REPORT
March 7, 2013

Prepared for:
Rio Algom Mining LLC

Phase 1 Report for Supplemental Site Assessment to Address Out-of-Compliance Status at Trend Wells RL-1 and EF-8

Lisbon Facility

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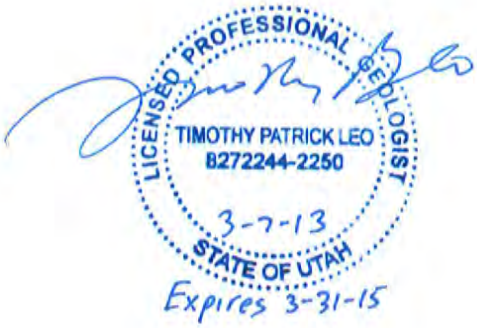

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CONTENTS

Page

CONTENTS – continued

TABLES

Table

ILLUSTRATIONS

Figure

CONTENTS – continued

Figure

CONTENTS – continued

Figure

CONTENTS – continued

APPENDICES

Appendix

MONTGOMERY & ASSOCIATES

March 7, 2013
REPORT

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

EXECUTIVE SUMMARY

Phase 1 of the two-phase hydrogeologic investigation was completed at the Rio Algom Mining LLC, Lisbon Facility (Site) during the fall 2012. Results from the Phase 1 hydrogeologic investigation are summarized below.

- The scope and objectives of the Phase 1 hydrogeologic investigation proposed in the final approved work plan were achieved. Eight new monitor wells were constructed, developed, surveyed, and sampled as planned. Four of the new wells (MW-100, MW-101, MW-102, and MW-105) are screened in the Burro Canyon Aquifer hydrostratigraphic unit (BCA) within the Burro Canyon Formation (Kbc), three of the new wells (MW-102DB, MW-103 and MW-106) are screened within the Brushy Basin Member of the Morrison Formation (Jmb) in the Brushy Basin Member hydrostratigraphic unit (BBM), and one of the new wells (MW-104) appears to be screened in a perched groundwater zone within the Kbc.
- Groundwater samples were collected from all existing and new wells using three methods: (1) no-purge (HydraSleeve), (2) minimal purge low-flow, and (3) standard three-casing volume purge. Groundwater samples were analyzed in a laboratory for common groundwater constituents and selected trace metals in accordance with the Site Utah Radioactive Materials License UT1900481.
- Slug tests were conducted in all existing and new wells except wells MW-104 and MW-106. The water level in these wells was still recovering from development at the time of slug testing; these wells will be slug tested in Phase 2. The borehole coring program, which included hydraulic conductivity testing and laboratory analysis for selected trace metals, was completed.
- All investigation derived waste from Phase 1 has been approved for disposal at US Ecology landfill in Grand View, Idaho, a facility licensed to accept low-level radioactive waste material. The drill cuttings have been disposed and the waste water is ready for disposal when weather conditions permit.
- The geologic conditions encountered and the hydraulic, groundwater elevation, and groundwater quality data obtained from Phase 1 were largely consistent with

historical data and expected conditions. Notable observations from Phase 1 include:

- Perched groundwater at the contact between the Kbc and Jmb in the BCA may exist at well MW-104. The groundwater elevation at this well is the highest of any well at the Site.
- The Kbc is dry at wells MW-103 and MW-106.
- An upward hydraulic gradient exists at the MW-102/MW-102DB well pair under ambient conditions. Purge sampling appears to have reversed the hydraulic gradient and caused contaminated groundwater to flow from the BCA to the BBM near the well. Fractures evident in the core from borehole MW-102DB may represent conduits for vertical groundwater flow.
- A slight upward hydraulic gradient exists at the MW-100/LW-1 well pair.
- Tailings water appears to have migrated into the upper 30 feet of saturated BBM near well MW-103.
- Laboratory test results on deep cores from MW-102DB, slug test results from well MW-103, and the observed slow recovery at well MW-106 indicate that the BBM has a low horizontal and vertical hydraulic conductivity. Extensive lateral or deep migration of tailings water in the BBM is unlikely due to the low estimated hydraulic conductivity.
- A well of unknown designation was found south of the tailings impoundments. This well is designated UW-1. The well was video-logged to determine its construction and condition. The well is likely screened in the BCA and is in good condition. The well was slug tested and sampled.
- Arsenic concentrations in groundwater from well OW-UT-9 exceeded the License compliance concentration. This result was reported to DRC in accordance with the License conditions.

- The results of Phase 1 partially addressed data gaps identified in the approved work plan. While some refinements to the conceptual Site model (CSM) are evident based on Phase 1 results, some of which are discussed above, the results of Phase 2 are needed to sufficiently refine the CSM and to determine the best approach for reestablishing compliance conditions at the Site.
- Analysis of the groundwater quality data from the comparative sampling event indicate that no-purge (HydraSleeve), minimal purge (low-flow), and volume-based purge sampling methods result in comparable concentrations of constituents of interest at the Site. All three methods appear to be adequate for compliance monitoring at the Site; however, the HydraSleeve and low-flow methods are preferred from a practicability standpoint because they produce limited waste water, are safer to conduct at the Site in all weather conditions, and are more economical.
- A work plan for the Phase 2 field investigation has been submitted to DRC under separate cover concurrently with this report.

MONTGOMERY & ASSOCIATES

March 7, 2013
REPORT

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

1.0 INTRODUCTION

This report summarizes the data obtained from the Phase 1 hydrogeologic investigation conducted at the Rio Algom Mining, LLC (RAML) Lisbon Facility (Site) located near La Sal, Utah. **Figure 1** shows the Site location and Site Map. The investigation was conducted in accordance with the Stipulation and Consent Agreement (SCA) between the Utah Department of Environmental Quality and RAML (Utah Department of Environmental Quality, 2012). The SCA incorporates the final approved work plan entitled *Supplemental Site Assessment to Address Out-Of-Compliance Status at Trend Wells RL-1 and EF-8* (Montgomery & Associates [M&A], 2012). The field investigation was conducted from September 9 to November 7, 2012.

1.1 BACKGROUND INFORMATION

Uranium mining and milling occurred at the Site from 1972 to 1989. Seepage from two tailings impoundments constructed during mining is suspected to have resulted in groundwater contamination at the Site. Interim and formal groundwater corrective action programs were implemented at the Site from the early 1980s through 2003 to minimize the

impact of tailings water seepage on groundwater quality. The corrective action program ceased when it became infeasible and ineffective to operate extraction wells due to the post-mining decline in groundwater levels at the Site. The tailings impoundments were covered with impervious material in the mid-2000s to prevent further impacts. **Figure 1** shows the location of the tailings impoundments.

An application for Alternate Concentration Limits (ACLs) and response to comments on the application were prepared by RAML for the U.S. Nuclear Regulatory Commission (NRC) from 2001 to 2003 (Lewis Water Consultants, Inc., 2001 and KOMEX, 2003). The NRC-approved ACL application established compliance concentrations in groundwater and resulted in a long-term monitoring remedy for the Site. Groundwater monitoring in 14 wells at the Site is conducted in accordance with the 2004 Long Term Groundwater Monitoring Plan (LTGMP) (KOMEX, 2004). In 2004, the Utah Department of Environmental Quality, Division of Radiation Control (DRC) obtained lead regulatory authority for the Site from NRC. Subsequent to obtaining lead authority, DRC lowered the compliance concentrations based on the results of groundwater modeling published in the LTGMP (DRC, 2012a). Currently, all Site activities are conducted in accordance with Utah Radioactive Materials License No. UT1900481, Amendment No. 4 (License) (DRC, 2012b). Among other specifications, the License specifies compliance concentrations, monitoring and reporting requirements, and identifies the following constituents of concern (COC) in Site groundwater: uranium, molybdenum, selenium, and arsenic. The License also requires groundwater monitoring for pH, total dissolved solids (TDS), chloride, sulfate, bicarbonate, and groundwater elevation.

Wells RL-1 and EF-8 (designated as “trend wells” in the License) are currently out of compliance with the License because uranium concentrations in groundwater have exceeded Target Action Levels (TALs) for more than two consecutive sampling events. The hydrogeologic investigation is being conducted to address this out-of-compliance condition. The investigation is being conducted in two phases. Phase 1 included construction of new wells on RAML property and testing and monitoring activities in new and existing wells.

Phase 2 will include constructing, testing, and monitoring in additional new wells located on public land. RAML submitted a work plan under separate cover to DRC for Phase 2 concurrently with this report.

Access to the Phase 2 well sites on public land requires approval from the Bureau of Land Management (BLM). RAML provided the required documents and information to BLM for the approval process in December 2012[1]. With RAML's support, BLM is currently preparing an Environmental Assessment (EA) for the project under the requirements of the National Environmental Policy Act. BLM has indicated that access to the Phase 2 well sites should be approved by late spring 2013. However, the EA is subject to public comment and the time required to address these comments, if any, is unknown. An extended response to comment period could delay the start of Phase 2.

1.2 REPORT CONTENT

The data gaps identified in the Phase 1 work plan were partially addressed by the completion of the Phase 1 hydrogeologic investigation. Results from the Phase 2 hydrogeologic investigation are required to fully address data gaps and refine the conceptual Site model (CSM). A refined CSM is needed to determine the best approach for reestablishing compliance conditions at the Site. Because data gaps are only partially addressed, only limited interpretation of the Phase 1 data is included in this report. Interpretation of Phase 1 data was limited to the level required to confirm and/or modify the Phase 2 field investigation. Thorough interpretation of the Phase 1 and Phase 2 data will be conducted after Phase 2 and will be summarized in the Phase 2 report.

[1] RAML submitted the final Plan of Development and supporting information to BLM on December 5, 2012. An authorized right-of-way agreement is needed before Phase 2 work can be conducted.

2.0 PHASE 1 INVESTIGATION METHODS

The Phase 1 field program included installation of new monitor wells, collection of core samples at selected borehole locations for physical properties and chemical analyses, conduct of hydraulic testing at new and existing monitor wells, video-logging of selected existing monitor wells, and collection of groundwater samples from new and existing monitor wells. Investigation methods are described in the following sections.

2.1 MONITOR WELL INSTALLATION

Eight new monitor wells were installed on RAML property during the Phase 1 field program. **Figure 2** shows the locations of the new wells. The well locations were selected based on an evaluation of historical Site data, the results of the Phase 1 modeling, and recommendations from DRC in their RFI letters dated February 6, 2012 and May 1, 2012 (DRC, 2012c and d). The installation program for the eight new monitor wells included drilling, well construction, development, surveying of well coordinates, and management of investigation derived waste (IDW).

2.1.1 Drilling Methods and Well Construction

Monitor wells MW-100, MW-101, MW-102, MW-102DB, MW-103, MW-104, MW-105, and MW-106 were installed on RAML property during the period from September 9 to October 31, 2012. The wells were designed and constructed in accordance with UAC R317-6-6.3(I)(6), the Utah Division of Water Rights Standards (R655-4 UAC), and the Resource Conservation and Recovery Act guidance document entitled *Ground Water Monitoring Technical Enforcement Guidance Document* (U.S. Environmental Protection

Agency, 1986). Well construction activities were conducted in accordance with procedures described in the approved work plan.

Drilling was conducted by Boart Longyear of Salt Lake City, Utah, a State of Utah licensed well driller. All drilling and well construction activities were directed in the field by a qualified M&A hydrogeologist and completed under the supervision of an M&A Professional Geologist, licensed in the State of Utah. During drilling operations, the on-site M&A hydrogeologist maintained continuous lithologic logs of the subsurface materials encountered and notes regarding drilling characteristics and water encountered in each of the boreholes. Six wells were drilled using the conventional air rotary drilling method. Representative samples of drill cuttings were obtained at 10-foot depth intervals at these six borehole locations. The remaining two borehole locations were sampled continuously using coring methods, and then reamed using the conventional air rotary method. Lithologic descriptions of drill cuttings samples and core samples were prepared and are provided in **Appendix A**.

Wells MW-100, MW-101, MW-102, MW-104, and MW-105 were completed with screens in the Burro Canyon Aquifer hydrostratigraphic unit (BCA) within the Burro Canyon Formation (Kbc). In this report, Kbc is used to refer to the rocks or unsaturated portion of the Burro Canyon Formation. Wells screened in the BCA are designated as BCA wells. Wells MW-102DB, MW-103, and MW-106 were completed with screens in the Brushy Basin Member (Jmb) of the Morrison Formation. In this report, Jmb is used to refer to the rocks or unsaturated portion of the Brushy Basin Member of the Morrison Formation. The saturated portion of the Jmb is designated the Brushy Basin Member hydrostratigraphic unit (BBM). Wells screened in the BBM are designated as BBM wells. The BBM well designation was retained to maintain the naming convention previously established for the Site.

BCA well MW-100 was completed as a companion well to existing well LW-1; wells MW-101, MW-102, MW-104, and MW-105 were completed to fully penetrate the BCA. BBM wells MW-103 and MW-106 were completed in the Jmb as water table wells; BBM well MW-102DB was screened in the Jmb beneath the BCA. Well construction details for the eight new monitor wells are summarized in **Table 1**. A summary of well installation activities and schematic diagrams of the monitor wells are provided in **Appendix A**.

2.1.2 Core Sampling and Analysis

Selected core samples obtained from the boreholes at BBM wells MW-102DB and MW-103 were submitted for laboratory analysis as proposed in the Phase 1 work plan. The remaining core samples from each borehole were placed in core boxes, labeled, and stored in a locked storage unit located at the Site. Core sample selection and analyses are described below:

MW-102DB: In the MW-102DB borehole, three representative samples of unbroken core approximately 1 foot in length were selected for laboratory analysis of hydraulic conductivity (K). One Kbc sample and two Jmb samples were submitted to Daniel B. Stevens & Associates, Inc. of Albuquerque, New Mexico (DBSA Lab) under standard chain of custody protocols and analyzed for saturated horizontal and vertical K by the flexible wall falling head-rising tail method. The Kbc sample consisted of fine-grained sandstone and was collected at the interval from 130 to 131 feet below ground surface (bgs), approximately 5 feet above the Kbc/Jmb contact. The Jmb samples were collected at intervals from 145 to 146 feet bgs and 156 to 157 feet bgs, approximately 9 and 20 feet below the Kbc/Jmb contact, respectively. The upper Jmb sample consisted of homogeneous shale. The lower Jmb sample consisted of very fine-grained sandstone.

One Kbc core sample from the MW-102DB borehole was selected for chemical analysis. The sample was collected at the interval from 123 to 123.5 feet bgs just above the

water table observed in adjacent monitor well MW-102. The sample consisted of fractured fine-grained sandstone with black staining along fracture surfaces. The sample was submitted to ACZ Laboratories of Steamboat Springs, Colorado (ACZ Lab) under standard chain of custody protocols and analyzed for uranium and other selected metals by US EPA Methods 6010B, 6020, and 7470A.

MW-103: In the MW-103 borehole, six representative core samples were selected from the vadose zone for chemical analysis. The samples were collected at the approximate depths of 22, 35, 44, 56, 69, and 74 feet bgs and were selected based on visual inspection of the core. In general, samples were collected where distinct changes in lithology or significant fracturing and staining were observed. The samples collected from 22 to 69 feet bgs consisted primarily of fine- to coarse-grained sandstone (Kbc). The sample collected from 74 feet bgs consisted of green homogeneous shale (Jmb). The samples were submitted to ACZ Lab under standard chain of custody protocols and analyzed for uranium and other selected metals by US EPA Methods 6010B, 6020, and 7470A.

2.1.3 Surface Completion and Survey

All new wells were completed with lockable, 8-inch diameter, steel, above-grade monuments, set into four by four-foot concrete pads. On October 31, 2012, Keogh Land Surveying, a licensed Utah land surveyor, surveyed the new and existing monitor wells. The elevation of the tops of the PVC casings, protective steel monuments, and land surface/concrete pads were surveyed relative to the 1988 North American Vertical Datum and horizontal coordinates were surveyed relative to the 1927 North American Datum, Utah State Plane South coordinate system. The PVC well casings were marked to indicate the water level measuring point.

2.1.4 Well Development

During the period from October 29 to October 31, 2012, the new wells were developed by surge and purge methods. Development activities were conducted by Confluence Environmental, Inc. (CEI) of Sacramento, California, and supervised in the field by an M&A hydrogeologist. Wells MW-100, MW-101, MW-102, MW-102DB, MW-103, and MW-105 were surged across the entire saturated screened intervals and purged until development water was free of sediment and field parameters including pH, specific conductance, and temperature had stabilized. Wells MW-104 and MW-106 were surged and then purged dry after one borehole volume was removed. Development at wells MW-104 and MW-106 was limited by slow recovery after the initial evacuation.

2.1.5 Investigation Derived Waste Management

All waste rock cuttings generated during drilling activities were contained in roll-off bins. After drilling was completed, four-point composite samples were collected from each roll-off bin and submitted to ACZ Lab under standard chain of custody protocols for disposal characterization analyses. Upon approval from the landfill in January 2013, the drill cuttings were transported by MP Environmental Services, Inc. (MPE) to US Ecology (a landfill licensed to accept low-level radioactive material) in Grand View, Idaho for final disposal. Copies of the laboratory reports and disposal manifests for the cuttings are provided in **Appendix B**.

All drilling, development, and sampling water generated during Phase 1 was contained in a 20,000-gallon secured storage tank located on RAML property. A water sample was collected from the tank on November 7, 2012 and submitted to ACZ Lab under standard chain of custody protocols for disposal characterization analysis. Approval for disposal of the waste water was granted by US Ecology in January 2013. A copy of the disposal characterization laboratory report is provided in **Appendix B**. Freezing

temperatures at the Site have delayed transport of the waste water to the landfill. The waste water will be transported by MPE to US Ecology in Grand View, Idaho for disposal as soon as weather conditions allow.

2.2 HYDRAULIC TESTING

Slug testing was conducted at new and existing wells to estimate formation K. In addition, core samples obtained from the MW-102DB borehole were submitted to DBSA Lab for K testing. Hydraulic testing was conducted in accordance with procedures described in the approved work plan.

2.2.1 Slug Testing

During the period from August 24 to August 29, 2012, slug testing was conducted at all existing wells at the RAML facility, with the exception of RL-3. Slug testing was conducted at well RL-3 and new wells MW-100, MW-101, MW-102, MW-102DB, MW-103, and MW-105 during the period from November 2 to November 5, 2012. Slug testing comprised the near instantaneous introduction and withdrawal of a solid cylinder into groundwater, displacing a known volume of water in each well and measuring the imposed fluctuation of the groundwater level. A minimum of two falling-head (lowering of slug into a well) and two rising-head (removal of slug from the well) slug tests were conducted at each well to verify that the data were repeatable. Where practical and as time permitted, three sets of slug tests were conducted. Slugs of different volumes were used at each location for comparative analysis.

In-Situ® Level TROLL® 300 series non-vented, integrated pressure transducer/ dataloggers were used to measure water level response during slug testing. At the majority of well locations, the dataloggers were programmed to record water level at a logging rate of one reading per second. At several well locations where recovery rates were slow, water

level readings were recorded at two-second intervals. After the monitoring equipment was installed in a well, a slug was lowered quickly into the water. Falling head was monitored until water level in the well recovered to within 90 percent of the initial static level. After water level had recovered to a static condition, the slug was quickly pulled out of the water. Monitoring of rising head continued until the water level recovered to within 90 percent of the initial static water level.

Slug testing was not conducted at new wells MW-104 and MW-106 during Phase 1. These wells were evacuated completely during well development and water levels had not recovered sufficiently to conduct slug testing at the time of the November testing event. Following development, pressure transducer/dataloggers were used to monitor water level recovery at each location. The water level recovery monitoring conducted at MW-104 and MW-106 after development indicated that recovery rates were very slow and any future slug testing at these wells will require an extended monitoring period for each test. Wells MW-104 and MW-106 will be slug tested during Phase 2.

2.2.2 Core Analysis

As described in **Section 2.1.2**, three representative samples of unbroken core approximately 1 foot in length were selected from the MW-102DB borehole for laboratory analysis of K. One Kbc core sample selected from the BCA and two Jmb core samples selected from the BBM were submitted to DBSA Lab under standard chain of custody protocols. The samples were analyzed for saturated horizontal and vertical K by flexible wall falling head-rising tail method.

2.3 VIDEO LOGGING

Down-hole video logging was conducted at three existing monitor wells during Phase 1 operations. Based on a review of historic information, discrepancies were noted in the construction of existing wells ML-1 and MW-13. To clarify the construction of these wells, they were video logged. During Site work, a well of unknown designation was located southeast of well MW-13 (**Figure 2**). This well, assigned the designation of UW-1, was video logged to determine its condition and viability as a monitor well. Video logging was conducted by CEI under the supervision of an M&A hydrogeologist. Findings of the video logging are described below:

ML-1: The well log for well ML-1 indicates that it was constructed with two well screen intervals separated by about 70 feet. Based on the video log, well ML-1 has one screened interval from 135.7 to 154.7 feet bgs (137.0 to 156.0 feet below the top of PVC casing measuring point [bmp]). The well screen is constructed with horizontal, machine-slotted PVC and appears to be in good condition. The bottom of the well is at 155.7 feet bgs (157.0 feet bmp).

MW-13: Discrepancies were noted in historic documentation of the depth of MW-13 and length of the screened interval. Video logging confirmed that well MW-13 is screened from 126.7 to 203.7 feet bgs (129.0 to 206.0 feet bmp). The well screen is constructed of PVC with vertical saw-cut perforations. The perforations are approximately 1/8 inch wide, 6 inches long, and staggered across the interval with three separate perforations in the casing. Heavy orange and black staining was observed on the lower 40 feet of well screen. The bottom of the well is at 203.7 feet bgs (206.0 feet bmp).

UW-1: Based on the video log, well UW-1 is screened from 100.6 to 137.6 feet bgs (103.0 to 140.0 feet bmp). The 4-inch diameter PVC well screen is perforated with vertical saw-cut perforations, approximately 1/8 inch wide, 6 inches long, and staggered across the

interval with three separate perforations in the casing. The screen appears to be in good condition. The bottom of the well is at 137.6 feet bgs (140.0 feet bmp).

2.4 GROUNDWATER MONITORING

During the period from October 29 to November 7, 2012, a comprehensive groundwater monitor event was conducted at the Site that included water level monitoring and sample collection at all existing and new Phase 1 monitor wells. Groundwater samples were collected using no-purge, low-flow minimal purge, and standard three casing volume purge methods. The sampling event was conducted to specifically investigate and compare different sampling methods in wells to determine the appropriate sampling method for the Site. Groundwater monitoring was conducted in accordance with procedures described in the approved work plan.

Groundwater monitoring was conducted by CEI, a qualified company specializing in groundwater sampling. The monitoring event was supervised in the field by an M&A hydrogeologist. Prior to well development, groundwater samples were collected from each new well using disposable polyethylene bailers. Following development, the new wells were left undisturbed for a period of at least seven days before they were sampled as part of the comparative sampling event.

On October 29, 2012, depth to water was measured in all existing and new wells. Water level measurements were used along with well construction details in preparation for sampling. Groundwater samples were collected by the no-purge HydraSleeve method, followed by the low-flow minimal purge method, followed by the volume-based standard purge method. Sample methods, water level data, and field parameters measured during sampling were recorded on field sampling data sheets (FSDSs). Copies of the FSDSs are provided in **Appendix C**. Field parameter data are summarized in **Table 2**.

Sample method procedures are described in detail in the approved work plan. General procedures for each method are described below:

HydraSleeve (No Purge) Method: A HydraSleeve consists of a disposable polyethylene tube-shaped bag, sealed at the bottom and flared open at the top with a check-valve (GeoInsight, 2006). During sampling, a quick, upward pull on the tether causes the HydraSleeve to fill with groundwater from the screened interval before the check-valve closes. The closed check-valve prevents contact with overlying groundwater as the HydraSleeve is removed from the well. The HydraSleeves were deployed at least 24 hours prior to sample collection. HydraSleeves were deployed with a weight at the bottom via a disposable nylon line and placed approximately 1 to 2 feet below the midpoint of the saturated portion of the well screens.

Low-Flow (Minimal Purge) Method: Groundwater samples were collected using low-flow sampling techniques in accordance with the US EPA *Low-Flow (Minimal Drawdown) Ground-Water Monitoring Procedures* (Puls and Barcelona, 1996). A submersible pump was placed at the midpoint of the well screen interval. Wells were purged through disposable tubing at rates less than 500 milliliters per minute to minimize water level drawdown. During purging, field parameters (pH, specific conductance, temperature, oxidation-reduction potential [ORP], dissolved oxygen [DO], and turbidity) were monitored through a flow-through cell and recorded on FSDSs at three minute intervals. With water level in the well stable, groundwater samples were collected after field parameters had stabilized within ± 0.1 standard units for pH, ± 3% for specific conductance and temperature, ± 10 millivolts (mv) for ORP, and ± 10% for turbidity and DO.

Volume Based (Standard Purge) Method: Groundwater samples were collected using volume-based purge techniques in accordance with the US EPA *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers* (Yeskis and Zavala, 2002). Depth to water in the well was measured and used to calculate casing volumes for

each well. A submersible pump and disposable tubing were used to purge the wells until at least three casing volumes were removed. During purging, purge rates and volumes were monitored using an in-line flowmeter and field parameters (pH, specific conductance, temperature, ORP, DO, and turbidity) were monitored through a flow-through cell after each purge volume was removed. Groundwater samples were collected after field parameters from three successive readings stabilized within ± 0.1 standard units for pH, ± 3% for specific conductance and temperature, ± 10 millivolts (mv) for ORP, and ± 10% for turbidity and DO. Several wells were purged dry before three casing volumes were removed. At these wells, samples were collected within a 24-hour period after 80 percent recovery.

The sequence of prescribed sampling methods was followed at all well locations with the exception of wells MW-104 and MW-106. Because of slow water level recovery rates after well development, these wells were sampled by a modified purge method. Monitor wells MW-104 and MW-106 were evacuated completely on October 29, 2012 during well development. The wells were sampled during the comprehensive monitoring event on November 7, 2012, after they had recovered approximately 60 percent. Both wells were sampled again on November 28, 2012, after recovery had exceeded the work plan criterion of 80 percent in the wells.

Quality Assurance/Quality Control (QA/QC) sampling conducted during the monitoring program included collection of duplicate samples, equipment rinsate blanks, and laboratory split samples. Duplicate groundwater samples were collected at a frequency of approximately 10 percent of the total number of groundwater samples collected during the program. A total of nine duplicate samples were collected, and at least two duplicate samples were collected using each of the three sample methods. Three equipment rinsate blanks were collected to assess the effectiveness of equipment decontamination procedures. Equipment blanks were prepared by pouring or pumping reagent-grade de-ionized water over or through sampling devices after decontamination procedures were conducted. One split

sample was collected at monitor well MW-102DB using all three sample methods and submitted to an alternate laboratory.

Samples were placed in laboratory-supplied containers and given a unique 4-digit sample identifier. Samples collected for dissolved metals analysis were filtered in the field using disposable 0.45 micron filters and preserved with laboratory-supplied nitric acid. Sample containers were placed in iced coolers immediately after sample collection and shipped to Energy Laboratories of Casper, Wyoming (Energy Lab) under standard chain of custody protocols. The QA/QC split samples were submitted to ACZ Lab. In accordance with the LTGMP and the License, all groundwater samples were analyzed for dissolved uranium, molybdenum, selenium, and arsenic by US EPA Method 200.8, for total dissolved solids by standard method A2540 C, for chloride and sulfate by US EPA Method 300.0, for bicarbonate as HCO_3 by standard method A2320 B, and pH by standard method A4500-HB. In addition to the required analyses, samples were also analyzed for calcium, magnesium, potassium, and sodium by US EPA Method 200.7, carbonate as CO_3 by standard method A2320 B, and specific conductance by standard method A2510 B.

Purge water generated during groundwater sampling activities was contained and transported to the 20,000-gallon storage tank located on RAML property. As described in **Section 2.1.5**, the waste water is secured onsite pending final disposal.

On October 30, 2012, DRC representative, Mr. Tom Rushing, visited the Site to collect a QA/QC split sample and to audit groundwater sampling procedures. During the Site visit, a second sample set was collected from well ML-1 using containers supplied by DRC. The split sample was collected using the low-flow method and sampling equipment provided by CEI. DRC maintained custody control of the split sample after collection. During the visit, Mr. Rushing observed sample collection by HydraSleeve, low-flow, and volume-based purge methods, calibration of field meters, and decontamination of sampling equipment at wells ML-1 and EF-6.

3.0 SUMMARY OF PHASE 1 DATA

This section summarizes the data obtained during Phase 1. Interpretation of the Phase 1 data was limited to the level needed to confirm and/or modify the Phase 2 field program. The Phase 2 work plan has been submitted to DRC under separate cover concurrently with this report. A complete interpretation of the Phase 1 and Phase 2 data will be included in the final report after Phase 2.

3.1 HYDROGEOLOGIC CONDITIONS

The hydrogeologic conditions encountered in the eight Phase 1 wells were generally consistent with expected conditions. The characteristics of the Kbc and Jmb encountered in the Phase 1 wells were generally consistent with lithologic information reported for previous investigations. **Appendix A** includes lithologic logs for the Phase 1 wells. The contact between the Kbc and Jmb was encountered at elevations generally consistent with previously reported elevations. **Figure 3** shows contours of estimated contact elevation between the Kbc and Jmb. The elevation contours were inferred based on observed contact elevations in the Phase 1 wells, reported contact elevations in the existing wells, reported contact elevations from abandoned wells and boreholes identified in historical hydrogeologic investigation reports, and contact elevations reported in the previous groundwater model (EarthFax Engineering, Inc., 1984; Lewis Water Consultants, Inc., 2001). Elevation data from abandoned wells and boreholes are not shown on **Figure 3** to improve clarity.

Figure 4 shows transect lines of three hydrogeologic sections that were prepared to depict hydrogeologic conditions in portions of the study area. Sections A-A', B-B', and C-C' are included on **Figures 5 through 7**. The sections were prepared using the recent and historical lithologic information. The sections include the screened interval of wells and the

groundwater elevation and uranium concentration data obtained during the Phase 1 field program. In general, the geologic, water level, and water quality conditions observed in these sections are consistent with expected conditions based on information available prior to the Phase 1 investigation. Based on information from the new wells, the following notable conditions were observed:

Section A-A'

- The upward hydraulic gradient from the BBM to the BCA in well pair MW-102/MW-102DB.
- The slight upward hydraulic gradient from the deep BCA to the shallow BCA at well pair MW-100/LW-1.
- The detections of uranium at 9.66 milligrams per liter (mg/L) and 11.4 mg/L in BBM wells MW-103 and MW-102DB, respectively. **Section 3.5.1** includes additional discussion of the uranium concentration in well MW-102DB.

Section B-B'

- The relatively thin saturated thickness of the BCA (generally less than 25 feet) in wells north of the Lisbon Valley Anticline axis.

Section C-C'

- The high groundwater elevation of 6,605.86 feet above mean sea level (ft msl) measured at well MW-106. The Kbc is dry at well MW-106.

Additional evaluation and interpretation of hydrogeologic conditions will be conducted during Phase 2.

3.2 HYDRAULIC TESTING RESULTS

Slug tests and laboratory tests were conducted to estimate saturated horizontal and vertical K of the BCA and BBM. The following sections summarize the hydraulic testing results. Additional analysis and interpretation of the historical, Phase 1, and future Phase 2 hydraulic data will be conducted during Phase 2.

3.2.1 Slug Test Results

Slug tests were conducted in all existing and Phase 1 wells except MW-104 and MW-106. Wells MW-104 and MW-106 had not fully recovered from development at the time of slug testing. These wells will be slug tested in Phase 2. Multiple sets of tests were conducted at each well using different slug volumes to demonstrate that the measurements were repeatable. Recovery of water level for both falling head and rising head tests were analyzed using the aquifer test analytical software AQTESOLV (HydroSOLVE, 2008). The Bouwer-Rice method (Bouwer and Rice, 1976) was used to analyze the observed water level response for all wells except MW-13, which was analyzed using the Springer-Gelhar Inertial method (Springer and Gelhar, 1991). These analytical methods are applicable to fully and partially penetrating wells, and to unconfined conditions (Bouwer, 1989; Hyder and Butler, 1995). For slug tests, displacement (i.e., change in water level in the well) at time t (H_t) is normalized by the initial displacement (H_0) as follows:

$$\text{normalized head} = H_t/H_0$$

The normalized head was plotted against time and matched against "type curves" of known horizontal K. Analytical results are presented as horizontal K in units of feet per day (ft/d). The arithmetic mean values of estimated horizontal K values for the slug tests are given in **Table 3** and are shown on **Figure 8** for the BCA and **Figure 9** for the BBM. Estimated horizontal K values considered anomalous were not included in the mean value.

The mean horizontal K values are considered to be representative values at the well locations. Graphs of observed water level response, and the selected type curve, are given in **Appendix D**. For most tests, the selected type curve matches the observed data within the normalized head range recommended by Butler for reliably matching results to solutions (Butler, 1998).

Estimated horizontal K values from the slug tests for the BCA ranged from 0.02 ft/d at well MW-5 to 360 ft/d at well MW-13 (**Figure 8**). The geometric mean of the representative horizontal K values in the BCA is 1.6 ft/d. The geometric mean horizontal K value estimated from the Phase 1 slug tests is similar to a previously reported geometric mean of K values of 2.35 ft/d (Lewis Water Consultants, Inc, 2001).

Estimated horizontal K values from the two slug tests conducted for BBM wells MW-102DB and MW-103 were 0.7 ft/d and 0.04 ft/d, respectively (**Figure 9**). A slug test was not conducted at well MW-106 during Phase 1 because the water level in the well was still recovering after well development at the time when slug testing was conducted. Well MW-106 will be slug tested during Phase 2. The very slow water level recovery in well MW-106 indicates that the K of the BBM at this location is lower than the K values estimated at wells MW-102DB and MW-103.

3.2.2 Laboratory Test Results

Core samples from well MW-102DB were tested at DBSA Lab for saturated horizontal and vertical K. **Table 4** summarizes the estimated K values from laboratory testing. The highest horizontal and vertical K values were reported in the Kbc sample from the BCA, collected in interval from 130 to 131 ft bgs. Horizontal and vertical K values were estimated at 0.6 ft/d and 0.3 ft/d, respectively.

In the Jmb core samples collected from the BBM at MW-102DB at depth intervals of 145 to 146 ft bgs and 156 to 156.9 ft bgs, laboratory results indicate that the horizontal and vertical K values are similar in each respective sample. The deepest core interval of 156 to 156.9 ft bgs exhibited very low horizontal and vertical K values, indicating that limited groundwater flow occurs in the deep BBM encountered in the borehole. Visual inspection of the core during drilling indicated a varying degree of fracturing and mineralization in the shale and sandstone of the Jmb over the depth interval from 138 to 165 ft bgs.

3.3 GROUNDWATER ELEVATIONS

Table 5 summarizes the groundwater elevation data obtained on October 29, 2012. **Figure 10** shows the groundwater elevation data on a site map for the BCA and BBM wells. **Appendix E** includes water level hydrographs for the 14 existing wells. Groundwater elevations obtained during Phase 1 in the BCA wells varied from a low of 6,449.39 ft msl at well RL-6 to a high of 6,607.53 ft msl at well MW-104. The groundwater elevations in the BCA wells are generally consistent with those expected based on previous monitoring data, with the exception of well MW-104. At this well, groundwater appears to be perched above the contact between the Kbc and Jmb because: (1) dry conditions were encountered during drilling in the upper 133 feet of Morrison Formation, and (2) the groundwater elevation is anomalously high compared to groundwater elevations in other BCA wells at the Site.

Groundwater elevations obtained during Phase 1 in the BBM wells varied from a low of 6,580.48 ft msl at well MW-103 to a high of 6,605.65 ft msl at well MW-106 (**Figure 10**). The Kbc was dry at BBM wells MW-103 and MW-106.

Groundwater elevation contour maps for the BCA and BBM will be prepared and additional analysis of groundwater elevation data will be conducted after water level data from the Phase 2 wells are available.

3.4 LABORATORY TESTING OF VADOSE ZONE CORE SAMPLES

Historical drainage of tailings water through the Kbc near the tailings could have resulted in residual uranium (and other trace metals) adsorbed to the rock matrix. Synthetic Precipitation Leaching Procedure (SPLP) tests on core samples from well MW-103 were conducted to assess the potential that residual uranium and other trace metals in the vadose zone near the tailings could be mobilized by infiltrating water and continue to impact groundwater quality. **Table 6** summarizes the leachate water quality from the SPLP tests conducted on vadose zone core samples from selected depth intervals from wells MW-103 and MW-102DB. SPLP testing on one core sample from MW-102DB was requested by DRC to assess the significance of a zone of black staining observed over the depth interval from 114 to 123.5 ft bgs.

The results of SPLP testing indicate that the uranium concentration in the leachate from all core samples from well MW-103 was low (**Table 6**). These results indicate that the amount of leachable uranium in the vadose zone at well MW-103 is low, and uranium in the vadose zone in this area does not represent a significant source to the groundwater. Arsenic, barium, and lead were also detected in SPLP leachate from the core samples from MW-103 at low concentrations. The presence of low concentrations of these trace metals is not believed to pose a long-term threat to groundwater quality at the Site.

In the core sample collected at a depth interval from 123 to 123.5 ft bgs from well MW-102DB, arsenic, barium, and lead were detected at low concentrations in the SPLP leachate. Uranium was not detected in the SPLP leachate from the MW-102DB core sample. These results indicate that trace metal leaching from the black staining is not an environmental concern.

3.5 GROUNDWATER QUALITY

Groundwater samples were collected using up to three different methods from 20 wells screened in the BCA and three wells screened in the BBM during Phase 1. **Table 7** summarizes the Phase 1 groundwater quality data, which include dissolved common constituent concentrations, pH, electrical conductivity, and dissolved trace metal concentrations. **Appendix E** includes time-series graphs of dissolved uranium, arsenic, selenium, molybdenum, bicarbonate, chloride, and sulfate concentrations, TDS concentration, and pH for low-flow sampling of the 14 existing wells.

3.5.1 Burro Canyon Aquifer

The time-series graphs of groundwater quality data indicate that dissolved concentrations of common constituents and trace metals detected during Phase 1 in the existing BCA wells are consistent with historical concentrations. The dissolved concentrations of common constituents and trace metals detected during Phase 1 in the new BCA wells are also generally consistent with concentrations reported from previous investigations (Lewis Water Consultants, Inc., 2001). The following sections briefly summarize the Phase 1 groundwater quality data for the BCA wells. Additional evaluation and interpretation of the Phase 1 water quality data will be conducted after the Phase 2 investigation results are available.

Common Constituents

Groundwater samples collected during Phase 1 from the BCA wells were analyzed for a range of common dissolved inorganic constituents and conditions (**Table 7**). Piper diagrams for selected sets of BCA wells are included in **Appendix G**. The Piper diagrams were prepared to assess variations in inorganic water quality in the study area. The Piper diagrams indicate that groundwater impacted by tailings water is generally characterized as

"saline", whereas groundwater less likely to be impacted by tailings water is generally characterized as "permanent hardness".

Maximum TDS concentrations reported in samples from BCA wells during Phase 1 are depicted on **Figure 11**. A TDS map was prepared in lieu of individual inorganic cations and anions because it provides an overall summary of dissolved inorganic water quality. TDS concentrations varied from a low of 362 mg/L at well LW-1 to a high of 37,000 mg/L at well OW-UT-9. The highest TDS concentrations in BCA groundwater were detected near the tailing impoundments.

Trace Metals

Groundwater samples collected during Phase 1 from BCA wells were analyzed for dissolved uranium, arsenic, selenium, and molybdenum (**Table 7**). **Figures 12 through 15** depict the maximum dissolved uranium, arsenic, selenium, and molybdenum concentration reported during the Phase 1 comparative sampling event at each BCA well. Brief summaries of the Phase 1 dissolved trace metal concentration data are provided below.

- **Uranium:** Dissolved uranium concentrations varied from a low of 0.0021 mg/L at well RL-5 to a high of 148 mg/L at well MW-102 (**Figure 12**). Dissolved uranium concentrations exceeded background concentrations[2] at wells MW-104, MW-105, OW-UT-9, MW-102, MW-101, RL-1, RL-3, EF-3A, EF-8, and EF-6. Dissolved uranium concentrations exceeded the target action levels specified in the License at wells RL-1 and EF-8.
- **Arsenic:** Dissolved arsenic concentrations varied from a low of less than the laboratory detection limit of 0.001 mg/L at wells MW-5, LW-1, MW-100, RL-4, and RL-5 to a high of 3.66 mg/L at well OW-UT-9 (**Figure 13**). Dissolved arsenic concentrations exceeded License background concentrations at wells OW-UT-9, MW-102, and EF-3A. Dissolved arsenic concentrations exceeded the License compliance concentration at well OW-UT-9.

