):
X			-Matrix Spike/Matrix Spike Duplicate Summary
X			-Laboratory Control Sample Summary
X			-Preparation/Method Blank Summary
X			-Instrument Performance Data Summary
X			-Initial and Continuing Calibration Data Summary
NR			-GC/MS Tuning and Mass Calibration
NR			-Surrogate Compound Recovery Summary
NR			-Internal Standard Area Summary
X			-CRDL Standard Results
X			-ICP Interference Check Sample Results
NR			-ICP Serial Dilutions
X			-ICP Inter-element Correction Factors
X			-ICP Linear Ranges
			-Method of Standard Addition Results
			Raw Data (for calibration, quality control and field samples if applicable to the method):
NR			-Chromatograms
NR			-Reconstructed Ion Current (RIC) Chromatograms
NR			-GC Quantitation Reports
NR			-Raw and Enhanced Mass Spectra
NR			-Reference Mass Spectra for Target Compounds
NR			-Mass Spectral Library Search for TICs
NR			-DFTPP and/or BFB mass spectra and mass listings
NR			-DDT and Endrin Degradation Check Data
X			-Instrument Print Outs
X			-Logbook and worksheet pages
NR			-Percent Solids Determination
NR			-List of Instrument Detection Limits
X			-Sample Preparation/Extraction Logs
X			-Analysis Run Logs

Inventory Code:

 X Included: no problems
 O Not included and/or Not Available

 NR Not Required
 * Included if required: problems noted in review

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:

Location:

Project TDD Number:

PAN:

2. HOLDING TIMES AND CUSTODY

Instructions: Review chain of custody forms against laboratory reported information, presence of appropriate signatures, sample condition upon receipt by the laboratory, and sample preservation. Also review if method holding times were met.

For ARI Job #PS25, the analytical holding times were met.

3. QA REVIEWS

Instructions: Review all Quality Control Summaries including blanks, laboratory control samples, matrix spike/matrix spike duplicate, etc. Use criteria specified in EPA Functional Guidelines and in the Sample and Analysis Plan if applicable.

Blanks: No target analyte was detected above the reporting limit in the method blank. However, a trace amount (1.6 ug/L) of dissolved copper was found in the equipment blank. No samples were affected since no dissolved copper was detected in the samples.

LCS: The recoveries of LCS and LCDS were within the control limit.

MS/MSD: Sample 09RDMMW03 was used for Matrix Spike analysis. The recoveries except antimony and calcium were within the control limit. Qualification was not required since the amount of these metals in the parent sample was greater than 4X the amount spiked.

Initial and Continuing Calibration Data Summary: Metals standards were used. Selenium and thallium were outside the control limits for some CCVs. Qualification was not necessary since these metals were not found in the associated samples.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

4. FIELD DUPLICATE ANALYSES

Instructions: Calculate the Relative Percent Difference between field duplicate pairs and report based on control criteria listed in the Sample and Analysis Plan.

Analyte (ug/L)	09RDMMW03	09RDMMW08	RPD (%)
Aluminum	<50	<50	0
Antimony	740	727	2
Arsenic	48.2	46.9	3
Barium	44.0	43.1	2
Beryllium	<0.2	<0.2	0
Cadmium	<0.2	<0.2	0
Calcium	26800	26300	2
Chromium	<0.5	<0.5	0
Cobalt	<0.2	<0.2	0
Copper	<0.5	<0.5	0
Iron	<20	<20	0
Lead	<1	<1	0
Magnesium	26300	26400	0
Manganese	<0.5	<0.5	0
Mercury	<0.1	<0.1	0
Nickel	1.3	1.3	0
Potassium	990	960	3
Selenium	<2	1.2	Not Calculated
Silver	<0.2	<0.2	0
Sodium	3370	3470	3
Thallium	<0.2	<0.2	0
Vanadium	<0.2	<0.2	0
Zinc	<4	<4	0

The RPD was within the control limit (less than 30%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:

Location:

Project TDD Number:

PAN:

5. OVERALL DATA QUALITY

Instructions: Generally assess the overall data quality. Perform random checks of reported results against raw data and of raw data for interference problems and/or system control problems (e.g., baseline anomalies, baseline drifts, etc.).

Al, Ca, Mg, K, and Na were analyzed by EPA Method 6010B/ICP, Hg was analyzed by EPA 7470A, and the rest of metals were analyzed by EPA Method 6020/ICPMS.

Sample 09RDMMW03

Ca: (26.36 mg/L) (20mL/20mL) (1000ug/1mg) = 26,360 ug/L. Lab reported 26,400ug/L.

As: (46.676 ug/L) (50mL/50mL) = 46.676 ug/L. Lab reported 46.7ug/L.

Ni: (1.124 ug/L) (50mL/50mL) = 1.124 ug/L. Lab reported 1.1 ug/L.

The data from ARI Job #PS25 were acceptable for use.

Attached are reviewed summary tables.

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS
Page 1 of 1

Sample ID: 09RDMMW01
SAMPLE

Lab Sample ID: PS25A
LIMS ID: 09-23978
Matrix: Water
Data Release Authorized: 
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.0X70
Date Sampled: 10/06/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	1.3	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	12.9	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20,100	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

 3/16/10



INORGANICS ANALYSIS DATA SHEET
 TOTAL METALS
 Page 1 of 1

Sample ID: 09RDMMW03
 SAMPLE

Lab Sample ID: PS25B
 LIMS ID: 09-23979
 Matrix: Water
 Data Release Authorized *[Signature]*
 Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
 Project: RED DEVIL MINE
 001096.0X70
 Date Sampled: 10/07/09
 Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
3010A	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	1	740	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.5	48.2	
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	44.0	
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	26,800	
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
3010A	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	26,300	
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	1.3	
3010A	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	990	
200.8	10/13/09	6020	10/27/09	7782-49-2	Selenium	2	2	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	3,370	
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
 RL-Reporting Limit

[Signature]
 3/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

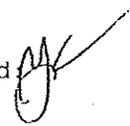
Page 1 of 1

Sample ID: 09RDMMW04
SAMPLE

Lab Sample ID: PS25C

LIMS ID: 09-23980

Matrix: Water

Data Release Authorized 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.OX70

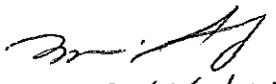
Date Sampled: 10/06/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	38.9	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	9.6	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	30	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL

RL-Reporting Limit


3/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS
Page 1 of 1

Sample ID: 09RDMMW06
SAMPLE

Lab Sample ID: PS25D
LIMS ID: 09-23981
Matrix: Water
Data Release Authorized: 
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.OX70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	5.0	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	28.9	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	1,060	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit


3/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS
Page 1 of 1

Sample ID: 09RDMMW08
SAMPLE

Lab Sample ID: PS25E
LIMS ID: 09-23982
Matrix: Water
Data Release Authorized: *[Signature]*
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.OX70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
3010A	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	1	727	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.5	46.9	
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	43.1	
200.8	10/13/09	6020	10/27/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	26,300	
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
3010A	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	26,400	
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	1.3	
3010A	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	960	
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	1.2	
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	3,470	
200.8	10/13/09	6020	10/27/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

[Signature]
2/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS
Page 1 of 1

Sample ID: 09RDMPR01
SAMPLE

Lab Sample ID: PS25F
LIMS ID: 09-23983
Matrix: Water
Data Release Authorized:
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.0X70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
3010A	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	50	U
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
3010A	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	50	U
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	0.5	U
3010A	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	500	U
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	500	U
200.8	10/13/09	6020	10/27/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

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3/16/11

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: 09RDMSW01
SAMPLE

Lab Sample ID: PS25G
LIMS ID: 09-23984
Matrix: Water
Data Release Authorized *OK*
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.0X70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	1.8	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	1.3	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	180	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

m. A.
3/16/11

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: 09RDMSW02
SAMPLE

Lab Sample ID: PS25H
LIMS ID: 09-23985
Matrix: Water
Data Release Authorized
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.OX70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	72.6	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	21.9	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	200	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

M. J.
3/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS
Page 1 of 1

Sample ID: 09RDMSW03
SAMPLE

Lab Sample ID: PS25I
LIMS ID: 09-23986
Matrix: Water
Data Release Authorized
Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.
Project: RED DEVIL MINE
001096.0X70
Date Sampled: 10/07/09
Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	67.7	
200.8	10/13/09	6020	10/29/09	7440-38-2	Arsenic	1	1,020	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	1,850	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

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2/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: 09RDMSW04
SAMPLE

Lab Sample ID: PS25J

LIMS ID: 09-23987

Matrix: Water

Data Release Authorized: 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	88.3	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	62.0	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	270	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit


3/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: 09RDM5W05
SAMPLE

Lab Sample ID: PS25K

LIMS ID: 09-23988

Matrix: Water

Data Release Authorized: 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.0X70