[2] Background concentrations are specified in Radioactive Materials License UT1900481

- **Selenium:** Dissolved selenium concentrations varied from a low of 0.002 mg/L at well LW-1 to a high of 0.191 mg/L at well MW-102 (**Figure 14**). Dissolved selenium concentrations exceeded License background concentrations at wells MW-5, UW-1, OW-UT-9, MW-105, MW-102, EF-3A, EF-8, EF-6, MW-101, RL-1, and RL-3. Dissolved selenium concentrations in BCA wells OW-UT-9 and EF-3A were less than License compliance concentrations.
- **Molybdenum:** Dissolved molybdenum concentrations varied from a low of 0.001 mg/L at wells MW-5 and MW-100 to a high of 51.7 mg/L at well OW-UT-9 (**Figure 15**). Dissolved molybdenum concentrations exceeded License background concentrations at wells MW-104, OW-UT-9, MW-102, EF-3A, MW-101, RL-1, and RL-3. Dissolved molybdenum concentrations in BCA wells OW-UT-9 and EF-3A were less than License compliance concentrations.

3.5.2 Brushy Basin Member

Historical groundwater quality data for wells properly constructed in the BBM have not been identified in previous reports. Therefore, the Phase 1 groundwater quality data from the three new BBM wells represent the first known data to characterize groundwater quality in the BBM. The following sections briefly summarize the Phase 1 groundwater quality data for the BBM wells. Additional evaluation and interpretation of the Phase 1 data will be conducted after the Phase 2 investigation results are available.

Common Constituents

Groundwater samples collected during Phase 1 from BBM wells were analyzed for a range of common dissolved inorganic constituents and conditions (**Table 7**). A Piper diagram depicting inorganic groundwater quality for the BBM wells is included in **Appendix G**.

Maximum TDS concentrations reported in samples collected from the BBM wells during Phase 1 are depicted on **Figure 16**. TDS concentrations in the BBM wells varied from a low of 2,170 mg/L at well MW-106 to a high of 4,440 mg/L at well MW-103.

Trace Metals

Groundwater samples collected during Phase 1 from BBM wells were analyzed for dissolved uranium, arsenic, selenium, and molybdenum (**Table 7**). **Figures 17 through 20** depict the maximum dissolved uranium, arsenic, selenium, and molybdenum concentrations reported during the Phase 1 comparative sampling event at each BBM well. Brief summaries of the Phase 1 trace metal concentration data are provided below.

- **Uranium:** Dissolved uranium concentrations varied from a low of 0.0086 mg/L at well MW-106 to a high of 11.4 mg/L at well MW-102DB (**Figure 17**). The dissolved uranium concentration at MW-106 is less than the Utah Ground Water Quality Standard (GWQS) for uranium of 0.03 mg/L. Groundwater quality data from sampling at MW-102DB indicate that the elevated uranium concentration at well MW-102DB is the result of purge sampling (see **Appendix F** for an analysis of the MW-102DB groundwater quality data). Dissolved uranium concentrations in samples collected from MW-102DB prior to purging ranged from approximately 0.04 to 0.09 mg/L, with a mean concentration of approximately 0.06 mg/L.

  Water quality data obtained during Phase 1 for well MW-103 indicate the presence of tailings water in the BBM at this location (**Table 7**). Moderate to well lithified shale of the Jmb with no obvious evidence of fracturing was observed in the MW-103 borehole. The horizontal K of the BBM at MW-103 was estimated at 0.04 ft/d, based on Phase 1 slug testing. The character of the shale in the Jmb encountered near the bottom of the MW-103 borehole is similar to that encountered at MW-102DB, which had a very low estimated horizontal and vertical K based on laboratory tests (on the order of 10^{-5} ft/d). The low K of

the BBM near MW-103 would effectively prevent extensive lateral and deep migration of tailings water in the BBM. Additional BBM wells are planned for Phase 2. Until these wells are drilled and hydrogeologic and water quality conditions in the BBM are further assessed, no further characterization work is planned at the MW-103 location.

- **Arsenic:** Dissolved arsenic concentrations varied from less than the laboratory detection limit of 0.001 mg/L at well MW-103 to a high of 0.0286 mg/L at well MW-102DB (**Figure 18**). The dissolved arsenic concentration at all three BBM wells is less than the GWQS for arsenic of 0.05 mg/L. The elevated dissolved arsenic concentration in MW-102DB was reported in the purge sample and is not indicative of ambient conditions. Dissolved arsenic concentrations in samples collected from MW-102DB prior to purging ranged from 0.004 to 0.006 mg/L, with a mean concentration of approximately 0.005 mg/L.
- **Selenium:** Dissolved selenium concentrations varied from less than the laboratory detection limit of 0.001 mg/L at well MW-106 to a high of 0.025 mg/L at well MW-103 (**Figure 19**). The dissolved selenium concentration at all three BBM wells is less than the GWQS for selenium of 0.05 mg/L. The elevated dissolved selenium concentration in MW-102DB was reported in the purge sample and is not indicative of ambient conditions. Dissolved selenium concentrations in samples collected from MW-102DB prior to purging were reported to be less than the detection limit of 0.001 mg/L for samples analyzed at Energy Lab and reported at a concentrations of 0.0002 and 0.0004 mg/L for samples analyzed at ACZ Lab.
- **Molybdenum:** Dissolved molybdenum concentrations varied from a low of 0.014 mg/L at well MW-106 to a high of 2.25 mg/L at well MW-102DB (**Figure 20**). A GWQS for molybdenum does not exist. The elevated dissolved molybdenum concentration in MW-102DB was reported in the purge sample and is not indicative of ambient conditions. Dissolved molybdenum concentrations in

samples collected from MW-102DB prior to purging ranged from 0.01 to 0.017 mg/L, with a mean concentration of approximately 0.014 mg/L.

3.5.3 Evaluation of Comparative Sampling Results

The Phase 1 groundwater samples were collected using three methods in the following order: (1) Hydrasleeve (no purge), (2) low-flow (minimal purge), and (3) standard 3-casing volume purge. All wells were sampled using the three methods except wells MW-104 and MW-106. Groundwater recovery after development in these two wells was very slow and ongoing during the sampling event, which prevented proper sampling with the HydraSleeve and low-flow methods.

Visual inspection of the Phase 1 groundwater quality data included in **Table 7** indicates that all three sampling methods provide comparable analytical results. These results indicate that the no purge method using the HydraSleeve and minimal purge low-flow method resulted in groundwater quality data comparable to groundwater samples collected using the traditional volume-based purge method. These results suggest that all three sampling methods would be adequate for compliance monitoring. The HydraSleeve and low-flow methods are preferred from a practicability perspective because they produce low volumes of waste water, they are more safely conducted in all weather conditions, and they are more economical.

In additional to visual inspection of the data, the analytical results from each sampling method were quantitatively analyzed to determine: (1) if results from all methods were comparable, and/or (2) if a preferred method was evident in the results. In general, the preferred sampling method for compliance monitoring would be the method that consistently results in the highest concentration. Wells MW-104 and MW-106 were excluded from the analysis since only one sampling method was used. Well MW-102DB was also excluded from analysis for reasons described in detail in **Appendix F**. Additionally, pH was not

included in the analysis. In total, data for 20 wells, 14 analytes, and 3 sampling methods were considered in the analysis, which results in 280 well-analyte pairs and 840 well-analyte-method combinations.

A preliminary analysis identified the sampling method that resulted in the highest concentration for each well-analyte pair. In some cases, the highest reported concentration was common to more than one sampling method. Results of this preliminary analysis indicated that the low-flow method resulted in the highest concentration for 154 well-analyte pairs, the purge method resulted in the highest concentration for 134 well-analyte pairs, and HydraSleeve method resulted in the highest concentration for 119 well-analyte pairs. On this basis, the low-flow sampling method appears to be the most conservative (i.e., produces the highest concentration) method for groundwater sampling at the Site.

Identifying the method that most often results in the highest concentration does not ensure that the method performs well in all circumstances. In other words, it is possible that the low-flow method would be the most conservative sampling method for many or most wells, but would be inappropriate for other wells. A second analysis was conducted to illustrate the distribution of sampling method performance. Initially, the percentage of the maximum concentration measured within each well-analyte pair by each sampling method was calculated. The resulting percentages were then binned and are presented in a histogram on **Figure 21**. The majority of all well-analyte-method combinations sampled water that had 95 to 100 percent of the maximum concentration measured within the well-analyte pair, indicating that all three methods performed comparably in most cases. However, the HydraSleeve and volume-based purge methods were more likely to sample lower concentration water than the low-flow method. This second quantitative analysis supports the findings that all three sampling methods generally produce comparable results and that low-flow sampling produces more conservative results than other sampling methods.

RAML may conduct a second comparative sampling event in spring 2013 using the same methods and procedures used during the Phase 1 groundwater monitoring event. Data from the 2013 event will be used to confirm the Phase 1 comparative sampling results and to further compare sampling methods.

4.0 SUMMARY

Phase 1 of the two-phase hydrogeologic investigation was completed at the Rio Algom Mining LLC, Lisbon Facility (Site) during the fall 2012. Results from the Phase 1 hydrogeologic investigation are summarized below.

- The scope and objectives of the Phase 1 hydrogeologic investigation proposed in the final approved work plan were achieved. Eight new monitor wells were constructed, developed, surveyed, and sampled as planned. Four of the new wells (MW-100, MW-101, MW-102, and MW-105) are screened in the BCA hydrostratigraphic unit within the Kbc, three of the new wells (MW-102DB, MW-103 and MW-106) are screened within the Jmb in the BBM hydrostratigraphic unit, and one of the new wells (MW-104) appears to be screened in a perched groundwater zone within the Kbc.
- Groundwater samples were collected from all existing and new wells using three methods: (1) no-purge (HydraSleeve), (2) minimal purge low-flow, and (3) standard three-casing volume purge. Groundwater samples were analyzed in a laboratory for common groundwater constituents and selected trace metals in accordance with the License.
- Slug tests were conducted in all existing and new wells except wells MW-104 and MW-106. The water level in these wells was still recovering from development at the time of slug testing; these wells will be slug tested in Phase 2. The borehole coring program, which included hydraulic conductivity testing and laboratory analysis for selected trace metals, was completed.
- All investigation derived waste from Phase 1 has been approved for disposal at US Ecology landfill in Grand View, ID, a facility licensed to accept low-level radioactive waste material. The drill cuttings have been disposed and the waste water is ready for disposal when weather conditions permit.

- The geologic conditions encountered and the hydraulic, groundwater elevation, and groundwater quality data obtained from Phase 1 were largely consistent with historical data and expected conditions. Notable observations from Phase 1 include:
    - Perched groundwater at the contact between the Kbc and Jmb in the BCA may exist at well MW-104. The groundwater elevation at this well is the highest of any well at the Site.
    - The Kbc is dry at wells MW-103 and MW-106.
    - An upward hydraulic gradient exists at the MW-102/MW-102DB well pair under ambient conditions. Purge sampling appears to have reversed the hydraulic gradient and caused contaminated groundwater to flow from the BCA to the BBM near the well. Fractures evident in the core from borehole MW-102DB may represent conduits for vertical groundwater flow.
    - A slight upward hydraulic gradient exists at the MW-100/LW-1 well pair.
    - Tailings water appears to have migrated into the upper 40 feet of saturated BBM near well MW-103.
    - Laboratory test results on deep cores from MW-102DB, slug test results from well MW-103, and the observed slow recovery at well MW-106 indicate that the BBM has a low horizontal and vertical hydraulic conductivity. Extensive lateral or deep migration of tailings water in the BBM is unlikely due to the low estimated hydraulic conductivity.
    - A well of unknown designation was found south of the tailings impoundments. This well is designated UW-1. The well was video-logged to determine its construction and condition. The well is likely screened in the BCA and is in good condition. The well was slug tested and sampled.

  - Arsenic concentrations in groundwater from well OW-UT-9 exceeded the License compliance concentration. This result was reported to DRC in accordance with the License conditions.

- The results of Phase 1 partially addressed data gaps identified in the approved work plan. While some refinements to the CSM are evident based on Phase 1 results, some of which are discussed above, the results of Phase 2 are needed to sufficiently refine the CSM and to determine the best approach for reestablishing compliance conditions at the Site.
- Analysis of the groundwater quality data from the comparative sampling event indicate that no-purge (HydraSleeve), minimal purge (low-flow), and volume-based purge sampling methods result in comparable concentrations of constituents of interest at the Site. All three methods appear to be adequate for compliance monitoring at the Site; however, the HydraSleeve and low-flow methods are preferred from a practicability standpoint because they produce limited waste water, are safer to conduct at the Site in all weather conditions, and are more economical.
- A work plan for the Phase 2 field investigation has been submitted to DRC under separate cover concurrently with this report.

5.0 REFERENCES CITED

Bouwer, H. and R.C. Rice, 1976, **A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells**: Water Resources Research, vol. 12, no. 3, pp. 423-428.

Bouwer, H., 1989. **The Bouwer and Rice slug test--an update**: Ground Water, vol. 27, no. 3, pp. 304-309.

Butler, J.J., Jr., 1998, **The Design, Performance, and Analysis of Slug Tests**: Lewis Publishers, Boca Raton, Florida.

Earthfax Engineering, Inc. 1984, **Remedial Action Plan for Groundwater Contamination Control at the Lisbon Uranium Mill**: prepared for Rio Algom Corporation, April 1984.

GeoInsight, 2006, **HYDRASleeve Simple by Design** (US Patents No. 6,481,300; 6,837,120; others pending), Field Manual: 2006.

Hyder, Z. and Butler, J.J., Jr., 1995, **Slug tests in unconfined formations: an assessment of the Bouwer and Rice technique**: Ground Water, 33(1), 16, 1995

HydroSOLVE, Inc., 2008, **AQTESOLV for Windows 95/98/NT/2000/XP/Vista:** HydroSOLVE, Inc., Reston, Virginia, version 4.50.004 – Professional.

KOMEX, 2003, **Response to Request for Additional Information (RAI), Application for Alternate Concentration Limits Source Materials License SUA -119, Rio Algom Mining LLC, Lisbon Facility, La Sal, Utah:** prepared for Rio Algom Mining LLC, October 13, 2003.

_____, 2004, **Long Term Groundwater Monitoring Plan, Application for Alternative Concentration Limits Source Materials License SUA-1119 RAMC Lisbon Facility, La Sal, Utah:** February 19, 2004.

Lewis Water Consultants, Inc., 2001, **Application for Alternative Concentration Limits Source Materials License SUA-1119 RAMC Lisbon Facility, La Sal, Utah:** March 1, 2001.

Montgomery & Associates, 2012, **Work Plan, Supplemental Site Assessment to Address Out-Of-Compliance Status at Trend Wells RL-1 and EF-8**: August 2012.

Puls, R. W. and M. J. Barcelona, 1996, **Low-Flow (Minimal Drawdown) Ground-Water Monitoring Procedures**: USEPA/540/S-95/504, April 1996.

U. S. Environmental Protection Agency, 1986, **Ground Water Monitoring Technical Enforcement Guidance Document:** USEPA/530/SW-86/055, September 1986.

Utah Division of Radiation Control (DRC), 2012a, **Review and Audit of the Rio Algom Mining, LLC (RAML) work plan prepared by Montgomery & Associates (M&A) entitled "Supplemental Site Assessment to Address Out-of-Compliance Status at Trend Wells RL-1 and EF-8, Lisbon Facility, dated December 13, 2011:** Memorandum prepared by David Edwards dated January 9, 2012.

_____, 2012b, **Letter to Chuck Wentz, Rio Algom Mining, LLC from Rusty Lundberg, DRC, transmitting Radioactive Material License UT1900481, Amendment No. 4**: February 6, 2012.

_____, 2012c, **DRC Review of the Rio Algom Mining, LLC (RAML) work plan, prepared by Montgomery & Associates (M&A) entitled "Supplemental Site Assessment to Address Out-of-Compliance Status at Trend Wells RL-1 and EF-8, Lisbon Facility, dated December 13, 2011:** Request for Information letter sent to Billy M. Ray, BHP Billiton, February 6, 2012.

_____, 2012d, **Montgomery & Associates (2012) Final Work Plan, Supplemental Site Assessment to Address Out-of-Compliance Status at Trend Wells RL-1 and EF-8, Lisbon Facility, Prepared for Rio Algom Mining LLC, April 13, 2012:** Request for Information letter sent to Billy M. Ray, BHP Billiton, May 1, 2012.

Utah Department of Environmental Quality, 2012, **Stipulation and Consent Agreement**: September 10, 2012.

Springer, **R**.K. and L.W. Gelhar, 1991, **Characterization of large-scale aquifer heterogeneity in glacial outwash by analysis of slug tests with oscillatory response, Cape Cod, Massachusetts**: U.S. Geological Survey Water Resource Investigation Report 91-4034, pp. 36-40.

Yeskis, D. and B. Zavala. 2002, **Ground-Water Sampling Guidelines for Superfund and RCRA Project Manager:** USEPA 542/S-02/001, May 2002.

TABLE 1. PHASE 1 WELL CONSTRUCTION DETAILS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	SCREENED UNIT	EASTING[1]	NORTHING[1]	GROUND SURFACE ELEVATION[2] (ft msl)	MEASURING POINT ELEVATION[2] (ft msl)	TOP OF SCREEN ELEVATION (ft msl)	BOTTOM OF SCREEN ELEVATION (ft msl)	SCREEN INTERVAL LENGTH (feet)	CASING DIAMETER (inches)
MW-100	BCA	2,636,664	594,323	6,724.19	6,725.37	6,586	6,521	65	4
MW-101	BCA	2,634,360	593,397	6,709.38	6,710.90	6,570	6,550	20	4
MW-102	BCA	2,635,889	592,129	6,701.46	6,702.88	6,585	6,565	20	4
MW-102DB	BBM	2,635,877	592,170	6,701.68	6,703.62	6,556	6,526	30	4
MW-103	BBM	2,635,778	589,620	6,662.56	6,663.92	6,581	6,551	30	4
MW-104	BCA	2,637,513	589,369	6,703.45	6,705.17	6,635	6,605	30	4
MW-105	BCA	2,636,131	588,105	6,622.46	6,624.12	6,558	6,488	70	4
MW-106	BBM	2,639,306	587,423	6,850.95	6,852.76	6,616	6,586	30	4

Notes:
BCA = Burro Canyon Aquifer
BBM = Brushy Basin Member of the Morrison Formation
[1] North American Datum 1927, Utah State Plane, South
[2] 1988 North American Vertical Datum
ft msl = Feet above mean sea level

TABLE 2. SUMMARY OF FIELD PARAMETERS FROM PHASE 1 GROUNDWATER MONITORING EVENT
RIO ALGOM MINING LLC, LISBON FACILITY

		HYDRASLEEVE METHOD							LOW-FLOW METHOD							PURGE METHOD							
WELL	SAMPLE DATE	Vol (L)	Temp (˚C)	pH (dim)	Cond (µS/cm)	Turb (NTU)	DO (mg/L)	ORP (mV)	Vol (L)	Temp (˚C)	pH (dim)	Cond (µS/cm)	Turb (NTU)	DO (mg/L)	ORP (mV)	Vol (G)	Temp (˚C)	pH (dim)	Cond (µS)	Turb (NTU)	DO (mg/L)	ORP (mV)	Comments
EF-3A	11/1/2012	--	10.8	7.3	7,091	7	0.9	-165	18.0	12.5	7.0	9,995	4	1.8	12	585	12.7	7.2	8,000	5	1.6	-265	
EF-6	10/30/2012	--	14.8	7.1	2,970	14	6.7	2	9.9	13.4	7.0	2,692	6	9.0	40	129	12.7	7.0	2,587	5	7.5	79	
EF-8	10/31/2012	--	12.3	7.6	3,041	9	4.4	-179	9.6	12.2	7.4	2,066	5	8.0	-128	330	12.7	7.4	2,069	3	7.6	-54	
H-63	11/3/2012	--	9.4	8.3	1,202	6	5.5	132	5.5	11.1	8.3	1,203	5	4.4	33	111	12.3	7.9	1,101	9	7.5	-138	
LW-1	11/2/2012	--	10.4	7.5	672	7	3.8	213	12.0	12.6	7.4	648	5	4.2	166	170	12.4	7.3	639	5	3.7	-23	
ML-1	10/30/2012	--	9.4	7.4	1,138	21	4.7	248	4.5	11.0	7.4	1,176	7	5.3	235	225	11.8	7.4	1,250	14	10.5	-144	
MW-13	11/3/2012	--	9.6	7.3	1,002	6	2.0	216	16.8	11.8	7.2	1,025	4	1.0	130	219	12.2	7.2	1,019	3	1.0	105	
MW-5	11/2/2012	--	12.9	6.9	2,992	8	1.4	104	20.5	14.0	6.9	3,002	4	1.1	92	105	13.2	7.2	2,780	10	2.7	201	Purge sample collected 1 day after purging
OW-UT-9	11/3/2012	--	14.6	9.9	40,145	NR	1.7	-238	6.4	14.2	9.9	46,724	4	0.4	-397	85	13.3	9.9	45,007	4	0.4	-268	
RL-1	10/31/2012	--	10.1	7.0	14,597	11	3.7	164	6.0	12.4	6.9	11,585	15	3.1	117	24	14.9	7.1	12,117	69	6.7	104	
RL-3	11/5/2012	--	12.4	7.1	8,087	6	4.3	221	8.4	15.0	6.9	11,987	7	3.9	8	39	13.9	7.0	10,671	7	5.5	93	
RL-4	11/1/2012	--	13.6	7.7	957	5	7.1	80	9.1	16.1	7.6	940	7	9.1	12	66	13.0	7.6	932	25	8.1	12	
RL-5	11/2/2012	--	16.4	7.7	688	4	5.0	38	7.2	12.5	7.6	719	9	9.2	56	105	12.6	7.6	713	5	11.2	68	
RL-6	11/1/2012	--	12.9	7.0	7,081	NR	1.9	-51	2.8	13.0	7.1	2,077	20	1.3	-41	9	12.0	7.1	2,074	7	1.3	-36	
MW-100	11/7/2012	--	10.6	7.3	932	8	1.7	131	6.0	11.2	7.3	1,395	6	1.5	129	113	12.3	7.3	1,391	11	1.0	118	
MW-101	11/6/2012	--	12.8	7.2	20,031	23	5.3	-258	9.6	18.0	7.0	21,708	724	4.4	75	19	14.0	7.0	19,845	>1000	4.3	71	
MW-102	11/6/2012	--	7.5	9.0	20,818	6	1.7	-220	10.0	14.5	8.9	21,623	9	1.1	-377	24	13.5	8.8	21,875	>1000	1.2	-399	
MW-102DB	11/6/2012	--	8.6	8.0	888	17	3.0	223	18.0	13.4	8.1	1,329	20	0.2	-87	109	12.2	8.1	990	12	0.1	-80	
MW-103	11/7/2012	--	9.7	7.0	6,620	4	5.2	63	7.3	8.0	7.0	7,300	9	5.0	83	55	12.7	7.0	7,181	13	3.3	25	
MW-104	11/7/2012	Not sampled by HydraSleeve method							Not sampled by low-flow method							--	11.1	7.3	1,521	6.1	--	--	Bailer sample collected at 60% water level recovery
MW-105	11/7/2012	--	9.9	7.4	1,282	8	1.4	220	16.8	12.1	7.2	1,600	14	0.28	102	123	12.0	7.3	1,262	10	1.3	120	
MW-106	11/7/2012	Not sampled by HydraSleeve method							Not sampled by low-flow method							--	11.7	7.0	3,067	9.9	--	86	Bailer sample collected at 60% water level recovery
UW-1	11/3/2012	--	13.1	7.1	1,835	12	6	107	8.4	15.1	7.1	1,217	30	2.9	88	107	12.8	7.2	1,747	33	5.4	50	
Minimum			7.5	6.9	672	4	0.9	-258	2.8	8.0	6.9	648	3.5	0.22	-397.1	9	11.1	7.0	639	3	0.1	-399	
Maximum			16.4	9.9	40,145	23	7.1	248	20.5	18.0	9.9	46,724	724	9.22	235	585	14.9	9.9	45,007	69	11.2	201	

Notes:
Vol (L) = Volume in liters
Temp (˚C) = Temperature in degrees celsius
pH (dim) = Decimal logarithm of the reciprocal of the hydrogen ion activity, dimensionless
Cond (µS/cm) = Electrical conductivity in microsiemens per centimeter
Turb (NTU) = Turbidity in nephelometric turbiditiy units
DO (mg/L) = Dissolved oxygen concentration in milligrams per liter
ORP (mV) = Oxidation-reduction potential in millivolts
Vol (G) = Volume in gallons
-- = Not applicable for sampling method
NR = Not reported on field sampling data sheet

TABLE 3. RESULTS OF SLUG TESTS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	TEST DATE	TEST IDENTIFIER	INITIAL WATER LEVEL DISPLACEMENT (feet)	CASING RADIUS (feet)	WELL RADIUS (feet)	ANALYTICAL METHOD	HSU[a]	ESTIMATED HYDRAULIC CONDUCTIVITY (feet per day)	MEAN OF ESTIMATED HYDRAULIC CONDUCTIVITY VALUES (feet per day)
EF-3A	28-Aug-12	Slug C Falling Head	0.39	0.25	0.46 (assumed)	Bouwer-Rice	BCA	38	37
		Slug C Rising Head	0.48					29	
		Slug E Falling Head	1.48					42	
		Slug E Rising Head	1.38					24	
		Slug B Falling Head	0.38					47	
		Slug B Rising Head	0.36					42	
EF-6	27-Aug-12	Slug A Falling Head	0.57	0.17	0.33	Bouwer-Rice	BCA	0.5	0.5
		Slug A Rising Head	0.61					0.5	
		Slug B Falling Head	0.98					0.5	
		Slug B Rising Head	0.96					0.6	
		Slug C Falling Head	1.32					0.5	
		Slug C Rising Head	1.15					0.5	
EF-8	27-Aug-12	Slug A Falling Head	0.86	0.17	0.33	Bouwer-Rice	BCA	1.5	1.4
		Slug A Rising Head	0.61					1.6	
		Slug D Falling Head	2.20					1.3	
		Slug D Rising Head	1.53					1.4	
		Slug B Falling Head	1.20					1.4	
		Slug B Rising Head	0.98					1.4	
H-63	26-Aug-12	Slug B Falling Head	1.11	0.17	0.33	Bouwer-Rice	BCA	1.6	1.6
		Slug B Rising Head	0.63					1.7	
		Slug C Falling Head	0.87					1.5	
		Slug C Rising Head	0.79					1.6	
		Slug D Falling Head	1.24					1.6	
		Slug D Rising Head	1.04					1.6	
LW-1	27-Aug-12	Slug B Falling Head	1.15	0.16	0.33	Bouwer-Rice	BCA	3.1	2.8
		Slug B Rising Head	0.77					2.6	
		Slug C Falling Head	1.63					3.2	
		Slug C Rising Head	0.96					2.6	
		Slug D Falling Head	1.14					2.5	
		Slug D Rising Head	1.24					2.8	
ML-1	26-Aug-12	Slug C Falling Head	1.31	0.17	0.33	Bouwer-Rice	BCA	1.8	1.8
		Slug C Rising Head	1.18					1.8	
		Slug B Falling Head	1.29					1.7	
		Slug B Rising Head	0.89					1.8	
		Slug D Falling Head	1.76					1.8	
		Slug D Rising Head	1.71					1.7	

TABLE 3. RESULTS OF SLUG TESTS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	TEST DATE	TEST IDENTIFIER	INITIAL WATER LEVEL DISPLACEMENT (feet)	CASING RADIUS (feet)	WELL RADIUS (feet)	ANALYTICAL METHOD	HSU[a]	ESTIMATED HYDRAULIC CONDUCTIVITY (feet per day)	MEAN OF ESTIMATED HYDRAULIC CONDUCTIVITY VALUES (feet per day)
MW-5	27-Aug-12	Slug E Falling Head	3.48	0.17	0.33 (assumed)	Bouwer-Rice	BCA	0.02	0.02
		Slug E Rising Head	1.69					0.02	
		Slug D Falling Head	1.47					0.02	
		Slug D Rising Head	0.71					0.02	
MW-13	26-Aug-12	Slug A Falling Head	0.44	0.17	0.33 (assumed)	Butler Inertial	BCA	211	360
		Slug A Rising Head	0.44					254	
		Slug B1 Falling Head	0.44					231	
		Slug B1 Rising Head	0.42					263	
		Slug B2 Falling Head	0.57					499	
		Slug B2 Rising Head	0.45					702	
OW-UT-9	29-Aug-12	Slug C Falling Head	0.98	0.25	0.41	Bouwer-Rice	BCA	0.8	1.2
		Slug C Rising Head	0.47					1.5	
		Slug B Falling Head	0.22					1.0	
		Slug B Rising Head	0.38					1.1	
		Slug D Falling Head	0.50					1.1	
		Slug D Rising Head	0.67					1.3	
RL-1	28-Aug-12	Slug A Falling Head	0.21	0.21	0.37	Bouwer-Rice	BCA	0.7	0.6
		Slug A Rising Head	0.32					0.6	
		Slug B Falling Head	0.36					0.5	
		Slug B Rising Head	0.52					0.6	
RL-3	2-Nov-12	Slug A Falling Head	0.41	0.21	0.36	Bouwer-Rice	BCA	1.3	1.2
		Slug A Rising Head	0.36					1.1	
		Slug B Falling Head	0.49					1.2	
		Slug B Rising Head	0.57					1.4	
		Slug G Falling Head	0.31					1.2	
		Slug G Rising Head	0.42					1.3	
RL-4	26-Aug-12	Slug C Falling Head	1.42	0.21	0.36	Bouwer-Rice	BCA	0.7	0.6
		Slug C Rising Head	0.70					0.7	
		Slug D Falling Head	0.89					0.7	
		Slug D Rising Head	0.79					0.6	
		Slug B Falling Head	0.32					0.5	
		Slug B Rising Head	0.82					0.7	

TABLE 3. RESULTS OF SLUG TESTS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	TEST DATE	TEST IDENTIFIER	INITIAL WATER LEVEL DISPLACEMENT (feet)	CASING RADIUS (feet)	WELL RADIUS (feet)	ANALYTICAL METHOD	HSU[a]	ESTIMATED HYDRAULIC CONDUCTIVITY (feet per day)	MEAN OF ESTIMATED HYDRAULIC CONDUCTIVITY VALUES (feet per day)
RL-5	25-Aug-12	Slug B Falling Head 19 ft screen	0.71	0.21	0.36	Bouwer-Rice	BCA	5.7	4.3
		Slug B Falling Head 36 ft screen	0.71					3.5	
		Slug B Rising Head 19 ft screen	0.59					5.6	
		Slug B Rising Head 36 ft screen	0.59					3.7	
		Slug C Falling Head 19 ft screen	0.50					4.4	
		Slug C Falling Head 36 ft screen	0.50					2.8	
		Slug C Rising Head 19 ft screen	0.68					5.5	
		Slug C Rising Head 36 ft screen	0.68					3.6	
		Slug D Falling Head 19 ft screen	0.91					5.2	
		Slug D Falling Head 36 ft screen	0.91					3.3	
		Slug D Rising Head 19 ft screen	0.81					5.5	
		Slug D Rising Head 36 ft screen	0.81					3.2	
RL-6	25-Aug-12	Slug A Falling Head	0.27	0.21	0.36	Bouwer-Rice	BCA	13.7	13.3
		Slug A Rising Head	0.32					21.8	
		Slug B Falling Head	0.08					8.5	
		Slug B Rising Head	0.35					9.2	
MW-100	3-Nov-12	Slug F Falling Head	0.34	0.17	0.33	Bouwer-Rice	BCA	0.6	0.7
		Slug F Rising Head	2.21					--- [b]	
		Slug C Falling Head	0.42					0.6	
		Slug C Rising Head	1.65					--- [b]	
		Slug B Falling Head	0.49					0.8	
		Slug B Rising Head	1.00					--- [b]	
MW-101	4-Nov-12	Slug A Falling Head	0.32	0.17	0.33	Bouwer-Rice	BCA	0.6	0.8
		Slug A Rising Head	0.54					1.0	
		Slug G Falling Head	0.49					0.7	
		Slug G Rising Head	0.75					0.9	
MW-102	3-Nov-12	Slug F Falling Head	1.37	0.17	0.33	Bouwer-Rice	BCA	0.3	0.3
		Slug F Rising Head	1.79					0.3	
		Slug A Falling Head	0.79					0.3	
		Slug A Rising Head	0.85					0.4	
MW-102DB	3-Nov-12	Slug A Falling Head	0.72	0.17	0.33	Bouwer-Rice	BBM	0.6	0.7
		Slug A Rising Head	0.64					0.6	
		Slug B Falling Head	1.16					0.8	
		Slug B Rising Head	1.00					0.6	
		Slug G Falling Head	0.71					0.6	
		Slug G Rising Head	1.26					0.9	

TABLE 3. RESULTS OF SLUG TESTS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	TEST DATE	TEST IDENTIFIER	INITIAL WATER LEVEL DISPLACEMENT (feet)	CASING RADIUS (feet)	WELL RADIUS (feet)	ANALYTICAL METHOD	HSU[a]	ESTIMATED HYDRAULIC CONDUCTIVITY (feet per day)	MEAN OF ESTIMATED HYDRAULIC CONDUCTIVITY VALUES (feet per day)
MW-103	4-Nov-12	Slug A Falling Head	0.61	0.17	0.33	Bouwer-Rice	BBM	0.05	0.04
		Slug A Rising Head	0.63					0.05	
		Slug F Falling Head	0.52					0.02	
		Slug F Rising Head	1.56					0.05	
MW-105	4-Nov-12	Slug C Falling Head	0.66	0.17	0.33	--	BCA	not analyzed [c]	--
		Slug C Rising Head	0.19						
		Slug F&C Falling Head	0.42						
		Slug F&C Rising Head	1.04						
UW-1	4-Nov-12	Slug C Falling Head	0.70	0.17	0.33	Bouwer-Rice	BCA	0.5	0.4
		Slug C Rising Head	0.72					0.5	
		Slug G Falling Head	0.47					0.5	
		Slug G Rising Head	0.38					0.4	
		Slug C&G Falling Head	1.18					0.4	
		Slug C&G Rising Head	1.15					0.4	

Notes:

[a] Hydrostratigraphic Unit
BCA - Burro Canyon Aquifer
BBM - Brushy Basin Member of Morrison Formation

[b] Rising head tests had anomalous responses; results not included in mean estimate

[c] Water level response too fast to analyze

ft - foot

TABLE 4. SUMMARY OF ESTIMATED SATURATED HYDRAULIC CONDUCTIVITY DATA FROM LABORATORY ANALYSIS
RIO ALGOM MINING LLC, LISBON FACILITY

SAMPLE IDENTIFIER	WELL	DEPTH INTERVAL (ft bgs)	GEOLOGIC FORMATION	DESCRIPTION	ESTIMATED HORIZONTAL K_{SAT}		ESTIMATED VERTICAL K_{SAT}	
					cm/sec	ft/d	cm/sec	ft/d
102DB-130-131	MW-102DB	130 to 131	Burro Canyon	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, trace subrounded clasts up to 1 cm, reaction to acid: very weak	2.18E-04	0.6	0.000123	0.3
102DB-145-146	MW-102DB	145 to 146	Morrison; Brushy Basin Member	SHALE; well lithified, homogeneous, hard to brittle, reaction to acid: none (strong on calcite fracture fill)	3.09E-05	0.1	0.0000215	0.1
102DB-156-156.9	MW-102DB	156 to 156.9	Morrison; Brushy Basin Member	SANDSTONE; well lithified, mottled reddish gray to gray, very fine grained, well sorted, very hard, reaction to acid: none (strong on calcite fracture fill)	3.60E-09	0.00001	7.93E-09	0.00002

Notes:
ft bgs - feet below ground surface
cm - centimeter
K_{SAT} - Saturated hydraulic conductivity
cm/sec - centimeters per second
ft/d - feet per day

TABLE 5. PHASE 1 GROUNDWATER ELEVATIONS
RIO ALGOM MINING LLC, LISBON FACILITY

WELL NAME	EASTING[1]	NORTHING[1]	MEASURING POINT ELEVATION[2] (ft msl)	DEPTH TO WATER (ft bmp)	GROUNDWATER ELEVATION[3] (ft msl)
Burro Canyon Aquifer Wells					
MW-104	2,637,513	589,369	6,705.17	97.64	6,607.53
MW-5	2,639,684	593,009	6,746.81	153.36	6,593.45
OW-UT-9	2,636,715	590,970	6,707.22	122.90	6,584.32
LW-1	2,636,700	594,336	6,725.02	146.15	6,578.87
MW-100	2,636,664	594,323	6,725.37	146.96	6,578.41
MW-102	2,635,889	592,129	6,702.88	125.28	6,577.60
MW-101	2,634,360	593,397	6,710.90	150.65	6,560.25
UW-1	2,636,621	587,297	6,656.04	105.30	6,550.74
H-63	2,637,682	588,202	6,686.49	135.84	6,550.65
MW-105	2,636,131	588,105	6,624.12	73.53	6,550.59
MW-13	2,636,128	587,830	6,644.46	93.92	6,550.54
RL-1	2,633,217	593,676	6,655.49	116.05	6,539.44
RL-3	2,632,620	594,239	6,707.63	170.09	6,537.54
RL-5	2,632,690	595,194	6,689.12	151.83	6,537.29
RL-4	2,631,660	595,070	6,684.29	156.40	6,527.89
EF-3A	2,633,923	589,279	6,584.70	82.37	6,502.33
EF-8	2,633,241	589,567	6,575.77	74.38	6,501.39
EF-6	2,633,033	590,617	6,571.12	71.40	6,499.72
ML-1	2,631,486	591,502	6,533.12	41.31	6,491.81
RL-6	2,627,878	594,632	6,464.76	15.37	6,449.39
Brushy Basin Member Wells					
MW-106	2,639,306	587,423	6,852.76	247.11	6,605.65
MW-102DB	2,635,877	592,170	6,703.62	122.08	6,581.54
MW-103	2,635,778	589,620	6,663.92	83.44	6,580.48

Notes:

ft msl = feet above mean sea level

ft bmp = feet below measure point elevation

[1] North American Datum 1927, Utah State Plane, South

[2] 1988 North American Vertical Datum

[3] Groundwater levels measured on October 29, 2012

TABLE 6. SUMMARY OF LEACHATE WATER QUALITY FROM CORE SAMPLES
RIO ALGOM MINING LLC, LISBON FACILITY

SAMPLE IDENTIFIER	102DB-123-123.5	103-22-22.8	103-35.3-36	103-44-44.8	103-56-56.8	103-69.2-70	103-74-74.8
WELL NAME	MW-102DB	MW-103	MW-103	MW-103	MW-103	MW-103	MW-103
DEPTH INTERVAL (ft bgs)	123 to 123.5	22 to 22.8	35.3 to 36	44 to 44.8	56 to 56.8	69.2 to 70	74 to 74.8
GEOLOGIC FORMATION	Burro Canyon	Burro Canyon	Burro Canyon	Burro Canyon	Burro Canyon	Burro Canyon	Morrison; BBM
DESCRIPTION	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak 114'-123.5': abundant fracturing with black "sooty" staining on fracture surfaces	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine grained matrix with rounded to subrounded clasts up to 1 cm, reaction to acid: none	CONGLOMERATE; moderately to well lithified, poorly sorted, matrix supported, fine grained matrix with rounded to subrounded clasts up to 1 cm, reaction to acid: none	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none 55'-58': vertical fracturing with iron oxide staining on fracture surfaces	SANDSTONE; well lithified, medium to coarse grained, poorly sorted, coarsens with depth, trace green subangular clasts of siltstone, reaction to acid: none	SHALE; moderately to well lithified, homogeneous, reaction to acid: none
LEACHATE CONCENTRATION (mg/L)[1]							
Arsenic	**0.0213**	**0.0065**	**0.0090**	**0.0088**	**0.0515**	**0.1158**	**0.0052**
Barium	**0.031**	**0.397**	0.008 B	**0.119**	**0.097**	<0.02	<0.02
Cadmium	0.0001 B	0.0004 B	<0.0005	<0.0005	0.0002 B	<0.0005	0.0001 B
Chromium	0.0014 B	0.0006 B	0.0007 B	0.0015 B	0.0016 B	**0.0032**	0.0014 B
Lead	**0.0009**	**0.0015**	0.0002 B	**0.0006**	**0.0195**	**0.0210**	**0.0009**
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	0.0003 B	<0.0003	<0.0003	<0.0003	<0.0003	0.0001 B	0.0003 B
Silver	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Uranium	<0.0005	<0.0005	<0.0005	0.0002 B	0.0003 B	**0.0039**	<0.0005

Notes:
ft bgs = feet below ground surface
B = Analyte concentration detected at value between method detection limit and practical quantitation limit (PQL); concentration is estimated.
mg/L = Milligrams per liter
BBM = Brushy Basin Member
cm = centimeter