Date Sampled: 10/07/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
3010A	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	0.2	214	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	98.3	
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	31.4	
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	20,200	
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.9	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	150	
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
3010A	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	12,500	
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	17.7	
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.2	
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	1.2	
3010A	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	500	U
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	2,600	
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL

RL-Reporting Limit


3/16/10

INORGANICS ANALYSIS DATA SHEET

DISSOLVED METALS

Page 1 of 1

Sample ID: 09RDMW03

SAMPLE

Lab Sample ID: PS25L

LIMS ID: 09-23989

Matrix: Water

Data Release Authorized 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.0X70

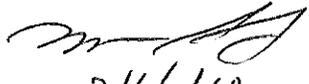
Date Sampled: 10/07/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
6010B	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	1	736	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.5	46.7	
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	42.2	
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	26,400	
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
6010B	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	26,300	
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	1.1	
6010B	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	960	
200.8	10/13/09	6020	10/27/09	7782-49-2	Selenium	2	2	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	3,580	
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL

RL-Reporting Limit


11/6/10

INORGANICS ANALYSIS DATA SHEET

DISSOLVED METALS

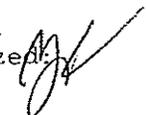
Page 1 of 1

Sample ID: 09RDMMW08
SAMPLE

Lab Sample ID: PS25M

LIMS ID: 09-23990

Matrix: Water

Data Release Authorized: 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.0X70

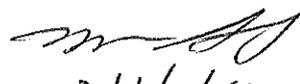
Date Sampled: 10/07/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
6010B	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	1	727	
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.5	46.1	
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	42.5	
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	27,000	
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
6010B	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	26,300	
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	1.0	
6010B	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	1,020	
200.8	10/13/09	6020	10/27/09	7782-49-2	Selenium	2	2	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	3,530	
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL

RL-Reporting Limit


3/16/10



INORGANICS ANALYSIS DATA SHEET

DISSOLVED METALS

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Sample ID: 09RDMPR01
SAMPLE

Lab Sample ID: PS25N

LIMS ID: 09-23991

Matrix: Water

Data Release Authorized:

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.OX70

Date Sampled: 10/07/09

Date Received: 10/10/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
6010B	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/29/09	7440-36-0	Antimony	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	0.5	U
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	50	U
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	1.6	
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/29/09	7439-92-1	Lead	1	1	U
6010B	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	50	U
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	0.5	U
6010B	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	500	U
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	500	U
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

2/16/10

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: PS25MB

LIMS ID: 09-23982

Matrix: Water

Data Release Authorized: 

Reported: 11/04/09

QC Report No: PS25-Ecology and Environmental, Inc.

Project: RED DEVIL MINE

001096.OX70

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
3010A	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	0.5	U
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	50	U
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
3010A	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	50	U
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	0.5	U
3010A	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	500	U
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
3010A	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	500	U
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL

RL-Reporting Limit


3/16/10

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: PS25MB

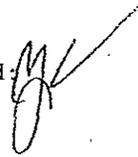
QC Report No: PS25-Ecology and Environmental, Inc.

LIMS ID: 09-23990

Project: RED DEVIL MINE

Matrix: Water

001096.OX70

Data Release Authorized: 

Date Sampled: NA

Reported: 11/04/09

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
6010B	10/12/09	6010B	10/21/09	7429-90-5	Aluminum	50	50	U
200.8	10/13/09	6020	10/27/09	7440-36-0	Antimony	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-38-2	Arsenic	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-39-3	Barium	0.5	0.5	U
200.8	10/13/09	6020	10/29/09	7440-41-7	Beryllium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-43-9	Cadmium	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-70-2	Calcium	50	50	U
200.8	10/13/09	6020	10/27/09	7440-47-3	Chromium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-48-4	Cobalt	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-50-8	Copper	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7439-89-6	Iron	20	20	U
200.8	10/13/09	6020	10/27/09	7439-92-1	Lead	1	1	U
6010B	10/12/09	6010B	10/21/09	7439-95-4	Magnesium	50	50	U
200.8	10/13/09	6020	10/27/09	7439-96-5	Manganese	0.5	0.5	U
7470A	10/12/09	7470A	10/19/09	7439-97-6	Mercury	0.1	0.1	U
200.8	10/13/09	6020	10/27/09	7440-02-0	Nickel	0.5	0.5	U
6010B	10/12/09	6010B	10/21/09	7440-09-7	Potassium	500	500	U
200.8	10/13/09	6020	10/29/09	7782-49-2	Selenium	0.5	0.5	U
200.8	10/13/09	6020	10/27/09	7440-22-4	Silver	0.2	0.2	U
6010B	10/12/09	6010B	10/21/09	7440-23-5	Sodium	500	500	U
200.8	10/13/09	6020	10/29/09	7440-28-0	Thallium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-62-2	Vanadium	0.2	0.2	U
200.8	10/13/09	6020	10/27/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit


3/16/10

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested:	Page: <u>1</u> of <u>2</u>
ARI Client Company: <u>ECOLOGIC & ENVIRONMENT INC.</u>	Phone: <u>(206) 624-9537</u> <u>(907) 257-3301</u>	Date: _____ Ice Present? <u>GEL</u>
Client Contact: <u>TIM DOBSON MARK LONGTINE</u>	No. of Coolers: <u>1</u>	Cooler Temps: <u>1.8</u>

Client Project Name: <u>RED DEVIL MINE</u>	Analysis Requested	Notes/Comments									
Client Project #: <u>0X70 001010101</u> <u>001096.0E05</u>	<table border="1"> <tr> <td>METALS-T (As, Sb, Pb, Fe)</td> <td>METALS TAL</td> <td>METALS (DISSOLVED)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	METALS-T (As, Sb, Pb, Fe)	METALS TAL	METALS (DISSOLVED)							
METALS-T (As, Sb, Pb, Fe)	METALS TAL	METALS (DISSOLVED)									
Samplers: <u>DOBSON / LONGTINE</u>											

Sample ID	Date	Time	Matrix	No. Containers	METALS-T (As, Sb, Pb, Fe)	METALS TAL	METALS (DISSOLVED)							
09RDMMW01	10/6/09	1730	LIQUID	1	X	X	X							
09RDMMW03	10/7/09 10/6/09	1320	LIQUID	2	X	X	X							
09RDMMW04	10/6/09	1855	LIQUID	1	X	X	X							
09RDMMW06	10/7/09	1725	LIQUID	1	X	X	X							
09RDMMW08	10/7/09	1345	LIQUID	2	X	X	X							
09RDMPR01	10/7/09	1030	LIQUID	2	X	X	X							
09RDMSW01	10/7/09	1610	LIQUID	1	X	X	X							
09RDMSW02	10/7/09	1555	LIQUID	1	X	X	X							
09RDMSW03	10/7/09	1550	LIQUID	1	X	X	X							
09RDMSW04	10/7/09	1530	LIQUID	1	X	X	X							

Comments/Special Instructions <u>09RDMMW03 - TAL METALS</u> <u>DIS. METALS</u> <u>09RDMMW04 - METALS (As, Sb,</u> <u>09RDMMW08 - METALS (Pb, Fe)</u> <u>(TAL) METALS (DIS)</u> <u>09RDMPR01 - METALS (TAL)</u> <u>METALS (DIS)</u>	Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <u>Timothy [Name]</u>	Printed Name: <u>Hilma Mulumba</u>	Printed Name:	Printed Name:
	Company: <u>FEI</u>	Company: <u>ARI</u>	Company:	Company:
	Date & Time: <u>10/9/09 12:00pm</u>	Date & Time: <u>10/10/09 1120</u>	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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

samples@brooksrand.com
 www.brooksrand.com

Chain of Custody Record

White: LAB COPY
 Yellow: CUSTOMER COPY

Client: <u>F&E</u>		Address:		COC receipt confirmation? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N													
Contact: <u>Mark Longfina</u>				If so, by: email / fax (circle one)													
Client project ID: <u>001096. 0405 as 10/12/09</u>				Email: <u>Mlongfina@fne.com</u>													
PO #: <u>0x70</u>		Phone #: <u>206-624-9537 x3603</u>		Fax #:													
Requested TAT in business days: <input type="checkbox"/> 20 (standard) <input type="checkbox"/> 15 <input type="checkbox"/> 10 <input type="checkbox"/> 5 <input type="checkbox"/> Other _____ <i>Surcharges apply for expedited turn around times.</i>	Collection		Miscellaneous			Field Preservation			Analyses required					Comments			
	Date	Time	Sampler (initials)	Matrix type	# of containers	Field filtered? (Y/N)	Unpreserved / ice only	HCl / HNO ₃ (circle one)	Other (specify)	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As / Se species (specify)		% Solids	Filtration	Other (specify)
Sample ID																	
1	<u>0912MSW05</u>	<u>10/9/09</u>	<u>MSD</u>	<u>L</u>	<u>1</u>	<u>N</u>											<input checked="" type="checkbox"/>
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
Relinquished by: <u>[Signature]</u>		Date: <u>10/9/09</u>		Time: <u>12:00 PM</u>		Relinquished by:		Date:		Time:							
Received by: <u>Mikha Mulumb</u>		Date: <u>10/10/09</u>		Time: <u>1120</u>		Received at BRL by:		Date:		Time:							
Shipping carrier: <u>FedEx</u>		# of coolers: <u>1</u>		BRL work order ID:		BRL project ID:											