[1] Concentrations reported in bold font are greater than PQL

TABLE 7. SUMMARY OF PHASE 1 WATER QUALITY DATA
RIO ALGOM MINING LLC, LISBON FACILITY

WELL/SAMPLING METHOD	HSU [a]	SAMPLE IDENTIFIER	QC Code [b]	SAMPLE DATE	LAB SAMPLE ID	ANALYTICAL LABORATORY [c]	DISSOLVED COMMON CONSTITUENT CONCENTRATION IN MILLIGRAMS PER LITER [d]									pH	EC (µmhos/cm)	DISSOLVED TRACE METAL CONCENTRATION IN MG/L [e,f]			
							Ca	Mg	Na	K	Cl	CO_3	HCO_3	SO_4	TDS			As	Mo	Se	U
EF-3A (Hydrasleeve)	BCA	6226	O	11/1/2012	C12110105-001B	Energy	210	111	1,660	12	705	<5	1,200	2,100	4,860	7.47	6,840	0.16	2.56	0.03	20
EF-3A (Low-Flow)		6227	O	11/1/2012	C12110105-002B	Energy	235	117	1,550	13	722	<5	1,090	2,140	4,880	7.39	6,770	0.128	1.87	0.028	19
EF-3A (Low-Flow; Duplicate)		6228	DUP	11/1/2012	C12110105-003B	Energy	233	116	1,550	13	702	<5	1,100	2,090	4,770	7.35	6,750	0.129	1.85	0.028	19
EF-3A (Purge)		6229	O	11/1/2012	C12110105-004B	Energy	205	108	1,780	12	740	<5	1,340	2,210	5,060	7.49	7,300	0.192	2.72	0.033	22
EF-6 (Hydrasleeve)	BCA	6214	O	10/30/2012	C12110024-016B	Energy	217	57	459	6	401	<5	479	795	2,170	7.27	3,140	0.014	<0.001	0.013	2.05
EF-6 (Low-Flow)		6215	O	10/30/2012	C12110024-017B	Energy	215	55	430	6	388	<5	487	789	2,180	7.3	3,110	0.013	0.002	0.013	1.77
EF-6 (Purge)		6216	O	10/30/2012	C12110024-018B	Energy	218	58	388	6	373	<5	455	775	2,080	7.21	3,010	0.013	<0.001	0.012	1.55
EF-8 (Hydrasleeve)	BCA	6222	O	10/31/2012	C12110024-009B	Energy	209	51	135	5	174	<5	350	363	1,140	7.61	1,670	0.036	0.009	0.011	**0.523**
EF-8 (Low-Flow)		6223	O	10/31/2012	C12110024-010B	Energy	206	55	144	5	191	<5	370	413	1,270	7.61	1,820	0.034	0.011	0.011	**0.515**
EF-8 (Purge)		6224	O	10/31/2012	C12110024-011B	Energy	209	56	144	6	190	<5	374	416	1,270	7.59	1,840	0.036	0.008	0.011	**0.537**
EF-8 (Purge; Duplicate)		6225	DUP	10/31/2012	C12110024-012B	Energy	209	55	146	5	190	<5	374	416	1,310	7.59	1,840	0.035	0.008	0.01	**0.528**
H-63 (Hydrasleeve)	BCA	6249	O	11/3/2012	C12110279-020B	Energy	26	5	212	3	67	<5	263	188	629	8.11	1,000	0.065	0.007	0.008	0.0099
H-63 (Low-Flow)		6250	O	11/3/2012	C12110279-021B	Energy	26	5	209	3	66	<5	259	183	640	8.11	1,000	0.065	0.008	0.008	0.0097
H-63 (Purge)		6261	O	11/3/2012	C12110279-022B	Energy	75	15	118	4	63	<5	230	184	585	7.76	914	0.032	0.005	0.008	0.0089
LW-1 (Hydrasleeve)	BCA	6230	O	11/2/2012	C12110279-006B	Energy	70	19	31	3	10	<5	208	113	352	7.54	555	<0.001	0.014	0.002	0.0053
LW-1 (Low-Flow)		6231	O	11/2/2012	C12110279-007B	Energy	73	17	31	3	10	<5	207	112	362	7.6	552	<0.001	0.004	0.002	0.0045
LW-1 (Purge)		6232	O	11/2/2012	C12110279-008B	Energy	70	18	31	3	10	<5	225	112	358	7.54	554	<0.001	<0.001	0.002	0.002
ML-1 (Hydrasleeve)	BCA	6211	O	10/30/2012	C12110024-013B	Energy	153	44	95	6	145	<5	250	312	928	7.59	1,380	0.007	0.009	0.008	0.0181
ML-1 (Low-Flow)		6212	O	10/30/2012	C12110024-014B	Energy	155	44	93	7	146	<5	239	317	922	7.57	1,380	0.006	0.01	0.008	0.018
ML-1 (Purge)		6213	O	10/30/2012	C12110024-015B	Energy	176	47	92	6	156	<5	256	345	1,010	7.49	1,480	0.021	0.006	0.009	0.0145
MW-13 (Hydrasleeve)	BCA	6235	O	11/3/2012	C12110279-011B	Energy	86	33	59	4	50	<5	243	174	549	7.48	850	0.029	0.012	0.009	0.0117
MW-13 (Low-Flow)		6236	O	11/3/2012	C12110279-012B	Energy	89	33	63	4	51	<5	243	167	565	7.46	861	0.028	0.012	0.009	0.0119
MW-13 (Purge)		6237	O	11/3/2012	C12110279-013B	Energy	88	32	57	4	47	<5	240	168	538	7.45	833	0.027	0.011	0.009	0.0108
MW-100 (Pre-Development)	BCA	6208	O	10/31/2012	C12110105-005B	Energy	81	63	11	3	11	<5	363	148	503	7.57	791	<0.001	0.001	0.006	0.0045
MW-100 (Hydrasleeve)		6287	O	11/7/2012	C12110375-013B	Energy	80	58	11	3	11	<5	357	150	504	7.51	783	<0.001	<0.001	0.006	0.0029
MW-100 (Low-Flow)		6288	O	11/7/2012	C12110375-014B	Energy	80	58	11	3	11	<5	356	150	505	7.52	787	<0.001	<0.001	0.006	0.0058
MW-100 (Purge)		6289	O	11/7/2012	C12110375-015B	Energy	78	58	11	3	11	<5	356	149	505	7.54	780	<0.001	<0.001	0.007	0.0038

TABLE 7. SUMMARY OF PHASE 1 WATER QUALITY DATA
RIO ALGOM MINING LLC, LISBON FACILITY

WELL/SAMPLING METHOD	HSU [a]	SAMPLE IDENTIFIER	QC Code [b]	SAMPLE DATE	LAB SAMPLE ID	ANALYTICAL LABORATORY [c]	DISSOLVED COMMON CONSTITUENT CONCENTRATION IN MILLIGRAMS PER LITER [d]									pH	EC (µmhos/cm)	DISSOLVED TRACE METAL CONCENTRATION IN MG/L [e,f]			
							Ca	Mg	Na	K	Cl	CO_3	HCO_3	SO_4	TDS			As	Mo	Se	U
MW-101 (Pre-Development)	BCA	6205	O	10/30/2012	C12110024-005B	Energy	493	159	4,160	14	1,210	<5	2,950	7,620	13,800	7.25	16,100	0.005	28.6	0.085	73.4
MW-101 (Low-Flow)		6259	O	11/6/2012	C12110375-020B	Energy	445	156	4,120	12	1,060	<5	2,900	6,680	14,100	7.31	16,100	0.004	27.5	0.08	76.3
MW-101 (Purge)		6260	O	11/6/2012	C12110375-021B	Energy	441	155	4,120	12	1,050	<5	2,870	6,710	13,700	7.3	16,100	0.004	28	0.082	78
MW-101 (Purge; Duplicate)		6281	DUP	11/6/2012	C12110375-022B	Energy	442	156	4,110	12	1,060	<5	2,870	6,790	13,100	7.31	16,100	0.003	28.1	0.079	76.3
MW-101 (Hydrasleeve)		6271	O	11/6/2012	C12110375-005B	Energy	463	159	4,280	13	1,130	<5	2,940	7,260	13,500	7.34	16,000	0.004	27	0.089	77
MW-102 (Pre-Development)	BCA	6203	O	10/30/2012	C12110024-003B	Energy	68	48	4,070	15	1,160	31	3,320	4,290	10,900	8.21	13,500	0.071	19.2	0.02	103
MW-102 (Hydrasleeve)		6267	O	11/6/2012	C12110375-001B	Energy	40	56	5,110	9	1,260	360	4,270	6,280	14,400	8.64	17,800	0.175	28.3	0.189	146
MW-102 (Hydrasleeve; Duplicate)		6268	DUP	11/6/2012	C12110375-002B	Energy	40	57	5,360	10	1,210	300	4,390	6,060	15,000	8.67	17,700	0.133	28.4	0.189	143
MW-102 (Low-Flow)		6269	O	11/6/2012	C12110375-003B	Energy	34	51	5,330	9	1,260	360	4,330	6,280	14,400	8.64	17,600	0.212	27.9	0.189	148
MW-102 (Purge)		6270	O	11/6/2012	C12110375-004B	Energy	48	56	5,340	10	1,320	240	4,630	6,620	13,700	8.61	17,700	0.109	27.3	0.191	136
MW-105 (Pre-Development)	BCA	6207	O	10/31/2012	C12110024-007B	Energy	102	29	45	4	56	<5	239	166	555	7.49	859	0.015	0.007	0.01	0.0122
MW-105 (Hydrasleeve)		6283	O	11/7/2012	C12110375-024B	Energy	122	32	74	4	98	<5	244	191	748	7.48	1,140	0.011	0.006	0.011	0.0169
MW-105 (Low-Flow)		6284	O	11/7/2012	C12110375-025B	Energy	138	36	84	4	124	<5	249	203	862	7.43	1,330	0.008	0.007	0.011	0.0231
MW-105 (Low-Flow; Duplicate)		6285	DUP	11/7/2012	C12110375-011B	Energy	146	38	91	5	126	<5	260	204	856	7.47	1,340	0.008	0.006	0.012	0.0248
MW-105 (Purge)		6286	O	11/7/2012	C12110375-012B	Energy	114	31	67	4	83	<5	240	183	686	7.47	1,050	0.016	0.004	0.011	0.0155
MW-5 (Hydrasleeve)	BCA	6233	O	11/2/2012	C12110279-009B	Energy	296	91	18	4	12	<5	317	780	1,460	7.15	1,680	<0.001	<0.001	0.066	0.007
MW-5 (Low-Flow)		6234	O	11/2/2012	C12110279-010B	Energy	300	92	18	4	12	<5	318	771	1,490	7.15	1,680	<0.001	0.001	0.064	0.0084
MW-5 (Purge)		6251	O	11/3/2012	C12110279-002B	Energy	268	88	17	4	13	<5	321	687	1,350	7.13	1,570	<0.001	<0.001	0.061	0.0087
OW-UT-9 (Hydrasleeve)	BCA	6262	O	11/3/2012	C12110279-023B	Energy	4	22	15,100	18	1,390	6,240	8,170	10,600	36,200	9.49	36,400	**3.28**	51.6	0.055	93.4
OW-UT-9 (Hydrasleeve; Duplicate)		6263	DUP	11/3/2012	C12110279-024B	Energy	3	22	15,000	18	1,390	6,420	8,050	10,700	37,000	9.49	36,900	**3.66**	51.7	0.044	93.6
OW-UT-9 (Low-Flow)		6264	O	11/3/2012	C12110279-025B	Energy	5	21	14,900	18	1,420	6,600	8,530	10,700	35,400	9.48	37,200	**2.9**	39.4	0.022	92.1
OW-UT-9 (Purge)		6265	O	11/3/2012	C12110279-026B	Energy	4	21	14,700	18	1,380	6,720	7,370	10,600	35,900	9.49	36,600	**3.58**	51.4	0.046	88.6
RL-1 (Hydrasleeve)	BCA	6217	O	10/31/2012	C12110024-019B	Energy	579	197	1,990	21	662	<5	1,090	4,410	8,300	7.19	9,710	0.002	10.4	0.069	**43**
RL-1 (Low-Flow)		6218	O	10/31/2012	C12110024-020B	Energy	589	209	2,060	22	685	<5	1,170	4,640	8,680	7.23	10,100	0.002	11.2	0.074	**43**
RL-1 (Low-Flow; Duplicate)		6219	DUP	10/31/2012	C12110024-021B	Energy	596	209	2,050	22	685	<5	1,180	4,640	8,820	7.24	10,000	0.003	11.2	0.073	**43**
RL-1 (Purge)		6220	O	10/31/2012	C12110024-022B	Energy	584	182	2,080	21	679	<5	1,270	4,570	8,620	7.35	10,100	0.004	11.6	0.077	42
RL-3 (Hydrasleeve)	BCA	6252	O	11/5/2012	C12110279-003B	Energy	540	219	1,450	20	533	<5	902	2,920	5,900	7.21	7,100	0.002	3.62	0.073	25
RL-3 (Low-Flow)		6253	O	11/5/2012	C12110279-004B	Energy	581	249	2,000	19	695	<5	1,300	4,140	8,280	7.17	9,600	0.005	6.21	0.08	34.8
RL-3 (Purge)		6254	O	11/5/2012	C12110279-005B	Energy	501	216	1,750	18	616	<5	1,150	3,530	7,090	7.31	8,490	0.003	4.52	0.069	27.2

TABLE 7. SUMMARY OF PHASE 1 WATER QUALITY DATA
RIO ALGOM MINING LLC, LISBON FACILITY

WELL/SAMPLING METHOD	HSU [a]	SAMPLE IDENTIFIER	QC Code [b]	SAMPLE DATE	LAB SAMPLE ID	ANALYTICAL LABORATORY [c]	DISSOLVED COMMON CONSTITUENT CONCENTRATION IN MILLIGRAMS PER LITER [d]									pH	EC (µmhos/cm)	DISSOLVED TRACE METAL CONCENTRATION IN MG/L [e,f]			
							Ca	Mg	Na	K	Cl	CO_3	HCO_3	SO_4	TDS			As	Mo	Se	U
RL-4 (Hydrasleeve)	BCA	6242	O	11/1/2012	C12110105-009B	Energy	89	31	49	4	47	<5	224	172	528	7.66	808	<0.001	<0.001	0.005	0.0031
RL-4 (Low-Flow)		6243	O	11/1/2012	C12110105-010B	Energy	89	32	49	4	46	<5	225	170	532	7.75	810	<0.001	0.003	0.005	0.0029
RL-4 (Purge)		6244	O	11/1/2012	C12110105-011B	Energy	91	32	50	4	48	<5	224	174	546	7.7	818	<0.001	0.001	0.005	0.003
RL-4 (Purge; Duplicate)		6245	DUP	11/1/2012	C12110105-012B	Energy	90	32	49	4	48	<5	225	175	547	7.72	819	<0.001	0.001	0.005	0.003
RL-5 (Hydrasleeve)	BCA	6246	O	11/2/2012	C12110279-017B	Energy	73	18	37	2	15	<5	226	100	360	7.66	572	<0.001	<0.001	0.003	0.002
RL-5 (Low-Flow)		6247	O	11/2/2012	C12110279-018B	Energy	73	18	43	3	15	<5	251	104	379	7.66	599	<0.001	0.002	0.003	0.0021
RL-5 (Purge)		6248	O	11/2/2012	C12110279-019B	Energy	73	18	42	3	15	<5	237	102	369	7.69	598	<0.001	<0.001	0.003	0.0021
RL-6 (Hydrasleeve)	BCA	6209	O	11/1/2012	C12110105-006B	Energy	278	96	48	2	39	<5	338	769	1,540	7.78	1,850	0.002	0.018	0.003	0.0166
RL-6 (Low-Flow)		6210	O	11/1/2012	C12110105-007B	Energy	280	96	49	2	38	<5	341	751	1,570	7.41	1,810	0.002	0.017	0.003	0.0172
RL-6 (Purge)		6241	O	11/1/2012	C12110105-008B	Energy	282	101	49	2	40	<5	338	788	1,540	7.27	1,800	0.002	0.016	0.003	0.0169
UW-1 (Hydrasleeve)	BCA	6238	O	11/3/2012	C12110279-014B	Energy	111	71	30	4	20	<5	401	228	672	7.33	1,000	0.003	0.005	0.012	0.0244
UW-1 (Low-Flow)		6239	O	11/3/2012	C12110279-015B	Energy	120	66	30	4	19	<5	401	223	707	7.31	1,010	0.002	0.006	0.013	0.0261
UW-1 (Purge)		6240	O	11/3/2012	C12110279-001B	Energy	114	61	30	4	20	<5	394	221	690	7.38	985	0.003	0.005	0.011	0.0364
MW-102DB (Pre-Development)	BBM	6204	O	10/30/2012	C12110024-004B	Energy	14	5	154	4	36	<5	332	55	440	8.48	728	0.006	0.016	<0.001	0.0917
MW-102DB (Hydrasleeve)		6255	O	11/6/2012	C12110375-016B	Energy	14	5	159	4	39	<5	344	64	459	8.1	749	0.005	0.017	<0.001	0.0814
MW-102DB (Hydrasleeve; Split)		6291	SP	11/6/2012	L97753-01	ACZ	14	5	151	4	43	4	312	63	490	8.4	725	0.0051	0.0169	0.0002	0.0761
MW-102DB (Low-Flow)		6256	O	11/6/2012	C12110375-017B	Energy	13	5	159	4	36	<5	355	60	460	8.13	740	0.004	0.01	<0.001	0.0416
MW-102DB (Low-Flow; Duplicate)		6257	DUP	11/6/2012	C12110375-018B	Energy	13	5	159	4	36	<5	344	60	455	8.11	739	0.004	0.011	<0.001	0.0416
MW-102DB (Low-Flow; Split)		6292	SP	11/6/2012	L97753-02	ACZ	13	5	150	4	41	5	310	62	480	8.4	713	0.0045	0.0108	0.0004	0.0364
MW-102DB (Purge)		6258	O	11/6/2012	C12110375-019B	Energy	15	9	599	4	270	56	1,080	1,230	3,150	8.69	4,470	0.028	2.25	0.015	11.4
MW-102DB (Purge; Split)		6293	SP	11/6/2012	L97753-03	ACZ	15	8	486	4	190	46	878	730	2,580	8.8	3,510	0.0286	1.82	0.0131	9.02
MW-103 (Pre-Development)	BBM	6206	O	10/31/2012	C12110024-006B	Energy	62	16	142	6	22	<5	263	240	618	7.74	941	<0.001	0.011	<0.001	0.047
MW-103 (Hydrasleeve)		6272	O	11/7/2012	C12110375-006B	Energy	655	213	529	18	1,180	<5	456	1,580	4,380	7.05	5,850	<0.001	0.036	0.023	8.81
MW-103 (Low-Flow)		6273	O	11/7/2012	C12110375-007B	Energy	654	214	537	18	1,200	<5	471	1,540	4,310	7.13	5,930	<0.001	0.012	0.02	8.55
MW-103 (Purge)		6276	O	11/7/2012	C12110375-010B	Energy	676	222	515	18	1,210	<5	467	1,500	4,440	6.99	5,970	<0.001	0.013	0.025	9.66
MW-106 (Pre-Development)	BBM	6201	O	10/29/2012	C12110024-001B	Energy	133	56	479	22	85	<5	234	1,170	2,050	7.55	2,740	0.002	0.014	<0.001	0.0086
MW-106 (Purge/Bailer)		6274	O	11/7/2012	C12110375-008B	Energy	115	55	442	16	77	<5	243	1,290	2,170	7.85	2,840	<0.001	0.007	<0.001	0.0043
MW-106 (Purge/Bailer)		6303	O	11/28/2012	C12111026-003B	Energy	125	60	498	17	75	<5	241	1,230	2,220	7.77	2,820	0.001	0.007	<0.001	0.0034
MW-104 (Pre-Development)	PW	6202	O	10/29/2012	C12110024-002B	Energy	59	14	369	6	117	<5	465	378	1,180	7.69	1,760	0.003	0.122	0.005	0.164
MW-104 (Purge/Bailer)		6275	O	11/7/2012	C12110375-009B	Energy	88	21	250	5	113	<5	474	247	968	7.72	1,490	0.002	0.119	0.004	0.21
MW-104 (Purge/Bailer)		6304	O	11/28/2012	C12111026-004	Energy	84	23	202	4	109	<5	470	209	925	7.76	1,410	0.002	0.096	0.004	0.215

TABLE 7. SUMMARY OF PHASE 1 WATER QUALITY DATA
RIO ALGOM MINING LLC, LISBON FACILITY

WELL/SAMPLING METHOD	HSU [a]	SAMPLE IDENTIFIER	QC Code [b]	SAMPLE DATE	LAB SAMPLE ID	ANALYTICAL LABORATORY [c]	DISSOLVED COMMON CONSTITUENT CONCENTRATION IN MILLIGRAMS PER LITER [d]									pH	EC (µmhos/cm)	DISSOLVED TRACE METAL CONCENTRATION IN MG/L [e,f]			
							Ca	Mg	Na	K	Cl	CO_3	HCO_3	SO_4	TDS			As	Mo	Se	U
Equipment Blank - Rinsate #1 (After RL-1)	NA	6221	O	10/31/2012	C12110024-008B	Energy	<1	<1	2	<1	<1	<5	<5	<1	74	5.74	2	<0.001	0.001	<0.001	0.0004
Equipment Blank - Rinsate #2 (After OW-UT-9)		6266	O	11/3/2012	C12110279-016B	Energy	<1	<1	<1	<1	1	<5	8	<1	72	6.8	12	<0.001	<0.001	<0.001	<0.0003
Equipment Blank - Rinsate #3 (After MW-101)		6282	O	11/6/2012	C12110375-023B	Energy	<1	<1	<1	<1	<1	<5	<5	<1	67	5.85	13	<0.001	0.002	<0.001	0.0022

[a] HYDROSTRATIGRAPHIC UNIT
BCA = Burro Canyon Aquifer
BBM = Brushy Basin Member of Morrison Formation
PW = Perched Water in Burro Canyon Formation
NA = Not applicable

[b] QC CODES
O = Original Sample
DUP = Duplicate Sample
SP = Split Sample

[c] ANALYTICAL LABORATORIES
Energy = Energy Laboratories
ACZ = ACZ Laboratories, Inc.

[d] COMMON CONSTITUENTS
Ca = Calcium
Mg = Magnesium
Na = Sodium
K = Potassium
Cl = Chloride
CO_3 = Carbonate
HCO_3 = Bicarbonate
SO_4 = Sulfate
TDS = Total dissolved solids
EC = Electrical Conductivity

[e] TRACE METALS
As = Arsenic
Mo = Molybdenum
Se = Selenium
U = Uranium

[f] Concentrations shown in bold font are greater than compliance concentration specified in Utah Radioactive Materials License UT1900481 (see table below)

COMPLIANCE STANDARD	CONSTITUENT CONCENTRATION (mg/L)			
	As	Mo	Se	U
Alternate Concentration Limit for POC Well EF-3A	3.06	23.34	0.93	96.87
Alternate Concentration Limit for POC Well OW-UT-9	2.63	58.43	0.10	101.58
Compliance Limit for POE Wells RL-4, RL-5, and RL-6	---	---	---	0.32
Target Action Level for Trend Well EF-6	---	---	---	3.9
Target Action Level for Trend Well EF-8	---	---	---	0.30
Target Action Level for Trend Well ML-1	---	---	---	0.26
Target Action Level for Trend Well RL-1	---	---	---	42.1
Target Action Level for Trend Well RL-3	---	---	---	37.3
Target Action Level for Trend Well H-63	---	---	---	0.06
Target Action Level for Trend Well LW-1	---	---	---	0.028

mg/L = Milligrams per liter
POC = Point of Compliance
POE = Point of Exposure
--- = Standard not established
µmhos/cm = micromhos per centimeter

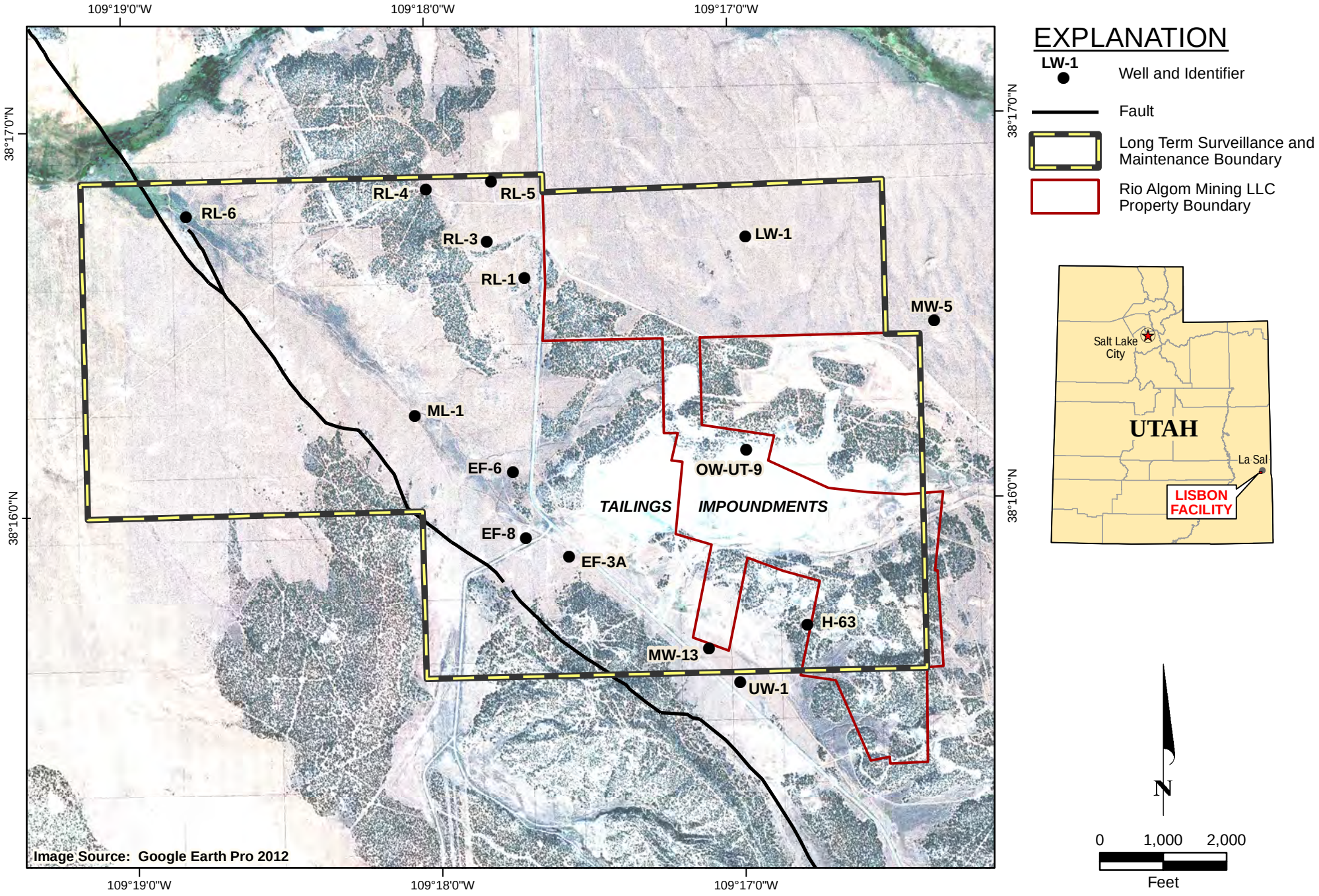


FIGURE 1. SITE MAP, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\ExistingWells_Fall2012.mxd\05March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

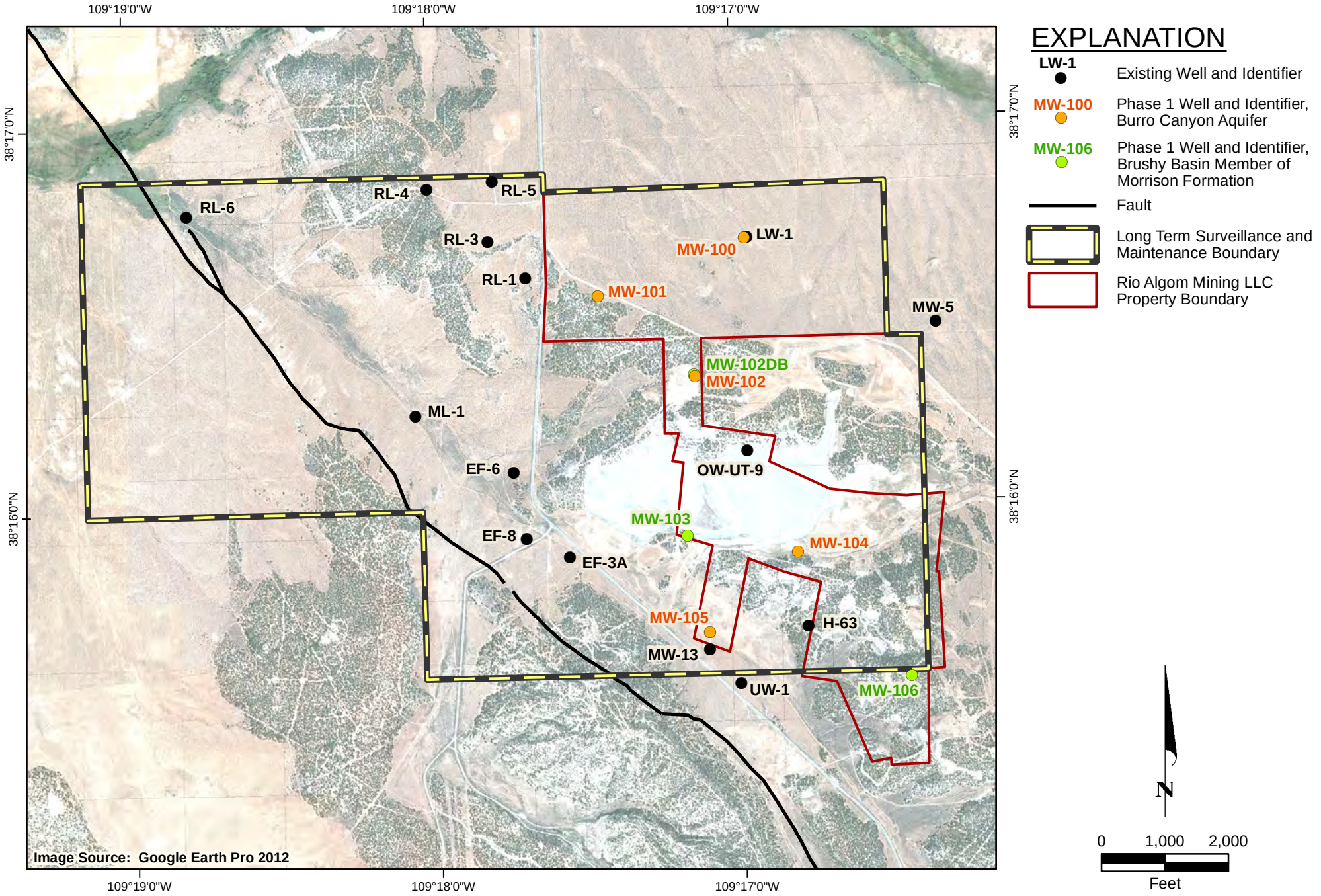


FIGURE 2. PHASE 1 WELL LOCATIONS, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\Phase1_Wells_Fall2012.mxd\05March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

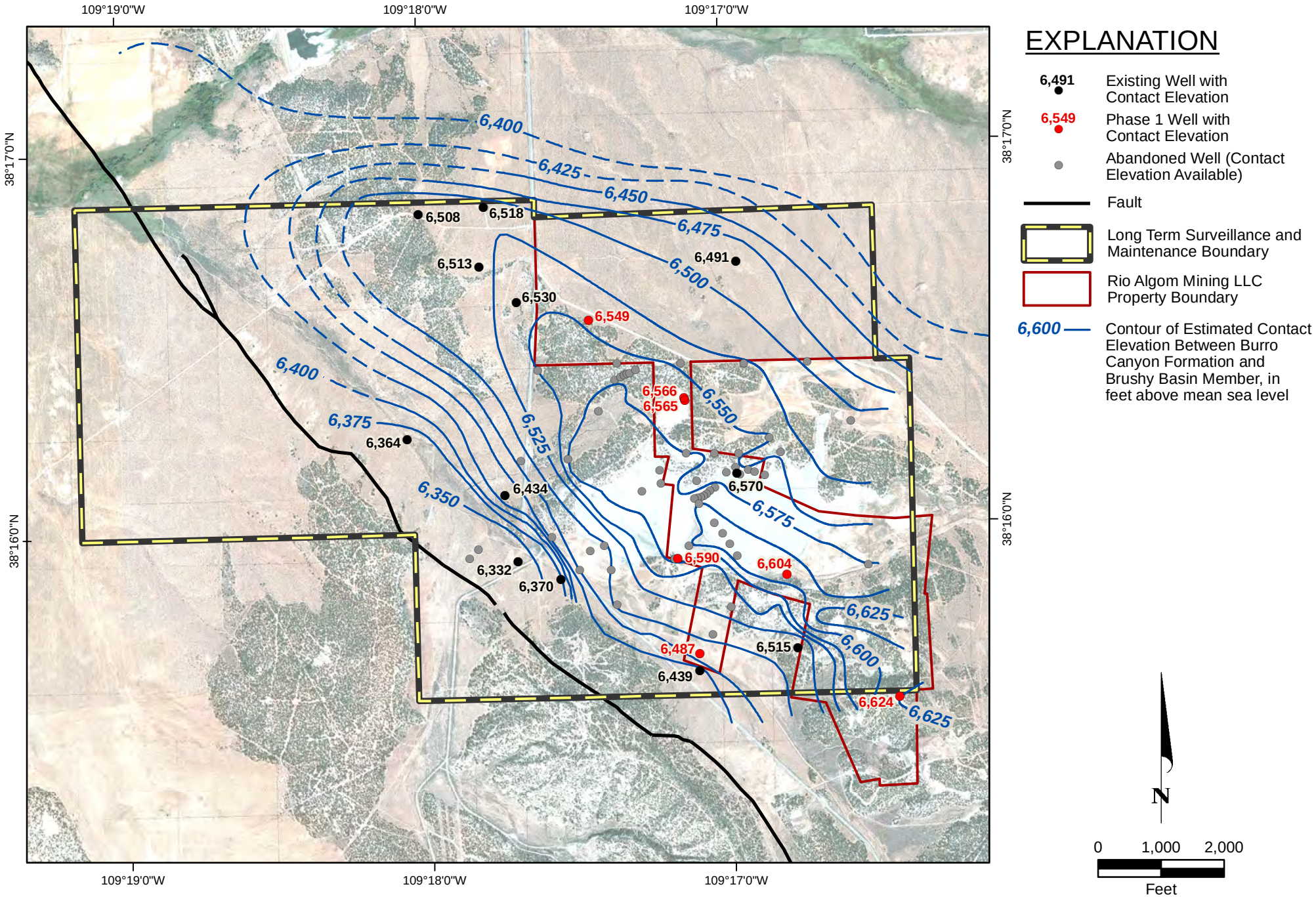


FIGURE 3. ESTIMATED ELEVATION OF GEOLOGIC CONTACT BETWEEN BURRO CANYON FORMATION AND BRUSHY BASIN MEMBER, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\2013StructureCont_twb.mxd\05March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

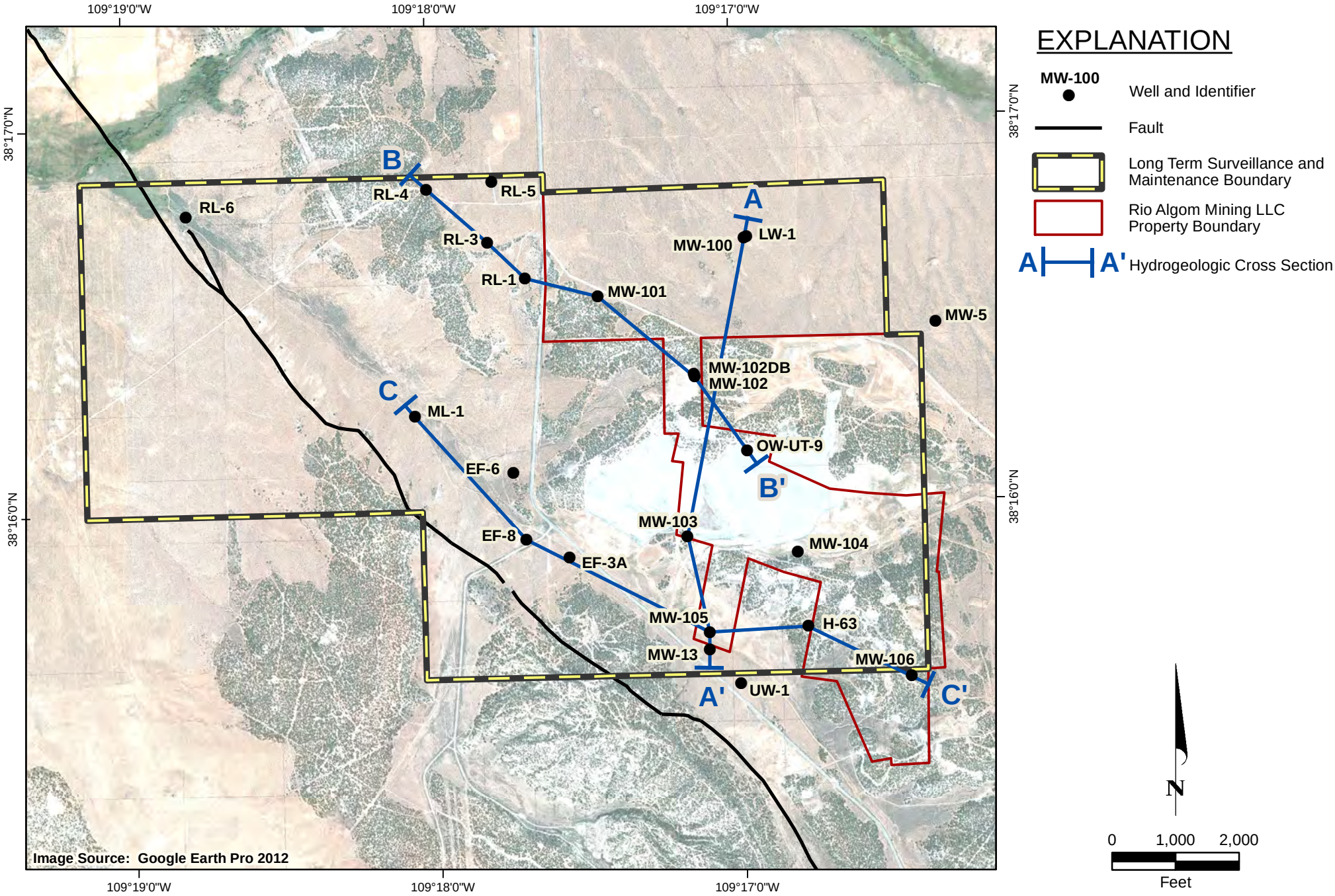
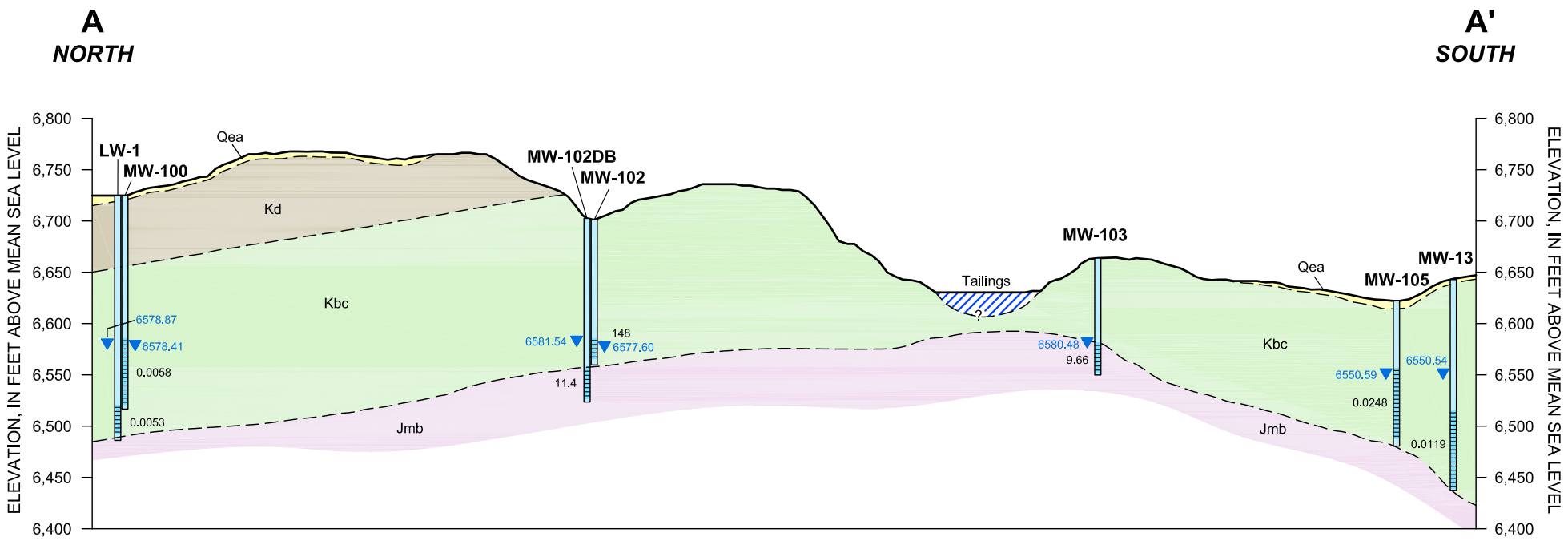


FIGURE 4. SITE MAP WITH HYDROGEOLOGIC SECTION LINES, RIO ALGOM MINING LLC, LISBON FACILITY

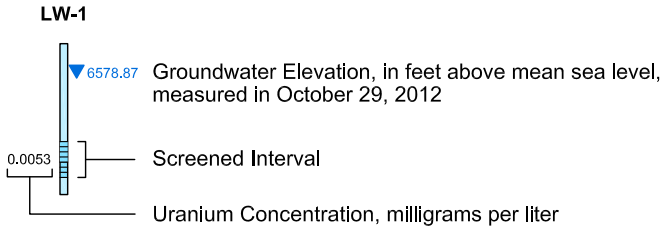
GIS\1350.14\SiteMap_XSecLines.mxd\05March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

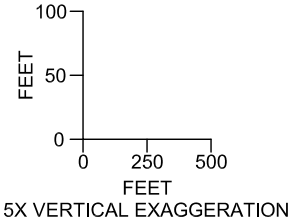
- Qea — Quaternary Eolian and Alluvial Deposits
- Tailings — Mill Tailings
- Kd — Dakota Sandstone
- Kbc — Burro Canyon Formation
- Jmb — Morrison Formation, Brushy Basin Member



Groundwater Elevation, in feet above mean sea level, measured in October 29, 2012

Screened Interval

Uranium Concentration, milligrams per liter

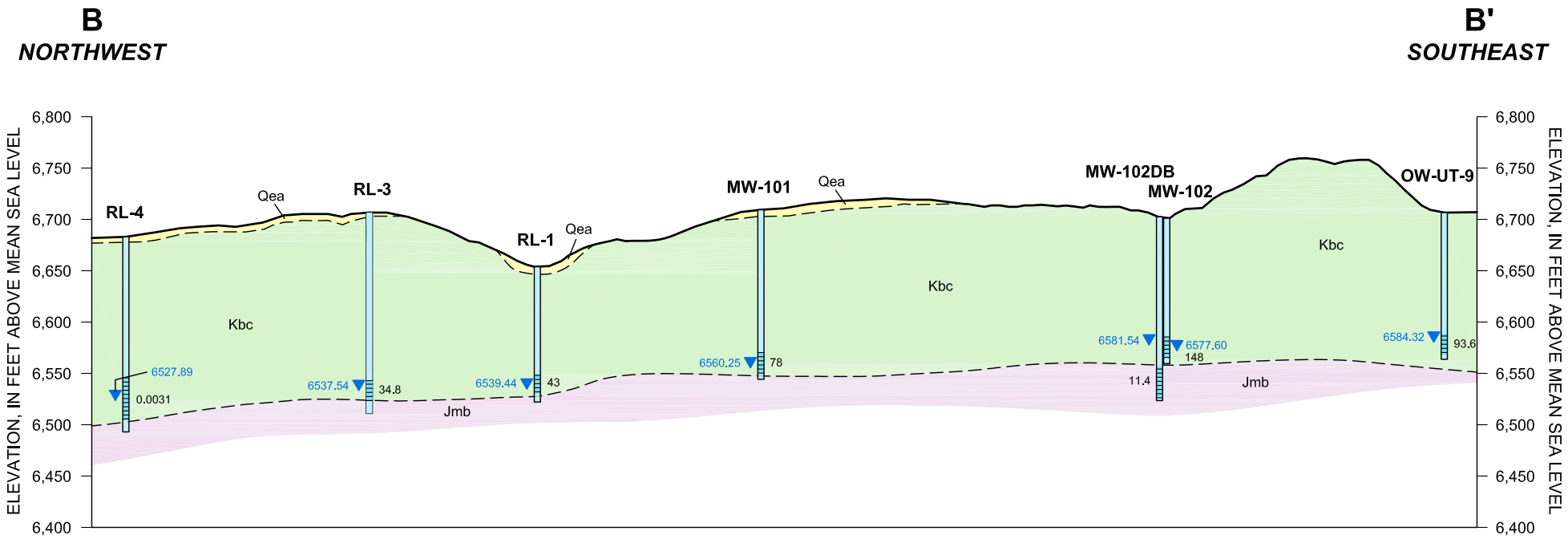


NOTE: The contact elevation between the Burro Canyon Formation and Brushy Basin Member is based on existing lithologic logs from previously drilled wells, lithologic logs from the new Phase 1 wells, and inferred elevations from Plate 1 of the April 1984 report titled "Remedial-Action Plan for Groundwater Contamination Control at the Lisbon Uranium Mill" prepared by EarthFax Engineering, Inc.

FIGURE 5. HYDROGEOLOGIC SECTION A-A', RIO ALGOM MINING LLC, LISBON FACILITY

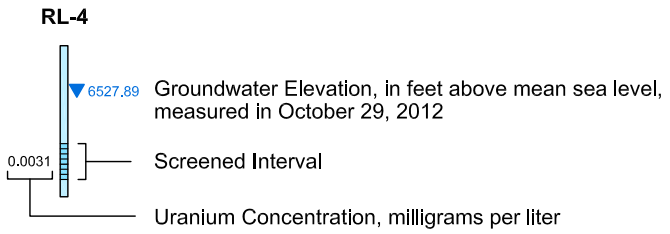
DRAFTING\1350.14\XS_A_letter\06March2013

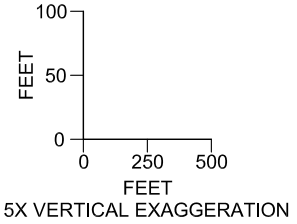
MONTGOMERY & ASSOCIATES



EXPLANATION

Qea	Quaternary Eolian and Alluvial Deposits
Kbc	Burro Canyon Formation
Jmb	Morrison Formation, Brushy Basin Member



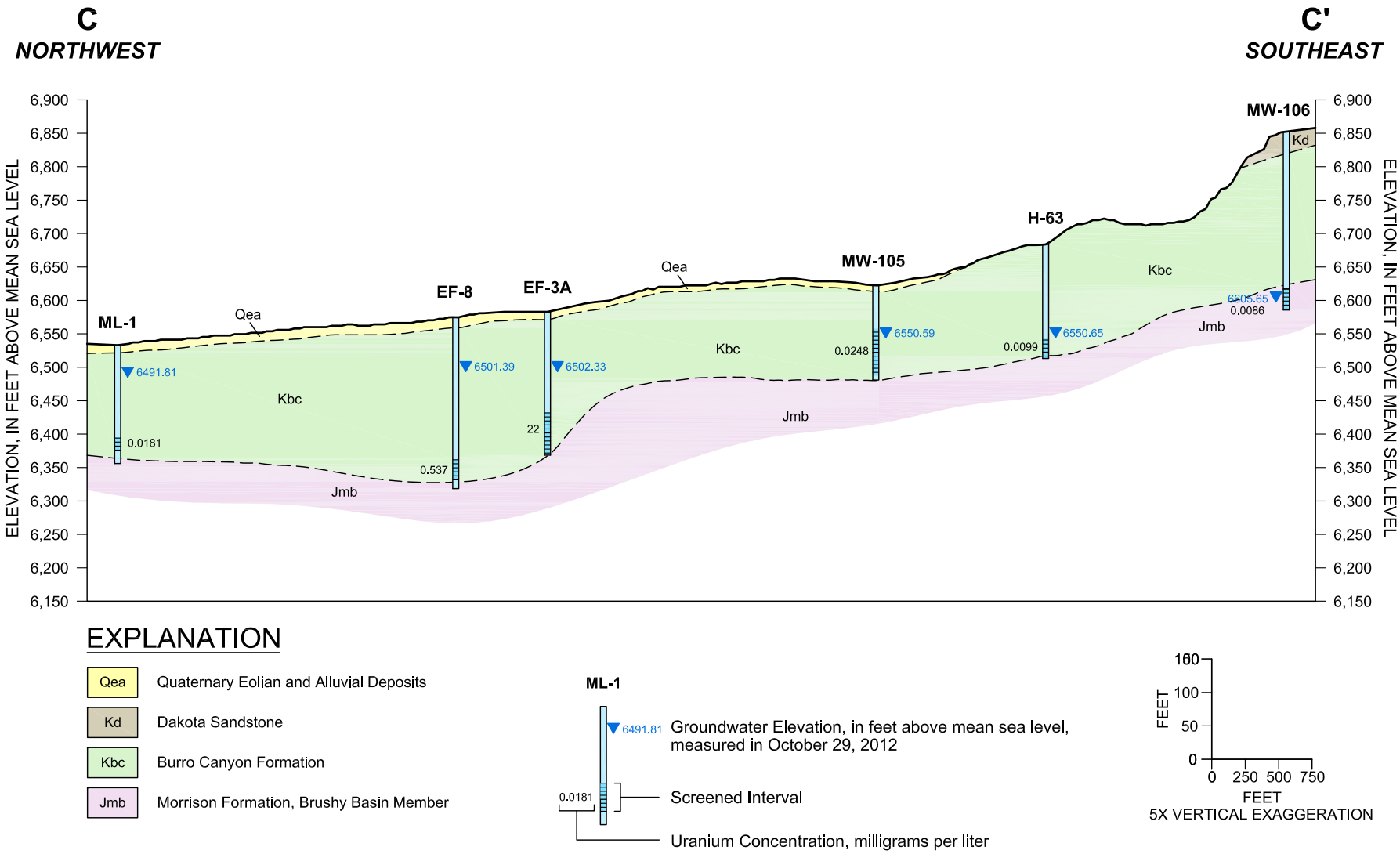


NOTE: The contact elevation between the Burro Canyon Formation and Brushy Basin Member is based on existing lithologic logs from previously drilled wells, lithologic logs from the new Phase 1 wells, and inferred elevations from Plate 1 of the April 1984 report titled "Remedial-Action Plan for Groundwater Contamination Control at the Lisbon Uranium Mill" prepared by EarthFax Engineering, Inc.

FIGURE 6. HYDROGEOLOGIC SECTION B-B', RIO ALGOM MINING LLC, LISBON FACILITY

DRAFTING\1350.14\XS_B_letter\06March2013

MONTGOMERY & ASSOCIATES



NOTE: The contact elevation between the Burro Canyon Formation and Brushy Basin Member is based on existing lithologic logs from previously drilled wells, lithologic logs from the new Phase 1 wells, and inferred elevations from Plate 1 of the April 1984 report titled "Remedial-Action Plan for Groundwater Contamination Control at the Lisbon Uranium Mill" prepared by EarthFax Engineering, Inc.

FIGURE 7. HYDROGEOLOGIC SECTION C-C', RIO ALGOM MINING LLC, LISBON FACILITY

DRAFTING\1350.14\XS_C_letter\06March2013

MONTGOMERY & ASSOCIATES

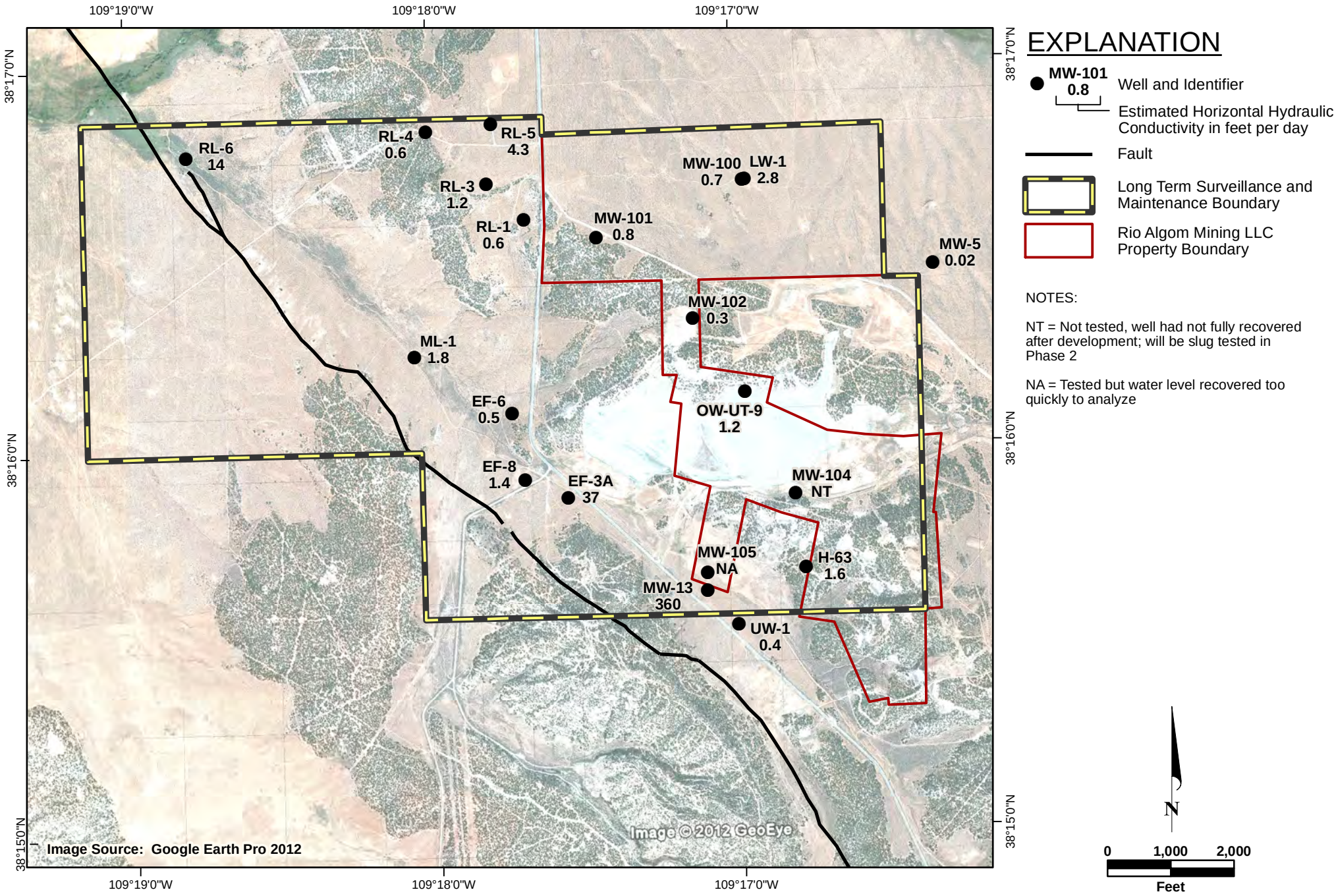
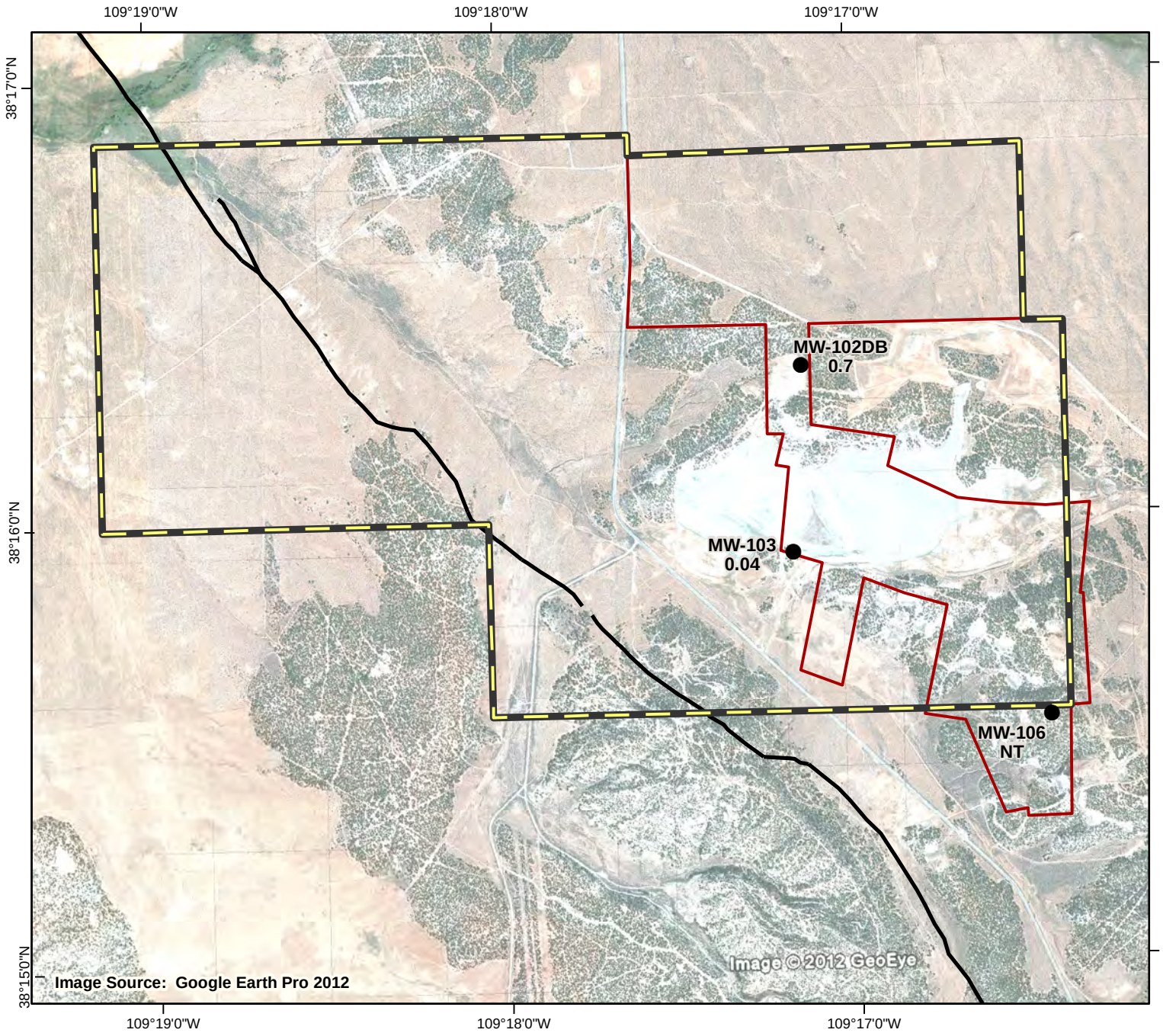


FIGURE 8. ESTIMATED HORIZONTAL HYDRAULIC CONDUCTIVITY VALUES FROM SLUG TESTING, BURRO CANYON AQUIFER, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Kvalue_BurroCanyon_Fall2012\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

- MW-103 0.04 — Well and Identifier; Estimated Horizontal Hydraulic Conductivity in feet per day
- Fault
- Long Term Surveillance and Maintenance Boundary
- Rio Algom Mining LLC Property Boundary

NOTE:

NT = Not tested, well had not fully recovered after development; will be slug tested in Phase 2

N

0 1,000 2,000

Feet

FIGURE 9. ESTIMATED HORIZONTAL HYDRAULIC CONDUCTIVITY VALUES FROM SLUG TESTING, BRUSHY BASIN MEMBER, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Kvalue_BrushyBasin_Fall2012\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

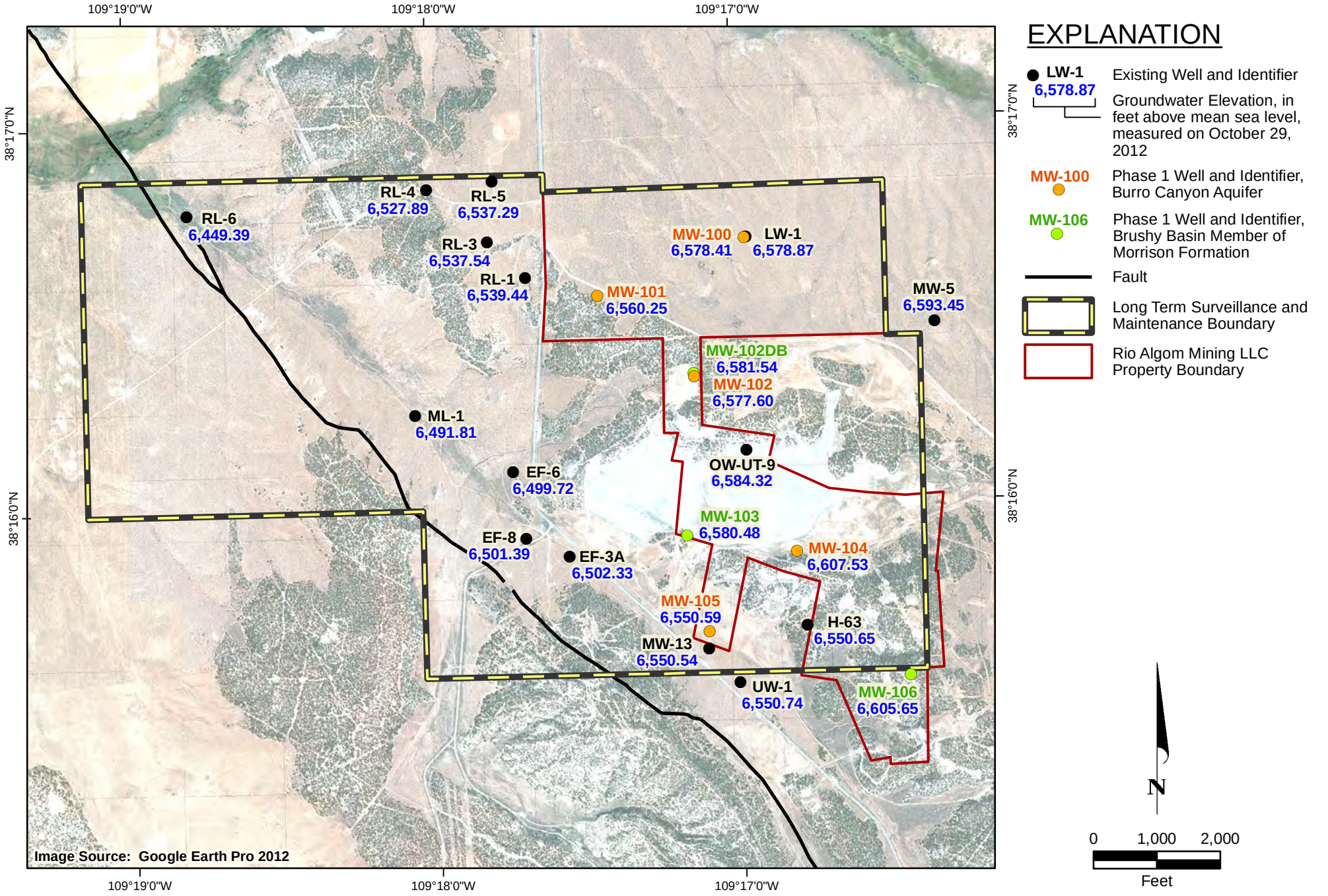


FIGURE 10. PHASE 1 GROUNDWATER ELEVATIONS, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WLs\GW_Elevation.mxd\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

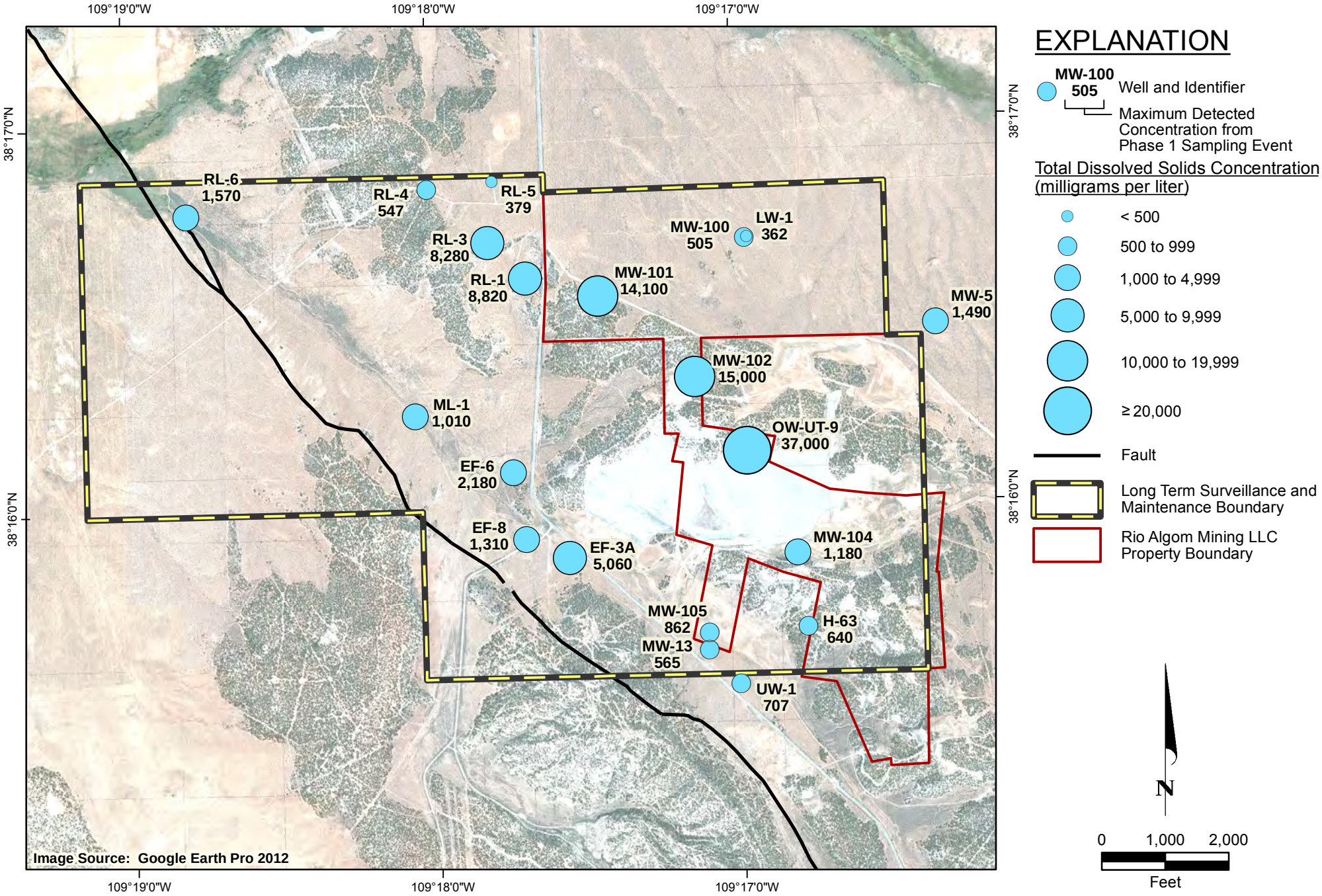
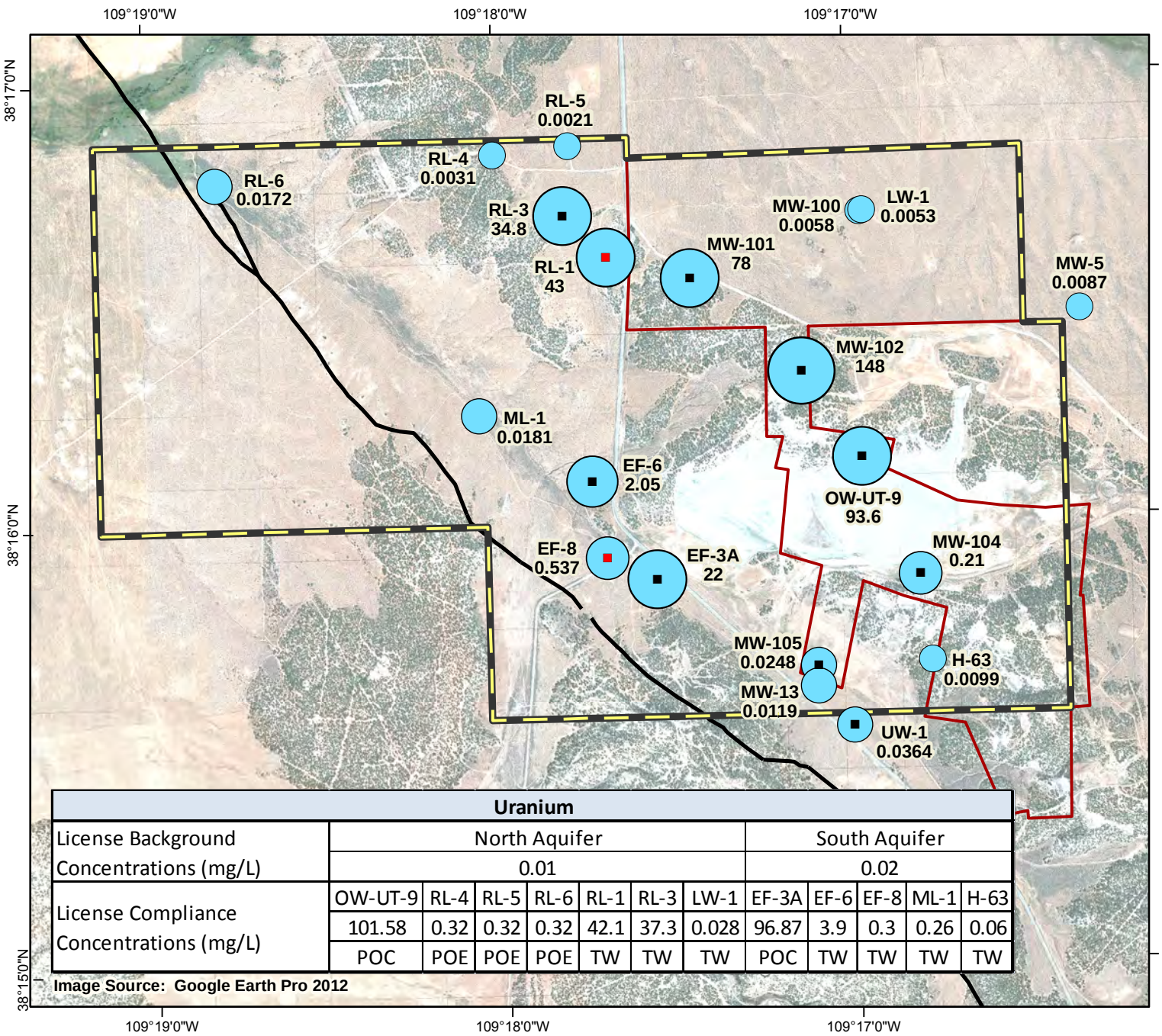


FIGURE 11. TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN GROUNDWATER, BURRO CANYON AQUIFER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\TDS_BurroCanyon_Fall2012\14Feb2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



Uranium												
License Background Concentrations (mg/L)	North Aquifer							South Aquifer				
	0.01							0.02				
License Compliance Concentrations (mg/L)	OW-UT-9	RL-4	RL-5	RL-6	RL-1	RL-3	LW-1	EF-3A	EF-6	EF-8	ML-1	H-63
	101.58	0.32	0.32	0.32	42.1	37.3	0.028	96.87	3.9	0.3	0.26	0.06
	POC	POE	POE	POE	TW	TW	TW	POC	TW	TW	TW	TW

Image Source: Google Earth Pro 2012

EXPLANATION

MW-5
0.0087
Well and Identifier
Maximum Detected Concentration from Phase 1 Sampling Event

Uranium Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.00$\overline{99}$
- 0.001 to 0.0$\overline{99}$
- 0.01 to 0.$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Concentration Above Background Concentration (See Table)

Concentration Above Compliance Concentration (See Table)

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTES:
mg/L = Milligrams Per Liter
POC = Point of Compliance Well
POE = Point of Exposure Well
TW = Trend Well

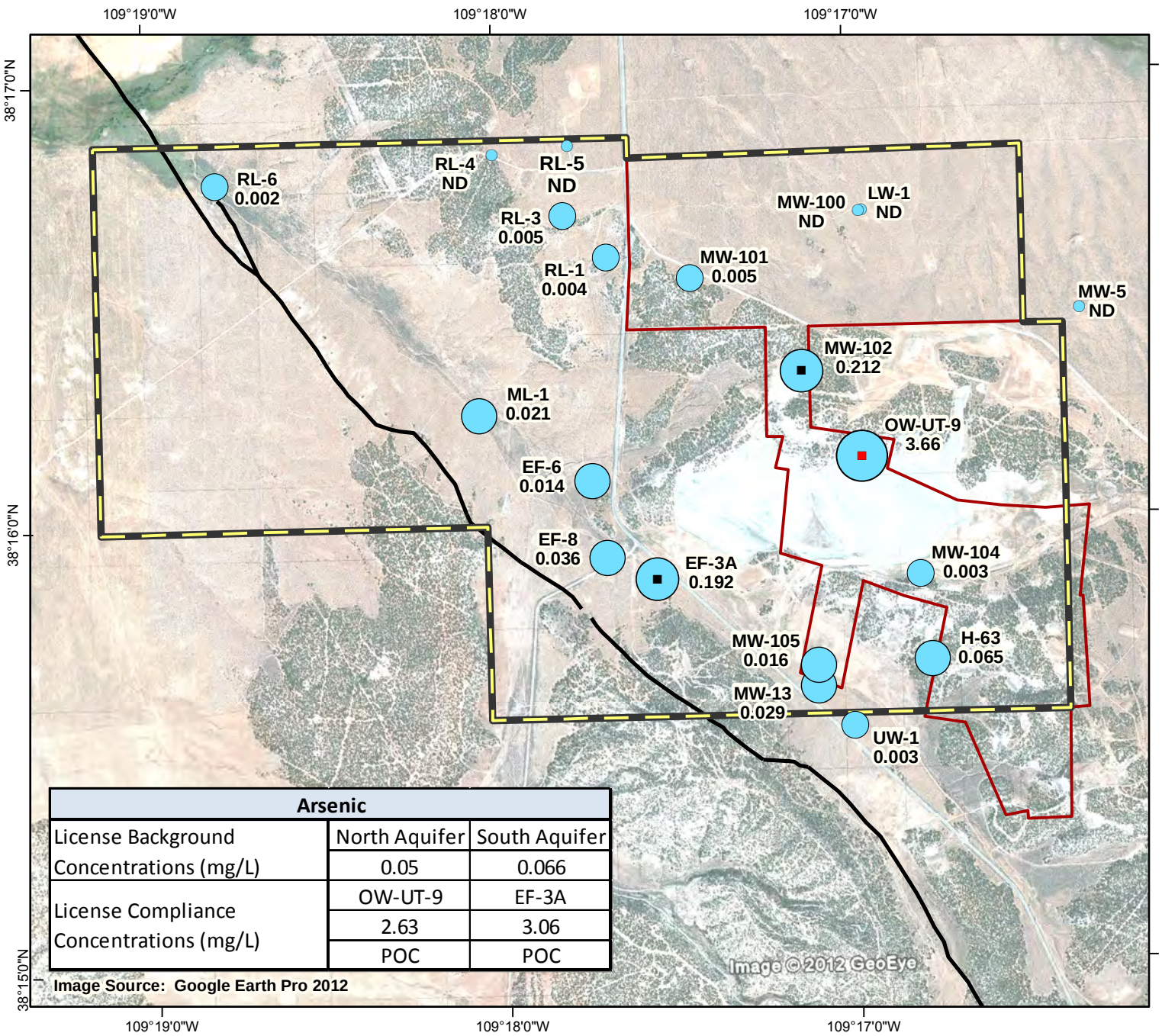
N

0 1,000 2,000
Feet

FIGURE 12. DISSOLVED URANIUM CONCENTRATIONS IN GROUNDWATER, BURRO CANYON AQUIFER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\U_BurroCanyon_Fall2012_V2\14Feb2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



Arsenic		
License Background Concentrations (mg/L)	North Aquifer	South Aquifer
	0.05	0.066
License Compliance Concentrations (mg/L)	OW-UT-9	EF-3A
	2.63	3.06
	POC	POC

Image Source: Google Earth Pro 2012

EXPLANATION

- **MW-101 0.005** — Well and Identifier; Maximum Detected Concentration from Phase 1 Sampling Event
- Arsenic Concentration (mg/L)
  - < 0.0001
  - 0.0001 to 0.000$\overline{99}$
  - 0.001 to 0.00$\overline{99}$
  - 0.01 to 0.0$\overline{99}$
  - 0.1 to 0.$\overline{99}$
  - 1 to 9.$\overline{99}$
  - 10 to 99.$\overline{99}$
  - ≥100
- Concentration Above Background Concentration (See Table)
- Concentration Above Compliance Concentration (See Table)
- Fault
- Long Term Surveillance and Maintenance Boundary
- Rio Algom Mining LLC Property Boundary

NOTES:
ND = Concentration < 0.001 mg/L
mg/L = Milligrams Per Liter
POC = Point of Compliance Well

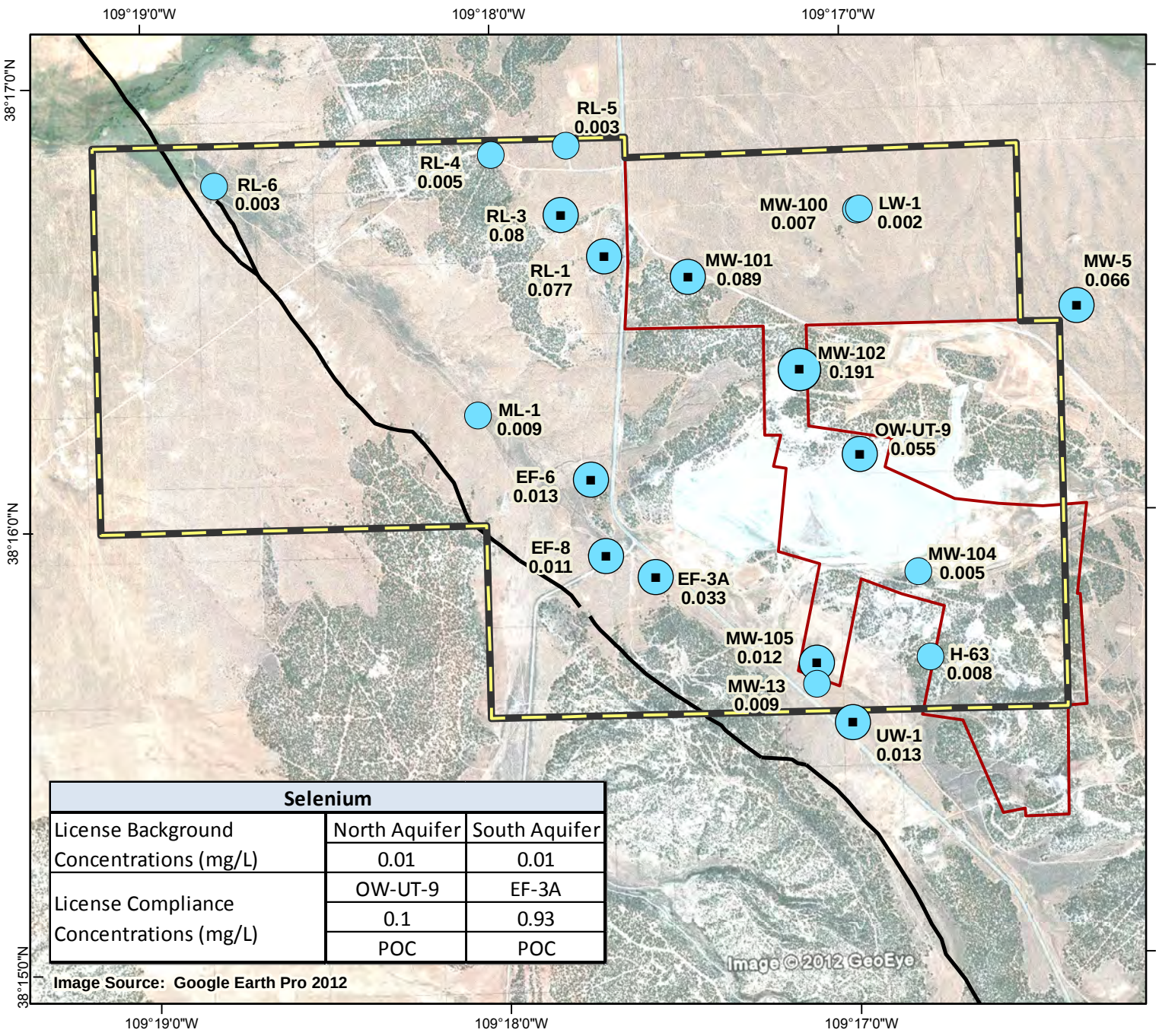
N

0 1,000 2,000
Feet

FIGURE 13. DISSOLVED ARSENIC CONCENTRATIONS IN GROUNDWATER, BURRO CANYON AQUIFER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\As_BurroCanyon_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



Selenium		
License Background Concentrations (mg/L)	North Aquifer	South Aquifer
	0.01	0.01
License Compliance Concentrations (mg/L)	OW-UT-9	EF-3A
	0.1	0.93
	POC	POC