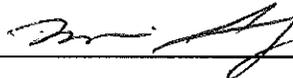
PS25: 00001

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine TDD Number:	Location: Alaska Project Number: 001096.0X70
Laboratory(s): Analytical Resources, Inc./ Brooks Land Labs	Lab Project Number: PS26
Sampling Dates: 10/6/09 & 10/7/09	Sample Matrix: Water
Analytical Method(s): Hg by EPA 1631, MeHg by EPA 1630, & As Speciation by EPA 1632	Data Reviewer: Mindy Song

The data were reviewed following guidelines specified in the Draft EPA Region 9 Quality Assurance Office Guidance, *Region 9 Superfund Data Evaluation/Validation Guidance* (R9QA/006.1, dated December 2001).

Reviewer (Signature):  Date: 3/17/10

PACKAGE IDENTIFICATION

In the table below, list each data package by Package ID, sample ID, and Analytical Method:

Package ID	Sample ID	Analytical Method
PS26	09RDMMW01, 09RDMMW04, 09RDMSW05, 09RDMMW08, 09RDMSW04, 09RDMPR01, 09RDMMW03, 09RDMSW02, 09RDMSW01, 09RDMMW06, & 09RDMSW03	Total Hg by EPA 1631, Methyl Hg by EPA 1630, and Arsenic Speciation by EPA 1632

Note(s):

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name: Red Devil Mine	Location: Alaska
TDD Number:	Project Number: 001096.0X70

1. COMPLETENESS REVIEW BY DATA PACKAGE

X			Package Inventory
X			Case Narrative
X			Data Summary Sheets
X			Chain-of-Custody Records
			QC Summary Sheets including (if applicable to the method):
X			-Matrix Spike/Matrix Spike Duplicate Summary
X			-Laboratory Control Sample Summary
X			-Preparation/Method Blank Summary
NR			-Instrument Performance Data Summary
X			-Initial and Continuing Calibration Data Summary
NR			-GC/MS Tuning and Mass Calibration
NR			-Surrogate Compound Recovery Summary
NR			-Internal Standard Area Summary
NR			-CRDL Standard Results
NR			-ICP Interference Check Sample Results
NR			-ICP Serial Dilutions
NR			-ICP Inter-element Correction Factors
NR			-ICP Linear Ranges
			-Method of Standard Addition Results
			Raw Data (for calibration, quality control and field samples if applicable to the method):
NR			-Chromatograms
NR			-Reconstructed Ion Current (RIC) Chromatograms
NR			-GC Quantitation Reports
NR			-Raw and Enhanced Mass Spectra
NR			-Reference Mass Spectra for Target Compounds
NR			-Mass Spectral Library Search for TICs
NR			-DFTPP and/or BFB mass spectra and mass listings
NR			-DDT and Endrin Degradation Check Data
X			-Instrument Print Outs
X			-Logbook and worksheet pages
NR			-Percent Solids Determination
NR			-List of Instrument Detection Limits
X			-Sample Preparation/Extraction Logs
X			-Analysis Run Logs

Inventory Code:

 X Included: no problems
 O Not Included and/or Not Available

 NR Not Required
 * Included if required: problems noted in review

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

2. HOLDING TIMES AND CUSTODY

Instructions: Review chain of custody forms against laboratory reported information, presence of appropriate signatures, sample condition upon receipt by the laboratory, and sample preservation. Also review if method holding times were met.

For ARI Job #PS26, the analytical holding times were met.

3. QA REVIEWS

Instructions: Review all Quality Control Summaries including blanks, laboratory control samples, matrix spike/matrix spike duplicate, etc. Use criteria specified in EPA Functional Guidelines and in the Sample and Analysis Plan if applicable.

Blanks: No target analyte was detected above the reporting limit in the method blank or equipment blank.

LCS: The recoveries of LCS and LCDS were within the control limit.

MS/MSD: Sample 09RDMSW05 was used for Mercury MS/MSD analysis and 09RDMMW04 was used for Arsenic MS/MSD analysis. The recoveries were within the control limit.

Initial and Continuing Calibration Data Summary: Mercury and Methyl Mercury standards were used. The recoveries of CCVs were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 1 Validation

Site Name:	Location:
Project TDD Number:	PAN:

4. FIELD DUPLICATE ANALYSES

Instructions: Calculate the Relative Percent Difference between field duplicate pairs and report based on control criteria listed in the Sample and Analysis Plan.

Analyte	09RDMMW03	09RDMMW08	RPD (%)
Mercury, ng/L	9.73	9.77	0
Methyl Mercury, ng/L	<0.020	<0.020	0
As(III), ug/L	0.861	0.906	5
As(Inorg); ug/L	45.3	28.6	45*
As(V), ug/L	44.4	27.7	45*

*: The RPD was outside of control limit (greater than 30%) and the detected As(Inorg) and As (V) results were qualified as estimated (J).

5. OVERALL DATA QUALITY

Instructions: Generally assess the overall data quality. Perform random checks of reported results against raw data and of raw data for interference problems and/or system control problems (e.g., baseline anomalies, baseline drifts, etc.).

The data from ARI Job #PS26 were acceptable for use with qualification.

Attached are reviewed summary tables.

Project ID: ARI-TU0902
 PM: Amy Durdle



BRL Report, WO# 0942004
 Client PM: Cheronne Oreiro

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
09RDMMW01										
0942004-01	Hg	Water	T	41.3		0.15	0.41	ng/L	B091463	0900879
09RDMMW03										
0942004-05	As(III)	Water	T	0.861	M	0.032	0.100	µg/L	B091507	0900888
0942004-05	As(Inorg)	Water	T	45.3	J	0.320	1.00	µg/L	B091506	0900887
0942004-05	As(V)	Water	T	44.4	J	0.320	1.00	µg/L	[CALC]	N/A
0942004-05	Hg	Water	T	9.73		0.15	0.40	ng/L	B091463	0900879
0942004-05	MeHg	Water	T	0.020	U	0.020	0.050	ng/L	B091417	0900880
09RDMMW04										
0942004-02	As(III)	Water	T	3.91		0.160	0.500	µg/L	B091507	0900888
0942004-02	As(Inorg)	Water	T	10.4	J	0.320	1.00	µg/L	B091506	0900887
0942004-02	As(V)	Water	T	6.49	J	0.320	1.00	µg/L	[CALC]	N/A
0942004-02	Hg	Water	T	81.0		0.15	0.40	ng/L	B091463	0900879
09RDMMW06										
0942004-07	Hg	Water	T	11.8		0.15	0.40	ng/L	B091463	0900879
0942004-07	MeHg	Water	T	0.020	U	0.020	0.050	ng/L	B091417	0900880
09RDMMW08										
0942004-10	As(III)	Water	T	0.906		0.160	0.500	µg/L	B091507	0900888
0942004-10	As(Inorg)	Water	T	28.6	J	0.320	1.00	µg/L	B091506	0900887
0942004-10	As(V)	Water	T	27.7	J	0.320	1.00	µg/L	[CALC]	N/A
0942004-10	Hg	Water	T	9.77		0.15	0.40	ng/L	B091463	0900879
0942004-10	MeHg	Water	T	0.020	U	0.020	0.049	ng/L	B091417	0900880
09RDMPR01										
0942004-09	As(III)	Water	T	0.008	U	0.008	0.025	µg/L	B091507	0900888
0942004-09	As(Inorg)	Water	T	0.008	U	0.008	0.025	µg/L	B091506	0900887
0942004-09	As(V)	Water	T	0.008	U	0.008	0.025	µg/L	[CALC]	N/A
0942004-09	Hg	Water	T	0.15	U	0.15	0.40	ng/L	B091463	0900879
0942004-09	MeHg	Water	T	0.020	U	0.020	0.049	ng/L	B091417	0900880
09RDMSW01										
0942004-11	Hg	Water	T	24.8		1.52	4.04	ng/L	B091463	0900879