Image Source: Google Earth Pro 2012

EXPLANATION

RL-5
0.003
Well and Identifier
Maximum Detected Concentration from Phase 1 Sampling Event

Selenium Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.000$\overline{99}$
- 0.001 to 0.00$\overline{99}$
- 0.01 to 0.0$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Concentration Above Background Concentration (See Table)

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTES:
mg/L = Milligrams Per Liter
POC = Point of Compliance Well

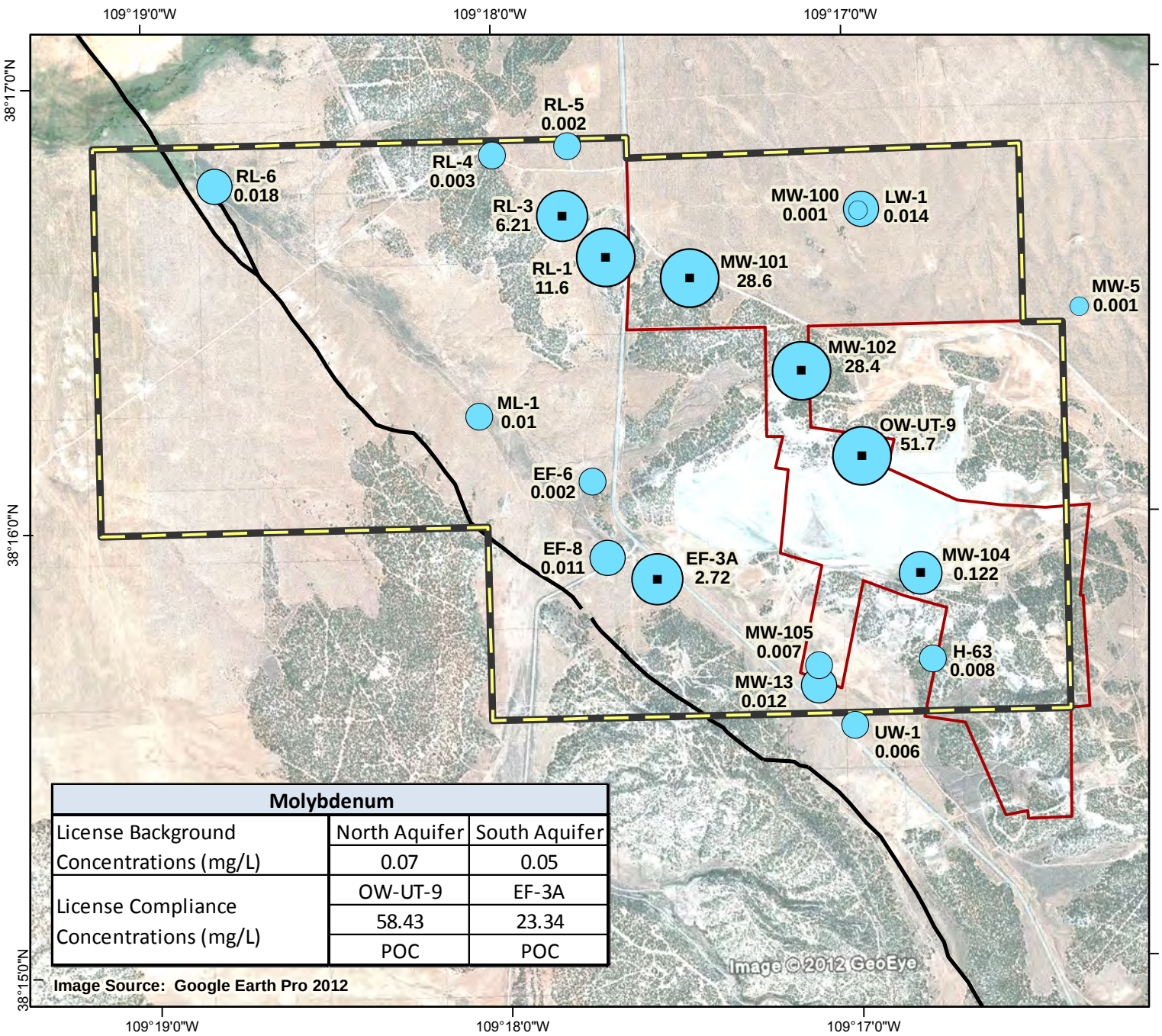
N

0 1,000 2,000
Feet

FIGURE 14. DISSOLVED SELENIUM CONCENTRATIONS IN GROUNDWATER, BURRO CANYON AQUIFER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Se_BurroCanyon_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



Molybdenum		
License Background Concentrations (mg/L)	North Aquifer	South Aquifer
	0.07	0.05
License Compliance Concentrations (mg/L)	OW-UT-9	EF-3A
	58.43	23.34
	POC	POC

Image Source: Google Earth Pro 2012

EXPLANATION

MW-5 0.001 — Well and Identifier; Maximum Detected Concentration from Phase 1 Sampling Event

Molybdenum Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.00$\overline{99}$
- 0.001 to 0.0$\overline{99}$
- 0.01 to 0.$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Concentration Above Background Concentration (See Table)

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTES:
mg/L = Milligrams Per Liter
POC = Point of Compliance Well

N

0 1,000 2,000
Feet

FIGURE 15. DISSOLVED MOLYBDENUM CONCENTRATIONS IN GROUNDWATER, BURRO CANYON AQUIFER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Mo_BurroCanyon_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

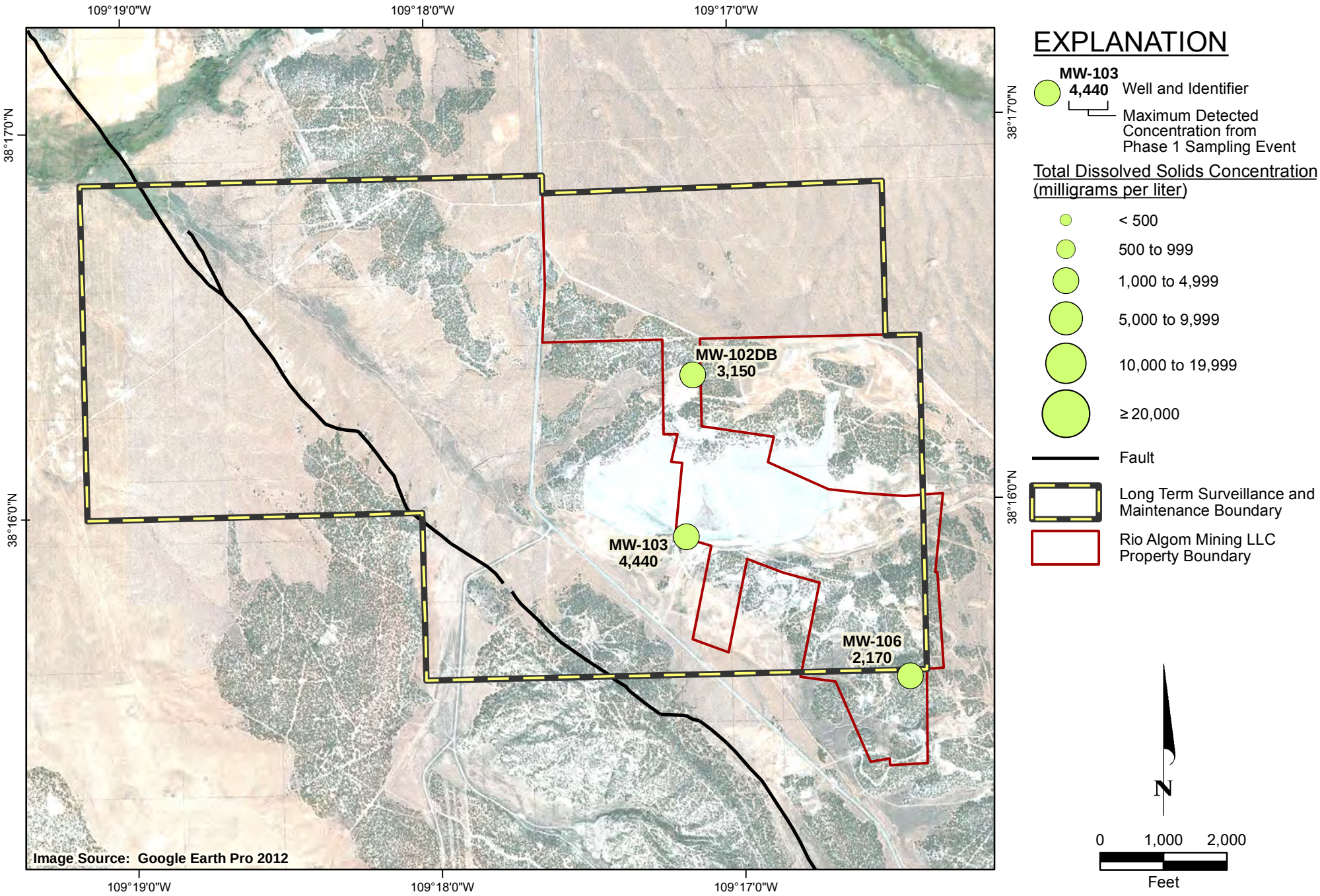
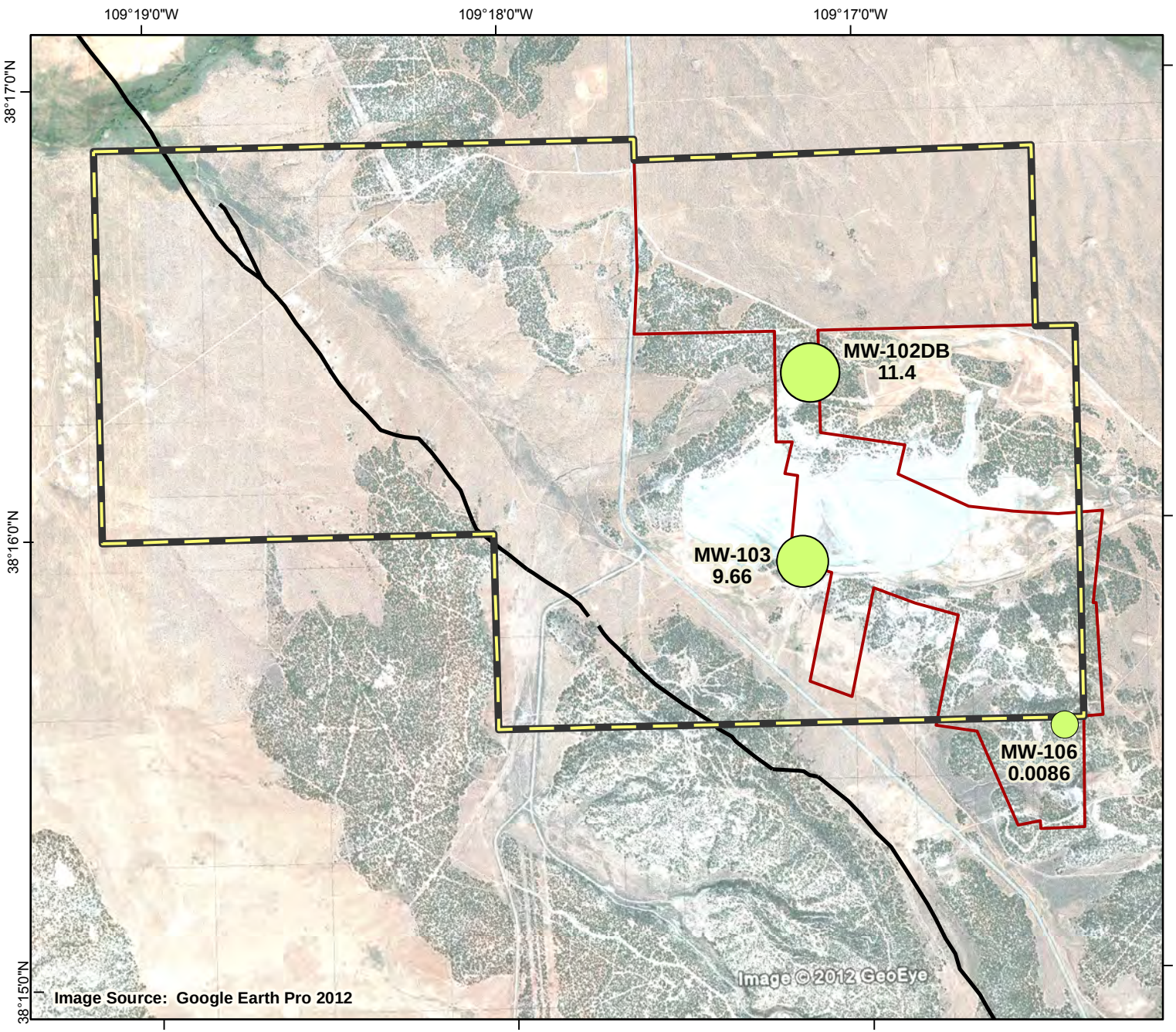


FIGURE 16. TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN GROUNDWATER, BRUSHY BASIN MEMBER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\TDS_BrushyBasin_Fall2012\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

MW-106
0.0086
Well and Identifier

Maximum Detected Concentration from Phase 1 Sampling Event

Uranium Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.000$\overline{99}$
- 0.001 to 0.00$\overline{99}$
- 0.01 to 0.0$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTE:
mg/L = Milligrams Per Liter

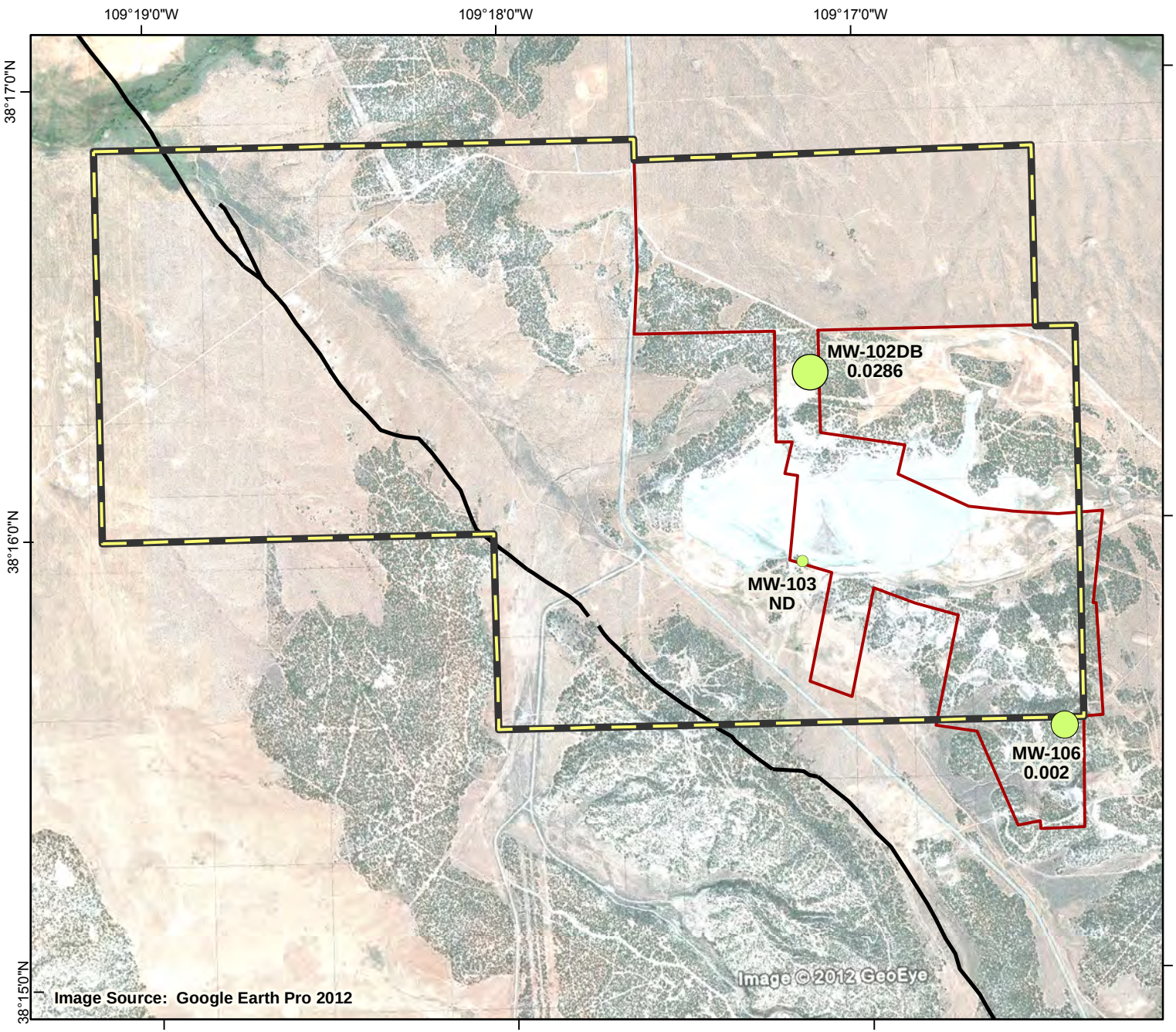
N

0 1,000 2,000
Feet

FIGURE 17. DISSOLVED URANIUM CONCENTRATIONS IN GROUNDWATER, BRUSHY BASIN MEMBER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\U_BrushyBasin_Fall2012_V2\14Feb2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

MW-106
0.002
Well and Identifier
Maximum Detected Concentration from Phase 1 Sampling Event

Arsenic Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.000$\overline{99}$
- 0.001 to 0.00$\overline{99}$
- 0.01 to 0.0$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTES:
ND = Concentration < 0.001 mg/L
mg/L = Milligrams Per Liter

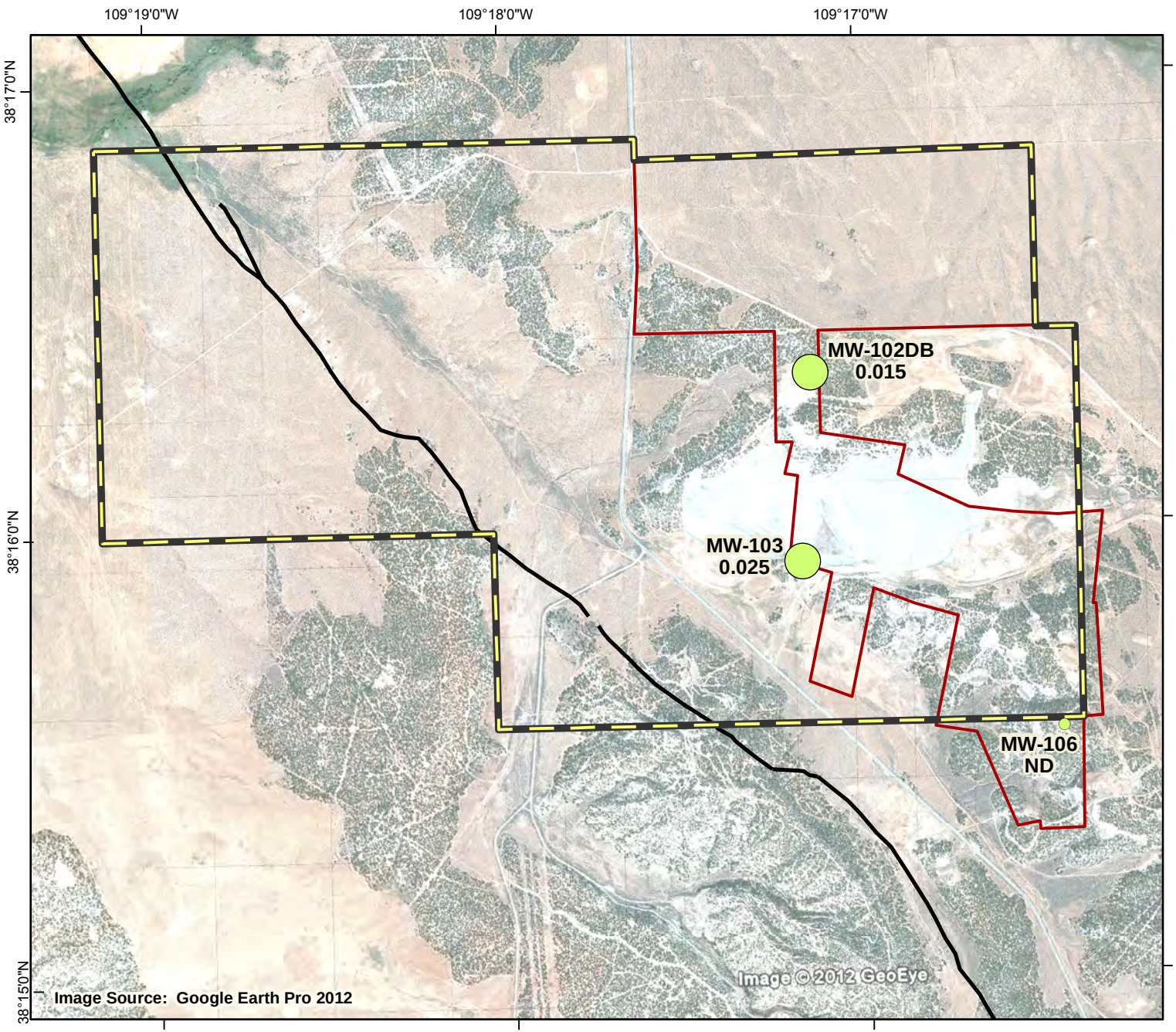
N

0 1,000 2,000
Feet

FIGURE 18. DISSOLVED ARSENIC CONCENTRATIONS IN GROUNDWATER, BRUSHY BASIN MEMBER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\As_BrushyBasin_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

- MW-103 0.025 — Well and Identifier; Maximum Detected Concentration from Phase 1 Sampling Event

Selenium Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.000$\overline{99}$
- 0.001 to 0.00$\overline{99}$
- 0.01 to 0.0$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100
- Fault
- Long Term Surveillance and Maintenance Boundary
- Rio Algom Mining LLC Property Boundary

NOTES:
ND = Concentration < 0.001 mg/L
mg/L = Milligrams Per Liter

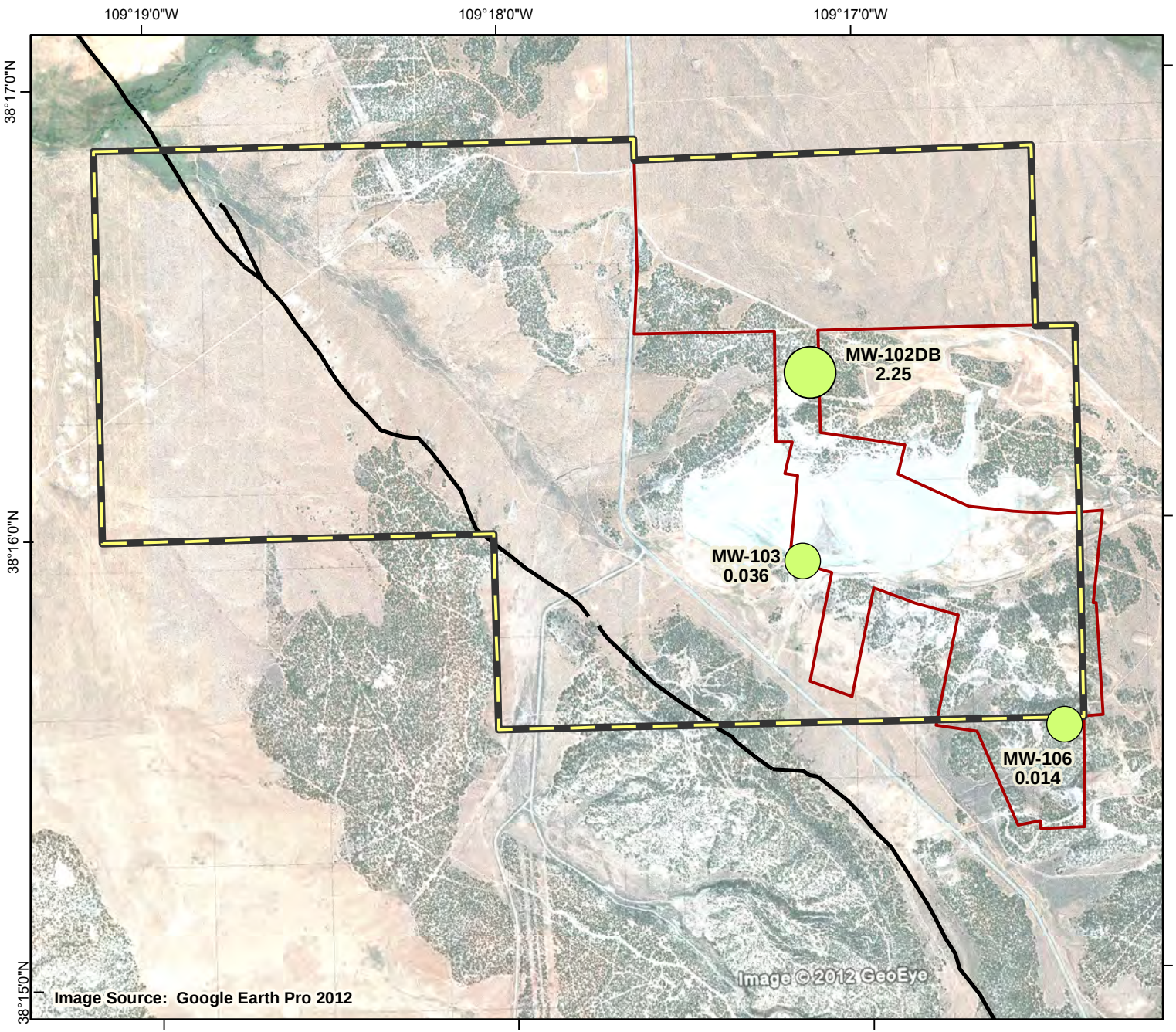
N

0 1,000 2,000
Feet

FIGURE 19. DISSOLVED SELENIUM CONCENTRATIONS IN GROUNDWATER, BRUSHY BASIN MEMBER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Se_BrushyBasin_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES



EXPLANATION

MW-103
0.036
Well and Identifier
Maximum Detected Concentration from Phase 1 Sampling Event

Molybdenum Concentration (mg/L)

- < 0.0001
- 0.0001 to 0.000$\overline{99}$
- 0.001 to 0.00$\overline{99}$
- 0.01 to 0.0$\overline{99}$
- 0.1 to 0.$\overline{99}$
- 1 to 9.$\overline{99}$
- 10 to 99.$\overline{99}$
- ≥100

Fault

Long Term Surveillance and Maintenance Boundary

Rio Algom Mining LLC Property Boundary

NOTE:
mg/L = Milligrams Per Liter

N

0 1,000 2,000
Feet

FIGURE 20. DISSOLVED MOLYBDENUM CONCENTRATIONS IN GROUNDWATER, BRUSHY BASIN MEMBER, FALL 2012, RIO ALGOM MINING LLC, LISBON FACILITY

GIS\1350.14\WQ\Mo_BrushyBasin_Fall2012_V2\06March2013 NAD27_SP_Utah_So.

MONTGOMERY & ASSOCIATES

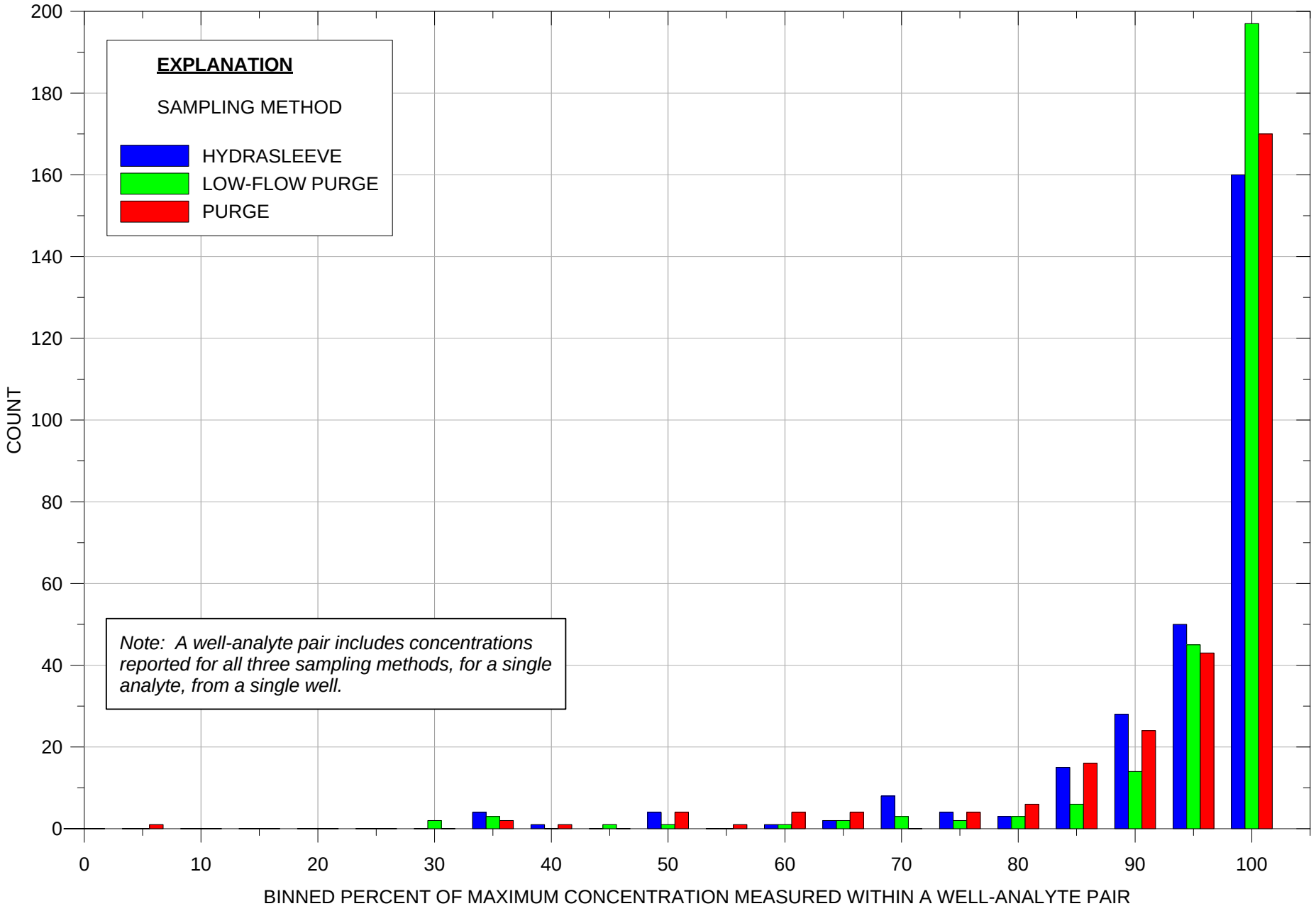


FIGURE 21. COMPARISON OF MEASURED CONCENTRATIONS FOR ALL ANALYTES IN INDIVIDUAL WELLS RIO ALGOM MINING LLC, LISBON FACILITY

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APPENDIX A

SUMMARY OF PHASE 1 WELL INSTALLATION ACTIVITIES

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

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APPENDIX A

SUMMARY OF PHASE 1 WELL INSTALLATION ACTIVITIES

During the period from September 9 to October 31, eight new monitor wells were installed on Rio Algom Mining LLC's Lisbon Facility (Site) as part of the Phase 1 field program. Monitor wells MW-100, MW-101, MW-102, MW-104, and MW-105 were completed with screens in the Burro Canyon Aquifer hydrostratigraphic unit (BCA) within the Burro Canyon Formation (Kbc) and are designated as BCA wells. Wells MW-102DB, MW-103, and MW-106 were completed with screens in the Brushy Basin Member (Jmb) of the Morrison Formation within the Brushy Basin Member hydrostratigraphic unit (BBM).

BCA well MW-100 was completed as a companion well to existing well LW-1. BCA wells MW-101, MW-102, MW-104, and MW-105 were completed to fully penetrate the BCA. BBM wells MW-103 and MW-106 were completed as BBM water table wells. BBM well MW-102DB was screened beneath the BCA. Schematic diagrams of the eight monitor wells are presented on **Figures A-1 through A-8**. Detailed lithologic logs are provided in **Figures A-9 through A-16**. Drilling and well installation activities are described below.

Companion Burro Canyon Aquifer Monitor Well

The MW-100 boring was advanced adjacent to existing monitor well LW-1. The borehole was advanced using an 8 5/8-inch diameter air hammer bit to a depth of 208 feet below ground surface (bgs). Unconsolidated Quaternary eolian and alluvial sediments (Qea) consisting primarily of silty sand were encountered from ground surface to approximately 5 feet bgs. Weakly- to well-lithified, interbedded, fine grained sandstone, shale, and siltstone of the Dakota Sandstone (Kd) were encountered from 5 to 70 feet bgs. Kbc was encountered from 70 feet bgs to total depth of 208 feet bgs and comprised siltstone and limestone underlain by moderately- to well-lithified, fine- to coarse-grained sandstone, generally coarsening with depth. During drilling activities, the borehole was purged periodically by airlifting to monitor for water production. Water was first encountered at approximately 170 feet bgs and stabilized in the borehole at approximately 145 feet bgs.

Monitor well MW-100 was completed as a companion well to LW-1, and was constructed to screen the upper saturated portion of the BCA not screened by the existing well. MW-100 was constructed of flush-threaded, 4-inch diameter, schedule 40, polyvinyl chloride (PVC) blank; machine-slotted well screen with horizontal 0.010-inch slots; and a threaded end cap. The well was screened from 138 to 203 feet bgs, with the bottom of the screened interval approximately at the elevation of the top of the well screen in LW-1. Centralizers were placed at the top and bottom of screened interval and at the top of the blank section to center the PVC casing in the borehole. From bottom to top, the annular space of the

MW-100 borehole was back filled with a 10/20 silica sand filter pack extending 5 feet above the screened interval, a 3-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 4 feet bgs, and concrete to ground surface.

Fully Penetrating Burro Canyon Aquifer Monitor Wells

Monitor wells MW-101, MW-102, MW-104, and MW-105 were completed as fully penetrating BCA water table wells, screened across the entire saturated thickness of the aquifer. The four monitor wells were generally drilled and constructed in a similar manner, although specific adaptations were made on a well-by-well basis to accommodate local hydrogeologic conditions. The boreholes were advanced using an 8 5/8-inch diameter air hammer bit. The four wells were constructed of flush-threaded, 4-inch diameter, schedule 40, PVC blank; machine-slotted well screen with horizontal 0.010-inch slots; and threaded end caps. Centralizers were placed at the top and bottom of screened intervals and at the top of the blank sections to center the PVC casings in the boreholes. Drilling characteristics and specific well construction details for each BCA well are described below.

MW-101: The MW-101 borehole was advanced to a depth of 165 feet bgs, approximately five feet below the Kbc/Jmb contact. Unconsolidated Qea consisting primarily of silty sand were encountered from ground surface to approximately 5 feet bgs. From 5 to 160 feet bgs, Kbc was encountered and primarily consisted of well-lithified, fine-grained sandstone with minor layers of siltstone and limestone in the upper portion of the sequence. Green to red homogeneous Jmb shale was encountered from 160 to 165 feet bgs. The occurrence of groundwater was not evident during drilling. However, after the borehole was advanced to total depth, the water table stabilized at approximately 149 feet bgs within a 24-hour period.

Monitor well MW-101 was screened from 139 to 159 feet bgs, with the screened interval extending from just above the Kbc/Jmb contact. From bottom to top, the annular space of the MW-101 borehole was back filled with coated bentonite pellets from total depth to the contact at 160 feet bgs, a 10/20 silica sand filter pack extending 5 feet above the screened interval, a 2-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 4 feet bgs, and concrete to ground surface.

MW-102: The MW-102 borehole was advanced to a depth of 141 feet bgs, approximately five feet below the Kbc/Jmb contact. Kbc was encountered from ground surface to 136 feet bgs, and comprised interbedded limestone and siltstone to 25 feet bgs, underlain by well-lithified, fine-grained sandstone with minor lenses of interbedded siltstone. Green to red homogeneous Jmb shale was encountered from 136 to 141 feet bgs. The occurrence of groundwater was not evident during drilling. After the borehole was advanced to total depth, the water table stabilized at approximately 124 feet bgs within a 24-hour period.

Monitor well MW-102 was screened from 116 to 136 feet bgs, with the screened interval extending from the Kbc/Jmb contact. From bottom to top, the annular space of the MW-102 borehole was back filled with coated bentonite pellets from total depth to the contact at 136 feet bgs, a 10/20 silica sand filter pack extending 4 feet above the screened interval, a 3-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 3 feet bgs, and concrete to ground surface.

MW-104: In the MW-104 borehole, Kbc consisting of well-lithified, fine-grained sandstone was encountered from ground surface to approximately 99 feet bgs, underlain by Jmb shale. After the Kbc/Jmb contact was reached, the borehole was monitored for water production by airlifting. No evidence of groundwater was observed, and the borehole was advanced into the Jmb with the intention of constructing a BBM monitor well. Green to red Jmb shale was encountered from 99 feet bgs to total depth of 232 feet bgs. During continued drilling, the borehole was advanced without injection water to aid in identifying the first occurrence of the water table. Evidence of groundwater was not observed and airlifting yielded no water production at total depth. However, wet mud on the sounder measuring tape indicated that the borehole sidewalls were wet across the entire interval from approximately 97 to 232 feet bgs. The borehole was left open and monitored periodically for water level. After a period of 24 days, water level in the borehole rose to 121 feet bgs. Water level had not yet stabilized and wet mud on the sounder tape indicated that formation water was present in the Kbc several feet above the Kbc/Jmb contact. A decision was made to partially backfill the borehole and complete well MW-104 as a BCA well. Prior to backfilling and well construction, the water that had accumulated in the borehole was evacuated.

Monitor well MW-104 was screened from 68.5 to 98.5 feet bgs, with the screened interval extending from just above the Kbc/Jmb contact. Because the saturated thickness appeared to be small at this location, a 10-foot blank sump was installed below the screen to provide a greater volume of water for future sample collection. From bottom to top, the annular space of the MW-104 borehole was back filled with hydrated bentonite chips from total depth to 110 feet bgs, coated bentonite pellets from 110 feet bgs to the Kbc/Jmb contact at 99 feet bgs, a 10/20 silica sand filter pack extending 4 feet above the screened interval, a 3-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 2 feet bgs, and concrete to ground surface.

MW-105: The MW-105 borehole was advanced to a depth of 141 feet bgs, approximately six feet below the Kbc/Jmb contact. Unconsolidated Qea consisting primarily of silty sand were encountered from land surface to approximately 10 feet bgs. From 10 to 135 feet bgs, Kbc was encountered and primarily consisted of well-lithified, fine-grained sandstone with a coarse sandstone to conglomerate layer from 120 to 135 feet bgs. Green to red homogeneous Jmb shale was encountered from 135 to 141 feet bgs. Water was first encountered at approximately 80 feet bgs and the borehole produced approximately 20 gallons per minute (gpm) at total depth. The water table stabilized in the borehole at approximately 75 feet bgs.

Monitor well MW-105 was screened from 64.5 to 134.5 feet bgs, with the screened interval extending from just above the Kbc/Jmb contact. From bottom to top, the annular space of the MW-105 borehole was back filled with coated bentonite pellets from total depth to the contact at 135 feet bgs, a 10/20 silica sand filter pack extending 5 feet above the screened interval, a 3-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 3 feet bgs, and concrete to ground surface.

Brushy Basin Member Monitor Wells

Monitor well MW-102DB was completed as a BBM well beneath saturated BCA. A steel conductor casing was installed to the Kbc/Jmb contact and cemented in place to seal off the BCA aquifer and prevent cross contamination to the BBM. Wells MW-103 and MW-106 were completed as BBM water table wells. The three monitor wells were constructed of flush-threaded, 4-inch diameter, schedule 40, PVC blank; machine-slotted well screen with horizontal 0.010-inch slots; and threaded end caps. Centralizers were placed at the top and bottom of screened intervals and at the top of the blank sections to center the PVC casings in the boreholes. Drilling characteristics and specific well construction details for each BBM well are described below.

MW-102DB: The MW-102DB borehole was initially advanced with a 5-inch diameter (PQ) core barrel to retrieve continuous core samples. The cored borehole was advanced to a depth of 140 feet bgs, approximately four feet below the Kbc/Jmb contact. Once the contact was reached, a 12 1/4-inch diameter corehole-chasing hammer bit was used to ream the borehole to 140 feet bgs. An 8 5/8-inch diameter welded blank steel conductor casing string was then installed from ground surface to 140 feet bgs, and cement was placed using a tremie pipe in the annular space between the steel casing and the 12 1/4-inch borehole. After a period of 6 days, the borehole was advanced with the core barrel to a depth of 170 feet bgs. An 8-inch diameter tricone corehole-chaser bit was then used to ream and advance the borehole to total depth of 178 feet bgs. At total depth, the borehole produced approximately 5 gpm during airlifting. After a 24-hour period, water level rose into the conductor casing and was measured at a depth of 129 feet bgs.

In the cored MW-102DB borehole, Kbc was encountered from ground surface to 136 feet bgs and consisted of interbedded weakly- to well-lithified limestone, siltstone, and fine-grained sandstone to 28.5 feet bgs, underlain by well-lithfied, fine-grained sandstone with lenses of medium- to coarse-grained sandstone, conglomerate, and siltstone to 136 feet bgs. Significant fracturing in the Kbc was observed at intervals from 2 to 12 feet bgs, from 62 to 74 feet bgs, from 80 to 95 feet bgs, from 107 to 124 feet bgs, and from 133 to 136 feet bgs. Secondary alteration at these intervals included moderate to heavy black and orange oxide staining on fracture surfaces and calcite fracture infill. Green to red homogeneous Jmb shale was encountered from 136 to 155 feet bgs, underlain by well-lithified, very fine-grained sandstone to 165 feet bgs, and red homogeneous shale to total depth of 178 feet bgs. Significant fracturing in the Jmb was observed at intervals from 138 to 142 feet bgs and from

159 to 163 feet bgs. Secondary alteration at these intervals included calcite and pyrite fracture infill.

Monitor well MW-102DB was screened from 145.5 to 175.5 feet bgs, with the top of screened interval approximately 9 feet below the Kbc/Jmb contact. From bottom to top, the annular space of the MW-102DB borehole below the conductor casing was back filled with coated bentonite pellets from total depth to 176 feet bgs, a 10/20 silica sand filter pack extending 3 feet above the screened interval, and a 2-foot thick layer of fine-grained 20/40 transitional sand above the filter pack. Hydrated bentonite chips were used to fill the annular space inside the steel conductor casing to ground surface.

MW-103: The MW-103 borehole was initially advanced with a 5-inch diameter (PQ) core barrel to a depth of 77 feet bgs, approximately four feet below the Kbc/Jmb contact. An 8-inch diameter tricone corehole-chaser bit was then used to ream and advance the borehole to a depth of 82 feet bgs with the intent to construct a BCA well. Drill injection water was evacuated by airlifting, and after a 24-hour period no water had accumulated in the borehole. The borehole was further advanced to a total depth of 114 feet bgs using the 8-inch diameter tricone bit. The occurrence of groundwater was not evident during drilling. However, after a 24-hour period the water level appeared to stabilize at approximately 93 feet bgs.

In the cored MW-103 borehole, Kbc was encountered from ground surface to 73 feet bgs and consisted of well-lithified, fine-grained sandstone interbedded with lenses of siltstone, medium- to coarse-grained sandstone, and conglomerate to 58 feet bgs, underlain by well-lithified medium- to coarse-grained sandstone and conglomerate to 73 feet bgs. Significant fracturing in the Kbc was observed at intervals from 8 to 14 feet bgs, from 22 to 25 feet bgs, and from 52 to 58 feet bgs. Secondary alteration at these intervals included moderate to heavy black and orange oxide staining on fracture surfaces. Core sampling continued into homogeneous green Jmb shale to a depth of 77 feet bgs. Red Jmb shale was observed in drill cuttings from 77 to 114 feet bgs.

Monitor well MW-103 was screened from 81.5 to 111.5 feet bgs, with the top of screen approximately 8 feet below the Kbc/Jmb contact. From bottom to top, the annular space of the MW-103 borehole was back filled with coated bentonite pellets from total depth to 112 feet bgs, a 10/20 silica sand filter pack extending 4 feet above the screened interval, a 2-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 2 feet bgs, and concrete to ground surface.

MW-106: The MW-106 borehole was initially advanced using an 8 5/8-inch diameter air hammer bit to a depth of 232 feet bgs, five feet below the Kbc/Jmb contact. Well-lithified sandstone and conglomerate of the Kd were encountered from ground surface to 30 feet bgs. Kbc was encountered from 30 to 227 feet bgs, and comprised interbedded sandstone, limestone, and siltstone to 80 feet bgs, underlain by well-lithified, fine-grained sandstone with minor lenses of interbedded siltstone. After the Kbc/Jmb contact was reached, the borehole was monitored for water production by airlifting. No evidence of

groundwater was observed, and the borehole was advanced further into the Jmb. Green to red Jmb shale was encountered from 232 feet bgs to total depth of 265 feet bgs. The occurrence of groundwater was not evident during drilling. The borehole was left open and monitored periodically for water level. After a period of 6 days, approximately one foot of water had accumulated in the borehole.

Monitor well MW-106 was screened from 235 to 265 feet bgs, with the top of screen approximately 8 feet below the Kbc/Jmb contact. From bottom to top, the annular space of the MW-106 borehole was back filled with a 10/20 silica sand filter pack extending 3 feet above the screened interval, a 2-foot thick layer of fine-grained 20/40 transitional sand above the filter pack, a bentonite grout surface seal to 2 feet bgs, and concrete to ground surface.

Surface Completion and Survey

All new wells were completed with lockable, 8-inch diameter, steel, above-grade monuments, set into four by four-foot concrete pads. On October 31, 2012, Keogh Land Surveying, a licensed Utah land surveyor, surveyed the new and existing monitor wells. The elevation of the tops of the PVC casings, protective steel monuments, and land surface/concrete pads were surveyed relative to the 1988 North American Vertical Datum and horizontal coordinates were surveyed relative to the 1927 North American Datum, Utah State Plane South coordinate system. The PVC well casings were marked to indicate the water level measuring point.

Well Development

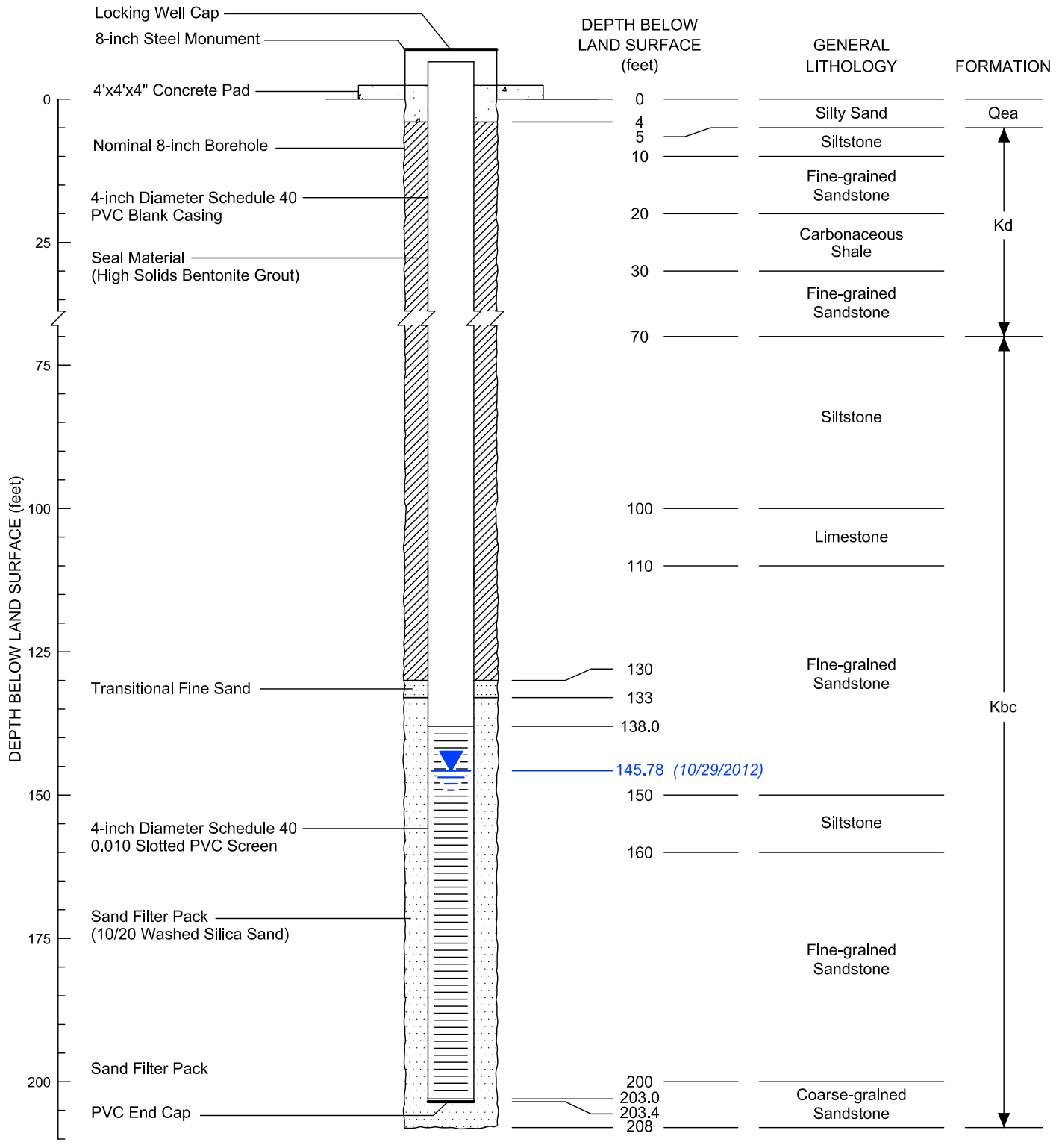
During the period from October 29 to October 31, 2012, the new wells were developed by surge and purge methods. Development activities were conducted by Confluence Environmental, Inc. (CEI) of Sacramento, California, and supervised in the field by an M&A hydrogeologist. Wells MW-100, MW-101, MW-102, MW-102DB, MW-103, and MW-105 were surged across the entire saturated screened intervals and purged until development water was free of sediment and field parameters including pH, specific conductance, and temperature had stabilized. Wells MW-104 and MW-106 were surged and then purged dry after one borehole volume was removed. Development at wellsMW-104 and MW-106 was limited by slow recovery after the initial evacuation.

Investigation Derived Waste Management

All waste rock cuttings generated during drilling activities were contained in roll-off bins. After drilling was completed, four-point composite samples were collected from each roll-off bin and submitted to ACZ Laboratories under standard chain of custody protocols for disposal characterization analyses. Upon approval from the landfill in January 2013, the drill cuttings were transported by MP Environmental Services, Inc. (MPE) to US Ecology (a landfill licensed to accept low-level radioactive material) in Grand View, Idaho for final

disposal. Copies of the laboratory reports and disposal manifests for the cuttings are provided in **Appendix B**.

All drilling and development water generated during well installation activities was contained in a 20,000-gallon secured storage tank located on RAML property. A water sample was collected from the tank on November 7, 2012 and submitted to ACZ Lab under standard chain of custody protocols for disposal characterization analysis. Approval for disposal of the waste water was granted by US Ecology in January 2013. A copy of the disposal characterization laboratory report is provided in **Appendix B**. Freezing temperatures at the Site have delayed transport of the waste water to the landfill. The waste water will be transported by MPE to US Ecology in Grand View, Idaho for disposal as soon as weather conditions allow.



EXPLANATION

Qal = Quaternary Eolian and Alluvium Deposits

Kd = Dakota Sandstone

Kbc = Burro Canyon Formation

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-100	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436190	NORTHING: 594322.5
COMPLETED: OCT. 2012	EASTING: 2636663.9
METHOD: AIR ROTARY	MP ELEVATION: 6725.4

MONITOR WELL MW-100
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

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FIGURE A-1

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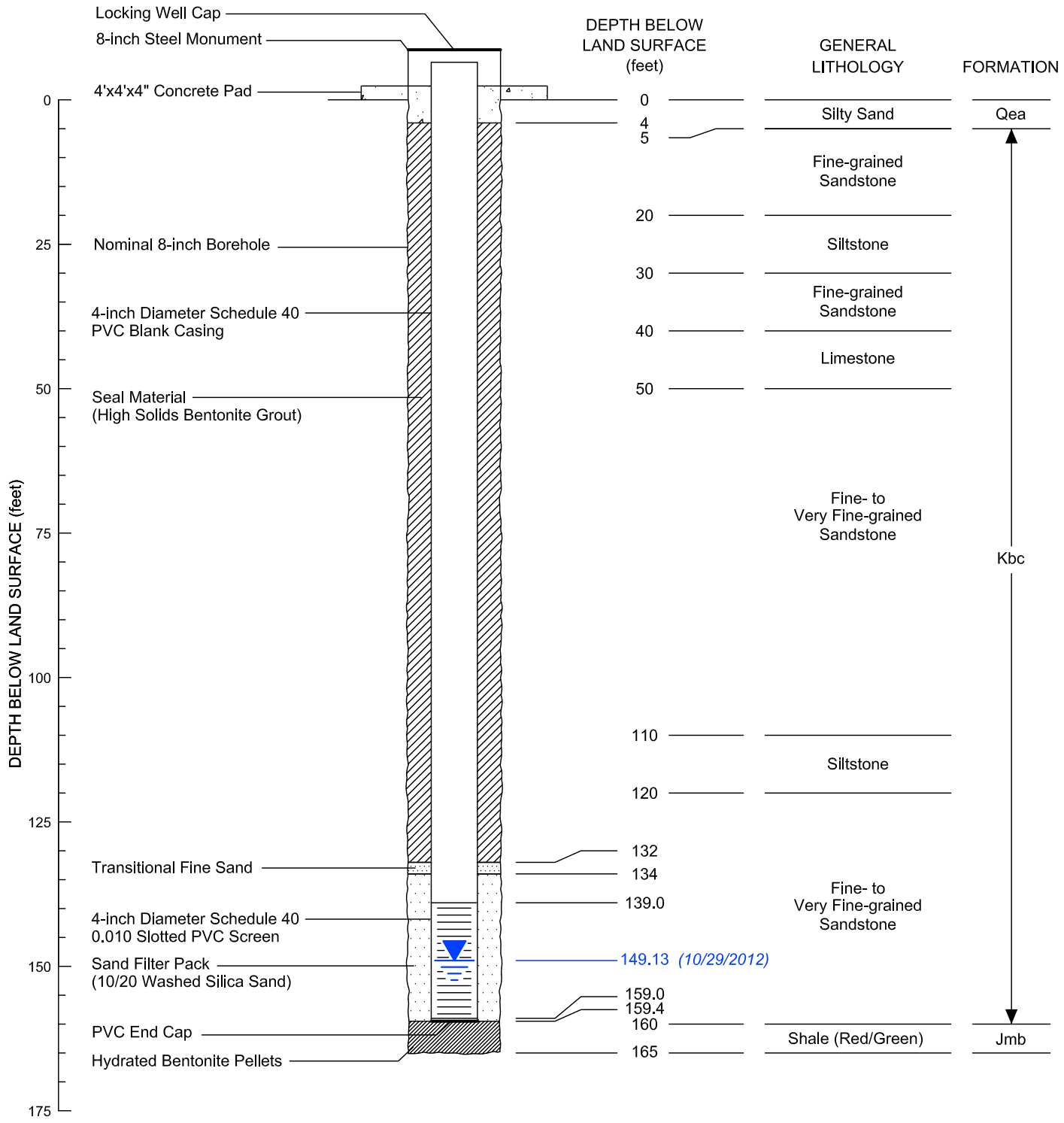

EXPLANATION

Qal = Quaternary Eolian and Alluvium Deposits

Kbc = Burro Canyon Formation

Jmb = Morrison Formation, Brushy Basin Member

WELL: MW-101	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436184	NORTHING: 593397.0
COMPLETED: OCT. 2012	EASTING: 2634360.1
METHOD: AIR ROTARY	MP ELEVATION: 6710.9

MONITOR WELL MW-101
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

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FIGURE A-2

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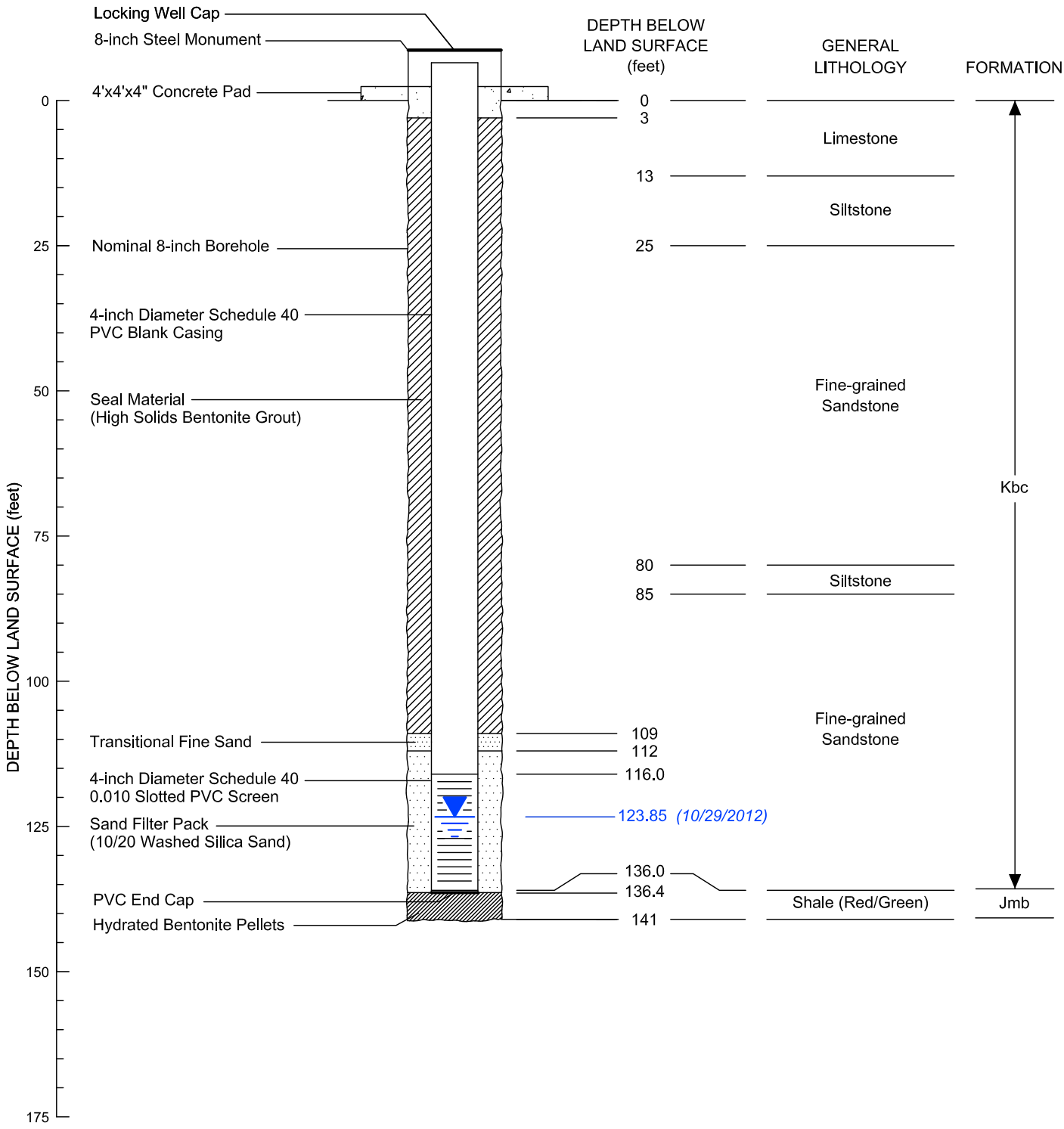

EXPLANATION

Kbc = Burro Canyon Formation
Jmb = Morrison Formation, Brushy Basin Member

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TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-102	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436187	NORTHING: 592128.8
COMPLETED: OCT. 2012	EASTING: 2635889.2
METHOD: AIR ROTARY	MP ELEVATION: 6702.9

MONITOR WELL MW-102
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

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FIGURE A-3

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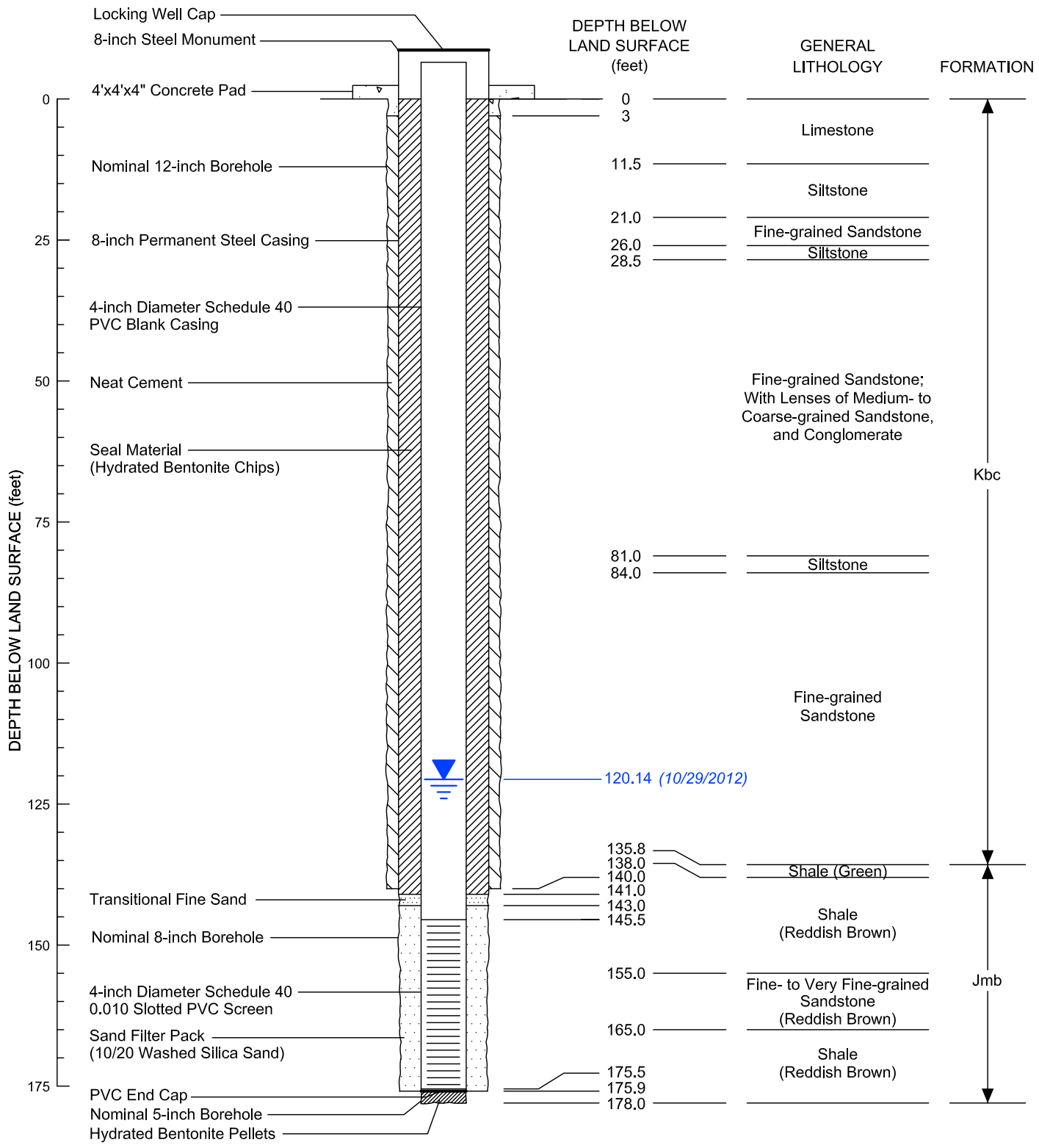

EXPLANATION

Kbc = Burro Canyon Formation
Jmb = Morrison Formation,
Brushy Basin Member

Borehole cored to 170' below ground surface; lithology based on continuous core

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-102DB	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436185	NORTHING: 592170.0
COMPLETED: OCT. 2012	EASTING: 2635877.1
METHOD: AIR ROTARY/CORE	MP ELEVATION: 6703.6

MONITOR WELL MW-102DB
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

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FIGURE A-4

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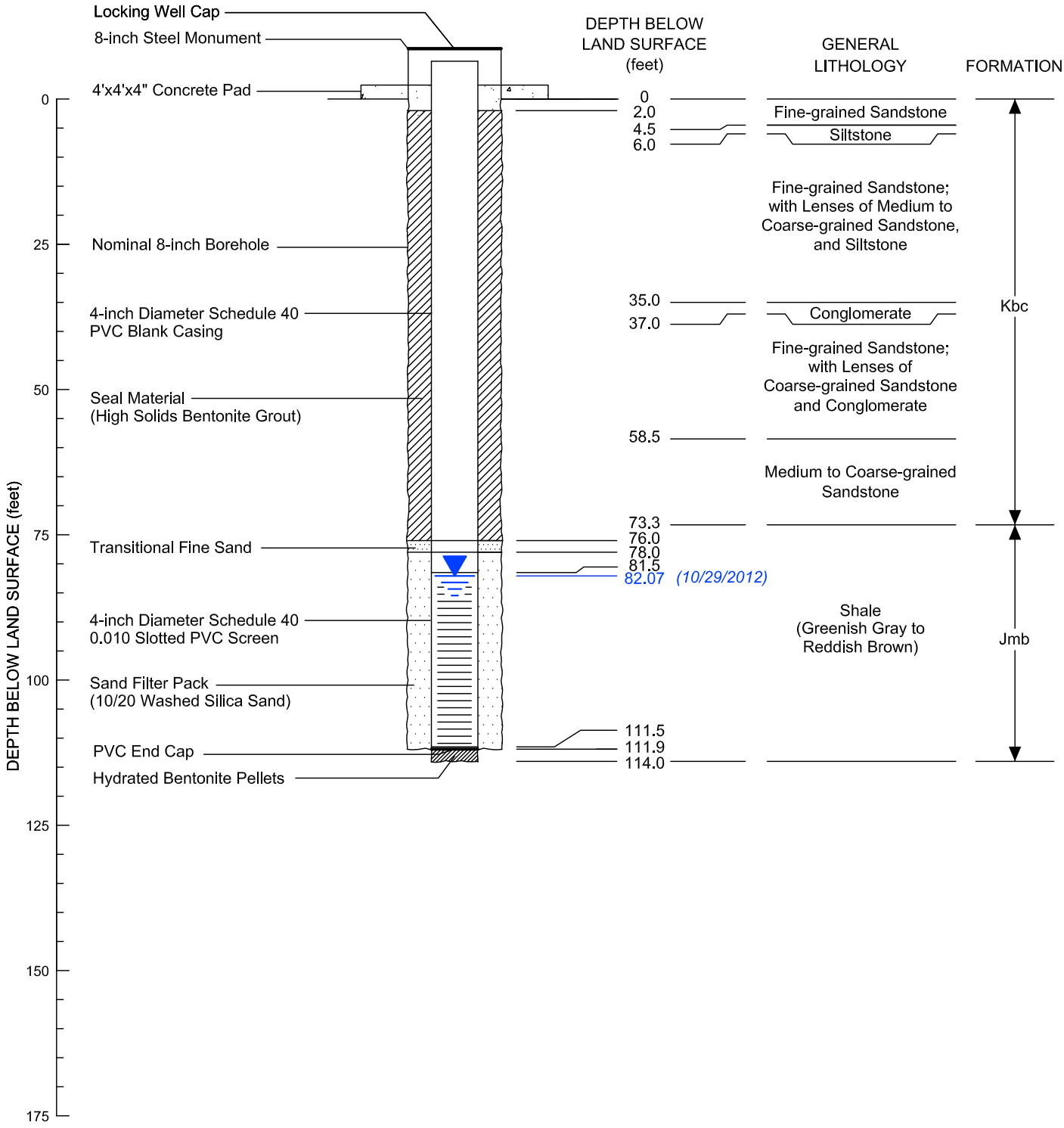

EXPLANATION

Kbc = Burro Canyon Formation
Jmb = Morrison Formation, Brushy Basin Member

Borehole cored to 77' below ground surface; lithology based on continuous core

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-103	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436186	NORTHING: 589620.3
COMPLETED: OCT. 2012	EASTING: 2635778.1
METHOD: AIR ROTARY/CORE	MP ELEVATION: 6663.9

MONITOR WELL MW-103
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

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FIGURE A-5

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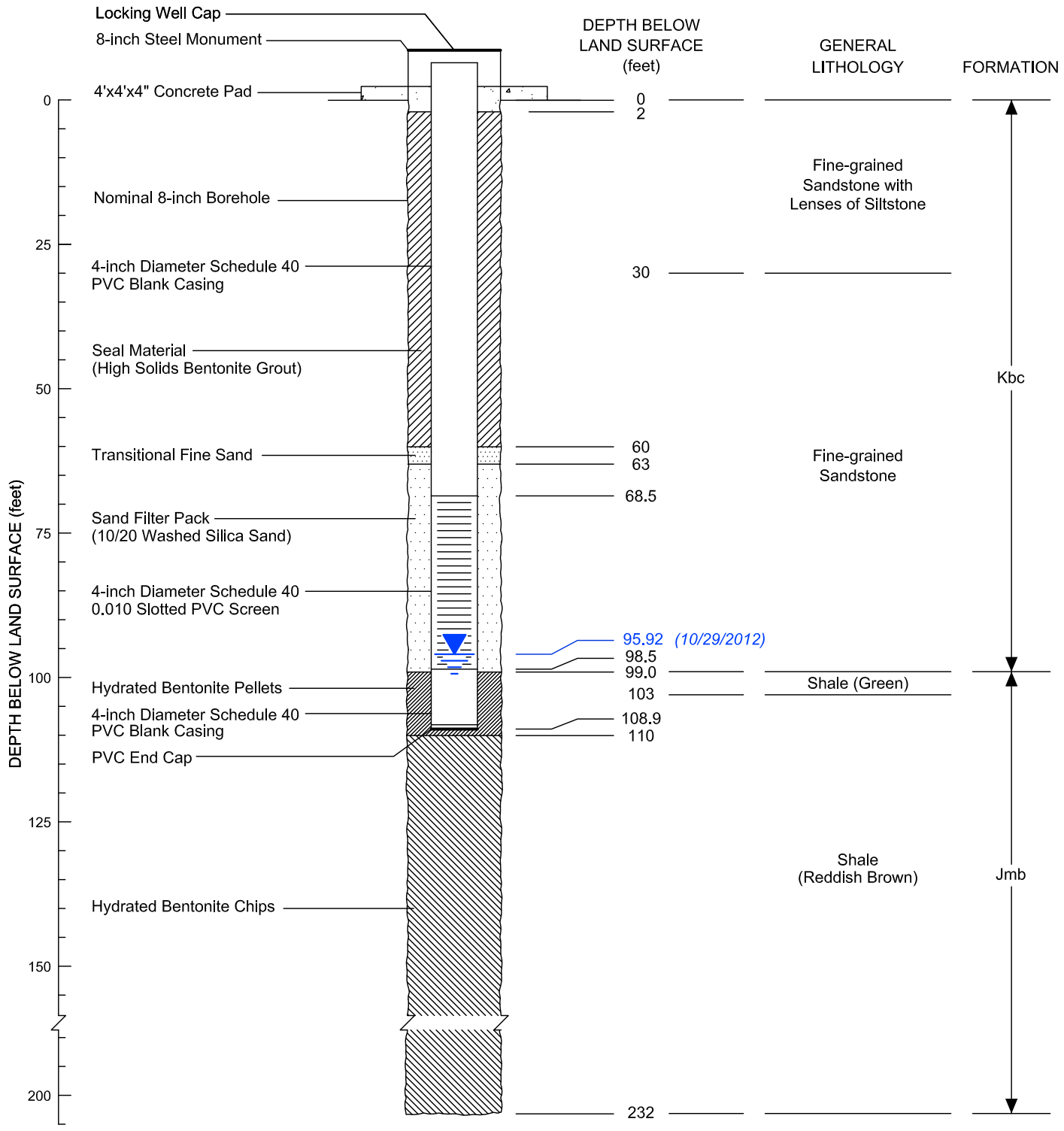

EXPLANATION

Kbc = Burro Canyon Formation
Jmb = Morrison Formation,
Brushy Basin Member

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-104	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436189	NORTHING: 589369.4
COMPLETED: OCT. 2012	EASTING: 2637513.0
METHOD: AIR ROTARY	MP ELEVATION: 6705.2

MONITOR WELL MW-104
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

MONTGOMERY & ASSOCIATES

FIGURE A-6

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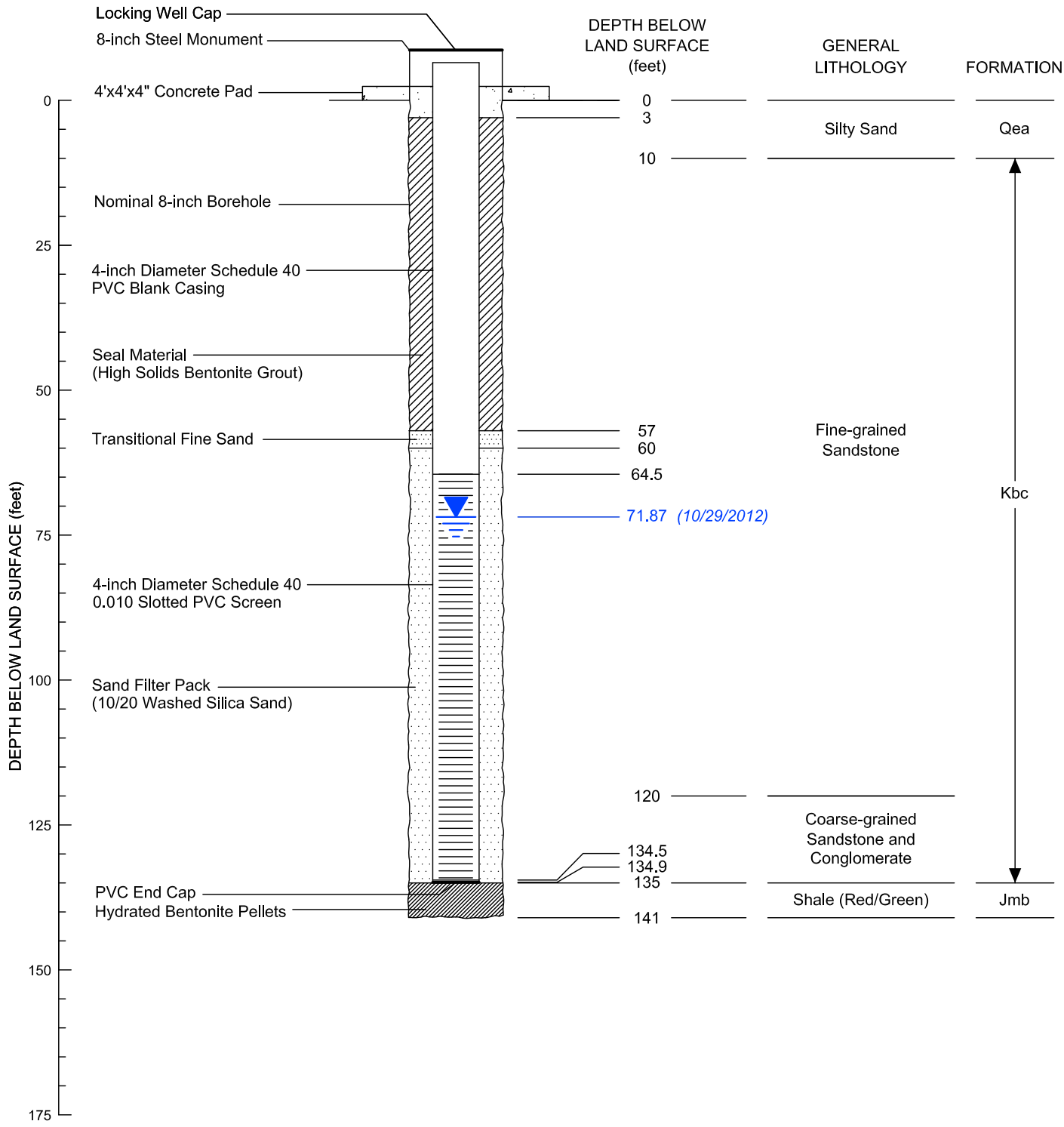

EXPLANATION

Qal = Quaternary Eolian and Alluvium Deposits

Kbc = Burro Canyon Formation

Jmb = Morrison Formation, Brushy Basin Member

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-105	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436191	NORTHING: 588104.7
COMPLETED: OCT. 2012	EASTING: 2636130.9
METHOD: AIR ROTARY	MP ELEVATION: 6624.1

MONITOR WELL MW-105
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

MONTGOMERY & ASSOCIATES

FIGURE A-7

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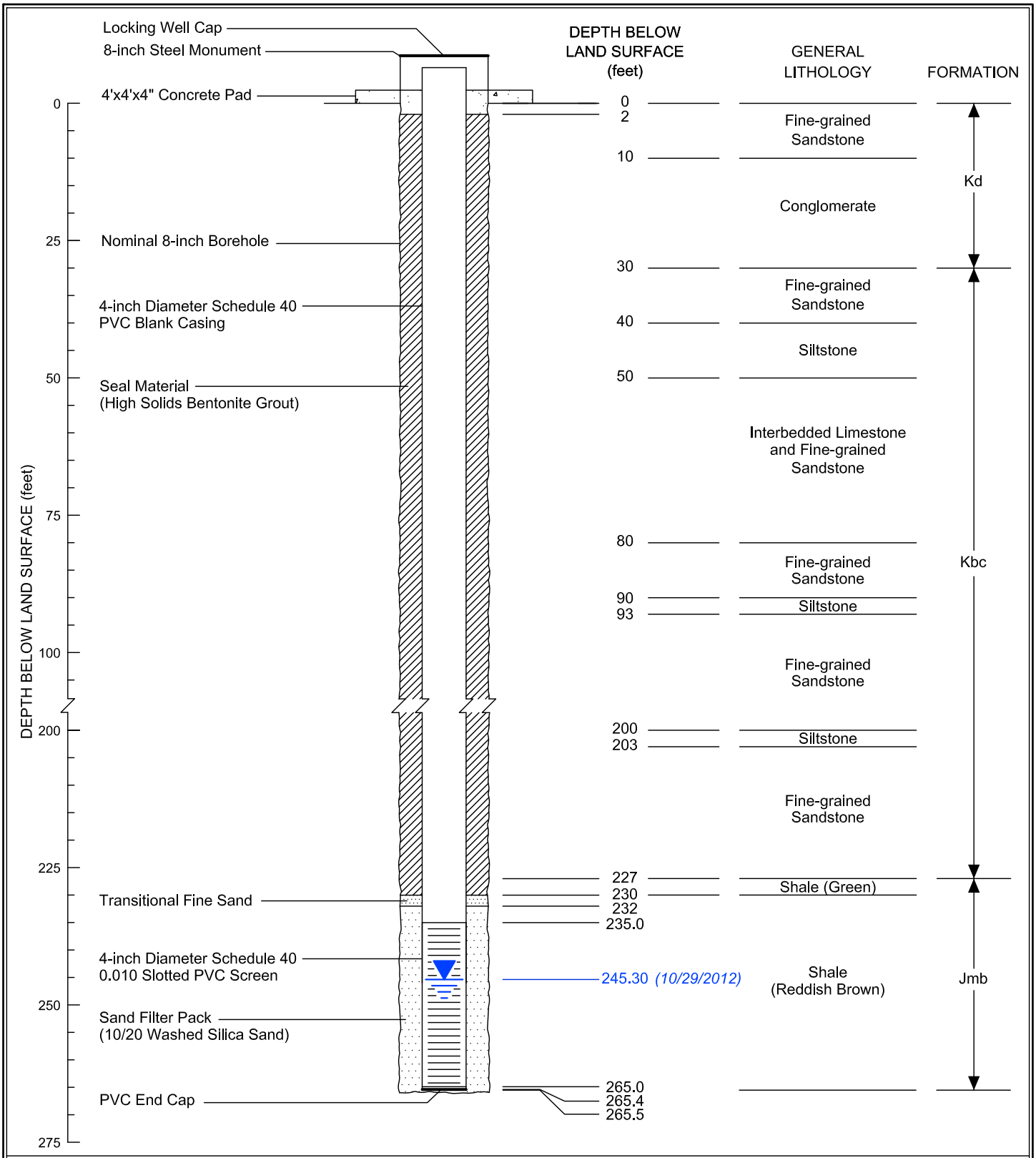

EXPLANATION

Kd = Dakota Sandstone
Kbc = Burro Canyon Formation
Jmb = Morrison Formation, Brushy Basin Member

LICENSED PROFESSIONAL GEOLOGIST
TIMOTHY PATRICK LEO
8272244-2250
12-19-12
STATE OF UTAH
expires 3-31-15

WELL: MW-106	NAD27 STATE PLANE UTAH SO.
UDWR WELL NO: 436187	NORTHING: 587422.7
COMPLETED: OCT. 2012	EASTING: 2639306.0
METHOD: AIR ROTARY	MP ELEVATION: 6852.8

MONITOR WELL MW-106
CONSTRUCTION SCHEMATIC
RIO ALGOM MINING LLC, LISBON FACILITY

2013

MONTGOMERY & ASSOCIATES

FIGURE A-8

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FIGURE A-9. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-100
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY EOLIAN AND ALLUVIAL DEPOSITS (Qea)						
0-5	Qea	Silty SAND	yellowish red [5YR 5/6]	Silty SAND; non-lithified, well sorted, reaction to acid: none		dry, loose silty sand
DAKOTA SANDSTONE (Kd)						
5-10	Kd	Sltst	greenish gray [GLEY 6/10Y]	SILTSTONE; weakly lithified, friable, reaction to acid: moderate	weathered; orange iron oxide staining	subrounded to subangular chips up to 2 cm
10-20	Kd	SS	gray [GLEY 5/10Y]	SANDSTONE; weakly to moderately lithified, very fine grained, well sorted, reaction to acid: none	trace iron oxide staining	subrounded chips up to 1 cm
20-30	Kd	SH	very dark gray [GLEY 3/N]	SHALE; weakly to moderately lithified, carbonaceous, soft to friable, reaction to acid: none		subrounded to subangular chips up to 2 cm
30-40	Kd	SS	yellowish brown [10YR 5/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded quartz grains, reaction to acid: weak	common iron oxide staining	subrounded to subangular chips up to 2 cm
40-50	Kd	SS	yellowish brown [10YR 5/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded quartz grains, reaction to acid: very weak	common iron oxide staining	rounded chips up to 0.2 cm
50-60	Kd	SS/Sltst	brownish yellow [10YR 6/8]	SANDSTONE; well lithified, very fine grained, well sorted, rounded quartz grains, with interbedded lenses of yellowish brown siltstone, reaction to acid: weak	common iron oxide staining	rounded to subrounded chips up to 1 cm
60-70	Kd	SS	yellowish brown [10YR 5/6]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded quartz grains , reaction to acid: moderate	common iron oxide staining	subrounded to subangular chips up to 1 cm

FIGURE A-9. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-100
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
BURRO CANYON FORMATION (Kbc)						
70-80	Kbc	Sltst	greenish gray [GLEY 5/5G]	SILTSTONE; weakly lithified, soft to friable, reaction to acid: none		subangular chips up to 2 cm
80-90	Kbc	Sltst	greenish gray [GLEY 5/5G] dusky red [2.5YR 3/2]	SILTSTONE; weakly lithified, interbedded greenish gray, reddish brown, and gray, soft to friable, reaction to acid: weak		angular to subangular chips up to 1.5 cm
90-100	Kbc	Sltst	greenish gray [GLEY 5/5G]	SILTSTONE; moderately lithified, interbedded greenish gray, reddish brown, and gray, soft to friable, reaction to acid: weak		subrounded to subangular chips up to 1 cm
100-110	Kbc	LS/SS	dark reddish gray [2.5YR 5/1]	LIMESTONE; well lithified, hard, with interbedded lenses of greenish gray, very fine grained sandstone, reaction to acid: strong		angular to subangular chips up to 1.5 cm
110-120	Kbc	SS	light greenish gray [GLEY 7/10GY]	SANDSTONE; moderately lithified, very fined grained, well sorted, reaction to acid: weak		subrounded chips up to 1.5 cm
120-130	Kbc	SS	brownish yellow [10YR 6/6]	SANDSTONE; well lithified, fine grained, well sorted, rounded quartz grains, with interbedded lenses of greenish gray siltstone, reaction to acid: moderate	trace iron oxide staining	subrounded chips up to 0.8 cm
130-140	Kbc	SS	pale yellow [2.5Y 7/3]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, rounded quartz grains, reaction to acid: moderate	trace iron oxide staining; cuttings moist	subrounded chips up to 1 cm
140-150	Kbc	SS/Sltst	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, rounded quartz grains, with interbedded lenses of yellowish brown siltstone, reaction to acid: moderate	trace iron oxide staining; cuttings moist	rounded to subrounded chips up to 0.5 cm

FIGURE A-9. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-100
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
150-160	Kbc	Sltst	greenish gray [GLEY 5/5G]	SILTSTONE; well lithified, soft to friable, reaction to acid: moderate to strong	cuttings moist	subrounded chips up to 0.5 cm
160-170	Kbc	SS	pale yellow [2.5Y 7/3]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, subrounded quartz grains, reaction to acid: moderate	trace iron oxide staining; cuttings damp	subrounded chips up to 0.8 cm
170-180	Kbc	SS	pale yellow [2.5Y 7/3]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, subrounded quartz grains, reaction to acid: very weak	cuttings saturated; borehole producing <1 gpm	rounded chips up to 0.2 cm
180-190	Kbc	SS/Sltst	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, subrounded quartz grains, with interbedded lenses of olive green siltstone, reaction to acid: very weak	cuttings saturated; borehole producing <5 gpm	rounded to angular chips up to 0.8 cm
190-200	Kbc	SS/Sltst	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine to medium grained, well sorted, clast-supported, subrounded quartz grains, interbedded lenses of olive green siltstone, reaction to acid: very weak	cuttings saturated; borehole producing <5 gpm	rounded to angular chips up to 0.5 cm
200-208	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, coarse grained; poorly sorted, matrix supported, trace clasts up to 0.5 cm, gravel-size clasts consist of rounded dark gray sandstone, angular red chert, and green shale, reaction to acid: very weak	cuttings saturated; borehole producing ~10 gpm	rounded to angular chips up to 0.5 cm

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FIGURE A-10. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-101
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY EOLIAN AND ALLUVIAL DEPOSITS (Qea)						
0-5	Qea	Silty SAND	yellowish red [5YR 5/6]	Silty SAND; non-lithified, well sorted, reaction to acid: none		dry, loose silty sand
BURRO CANYON FORMATION (Kbc)						
5-10	Kbc	SS	light gray [10YR 7/2]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate	orange iron oxide staining	angular to subangular chips up to 5 cm
10-20	Kbc	SS/LS	brown [10YR 5/3]	SANDSTONE; well lithified, fine grained, well sorted, with interbedded lenses of gray limestone, reaction to acid: strong	trace iron oxide staining	angular to subangular chips up to 5 cm
20-30	Kbc	Sltst/LS/ SS	brown [10YR 5/3] light greenish gray [GLEY 7/5G]	SILTSTONE; weakly to well lithified, with interbedded lenses of gray limestone and gray fine grained sandstone, reaction to acid: moderate to strong		subrounded to subangular chips up to 2 cm
30-40	Kbc	SS	pale brown [10YR 7/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate	trace iron oxide staining	subrounded to subangular chips up to 1 cm
40-50	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE; well lithified, hard, reaction to acid: strong		angular to subangular chips up to 1.5 cm
50-60	Kbc	SS/Sltst	pale olive [5Y 6/3]	SANDSTONE; weakly to well lithified, fine grained, well sorted, with interbedded lenses of soft, greenish gray siltstone, reaction to acid: none		subrounded to subangular chips up to 0.5 cm
60-70	Kbc	SS	pale yellow [5Y 7/2]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, rounded to subrounded quartz grains, reaction to acid: moderate		subrounded to subangular chips up to 1.5 cm

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FIGURE A-10. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-101
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
70-80	Kbc	SS	pale yellow [5Y 7/2]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, rounded to subrounded quartz grains; reaction to acid: moderate		subangular chips up to 0.8 cm
80-90	Kbc	SS	pale olive [5Y 6/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, rounded to subrounded quartz grains, reaction to acid: strong		subrounded to subangular chips up to 0.8 cm
90-100	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak		pulverized, fine sand sized chips (1/8-1/4 mm)
100-110	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak		subangular chips up to 0.2 cm
110-120	Kbc	Sltst/SS	yellow [2.5Y 7/6]	SILTSTONE; weakly lithified, with interbedded lenses of white, fine grained sandstone, reaction to acid: none	trace iron oxide staining	subrounded to subangular chips up to 1 cm
120-130	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak	trace iron oxide staining	rounded chips up to 0.3 cm
130-140	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none	trace iron oxide staining	subrounded to subangular chips up to 1 cm
140-150	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak	trace iron oxide staining	rounded chips up to 0.3 cm
150-160	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		angular to subangular chips up to 1 cm

FIGURE A-10. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-101
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
160-165	Jmb	SH	dusky red [10R 3/4] greenish gray [GLEY 6/5G]	SHALE; moderately lithified, reaction to acid: none		angular to subangular chips up to 2 cm

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FIGURE A-11. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
BURRO CANYON FORMATION (Kbc)						
0-10	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE, well lithified, hard, reaction to acid: strong	weathered	angular to subangular chips up to 0.8 cm
10-13	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE, well lithified, hard, reaction to acid: moderate to strong	weathered	angular to subangular chips up to 1.5 cm
13-20	Kbc	Sltst	dusky red [10R 3/4]	SILTSTONE; weakly lithified, reaction to acid: none	weathered	angular to subangular chips up to 1.5 cm
20-25	Kbc	Sltst	greenish gray [GLEY 6/5G]	SILTSTONE; weakly lithified, reaction to acid: moderate		angular to subangular chips up to 1.5 cm
25-30	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; moderately lithified, very fine grained, well sorted, reaction to acid: moderate		angular to subangular chips up to 1.5 cm
30-40	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate		pulverized, fine sand sized chips (1/8-1/4 mm)
40-50	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate		subrounded chips up to 1 cm
50-60	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate	trace iron oxide staining	subrounded chips up to 1 cm
60-70	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: moderate	trace iron oxide staining	subrounded chips up to 1 cm

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FIGURE A-11. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
70-80	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: weak		subrounded chips up to 0.8 cm
80-85	Kbc	Sltst	olive [5Y 5/4]	SILTSTONE; weakly lithified, soft to friable, reaction to acid: none		subrounded chips up to 0.8 cm
85-90	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: none		subrounded chips up to 0.8 cm
90-100	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: weak		pulverized, fine sand sized chips (1/8-1/4 mm)
100-110	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
110-120	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, clast supported, subrounded quartz grains, reaction to acid: none		subrounded chips up to 0.8 cm
120-130	Kbc	SS/Sltst	pale yellow [2.5Y 7/4]	SANDSTONE; moderately to well lithified, fine grained, well sorted, subrounded quartz grains, with interbedded lenses of olive green siltstone, reaction to acid: very weak	trace iron oxide staining	subrounded to subangular chips up to 1.5 cm
130-136	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: very weak	cuttings damp at 130'	subrounded to subangular chips up to 1.5 cm

FIGURE A-11. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
136-138	Jmb	SH	pale green [GLEY 6/5G]	SHALE; weakly to moderately lithified, reaction to acid: none		angular to subangular chips up to 0.8 cm
138-141	Jmb	SH	dusky red [10R 3/4]	SHALE; moderately lithified, fissile, reaction to acid: none		angular chips up to 0.8 cm

FIGURE A-12. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102DB
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
BURRO CANYON FORMATION (Kbc)						
0-2	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE; non-lithified, weathered, reaction to acid: strong	weathered, loose	Boring was advanced from 2' bgs to 170' bgs (34' below the Kbc/Jmb contact) with PQ core barrel to retrieve continuous core samples; borehole reamed to 140 ' bgs with 12-inch diameter hammer bit; borehole reamed from 140' to 178' bgs with 8-inch diameter tricone corehole chaser bit
2-7	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE; well lithified, crystalline, hard, reaction to acid: strong	abundant fractures, orange and black oxide staining on fracture surfaces	
8-11.5	Kbc	LS	greenish gray [GLEY 6/10G]	LIMESTONE, well lithified, crystalline, hard, reaction to acid: strong	abundant fractures, orange and black oxide staining on fracture surfaces, calcite infill on fracture surfaces	
11.5-21	Kbc	Sltst	dusky red [10R 3/4]	SILTSTONE; weakly lithified, reaction to acid: moderate	weathered, common iron oxide staining on fracture surfaces	15'-17': no recovery
21-26	Kbc	SS	dusky red [10R 3/4]	SANDSTONE; moderately to well lithified, very fine to fine grained, well sorted, reaction to acid: weak	trace iron oxide staining	
26-28.5	Kbc	Sltst	greenish gray [GLEY 6/5G]	SILTSTONE; moderately lithified, homogeneous, reaction to acid: none	trace iron oxide staining	
28.5-31	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, very fine to fine grained, well sorted, subrounded quartz grains, interval contains thin stringers of green siltstone, reaction to acid: none	common iron oxide staining	

FIGURE A-12. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102DB
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
31-43	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak 31' - 32': trace subrounded clasts up to 0.5 cm 36' - 36.5': medium to coarse grained sandstone lens 39' - 39.5': medium to coarse grained sandstone lens	trace iron oxide staining	
43-44.5	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, coarse grained, poorly sorted, matrix supported, coarsens with depth, reaction to acid: weak 44' - 44.5': conglomerate lens, matrix supported, fine grained matrix with subrounded clasts up to 2 cm	trace iron oxide staining	
44.5-46	Kbc	Sltst	pale yellow [2.5Y 8/3]	SILTSTONE; well lithified, trace coarse grained subrounded clasts, reaction to acid: weak	trace iron oxide staining	
46-49	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: weak 48' 48.3': coarse grained sandstone lens	trace iron oxide staining	
49-56	Kbc	Cgl	pale yellow [2.5Y 8/3]	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine grained matrix with subrounded clasts up to 1.5 cm, reaction to acid: moderate		
56-59	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak		

FIGURE A-12. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102DB
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
59-81	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, primarily fine grained, well sorted, subrounded quartz grains, reaction to acid: none (strong on calcite fracture fill) 60' - 61': very fined grained sandstone lens 74' - 75': medium grained sandstone lens	trace iron oxide staining; 62'-65': vertical fracturing with calcite crystals fracture surfaces 67'-69': vertical fracturing with calcite crystals on fracture surfaces 71'-74': vertical fracturing with calcite infill 80'-81': vertical fracturing with calcite infill	
81-84	Kbc	Sltst	olive [5Y 5/4]	SILTSTONE: moderately to well lithified, homogeneous, reaction to acid: none	81'-83': abundant iron oxide staining	
84-90	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none (strong on calcite fracture fill)	86'-88': vertical fracturing with calcite infill	
90-91	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; moderately lithified, medium grained with green silty matrix, poorly sorted, reaction to acid: none	common iron oxide staining	
91-97	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak 95' - 97': thin green siltstone stringers (<2mm)	91'-95': vertical fracturing with calcite on fracture surfaces	
97-97.2	Kbc	Sltst	olive [5Y 5/4]	SILTSTONE; moderately lithified, reaction to acid: very weak		
97.2-128	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak	107'-110': vertical fracturing with black "sooty" staining on fracture surfaces 114'-123.5': abundant fracturing with black "sooty" staining on fracture surfaces 123.5'-124': orange and black staining on fracture surfaces	

FIGURE A-12. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102DB
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
128-128.5	Kbc	Cgl	pale yellow [2.5Y 8/3]	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine grained matrix with subrounded clasts up to 3 cm, reaction to acid: weak		
128.5-133	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, trace subrounded clasts up to 1 cm, reaction to acid: very weak	trace iron oxide staining	
133-135.8	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; moderately lithified, fine to medium grained, coarsens with depth, well sorted, reaction to acid: none	weathered appearance, abundant fractures, dark orange to brown iron oxide staining on fracture surfaces	133'-135': poor recovery
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
135.8-136.9	Jmb	SH	pale green [GLEY 6/5G]	SHALE; well lithified, fissile, reaction to acid: none	iron oxide staining across entire interval	
136.9-138	Jmb	SH	pale green [GLEY 6/5G]	SHALE; well lithified, fissile, reaction to acid: none		
138-140	Jmb	SH	dusky red [10R 3/4] reddish gray [10Y 5/1]	SHALE; well lithified, mottled reddish brown to reddish gray to greenish gray, homogeneous, hard, reaction to acid: none	abundant fracturing with yellowish brown mineral infill, not calcite	
140-141.5	Jmb	SH	dusky red [10R 3/4] pale green [GLEY 6/5G]	SHALE; well lithified, mottled reddish brown to greenish gray, fissile, reaction to acid: none	common fracturing with brown mineral infill	
141.5-155	Jmb	SH	dusky red [10R 3/4]	SHALE; well lithified, homogeneous, hard to brittle, reaction to acid: none (strong on calcite fracture fill)	142'-151': very small fractures in core sample 153'-154': vertical fracture with calcite on fracture surfaces	

FIGURE A-12. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-102DB
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
155-165	Jmb	SS	dusky red [10R 3/4] reddish gray [10Y 5/1]	SANDSTONE; well lithified, mottled reddish gray to gray, very fine grained, well sorted, very hard, reaction to acid: none (strong on calcite fracture fill)	159'-163': vertical fracturing with calcite and pyrite crystals on fracture faces	
165-170	Jmb	SH	dusky red [10R 3/4]	SHALE; well lithified, fissile, very thin laminations, reaction to acid: none		Stopped coring at 170'
170-178	Jmb	SH	dusky red [10R 3/4]	SHALE; well lithified, fissile, reaction to acid: none		Borehole advanced from 170' bgs to 178' bgs (total depth) with 8-inch diameter tricone bit

FIGURE A-13. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-103
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
BURRO CANYON FORMATION (Kbc)						
0-4.5	Kbc	SS	pale brown [10YR 7/3]	SANDSTONE; well lithified, fine grained, well sorted, reaction to acid: none	trace iron oxide staining, trace black oxide staining	Boring was advanced from 2' bgs to 77' bgs (4' below the Kbc/Jmb contact) with PQ core barrel to retrieve continuous core samples; borehole was reamed with 8-inch diameter tricone corehole chaser bit to 77' bgs
4.5-6	Kbc	Sltst	brownish yellow [10YR 6/8]	SILTSTONE; weakly lithified, friable, reaction to acid: moderate	weathered, iron oxide staining	100% core sample recovery from 2' to 77' bgs
6-14	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak	8'-14': abundant fractures with iron oxide staining on fracture surfaces	
14-14.5	Kbc	SS	light brownish gray [2.5Y 6/2]	SANDSTONE; well lithified, medium to coarse grained, poorly sorted, clast supported, reaction to acid: none		
14.5-16	Kbc	Sltst	pale olive [5Y 6/3]	SILTSTONE; well lithified, reaction to acid: none	common iron oxide staining	
16-17	Kbc	SS	pale yellow [5Y 7/3]	SANDSTONE; well lithified, very fine grained, well sorted, reaction to acid: none	abundant iron oxide staining	
17-35	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none 26' - 27': green siltstone stringers less than 2mm thick 28.5' - 29': coarse sandstone lens with green matrix 32' - 34': thin lenses of medium grained sandstone	22'-22.5': fracture with "sooty" black oxide staining on fracture surfaces 25': black oxide staining	

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FIGURE A-13. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-103
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
35-37	Kbc	Cgl	pale yellow [5Y 7/4]	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine grained matrix with rounded to subrounded clasts up to 1 cm, reaction to acid: none	common iron oxide staining	
37-44	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		
44-45	Kbc	Cgl	pale yellow [2.5Y 8/3]	CONGLOMERATE; moderately to well lithified, poorly sorted, matrix supported, fine grained matrix with rounded to subrounded clasts up to 1 cm, reaction to acid: none		
45-58.5	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, primarily fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none 48.5' - 49': coarse sandstone lens with orange staining 51.5' - 52.5': coarse sandstone lens with orange staining	48.5'-49': iron oxide staining 51.5'-52.5': trace iron staining 52.5'-53.5': vertical fracturing with iron oxide staining on fracture surfaces 55'-58': vertical fracturing with iron oxide staining on fracture surfaces	
58.5-63.8	Kbc	SS	pale yellow [5Y 7/3]	SANDSTONE; well lithified, medium to coarse grained, poorly sorted, coarsens with depth, trace green subangular clasts of siltstone, reaction to acid: none	common iron oxide staining	
63.8-64	Kbc	Sltst	olive [5Y 5/4]	SILTSTONE; weakly lithified, friable, reaction to acid: none		
64-70.5	Kbc	SS	pale yellow [2.5Y 8/3]	SANDSTONE; well lithified, medium to coarse grained, poorly sorted, coarsens with depth, trace green subangular clasts of siltstone, reaction to acid: none	64'-65.5': abundant iron oxide staining 66.5'-68': common trace iron oxide staining 68'-70': abundant iron oxide staining	

FIGURE A-13. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-103
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
70.5-71.5	Kbc	Cgl	light gray [2.5Y 7/1]	CONGLOMERATE; well lithified, well sorted, clast supported, clasts rounded up to 1 cm, reaction to acid: none	common iron oxide staining	
71.5-73.3	Kbc	SS	light gray [2.5Y 7/2]	SANDSTONE; well lithified, medium to coarse grained, poorly sorted, coarsens with depth, trace green subangular clasts of siltstone, reaction to acid: none	common iron oxide staining	
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
73.3-74.5	Jmb	SH	olive yellow [5Y 6/6]	SHALE; moderately to well lithified, homogeneous, reaction to acid: none	heavy orange iron oxide staining	
74.5-77	Jmb	SH	greenish gray [GLEY 5/5G]	SHALE; moderately to well lithified, homogeneous, reaction to acid: none		
77-114	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately to well lithified, fissile, reaction to acid: none		Borehole advanced from 77' bgs to 114' bgs (total depth) with 8-inch diameter tricone bit

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FIGURE A-14. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-104
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
BURRO CANYON FORMATION (Kbc)						
0-10	Kbc	SS/Sltst	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, with interbedded thin lenses of pale green siltstone, reaction to acid: moderate		subangular chips up to 2 cm
10-20	Kbc	SS/Sltst	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, with interbedded thin lenses of pale green siltstone, reaction to acid: none		subrounded to subangular chips up to 0.5 cm
20-30	Kbc	SS/Sltst	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, with interbedded thin lenses of pale green siltstone, reaction to acid: none		subrounded to subangular chips up to 1 cm
30-40	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
40-50	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
50-60	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
60-70	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
70-80	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
80-90	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none		subrounded chips up to 1 cm

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FIGURE A-14. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-104
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
90-99	Kbc	SS	olive [5Y 5/4]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	trace iron oxide staining	subrounded chips up to 1 cm
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
99-103	Jmb	SH	pale green [GLEY 6/5G]	SHALE; moderately lithified, weathered, friable, reaction to acid: none		subangular chips up to 1.5 cm
103-110	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately lithified, reaction to acid: none		angular to subangular chips up to 0.8 cm
110-120	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately lithified, reaction to acid: none		angular to subangular chips up to 0.8 cm
120-130	Jmb	SH	dusky red [2.5YR 4/2]	SHALE; moderately lithified,reaction to acid: none		angular to subangular chips up to 0.8 cm
130-140	Jmb	SH	dusky red [2.5YR 4/4]	SHALE; moderately lithified, reaction to acid: none		subangular chips up to 1 cm
140-150	Jmb	SH	dusky red [2.5YR 3/3]	SHALE; moderately lithified, reaction to acid: none		subrounded to subangular chips up to 1 cm
150-160	Jmb	SH	reddish gray [2.5YR 6/1]	SHALE; moderately lithified, interbedded layers of reddish brown and greenish gray, reaction to acid: none		subrounded to subangular chips up to 1 cm
160-170	Jmb	SH	reddish gray [2.5YR 6/1]	SHALE; moderately lithified, interbedded layers of reddish brown and greenish gray, reaction to acid: none		subrounded to subangular chips up to 2 cm
170-180	Jmb	SH	reddish gray [2.5YR 6/1]	SHALE; moderately lithified, interbedded layers of reddish brown and greenish gray, reaction to acid: none		subangular chips up to 0.8 cm

FIGURE A-14. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-104
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
180-190	Jmb	SH	reddish gray [2.5YR 6/1]	SHALE; moderately lithified, interbedded layers of reddish brown and greenish gray, reaction to acid: none		subangular chips up to 0.8 cm
190-200	Jmb	SH	dusky red [2.5YR 4/4]	SHALE; moderately lithified, reaction to acid: none		subangular chips up to 0.8 cm
200-210	Jmb	SH	dusky red [2.5YR 4/4]	SHALE; moderately lithified, reaction to acid: none		subangular chips up to 0.8 cm
210-220	Jmb	SH	reddish gray [2.5YR 6/1]	SHALE; moderately lithified, reaction to acid: none		subangular chips up to 0.8 cm
220-232	Jmb	SH	dusky red [2.5YR 4/4]	SHALE; moderately lithified, reaction to acid: none		subangular chips up to 0.8 cm

FIGURE A-15. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-105
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY EOLIAN AND ALLUVIAL DEPOSITS (Qea)						
0-10	Qea	Silty SAND	yellowish red [5YR 5/6]	Silty SAND; non-lithified, well sorted, reaction to acid: weak		dry, loose silty sand
BURRO CANYON FORMATION (Kbc)						
10-20	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: weak	trace iron oxide staining	pulverized, fine sand sized chips (1/8-1/4 mm)
20-30	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains		subrounded to subangular chips up to 1 cm
30-40	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: weak to moderate		pulverized, fine sand sized chips (1/8-1/4 mm)
40-50	Kbc	SS	yellow [2.5Y 8/6]	SANDSTONE; well lithified, very fine to fine grained, well sorted, subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
50-60	Kbc	SS/Sltst	olive yellow [2.5Y 6/6]	SANDSTONE; well lithified, very fine to fine grained, well sorted, subrounded quartz grains, with interbedded lenses of orange brown, friable siltstone, reaction to acid: none		subrounded chips up to 2 cm
60-70	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	trace iron oxide staining; cuttings damp at 70'	pulverized, fine sand sized chips (1/8-1/4 mm)

FIGURE A-15. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-105
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
70-80	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains	trace iron oxide staining; cuttings saturated at 82'	subrounded chips up to 1.5 cm
80-90	Kbc	SS	pale yellow [2.5Y 8/2]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	abundant iron oxide staining on fracture surfaces; cuttings saturated; borehole producing ~20 gpm	subrounded to subangular chips up to 1.5 cm
90-100	Kbc	SS	yellow [2.5Y 8/6]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	common iron oxide staining; cuttings saturated; borehole producing ~20 gpm	pulverized, fine sand sized chips (1/8-1/4 mm)
100-110	Kbc	SS	yellow [2.5Y 8/6]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	common iron oxide staining; cuttings saturated; borehole producing ~20 gpm	pulverized, fine sand sized chips (1/8-1/4 mm)
110-120	Kbc	SS	yellow [2.5Y 8/6]	SANDSTONE; well lithified, fine grained, well sorted, subrounded quartz grains, reaction to acid: none	common iron oxide staining; cuttings saturated; borehole producing ~20 gpm	subrounded chips up to 2 cm
120-130	Kbc	SS/Cgl	pale yellow [2.5Y 7/4] pale yellow [2.5Y 8/2]	SANDSTONE/CONGLOMERATE; well lithified, interbedded coarse-grained sandstone and conglomerate, poorly sorted, matrix supported, clasts up to 1.5 cm, clasts consist of rounded dark gray sandstone and angular olive green shale, reaction to acid: none	trace iron oxide staining; cuttings saturated; borehole producing ~20 gpm	subrounded to subangular chips up to 1.5 cm
130-135	Kbc	SS/Cgl	pale yellow [2.5Y 7/4] pale yellow [2.5Y 8/2]	SANDSTONE/CONGLOMERATE; well lithified, interbedded coarse-grained sandstone and conglomerate, poorly sorted, matrix supported, clasts up to 1.5 cm, clasts consist of rounded dark gray sandstone and angular olive green shale, reaction to acid: none	trace iron oxide staining; cuttings saturated; borehole producing ~20 gpm	subrounded to subangular chips up to 1.5 cm

FIGURE A-15. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-105
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
135-138	Jmb	SH	pale green [GLEY 6/5G]	SHALE; weakly to moderately lithified, friable, reaction to acid: none	cuttings saturated; borehole producing ~20 gpm	angular to subangular chips up to 1.5 cm
138-141	Jmb	SH	dusky red [10R 3/4]	SHALE; moderately lithified, fissile, reaction to acid: none	cuttings saturated; borehole producing ~20 gpm	angular chips up to 2 cm

FIGURE A-16. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-106
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
DAKOTA SANDSTONE (Kd)						
0-10	Kd	SS	light gray [2.5Y 7/2]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none	trace iron oxide staining	subrounded to subangular chips up to 1.5 cm
10-20	Kd	Cgl	yellow [2.5Y 7/6]	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine-grained sandy matrix, clasts consist of rounded dark gray and brown sandstone, clasts up to 2 cm, reaction to acid: none	common iron oxide staining	subrounded to subangular chips up to 1 cm
20-30	Kd	Cgl	olive yellow [2.5Y 6/6]	CONGLOMERATE; well lithified, poorly sorted, matrix supported, fine-grained sandy matrix, clasts consist of rounded dark gray and brown sandstone, clasts up to 2 cm, reaction to acid: none		rounded to subangular chips up to 1 cm
BURRO CANYON FORMATION (Kbc)						
30-40	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak		subrounded to subangular chips up to 1.5 cm
40-50	Kbc	Sltst	greenish gray [GLEY 5/5G]	SILTSTONE; weakly to well lithified, fissile, friable, reaction to acid: weak to moderate		subangular chips up to 2 cm
50-60	Kbc	LS/SS	light olive brown [2.5Y 5/3] dark reddish gray [10R 4/1]	LIMESTONE; weakly to well lithified, hard, with interbedded lenses of reddish brown, fine grained sandstone, reaction to acid: moderate to strong		angular to subangular chips up to 1 cm
60-70	Kbc	LS/SS	light olive brown [2.5Y 5/3] dark reddish gray [10R 4/1]	LIMESTONE; well lithified, hard, with interbedded lenses of reddish brown, fine grained sandstone, reaction to acid: none	trace iron oxide staining	angular chips up to 0.8 cm

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FIGURE A-16. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-106
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
70-80	Kbc	LS/SS	light olive brown [2.5Y 5/3] dark reddish gray [10R 4/1]	LIMESTONE; well lithified, hard, with interbedded lenses of reddish brown, fine grained sandstone, reaction to acid: none		subrounded to subangular chips up to 1.5 cm
80-88	Kbc	SS	dark reddish gray [10R 4/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, reaction to acid: very weak		subrounded chips up to 0.8 cm
88-90	Kbc	SS	greenish gray [GLEY 5/5G]	SANDSTONE; well lithified, very fine to fine grained, well sorted, reaction to acid: very weak		subrounded chips up to 1 cm
90-93	Kbc	Sltst	greenish gray [GLEY 5/5G] dark reddish gray [10R 4/1]	SILTSTONE; moderately to well lithified, interbedded greenish gray to reddish brown, reaction to acid: very weak		subangular chips up to 0.8 cm
93-100	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak		subrounded chips up to 1 cm
100-110	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak	trace black staining	pulverized, fine sand sized chips (1/8-1/4 mm)
110-120	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: very weak		subrounded to subangular chips up to 0.8 cm
120-130	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: moderate		pulverized, fine sand sized chips (1/8-1/4 mm)
130-140	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: weak		rounded to subrounded chips up to 1 cm

FIGURE A-16. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-106
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
140-150	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		rounded to subrounded chips up to 1.5 cm
150-160	Kbc	SS	pale yellow [2.5Y 7/4]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
160-170	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
170-180	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
180-190	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
190-195	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
195-200	Kbc	SS	yellowish brown [10YR 5/6]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none	iron oxide staining	pulverized, fine sand sized chips (1/8-1/4 mm)
200-203	Kbc	Sltst	greenish gray [GLEY 5/5G]	SILTSTONE; moderately lithified, friable, reaction to acid: none		subangular chips up to 0.5 cm
203-210	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		subrounded chips up to 0.8 cm

FIGURE A-16. LITHOLOGIC DESCRIPTION OF DRILL CUTTINGS FROM MONITOR WELL MW-106
RIO ALGOM MINING LLC, LISBON FACILITY

DEPTH INTERVAL (feet)	UNIT	ROCK TYPE	COLOR	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
210-220	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
220-227	Kbc	SS	white [2.5Y 8/1]	SANDSTONE; well lithified, very fine to fine grained, well sorted, rounded to subrounded quartz grains, reaction to acid: none		pulverized, fine sand sized chips (1/8-1/4 mm)
MORRISON FORMATION, BRUSHY BASIN MEMBER (Jmb)						
227-230	Jmb	SH	greenish gray [GLEY 5/5G]	SHALE; moderately lithified, soft, friable, reaction to acid: none	trace iron oxide staining	subangular chips up to 1 cm
230-240	Jmb	SH	dusky red [2.5YR 4/2]	SHALE; moderately to well lithified, fissile, friable, reaction to acid: none		angular chips up to 1 cm
240-250	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately to well lithified, fissile, reaction to acid: none		angular chips up to 2 cm
250-260	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately to well lithified, fissile, reaction to acid: none		angular chips up to 2 cm
260-265	Jmb	SH	dusky red [2.5YR 3/4]	SHALE; moderately to well lithified, fissile, reaction to acid: none		angular chips up to 2 cm

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APPENDIX B

INVESTIGATION DERIVED WASTE
LABORATORY REPORTS AND DISPOSAL DOCUMENTS

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

13012100612 10yds 10tons 20020

F

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	1	(520) 531-6961	011813-03

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
8950 N. ORACLE ROAD, SUITE 150
TUCSON AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL UT 84530

6. Transporter 1 Company Name: MP ENVIRONMENTAL — U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW ID 83624
Facility's Phone: (800) 274-1516
U.S. EPA ID Number: IDD073114654

9. Waste Shipping Name and Description	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.
1. MATERIAL NOT REGULATED BY D.O.T.	1	CM	9	T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
WSID#29927

Bin #6185

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Ray — Signature: [signature] — Month 1 Day 15 Year 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name — Signature — Month Day Year
Transporter 2 Printed/Typed Name: George Peterson — Signature: [signature] — Month 1 Day 18 Year 13

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Corian Kastner — Signature: C. Kastner — Month 1 Day 21 Year 13

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

CERTIFICATE OF DISPOSAL

January 28,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **011813-03/** was received by U.S. Ecology, Inc., on **01/21/2013**.The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **01/21/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13012100612-011813-03-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

1302010096-6 10-11 7-725 15440

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone (520) 531-6961	4. Waste Tracking Number 01R113-01

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
8950 N ORACLE ROAD, SUITE 150
TUCSON AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL UT 84530

6. Transporter 1 Company Name
MP ENVIRONMENTAL
U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW ID 83624
Facility's Phone: (800) 274-1516
U.S. EPA ID Number: IDD073114654

9. Waste Shipping Name and Description	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.
1. MATERIAL NOT REGULATED BY D.O.T.	1	CM	8	T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
WSID#29927

Bin # 6077

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Ray | Signature: [signature] | Month 1 Day 15 Year 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: GARY HILL | Signature: Gary Hill | Month 01 Day 21 Year 13
Transporter 2 Printed/Typed Name: | Signature: | Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Jana McCarthy | Signature: Jana McCarthy | Month 2 Day 1 Year 13

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

CERTIFICATE OF DISPOSAL

February 05,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **012113-01/** was received by U.S. Ecology, Inc., on **02/01/2013**.The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **02/01/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13020100966-012113-01-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

10 yds 8.31 tons
130121006012 16620

B

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone (520) 531-6961	4. Waste Tracking Number 011813-04

GENERATOR

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
6950 N ORACLE ROAD, SUITE 150
TUCSON AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL UT 84530

6. Transporter 1 Company Name
MP ENVIRONMENTAL
U.S. EPA ID Number
CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW ID 83624
Facility's Phone: (800) 274-1515
U.S. EPA ID Number
IDD073114654

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	MATERIAL NOT REGULATED BY D.O.T.	1	CM	9	T
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
WSID#29927

Bin #6017

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Ray
Signature:
Month 1 Day 15 Year 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: George Peterson
Signature:
Month 1 Day 18 Year 13

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Corian Kastner
Signature:
Month 1 Day 21 Year 13

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF DISPOSAL

January 28,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **011813-04/** was received by U.S. Ecology, Inc., on **01/21/2013**.The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **01/21/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13012100612-011813-04-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

Please print or type
(Form designed for use on elite (12 pitch) typewriter.)

13012220672 12/+ 10 tons 2013

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone	4. Waste Tracking Number
		(520) 531-6961	011813-01

GENERATOR

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
8950 N ORACLE ROAD, SUITE 150
TUCSON AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL UT 84530

6. Transporter 1 Company Name
MP ENVIRONMENTAL
U.S. EPA ID Number
CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW ID 83624
Facility's Phone: (800) 274-1516
U.S. EPA ID Number
IDD073114654

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	MATERIAL NOT REGULATED BY D.O.T.	1	CM	9	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
WSID# 29927

Bin # 6061

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Roy
Signature:
Month: 1 Day: 15 Year: 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: GARY HILL
Signature: Gary Hill
Month: 01 Day: 18 Year: 13

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jenny McCarthy
Signature: Jenny McCarthy
Month: 1 Day: 29th Year: 13

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF DISPOSAL

January 28,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **011813-01/** was received by U.S. Ecology, Inc., on **01/22/2013** .The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **01/22/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13012200672-011813-01-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

13012200472 84# 2 tons 5440

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone	4. Waste Tracking Number
		(520) 531-6961	011813-02

GENERATOR

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
6950 N ORACLE ROAD, SUITE 150
TUCSON, AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

6. Transporter 1 Company Name
MR ENVIRONMENTAL
U.S. EPA ID Number
CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
Facility's Phone: (800) 274-1516
U.S. EPA ID Number
IDD073114654

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	MATERIAL NOT REGULATED BY D.O.T.	1	CM	5	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
WSID#29927
Bin #6103

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Ray | Signature | Month: 1 | Day: 15 | Year: 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: GARY HILL | Signature | Month: 01 | Day: 18 | Year: 13

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☒ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Actual Received ~~2 tons~~ 2.72 tons, WTOK per Jenny ORR via email / 1/23/13 CK
Manifest Reference Number:

17b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jane McCarthy | Signature: Jane McCarthy | Month: 1 | Day: 22 | Year: 13

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF DISPOSAL

January 28,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **011813-02/** was received by U.S. Ecology, Inc., on **01/22/2013**.The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **01/22/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13012200672-011813-02-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

13012300707 11.50 tons 23380 15 yds

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone (520) 531-6961	4. Waste Tracking Number 012113-02

5. Generator's Name and Mailing Address
RIO ALGOM MINING, LLC
6950 N ORACLE ROAD, SUITE 150
TUCSON AZ 85704
Generator's Phone: (520) 531-6961

Generator's Site Address (if different than mailing address)
RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL UT 84530

6. Transporter 1 Company Name: MP ENVIRONMENTAL — U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW ID 83624
Facility's Phone: (800) 274-1516
U.S. EPA ID Number: IDD073114654

9. Waste Shipping Name and Description	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.
1. MATERIAL NOT REGULATED BY D.O.T.	1	CM	13	T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
WSID#29927

Bin #6182

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William Ray — Signature: [signature] — Month 1 Day 15 Year 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Jeffrey Moores — Signature: [signature] — Month 1 Day 21 Year 13
Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Corian Kastner — Signature: [signature] — Month 1 Day 23 Year 13

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

CERTIFICATE OF DISPOSAL

January 28,2013

RIO ALGOM MINING, LLC
LISBON VALLEY ROAD AND WEST COYOTE CREEK ROAD
LA SAL, UT 84530

This is to certify that waste as defined on Waste Manifest number **012113-02/** was received by U.S. Ecology, Inc., on **01/23/2013**.The waste(s) were subsequently treated, if required by 40 CFR Part 268 and U.S. Ecology's permits and disposed of by **01/23/2013** in accordance with permits and laws regulating this facility.

Reference Number: 13012300707-012113-02-1-1
Material: 1 ROLL-OFF
Process: Direct Landfill
Management Code:
Facility: U.S. ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654
Waste Type: NON HAZARDOUS WASTE
Customer: MP ENVIRONMENTAL SERVICES

Printed Name: DONNA PULLEN

Signature: Donna Pullen

Title: RECEIVING SUPERVISOR

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

October 01, 2012

Report to:
Tim Leo
Montgomery and Associates
1550 E. Prince Rd.
Tuscon, AZ 85719

Bill to:
Accounts Payable
Montgomery and Associates
1550 E Prince Rd
Tucson, AZ 85719

cc: John Laney

Project ID: 1350.13
ACZ Project ID: L96899

Tim Leo:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 22, 2012. This project has been assigned to ACZ's project number, L96899. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L96899. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 01, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: DC-104

Drill Cuttings

ACZ Sample ID: ***L96899-01***
Date Sampled: *09/17/12 13:00*
Date Received: *09/22/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							09/27/12 15:29	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (TCLP)	M6010B ICP		U	*	mg/L	0.06	0.3	09/28/12 10:55	jjc
Barium (TCLP)	M6010B ICP	2.550		*	mg/L	0.003	0.02	09/28/12 10:55	jjc
Cadmium (TCLP)	M6010B ICP		U	*	mg/L	0.005	0.02	09/28/12 10:55	jjc
Chromium (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.05	09/28/12 10:55	jjc
Lead (TCLP)	M6010B ICP		U	*	mg/L	0.04	0.2	09/28/12 10:55	jjc
Mercury (TCLP)	M7470 CVAA		U	*	mg/L	0.0002	0.001	09/27/12 16:07	mfm
Selenium (TCLP)	M6010B ICP		U	*	mg/L	0.06	0.3	09/28/12 10:55	jjc
Silver (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.03	09/28/12 10:55	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
TCLP Metal Extraction	M1311							09/25/12 20:13	njj/mss

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: DC-100-105

Drill Cuttings

ACZ Sample ID: ***L96899-02***
Date Sampled: *09/19/12 13:00*
Date Received: *09/22/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							09/27/12 17:16	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (TCLP)	M6010B ICP		U	*	mg/L	0.06	0.3	09/28/12 11:04	jjc
Barium (TCLP)	M6010B ICP	1.180		*	mg/L	0.003	0.02	09/28/12 11:04	jjc
Cadmium (TCLP)	M6010B ICP	0.008	B	*	mg/L	0.005	0.02	09/28/12 11:04	jjc
Chromium (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.05	09/28/12 11:04	jjc
Lead (TCLP)	M6010B ICP		U	*	mg/L	0.04	0.2	09/28/12 11:04	jjc
Mercury (TCLP)	M7470 CVAA		U	*	mg/L	0.0002	0.001	09/27/12 16:14	mfm
Selenium (TCLP)	M6010B ICP		U	*	mg/L	0.06	0.3	09/28/12 11:04	jjc
Silver (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.03	09/28/12 11:04	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
TCLP Metal Extraction	M1311							09/26/12 4:03	njj/mss

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: DC-101-102

Drill Cuttings

ACZ Sample ID: ***L96899-03***
Date Sampled: *09/21/12 12:40*
Date Received: *09/22/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							09/27/12 18:28	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (TCLP)	M6010B ICP	0.08	B	*	mg/L	0.06	0.3	09/28/12 11:11	jjc
Barium (TCLP)	M6010B ICP	1.660		*	mg/L	0.003	0.02	09/28/12 11:11	jjc
Cadmium (TCLP)	M6010B ICP		U	*	mg/L	0.005	0.02	09/28/12 11:11	jjc
Chromium (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.05	09/28/12 11:11	jjc
Lead (TCLP)	M6010B ICP		U	*	mg/L	0.04	0.2	09/28/12 11:11	jjc
Mercury (TCLP)	M7470 CVAA		U	*	mg/L	0.0002	0.001	09/27/12 16:18	mfm
Selenium (TCLP)	M6010B ICP		U	*	mg/L	0.06	0.3	09/28/12 11:11	jjc
Silver (TCLP)	M6010B ICP		U	*	mg/L	0.01	0.03	09/28/12 11:11	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
TCLP Metal Extraction	M1311							09/26/12 9:16	njj/mss

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Montgomery and Associates

ACZ Project ID: ***L96899***

Arsenic (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	4		4.086	mg/L	102.2	90	110			
WG331081ICB	ICB	09/28/12 10:36				U	mg/L		-0.18	0.18			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.18	0.18			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	1		1.135	mg/L	113.5	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	1	U	1.078	mg/L	107.8	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	1	U	1.119	mg/L	111.9	75	125	3.73	20	
L96899-02DUP	DUP	09/28/12 11:08			U	U	mg/L				0	20	RA

Barium (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	2		1.982	mg/L	99.1	90	110			
WG331081ICB	ICB	09/28/12 10:36				.0032	mg/L		-0.009	0.009			
WG330841PBS	PBS	09/28/12 10:48				.0092	mg/L		-0.009	0.009			BA
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	20.5		19.22	mg/L	93.8	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	20.5	2.55	21.95	mg/L	94.6	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	20.5	2.55	21.47	mg/L	92.3	75	125	2.21	20	
L96899-02DUP	DUP	09/28/12 11:08			1.18	1.676	mg/L				34.7	20	RD

Cadmium (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	2		1.951	mg/L	97.6	90	110			
WG331081ICB	ICB	09/28/12 10:36				U	mg/L		-0.015	0.015			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.015	0.015			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	.5		.4986	mg/L	99.7	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	.5	U	.4955	mg/L	99.1	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	.5	U	.4902	mg/L	98	75	125	1.08	20	
L96899-02DUP	DUP	09/28/12 11:08			.008	.0077	mg/L				3.8	20	RA

Chromium (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	2		1.985	mg/L	99.3	90	110			
WG331081ICB	ICB	09/28/12 10:36				U	mg/L		-0.03	0.03			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.03	0.03			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	.5		.509	mg/L	101.8	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	.5	U	.503	mg/L	100.6	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	.5	U	.499	mg/L	99.8	75	125	0.8	20	
L96899-02DUP	DUP	09/28/12 11:08			U	U	mg/L				0	20	RA

Montgomery and Associates

ACZ Project ID: ***L96899***

Lead (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	4		4.02	mg/L	100.5	90	110			
WG331081ICB	ICB	09/28/12 10:36				U	mg/L		-0.12	0.12			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.12	0.12			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	1		1.049	mg/L	104.9	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	1	U	1.002	mg/L	100.2	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	1	U	1.022	mg/L	102.2	75	125	1.98	20	
L96899-02DUP	DUP	09/28/12 11:08			U	U	mg/L				0	20	RA

Mercury (TCLP) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG330849													
WG330849ICV	ICV	09/27/12 9:43	II120921-1	.005025		.0051	mg/L	101.5	95	105			
WG330849ICB	ICB	09/27/12 9:46				U	mg/L		-0.0002	0.0002			
WG330977													
WG330841PBS	PBS	09/27/12 16:03				U	mg/Kg		-0.0006	0.0006			
WG330841LFB	LFB	09/27/12 16:05	II120831-3	.002002		.0019	mg/L	94.9	85	115			
L96899-01MS	MS	09/27/12 16:10	II120831-3	.002002	U	.00189	mg/L	94.4	85	115			
L96899-01MSD	MSD	09/27/12 16:12	II120831-3	.002002	U	.00194	mg/L	96.9	85	115	2.61	20	
L96899-02DUP	DUP	09/27/12 16:16			U	U	mg/L				0	20	RA

Selenium (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	4		4.115	mg/L	102.9	90	110			
WG331081ICB	ICB	09/28/12 10:36				.071	mg/L		-0.18	0.18			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.18	0.18			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	1		1.122	mg/L	112.2	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	1	U	1.106	mg/L	110.6	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	1	U	1.015	mg/L	101.5	75	125	8.58	20	
L96899-02DUP	DUP	09/28/12 11:08			U	U	mg/L				0	20	RA

Silver (TCLP) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG331081													
WG331081ICV	ICV	09/28/12 10:33	II120914-3	.998		1.001	mg/L	100.3	90	110			
WG331081ICB	ICB	09/28/12 10:36				U	mg/L		-0.03	0.03			
WG330841PBS	PBS	09/28/12 10:48				U	mg/L		-0.03	0.03			
WG330841LFB	LFB	09/28/12 10:51	IITCLPSPIK	.5		.459	mg/L	91.8	85	115			
L96899-01MS	MS	09/28/12 10:58	IITCLPSPIK	.5	U	.472	mg/L	94.4	75	125			
L96899-01MSD	MSD	09/28/12 11:01	IITCLPSPIK	.5	U	.476	mg/L	95.2	75	125	0.84	20	
L96899-02DUP	DUP	09/28/12 11:08			U	U	mg/L				0	20	RA

Montgomery and Associates

ACZ Project ID: ***L96899***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L96899-01	WG331081	Arsenic (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Barium (TCLP)	M6010B ICP	BA	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 20X the concentration in the method blank.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Cadmium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG330977	Mercury (TCLP)	M7470 CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG331081	Selenium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Silver (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L96899-02	WG331081	Arsenic (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Barium (TCLP)	M6010B ICP	BA	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 20X the concentration in the method blank.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Cadmium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG330977	Mercury (TCLP)	M7470 CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG331081	Selenium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Silver (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Extended Qualifier Report

Montgomery and Associates

ACZ Project ID: ***L96899***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L96899-03	WG331081	Arsenic (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Barium (TCLP)	M6010B ICP	BA	Target analyte detected in prep / method blank at or above acceptance limit. Sample value is > 20X the concentration in the method blank.
			M6010B ICP	RD	For a solid matrix, the duplicate RPD (spike or matrix) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Cadmium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG330977	Mercury (TCLP)	M7470 CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG331081	Selenium (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Silver (TCLP)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Montgomery and Associates

ACZ Project ID: ***L96899***

No certification qualifiers associated with this analysis

ACZ Laboratories, Inc. L96899

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN OF CUSTODY

Name: Tim Leo	Address: 1550 E Prince Rd
Company: Montgomery & Assoc.	Tucson AZ 85719
E-mail: tleo@elmontgomery.com	Telephone: 520-881-4912

Name: John Laney	E-mail: jlaney@elmontgomery.com
Company: Montgomery	Telephone: SAA

Name: Tim Leo	Address: SAA
Company: SAA	
E-mail: SAA	Telephone: SAA

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes [ ] No [X]

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: _____ Sampler's site information State [ ] Zip code [ ] Time Zone [ ]

Quote #: LISBON - 50

Project/PO #: 1350.13

Reporting state for compliance testing: UTAH

Check box if samples include NRC licensed material? [ ]

				# of Containers	LISBON-50							
DC-104	9/17/12	1300	SO	1	X							
DC-100-105	9/19/12	1300	SO	1	X							
DC-101-102	9/21/12	1240	SO	1	X							

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

(*) 5 day turn around time

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

	9/21/2012/14:00	TCB	9/22/12 10:24

L96899 Chain of Custody

FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 14, 2012

Report to:
Tim Leo
Montgomery and Associates
1550 E. Prince Rd.
Tuscon, AZ 85719

Bill to:
Accounts Payable
Montgomery and Associates
1550 E. Prince Rd.
Tucson, AZ 85719

cc: Leilani Bew

Project ID: 1350
ACZ Project ID: L97754

Tim Leo:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 08, 2012. This project has been assigned to ACZ's project number, L97754. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L97754. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 14, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

Montgomery and Associates
Project ID: 1350
Sample ID: 6294

ACZ Sample ID: ***L97754-01***
Date Sampled: *11/07/12 11:00*
Date Received: *11/08/12*
Sample Matrix: *Waste Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							12/10/12 9:57	las
Total Hot Plate Digestion	M200.2 ICP							11/12/12 19:59	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0609			mg/L	0.0002	0.001	11/15/12 6:07	pmc
Arsenic, total	M200.8 ICP-MS	0.0639			mg/L	0.0002	0.001	11/15/12 3:01	pmc
Barium, dissolved	M200.7 ICP	0.090			mg/L	0.003	0.02	11/14/12 12:35	aeb
Barium, total	M200.7 ICP	0.084			mg/L	0.003	0.02	11/13/12 23:47	jjc
Cadmium, dissolved	M200.7 ICP		U		mg/L	0.005	0.02	11/14/12 12:35	aeb
Cadmium, total	M200.7 ICP		U		mg/L	0.005	0.02	11/13/12 23:47	jjc
Chromium, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	11/14/12 15:30	aeb
Chromium, total	M200.7 ICP		U		mg/L	0.01	0.05	11/13/12 23:47	jjc
Lead, dissolved	M200.8 ICP-MS	0.0030			mg/L	0.0001	0.0005	12/08/12 5:06	pmc
Lead, total	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/11/12 22:04	pmc
Mercury, dissolved	M245.1 CVAA		U	*	mg/L	0.0002	0.001	11/15/12 15:44	mfm
Mercury, total	M245.1 CVAA		U		mg/L	0.0002	0.001	11/14/12 13:17	mfm
Molybdenum, dissolved	M200.8 ICP-MS	1.41			mg/L	0.03	0.1	11/17/12 1:48	pmc
Molybdenum, total	M200.8 ICP-MS	1.42			mg/L	0.03	0.1	11/15/12 21:29	pmc
Selenium, dissolved	M200.8 ICP-MS	0.012			mg/L	0.005	0.01	11/17/12 1:48	pmc
Selenium, total	M200.8 ICP-MS	0.0128			mg/L	0.0001	0.0003	11/15/12 3:01	pmc
Silver, dissolved	M200.7 ICP		U	*	mg/L	0.01	0.03	11/14/12 12:35	aeb
Silver, total	M200.7 ICP		U		mg/L	0.01	0.03	11/13/12 23:47	jjc
Uranium, dissolved	M200.8 ICP-MS	5.020			mg/L	0.005	0.03	11/17/12 1:48	pmc
Uranium, total	M200.8 ICP-MS	5.140			mg/L	0.005	0.03	11/15/12 21:29	pmc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Ignitability (Flashpoint)	M1010, Pensky-Martens Closed Cup	no flash to 99.3			C			11/18/12 22:21	mss2

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Lab Filtration (0.45um) & Acidification	M200.7/200.8							11/12/12 12:53	jjc
pH (lab)	M9045D/M9040C								
pH		8.6	H		units	0.1	0.1	11/10/12 0:00	las
pH measured at		21.0			C	0.1	0.1	11/10/12 0:00	las

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4)	EPA SW-846. Test Methods for Evaluating Solid Waste.
(5)	Standard Methods for the Examination of Water and Wastewater.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4)	An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5)	If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Montgomery and Associates

ACZ Project ID: ***L97754***

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334066													
WG334066ICV	ICV	11/15/12 5:36	MS121001-5	.05		.0549	mg/L	109.8	90	110			
WG334066ICB	ICB	11/15/12 5:39				U	mg/L		-0.0006	0.0006			
WG334066LFB	LFB	11/15/12 5:42	MS121009-6	.05005		.04692	mg/L	93.7	85	115			
L97743-01AS	AS	11/15/12 6:01	MS121009-6	.05005	U	.05218	mg/L	104.3	70	130			
L97743-01ASD	ASD	11/15/12 6:04	MS121009-6	.05005	U	.05348	mg/L	106.9	70	130	2.46	20	

Arsenic, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334150													
WG334150ICV	ICV	11/15/12 1:29	MS121001-5	.05		.05079	mg/L	101.6	90	110			
WG334150ICB	ICB	11/15/12 1:32				U	mg/L		-0.0006	0.0006			
WG334049LRB	LRB	11/15/12 1:36				U	mg/L		-0.00044	0.00044			
WG334049LFB	LFB	11/15/12 1:39	MS121009-6	.05005		.05093	mg/L	101.8	85	115			
L97747-05LFM	LFM	11/15/12 2:55	MS121009-6	.05005	.0081	.05528	mg/L	94.3	70	130			
L97747-05LFMD	LFMD	11/15/12 2:58	MS121009-6	.05005	.0081	.05768	mg/L	99.1	70	130	4.25	20	

Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	2		1.9546	mg/L	97.7	95	105			
WG334092ICB	ICB	11/14/12 11:18				.0032	mg/L		-0.009	0.009			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	.5		.491	mg/L	98.2	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	.5	.045	.536	mg/L	98.2	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	.5	.045	.5388	mg/L	98.8	85	115	0.52	20	

Barium, total M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334003													
WG334003ICV	ICV	11/13/12 22:04	II120914-3	2		2.0125	mg/L	100.6	95	105			
WG334003ICB	ICB	11/13/12 22:11				U	mg/L		-0.009	0.009			
WG333964LRB	LRB	11/13/12 22:26				U	mg/L		-0.0066	0.0066			
WG333964LFB	LFB	11/13/12 22:29	II121029-3	.5		.4966	mg/L	99.3	85	115			
L97747-01LFM	LFM	11/13/12 23:22	II121029-3	.5	.029	.5422	mg/L	102.6	70	130			
L97747-01LFMD	LFMD	11/13/12 23:25	II121029-3	.5	.029	.5461	mg/L	103.4	70	130	0.72	20	

Cadmium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	2		1.894	mg/L	94.7	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.015	0.015			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	.5		.5085	mg/L	101.7	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	.5	U	.5174	mg/L	103.5	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	.5	U	.5147	mg/L	102.9	85	115	0.52	20	

Montgomery and Associates

ACZ Project ID: ***L97754***

Cadmium, total M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334003													
WG334003ICV	ICV	11/13/12 22:04	II120914-3	2		1.9768	mg/L	98.8	95	105			
WG334003ICB	ICB	11/13/12 22:11				U	mg/L		-0.015	0.015			
WG333964LRB	LRB	11/13/12 22:26				U	mg/L		-0.011	0.011			
WG333964LFB	LFB	11/13/12 22:29	II121029-3	.5		.5112	mg/L	102.2	85	115			
L97747-01LFM	LFM	11/13/12 23:22	II121029-3	.5	U	.5168	mg/L	103.4	70	130			
L97747-01LFMD	LFMD	11/13/12 23:25	II121029-3	.5	U	.5165	mg/L	103.3	70	130	0.06	20	

Chromium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334130													
WG334130ICV	ICV	11/14/12 14:52	II120914-1	2		2.055	mg/L	102.8	95	105			
WG334130ICB	ICB	11/14/12 14:56				U	mg/L		-0.03	0.03			
WG334130LFB	LFB	11/14/12 15:08	II121029-3	.5		.525	mg/L	105	85	115			
L97746-04AS	AS	11/14/12 15:23	II121029-3	.5	U	.546	mg/L	109.2	85	115			
L97746-04ASD	ASD	11/14/12 15:27	II121029-3	.5	U	.542	mg/L	108.4	85	115	0.74	20	

Chromium, total M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334003													
WG334003ICV	ICV	11/13/12 22:04	II120914-3	2		1.999	mg/L	100	95	105			
WG334003ICB	ICB	11/13/12 22:11				U	mg/L		-0.03	0.03			
WG333964LRB	LRB	11/13/12 22:26				U	mg/L		-0.022	0.022			
WG333964LFB	LFB	11/13/12 22:29	II121029-3	.5		.5	mg/L	100	85	115			
L97747-01LFM	LFM	11/13/12 23:22	II121029-3	.5	U	.512	mg/L	102.4	70	130			
L97747-01LFMD	LFMD	11/13/12 23:25	II121029-3	.5	U	.522	mg/L	104.4	70	130	1.93	20	

Conductivity M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333858													
WG333858LCSW1	LCSW	11/09/12 15:48	PCN40827	1408.8		1418.1	µmhos/cm	100.7	90	110			
WG333858LCSW4	LCSW	11/09/12 19:39	PCN40827	1408.8		1364.8	µmhos/cm	96.9	90	110			
WG333858LCSW7	LCSW	11/09/12 22:56	PCN40827	1408.8		1348.4	µmhos/cm	95.7	90	110			
WG333858LCSW10	LCSW	11/10/12 2:21	PCN40827	1408.8		1304.2	µmhos/cm	92.6	90	110			
WG333858LCSW13	LCSW	11/10/12 4:38	PCN40827	1408.8		1302.2	µmhos/cm	92.4	90	110			

Lead, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335522													
WG335522ICV	ICV	12/08/12 4:57	MS121001-5	.05		.052	mg/L	104	90	110			
WG335522ICB	ICB	12/08/12 5:00				U	mg/L		-0.0003	0.0003			
WG335522LFB	LFB	12/08/12 5:03	MS121130-3	.05005		.05037	mg/L	100.6	85	115			
L98046-01AS	AS	12/08/12 5:13	MS121130-3	.05005	U	.05221	mg/L	104.3	70	130			
L98046-01ASD	ASD	12/08/12 5:16	MS121130-3	.05005	U	.05148	mg/L	102.9	70	130	1.41	20	

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ACZ Project ID: ***L97754***

Lead, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335598													
WG335598ICV	ICV	12/11/12 21:51	MS121001-5	.05		.0509	mg/L	101.8	90	110			
WG335598ICB	ICB	12/11/12 21:54				U	mg/L		-0.0003	0.0003			
WG335538LRB	LRB	12/11/12 21:58				U	mg/L		-0.00022	0.00022			
WG335538LFB	LFB	12/11/12 22:01	MS121130-3	.05005		.04776	mg/L	95.4	85	115			
L98247-03LFM	LFM	12/11/12 22:45	MS121130-3	.05005	.0041	.05134	mg/L	94.4	70	130			
L98247-03LFMD	LFMD	12/11/12 22:48	MS121130-3	.05005	.0041	.05078	mg/L	93.3	70	130	1.1	20	

Mercury, dissolved M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333984													
WG333984ICV	ICV	11/15/12 13:19	II121107-3	.005025		.005	mg/L	99.5	95	105			
WG333984ICB	ICB	11/15/12 13:21				U	mg/L		-0.0002	0.0002			
WG334104													
WG334104LRB	LRB	11/15/12 14:45				U	mg/L		-0.00044	0.00044			
WG334104LFB	LFB	11/15/12 14:47	II121030-3	.002002		.00175	mg/L	87.4	85	115			
L97739-01LFM	LFM	11/15/12 15:35	II121030-3	.002002	U	.00178	mg/L	88.9	85	115			
L97739-01LFMD	LFMD	11/15/12 15:37	II121030-3	.002002	U	.00162	mg/L	80.9	85	115	9.41	20	MA

Mercury, total M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334007													
WG334007ICV	ICV	11/14/12 10:19	II121107-3	.005025		.00523	mg/L	104.1	90	110			
WG334007ICB	ICB	11/14/12 10:21				U	mg/L		-0.0006	0.0006			
WG334011													
WG334011LRB	LRB	11/14/12 11:35				U	mg/L		-0.00044	0.00044			
WG334011LFB	LFB	11/14/12 11:37	II121030-3	.002002		.00195	mg/L	97.4	85	115			
L97729-03LFM	LFM	11/14/12 12:58	II121030-3	.002002	U	.00205	mg/L	102.4	85	115			
L97729-03LFMD	LFMD	11/14/12 13:04	II121030-3	.002002	U	.00211	mg/L	105.4	85	115	2.88	20	

Molybdenum, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334247													
WG334247ICV	ICV	11/17/12 1:32	MS121001-5	.02004		.01988	mg/L	99.2	90	110			
WG334247ICB	ICB	11/17/12 1:35				U	mg/L		-0.0015	0.0015			
WG334247LFB	LFB	11/17/12 1:39	MS121009-6	.05		.05086	mg/L	101.7	85	115			
L97836-02AS	AS	11/17/12 2:04	MS121009-6	.05	U	.0526	mg/L	105.2	70	130			
L97836-02ASD	ASD	11/17/12 2:13	MS121009-6	.05	U	.05144	mg/L	102.9	70	130	2.23	20	

Montgomery and Associates

ACZ Project ID: ***L97754***

Molybdenum, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334240													
WG334240ICV	ICV	11/15/12 21:04	MS121001-5	.02004		.02011	mg/L	100.3	90	110			
WG334240ICB	ICB	11/15/12 21:06				U	mg/L		-0.0015	0.0015			
WG334049LRB	LRB	11/15/12 21:09				U	mg/L		-0.0011	0.0011			
WG334049LFB	LFB	11/15/12 21:12	MS121009-6	.05		.05081	mg/L	101.6	85	115			
L97747-05LFM	LFM	11/15/12 21:24	MS121009-6	.05	.0011	.05049	mg/L	98.8	70	130			
L97747-05LFMD	LFMD	11/15/12 21:27	MS121009-6	.05	.0011	.0509	mg/L	99.6	70	130	0.81	20	

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333858													
WG333858LCSW3	LCSW	11/09/12 16:03	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW6	LCSW	11/09/12 19:54	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW9	LCSW	11/09/12 23:11	PCN39825	6		6.04	units	100.7	98	102			
L97780-01DUP	DUP	11/10/12 2:20			7	6.95	units				0.7	20	
WG333858LCSW12	LCSW	11/10/12 2:37	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW15	LCSW	11/10/12 4:53	PCN39825	6		6.03	units	100.5	98	102			

Selenium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334247													
WG334247ICV	ICV	11/17/12 1:32	MS121001-5	.05		.05008	mg/L	100.2	90	110			
WG334247ICB	ICB	11/17/12 1:35				U	mg/L		-0.0003	0.0003			
WG334247LFB	LFB	11/17/12 1:39	MS121009-6	.05005		.04792	mg/L	95.7	85	115			
L97836-02AS	AS	11/17/12 2:04	MS121009-6	.05005	.0001	.0615	mg/L	122.7	70	130			
L97836-02ASD	ASD	11/17/12 2:13	MS121009-6	.05005	.0001	.05986	mg/L	119.4	70	130	2.7	20	

Selenium, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334150													
WG334150ICV	ICV	11/15/12 1:29	MS121001-5	.05		.05177	mg/L	103.5	90	110			
WG334150ICB	ICB	11/15/12 1:32				U	mg/L		-0.0003	0.0003			
WG334049LRB	LRB	11/15/12 1:36				U	mg/L		-0.00022	0.00022			
WG334049LFB	LFB	11/15/12 1:39	MS121009-6	.05005		.04897	mg/L	97.8	85	115			
L97747-05LFM	LFM	11/15/12 2:55	MS121009-6	.05005	.0004	.0494	mg/L	97.9	70	130			
L97747-05LFMD	LFMD	11/15/12 2:58	MS121009-6	.05005	.0004	.05005	mg/L	99.2	70	130	1.31	20	

Silver, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	.998		.956	mg/L	95.8	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.03	0.03			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	.5		.476	mg/L	95.2	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	.5	U	.389	mg/L	77.8	85	115			M2 ZA
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	.5	U	.357	mg/L	71.4	85	115	8.58	20	M2 ZA

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ACZ Project ID: ***L97754***

Silver, total M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334003													
WG334003ICV	ICV	11/13/12 22:04	II120914-3	.998		1.005	mg/L	100.7	95	105			
WG334003ICB	ICB	11/13/12 22:11				U	mg/L		-0.03	0.03			
WG333964LRB	LRB	11/13/12 22:26				U	mg/L		-0.022	0.022			
WG333964LFB	LFB	11/13/12 22:29	II121029-3	.5		.486	mg/L	97.2	85	115			
L97747-01LFM	LFM	11/13/12 23:22	II121029-3	.5	U	.492	mg/L	98.4	70	130			
L97747-01LFMD	LFMD	11/13/12 23:25	II121029-3	.5	U	.493	mg/L	98.6	70	130	0.2	20	

Uranium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334247													
WG334247ICV	ICV	11/17/12 1:32	MS121001-5	.05		.0519	mg/L	103.8	90	110			
WG334247ICB	ICB	11/17/12 1:35				U	mg/L		-0.0003	0.0003			
WG334247LFB	LFB	11/17/12 1:39	MS121009-6	.05		.05011	mg/L	100.2	85	115			
L97836-02AS	AS	11/17/12 2:04	MS121009-6	.05	U	.0526	mg/L	105.2	70	130			
L97836-02ASD	ASD	11/17/12 2:13	MS121009-6	.05	U	.05206	mg/L	104.1	70	130	1.03	20	

Uranium, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334240													
WG334240ICV	ICV	11/15/12 21:04	MS121001-5	.05		.05151	mg/L	103	90	110			
WG334240ICB	ICB	11/15/12 21:06				U	mg/L		-0.0003	0.0003			
WG334049LRB	LRB	11/15/12 21:09				U	mg/L		-0.00022	0.00022			
WG334049LFB	LFB	11/15/12 21:12	MS121009-6	.05		.05152	mg/L	103	85	115			
L97747-05LFM	LFM	11/15/12 21:24	MS121009-6	.05	.0009	.05307	mg/L	104.3	70	130			
L97747-05LFMD	LFMD	11/15/12 21:27	MS121009-6	.05	.0009	.05382	mg/L	105.8	70	130	1.4	20	

ACZ Laboratories, Inc.
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Inorganic Extended Qualifier Report

Montgomery and Associates

ACZ Project ID: ***L97754***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97754-01	WG334104	Mercury, dissolved	M245.1 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG334092	Silver, dissolved	M200.7 ICP	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M200.7 ICP	ZA	Poor recovery for Silver quality control is accepted due to low Silver solubility in samples, digestates, or extracts that do not contain sufficient Hydrochloric acid.

Montgomery and Associates
Project ID: 1350
Sample ID: 6294
Locator:

ACZ Sample ID: ***L97754-01***
Date Sampled: *11/07/12 11:00*
Date Received: *11/08/12*
Sample Matrix: *Waste Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	11/27/12 16:02		2600	89	6	pCi/L		mla
Gross Beta	11/27/12 16:02		1200	31	8.7	pCi/L	*	mla

Uranium, Isotopic Total
Eichrom ACW03

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234, total	11/29/12 0:02		1700	90	9	pCi/L	*	jjg
Uranium 235, total	11/29/12 0:02		57	21	9	pCi/L	*	jjg
Uranium 238, total	11/29/12 0:02		1700	90	9	pCi/L	*	jjg

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Error(+/-)	Calculated sample specific uncertainty
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
LCL	Lower Control Limit, in % (except for LCSS, mg/Kg)
LLD	Calculated sample specific Lower Limit of Detection
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RER	Relative Error Ratio, calculation used for Dup. QC taking into account the error factor.
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
UCL	Upper Control Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

DUP	Sample Duplicate	*MS/MSD*	Matrix Spike/Matrix Spike Duplicate
LCSS	Laboratory Control Sample - Soil	*PBS*	Prep Blank - Soil
LCSW	Laboratory Control Sample - Water	*PBW*	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Matrix Spikes	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

H	Analysis exceeded method hold time.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater.
D	ASTM
RP	DOE
ESM	DOE/ESM

Comments

(1)	Solid matrices are reported on a dry weight basis.
(2)	Preparation method: "Method" indicates preparation defined in analytical method.
(3)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(4)	An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Radiochemistry QC Summary

Montgomery and Associates

ACZ Project ID: ***L97754***

Alpha M9310 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG334953																
WG333905PBW	PBW	11/27/12						2.7	1.8	1.4			2.8			
WG333905LCSW	LCSW	11/27/12	RC121002-2	81.06				75	7.5	1.4	92.5	83	133			
L97752-02DUP	DUP-RER	11/27/12			340	26	3.9	320	24	3.4				0.57	2	
L97779-01DUP	DUP-RER	11/27/12			790	31	2.4	880	33	2.4				1.99	2	
L97752-02MS	MS	11/27/12	RC121002-2	115.8	340	26	3.9	450	29	3.7	95	83	133			

Beta M9310 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG334953																
WG333905PBW	PBW	11/27/12						1	2.7	3.9			7.8			
WG333905LCSW	LCSW	11/27/12	PCN40504	100				87	6	3.8	87	70	129			
L97752-02DUP	DUP-RER	11/27/12			180	11	5.8	210	11	5.7				1.93	2	
L97779-01MS	MS	11/27/12	PCN40504	100	370	12	4	500	14	4	130	70	129			M1

Uranium 234 Eichrom ACW03 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335162																
WG334724PBW	PBW	11/29/12						1.5	1.6	1.1			2.2			
WG334724LCSW	LCSW	11/29/12	RC121130-10	196.4				210	14	1.8	106.9	77	122			
L97972-01DUP	DUP-RER	11/29/12			2.5	2.1	1.1	-.68	1.5	1.2				1.23	2	
L97972-01MS	MS	11/29/12	RC121130-10	196.4	2.5	2.1	1.1	190	14	1.9	95.5	77	122			

Montgomery and Associates

ACZ Project ID: ***L97754***

Uranium 235 Eichrom ACW03 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335162																
WG334724PBW	PBW	11/29/12						-.25	0.52	1.1			2.2			
WG334724LCSW	LCSW	11/29/12	RC121130-10	8.96				7.9	3.5	1.8	88.2	42	136			
L97972-01DUP	DUP-RER	11/29/12			-0.62	1.1	1.1	-.41	0.86	1.2				0.15	2	
L97972-01MS	MS	11/29/12	RC121130-10	8.96	-0.62	1.1	1.1	6.8	3.2	1.9	82.8	42	136			

Uranium 238 Eichrom ACW03 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335162																
WG334724PBW	PBW	11/29/12						1.5	1.4	1.1			2.2			
WG334724LCSW	LCSW	11/29/12	RC121130-10	194.8				214	14	1.8	109.9	87	124			
L97972-01DUP	DUP-RER	11/29/12			1.8	1.9	1.1	1.22	1.5	1.2				0.24	2	
L97972-01MS	MS	11/29/12	RC121130-10	194.8	1.8	1.9	1.1	213	15	1.9	108.4	87	124			

Montgomery and Associates

ACZ Project ID: ***L97754***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97754-01	WG334953	Gross Beta	M9310	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.

Montgomery and Associates ACZ Project ID: ***L97754***

Radiochemistry

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.	
Uranium 234, total	Eichrom ACW03
Uranium 235, total	Eichrom ACW03
Uranium 238, total	Eichrom ACW03
The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.	
Uranium 234, total	Eichrom ACW03
Uranium 235, total	Eichrom ACW03
Uranium 238, total	Eichrom ACW03

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Montgomery and Associates
1350

ACZ Project ID: L97754
Date Received: 11/08/2012 09:49
Received By: ksj
Date Printed: 11/9/2012

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?	X		
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?		X	

```
L97754-01 : A green (filt-ac) container was not received and a
new container was created from the raw .
```

16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA16537	0.5	15	Yes

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

ACZ Laboratories, Inc. L97754

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN OF CUSTODY

Name: Tim Leo	Address: 1550 E. Price Rd
Company: Montgomery & Assoc.	Tucson AZ 85719
E-mail: tleo@elmontgomery.com	Telephone: 520-881-4912

Name: Leilani Bew	E-mail: lbew@elmontgomery.com
Company: M&A	Telephone:

Name: SAA	Address:
Company:	
E-mail:	Telephone:

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes [ ] No [X]

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Brandon Nyce Sampler's site Information: State: UT Zip code: Time Zone:

Quote #: LISBON - WW

Project/PO #: 1350

Reporting state for compliance testing: Utah

Check box if samples include NRC licensed material? [ ]

			# of Containers	LISBON-WW						
6294	11/7/12 11:00	W	4	X						

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

(*) Collected double volume amount of sample; additional analyses may be requested; please contact Tim Leo for additional analyses

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

	11/7/12 1200		11.8.12 949

FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

L97754 Chain of Custody

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 14, 2012

Report to:
Tim Leo
Montgomery and Associates
1550 E. Prince Rd.
Tuscon, AZ 85719

Bill to:
Accounts Payable
Montgomery and Associates
1550 E. Prince Rd.
Tucson, AZ 85719

cc: John Laney

Project ID: 1350.13
ACZ Project ID: L97797

Tim Leo:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 09, 2012. This project has been assigned to ACZ's project number, L97797. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L97797. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 14, 2013. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

Montgomery and Associates

December 14, 2012

Project ID: 1350.13
ACZ Project ID: L97797

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 soil samples from Montgomery and Associates on November 9, 2012. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L97797. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic, radiochemistry parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. The Ba-133 data on L97797-02 and -03 has been qualified with the N1 flag. The chemist noted that the data can't be confimed due to the primary and secondary peaks could not be identified.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6017

ACZ Sample ID: ***L97797-01***
Date Sampled: *11/06/12 08:00*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	0.57		*	mg/Kg	0.05	0.3	11/21/12 20:11	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		9.7			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.3			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	84.3		*	%	0.1	0.5	11/22/12 20:41	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:14	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 14:00	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:00	zsh

Arizona license number: AZ0102

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6077

ACZ Sample ID: ***L97797-02***
Date Sampled: *11/06/12 08:15*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	0.58		*	mg/Kg	0.05	0.3	11/21/12 20:14	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		8.8			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.5			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/23/12 2:18	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:17	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 14:15	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:03	zsh

Arizona license number: AZ0102

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6103

ACZ Sample ID: ***L97797-03***
Date Sampled: *11/06/12 08:30*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	1.85		*	mg/Kg	0.05	0.3	11/21/12 20:18	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		9.2			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.3			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	90.4		*	%	0.1	0.5	11/23/12 7:55	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:20	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 14:30	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:06	zsh

Arizona license number: AZ0102

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6061

ACZ Sample ID: ***L97797-04***
Date Sampled: *11/06/12 08:40*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	5.43		*	mg/Kg	0.05	0.3	11/21/12 20:21	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		8.8			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.1			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	91.6		*	%	0.1	0.5	11/23/12 13:32	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:23	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 14:45	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:09	zsh

Arizona license number: AZ0102

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6182

ACZ Sample ID: ***L97797-05***
Date Sampled: *11/06/12 08:50*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	0.36		*	mg/Kg	0.05	0.3	11/21/12 20:25	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		9.1			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.1			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	84.8		*	%	0.1	0.5	11/23/12 19:09	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:26	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 15:00	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:12	zsh

Arizona license number: AZ0102

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6185

ACZ Sample ID: ***L97797-06***
Date Sampled: *11/06/12 09:05*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Uranium, total (3050)	M6020 ICP-MS	16.90		*	mg/Kg	0.05	0.3	11/21/12 20:28	msh

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		12.6			units	0.1	0.1	11/20/12 0:00	nrc
pH measured at		22.4			C	0.1	0.1	11/20/12 0:00	nrc
Solids, Percent	CLPSOW390, PART F, D-98	32.8		*	%	0.1	0.5	11/24/12 0:46	mss2/cd

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			*				11/15/12 15:29	zsh
Digestion - Hot Plate	M3050B ICP-MS			*				11/20/12 15:15	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2			*				11/19/12 12:15	zsh

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Montgomery and Associates

ACZ Project ID: ***L97797***

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334427													
WG334427ICV	ICV	11/20/12 11:05	PCN38642	4		4.03	units	100.8	97	103			
L97797-06DUP	DUP	11/20/12 13:38			12.6	12.61	units				0.1	20	

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334540													
WG334540PBS	PBS	11/21/12 11:00				U	%		99.9	100.1			
L97806-01DUP	DUP	11/24/12 11:59			21.5	21.32	%				0.8	20	

Uranium, total (3050) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334520													
WG334520ICV	ICV	11/21/12 19:04	MS121001-5	.05		.05256	mg/L	105.1	90	110			
WG334520ICB	ICB	11/21/12 19:07				U	mg/L		-0.0003	0.0003			
WG334439PBS	PBS	11/21/12 19:21				U	mg/Kg		-0.15	0.15			
WG334439LCSS2	LCSS	11/21/12 19:31	PCN39904	6.18		5.005	mg/Kg		4.13	7.04			
WG334439LCSSD2	LCSSD	11/21/12 19:35	PCN39904	6.18		4.576	mg/Kg		4.13	7.04	9	20	
L97538-01MS	MS	11/21/12 19:41	MS120820-3	13	3.78	13.156	mg/Kg	72.1	75	125			M2
L97538-01MSD	MSD	11/21/12 19:45	MS120820-3	13	3.78	13.026	mg/Kg	71.1	75	125	0.99	20	M2

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Inorganic Extended Qualifier Report

Montgomery and Associates

ACZ Project ID: ***L97797***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97797-01	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97797-02	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97797-03	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97797-04	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97797-05	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97797-06	WG334520	Uranium, total (3050)	M6020 ICP-MS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.

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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6017
Locator:

ACZ Sample ID: ***L97797-01***
Date Sampled: *11/06/12 8:00*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 10:39		0.95	0.27	0.61	pCi/g	*	mhm
Ba-133	12/06/12 10:39		0.0	0.0615	0.0376	pCi/g	*	mhm
Bi-212	12/06/12 10:39		0.81	0.49	1.14	pCi/g	*	mhm
Bi-214	12/06/12 10:39		0.61	0.18	0.38	pCi/g	*	mhm
Cd-109	12/06/12 10:39		-0.22	0.7	0.1	pCi/g	*	mhm
Ce-139	12/06/12 10:39		0.0	0.0378	0.0807	pCi/g	*	mhm
Co-56	12/06/12 10:39		-0.23	0.5	0.22	pCi/g	*	mhm
Co-57	12/06/12 10:39		0.0	0.0532	0.0125	pCi/g	*	mhm
Co-58	12/06/12 10:39		-0.01	2.23	1.15	pCi/g	*	mhm
Co-60	12/06/12 10:39		-0.03	0.08	0.03	pCi/g	*	mhm
Cs-134	12/06/12 10:39		-0.05	0.07	0.01	pCi/g	*	mhm
Cs-137	12/06/12 10:39		0.03	0.05	0.1	pCi/g	*	mhm
I-131	12/06/12 10:39		-0.01	0.04	0.01	pCi/g	*	mhm
K-40	12/06/12 10:39		18.1	2.25	4.47	pCi/g	*	mhm
Pb-210	12/06/12 10:39		1.46	1.01	1.7	pCi/g	*	mhm
PB-212	12/06/12 10:39		1.43	0.16	0.29	pCi/g	*	mhm
PB-214	12/06/12 10:39		0.62	0.15	0.31	pCi/g	*	mhm
Th-227	12/06/12 10:39		0.08	0.2	0.46	pCi/g	*	mhm
Th-234	12/06/12 10:39		1.38	0.93	1.69	pCi/g	*	mhm
Tl-201	12/06/12 10:39		-0.02	0.03	0	pCi/g	*	mhm
U-235	12/06/12 10:39		0.11	0.06	0.12	pCi/g	*	mhm
Zn-65	12/06/12 10:39		-0.01	0.16	0.29	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:23		4.3	0.97	0.4	pCi/g		zsh
Gross Beta	12/03/12 20:23		6.4	0.85	0.8	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:02		-0.08	0.47	0.23	pCi/g	*	jjg
Uranium 235	11/29/12 0:02		0.06	0.36	0.23	pCi/g	*	jjg
Uranium 238	11/29/12 0:02		-0.02	0.48	0.23	pCi/g	*	jjg

Arizona license number: AZ0102

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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6077
Locator:

ACZ Sample ID: ***L97797-02***
Date Sampled: *11/06/12 8:15*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 12:57		0.83	0.17	0.37	pCi/g	*	mhm
Ba-133	