MA 3/16/10

Project ID: ARI-TU0902
 PM: Amy Durdie



BRL Report WO# 0942004
 Client PM: Cheronne Oreiro

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
09RDMSW02 0942004-06	Hg	Water	T	60.7		0.15	0.40	ng/L	B091463	0900879
09RDMSW03 0942004-08	Hg	Water	T	209		3.03	8.08	ng/L	B091463	0900879
09RDMSW04 0942004-04	Hg	Water	T	683		3.03	8.08	ng/L	B091463	0900879
09RDMSW05 0942004-03	As(III)	Water	T	2.57		0.160	0.500	µg/L	B091507	0900888
0942004-03	As(Inorg)	Water	T	108	J	3.20	10.0	µg/L	B091506	0900887
0942004-03	As(V)	Water	T	105	J	3.20	10.0	µg/L	[CALC]	N/A
0942004-03	Hg	Water	T	163		3.03	8.08	ng/L	B091463	0900879
0942004-03	MeHg	Water	T	0.168		0.020	0.050	ng/L	B091417	0900880

m. J.
 3/16/10



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

samples@brooksrand.com
 www.brooksrand.com

Chain of Custody Record

White: LAB COPY
 Yellow: CUSTOMER COPY

Client: <u>ECOLOGY & ENVIRONMENT INC</u>	Address: <u>3301 "C" STREET NW</u>	COC receipt confirmation? <input checked="" type="radio"/> Y / <input type="radio"/> N
Contact: <u>THOMAS DOBSON</u> <u>MARK LONGTINE</u>	<u>SUITE 2097 TD</u>	If so, by: email / fax (circle one)
Client project ID: <u>DD 10910, DFDS</u> <small>DD 10/10/09</small>	<u>ANCHORAGE, AK 99501</u>	Email: <u>inlongtine@eue.com</u>
PO #: <u>0X70</u>	Phone #: <u>(907) 257-3301</u> ³⁶⁰³ <u>206-624-9531</u>	Fax #:

Sample ID	Collection		Miscellaneous				Field Preservation			Analyses required						Comments		
	Date	Time	Sampler (Initials)	Matrix type	# of containers	Field filtered? (Y/N)	Unpreserved / ice only	HCl / HNO ₃ (circle one)	Other (specify)	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As / Se species (specify)	% Solids	Filtration		Other (specify)	Other (specify)
1	09RDMMW01	10/6/09 1730								X								
2	09RDMMW04	10/6/09 1855								X								
3	09RDMMW04	10/6/09 1855											X					
4	09RDMSW05	10/7/09 1450								X								
5	09RDMSW05	10/7/09 1450									X							
6	09RDMSW05	10/7/09 1450											X					
7	09RDMMW08	10/7/09 1345								X								
8	09RDMSW04	10/7/09 1530								X								
9	09RDMR01	10/7/09 1030																
10	09RDMMW03	10/7/09 1520								X								

Relinquished by: <u>THOMAS DOBSON</u>	Date: <u>10/9/09</u>	Time: <u>12:00 PM</u>	Relinquished by:	Date:	Time:
Received by: <u>Mikka Mulumbu</u>	Date: <u>10/10/09</u>	Time: <u>1125</u>	Received at BRL by:	Date:	Time:
Shipping carrier: <u>Fed Ex</u>	# of coolers: <u>1</u>	BRL work order ID:	BRL project ID:		

PS26: 000003



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 Fax: 206-632-6017

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Chain of Custody Record

White: LAB COPY
 Yellow: CUSTOMER COPY

Client: <u>ECOLOGY + ENVIRONMENT INC</u>	Address: <u>3301 C STREET</u>	COC receipt confirmation? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Contact: <u>FIM^{TAB} DOBSON MARK LONGTINE</u>	<u>SUITE 209</u>	If so, by: email / fax (circle one)
Client project ID: <u>001096. 0105 on 10/10/09</u>	<u>ANCHORAGE, AK 99501</u>	Email: <u>m.longtine@ene.com</u>
PO #: <u>0X70</u>	Phone #: <u>(907) 257-3304 206-621-4537</u>	Fax #:

Requested TAT in business days: <input checked="" type="checkbox"/> 20 (standard) <input type="checkbox"/> 15 <input type="checkbox"/> 10 <input type="checkbox"/> 5 <input type="checkbox"/> Other _____ <i>Surcharges apply for expedited turn around times.</i>	Collection		Miscellaneous				Field Preservation			Analyses required							Comments	
	Date	Time	Sampler (initials)	Matrix type	# of containers	Field filtered? (Y/N)	Unpreserved / ice only	HCl / HNO ₃ (circle one)	Other (specify)	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As / Se species (specify)	% Solids	Filtration	Other (specify)		Other (specify)
	1	<u>09RDMMW03</u>	<u>10/7/09</u>	<u>1320</u>							<input checked="" type="checkbox"/>							
	2	<u>09RDMMW03</u>	<u>10/7/09</u>	<u>1320</u>									<input checked="" type="checkbox"/>					
	3	<u>09RDMMW03</u>	<u>10/7/09</u>	<u>1320</u>						<input checked="" type="checkbox"/>								
	4	<u>09RDMSW02</u>	<u>10/7/09</u>	<u>1555</u>						<input checked="" type="checkbox"/>								
	5	<u>09RDMSW01</u>	<u>10/7/09</u>	<u>1610</u>						<input checked="" type="checkbox"/>								
	6	<u>09RDMMW06</u>	<u>10/7/09</u>	<u>1725</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
	7	<u>09RDMSW03</u>	<u>10/7/09</u>	<u>1550</u>						<input checked="" type="checkbox"/>								
	8	<u>09RDMPRO1</u>	<u>10/7/09</u>	<u>1030</u>						<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>					
	9	<u>09RDMMW08</u>	<u>10/7/09</u>	<u>1345</u>						<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>					
	10																	

Relinquished by: <u>[Signature]</u>	Date: <u>10/9/09</u>	Time: <u>12:00 pm</u>	Relinquished by:	Date:	Time:
Received by: <u>Mikka Mulumba</u>	Date: <u>10/10/09</u>	Time: <u>1125</u>	Received at BRL by:	Date:	Time:
Shipping carrier: <u>FED EX</u>	# of coolers: <u>1</u>	BRL work order ID:	BRL project ID:		

P526: 00004

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

ADEC File Number: ADEC RecKey Number:

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
 Yes No NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
 Yes No NA (Please explain.) Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
 Yes No NA (Please explain.) Comments:

b. Correct analyses requested?
 Yes No NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
 Yes No NA (Please explain.) Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
 Yes No NA (Please explain.) Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
 Yes No NA (Please explain.) Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
Yes No NA (Please explain.) Comments:

No discrepancies were found.

e. Data quality or usability affected? (Please explain.) Comments:

None

4. Case Narrative

a. Present and understandable?
 Yes No NA (Please explain.) Comments:

b. Discrepancies, errors or QC failures identified by the lab?
 Yes No NA (Please explain.) Comments:

c. Were all corrective actions documented?
 Yes No NA (Please explain.) Comments:

d. What is the effect on data quality/usability according to the case narrative? none
Comments:

None

5. Samples Results

a. Correct analyses performed/reported as requested on COC?
 Yes No NA (Please explain.) Comments:

b. All applicable holding times met?
 Yes No NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?
Yes No NA (Please explain.)

Comments:

The samples were all water.

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

Yes No NA (Please explain.)

Comments:

e. Data quality or usability affected?

Comments:

No

6. QC Samples

a. Method Blank

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

Yes No NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

Yes No NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

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

Yes No NA (Please explain.)

Comments:

All method blank results were less than PQL.

v. Data quality or usability affected? (Please explain.)

Comments:

No

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No NA (Please explain.)

Comments:

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

Yes No NA (Please explain.) Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No NA (Please explain.) Comments:

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

Yes No NA (Please explain.) Comments:

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

Comments:

None

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

Yes No NA (Please explain.) Comments:

RPDs were within the control limits.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

None

c. Surrogates – Organics Only

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

Yes No NA (Please explain.) Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes No NA (Please explain.) Comments:

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

Yes No NA (Please explain.) Comments:

All surrogate recoveries were within the control limits.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

None

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes No NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes No NA (Please explain.) Comments:

iii. All results less than PQL?

Yes No NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

None

v. Data quality or usability affected? (Please explain.)

Comments:

None

e. Field Duplicate

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

Yes No NA (Please explain.) Comments:

09RDMMW08 was a field duplicate of 09RDMMW03.

ii. Submitted blind to lab?

Yes No NA (Please explain.)

Comments:

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

$$RPD (\%) = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2) / 2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No NA (Please explain.)

Comments:

The RPD of As(Inorg) and As(V) was 45%. (greater than 30%)

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Yes. The detected As(Inorg) and As(V) results were qualified as estimated (J).

f. Decontamination or Equipment Blank (If not used explain why).

Yes No NA (Please explain.)

Comments:

i. All results less than PQL?

Yes No NA (Please explain.)

Comments:

1.6 ug/L of dissolved copper was detected in the equipment blank, 09RDMPR01

ii. If above PQL, what samples are affected?

Comments:

None. No dissolved copper was detected in the samples.

iii. Data quality or usability affected? (Please explain.)

Comments:

None

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

a. Defined and appropriate?

Yes No NA (Please explain.)

Comments: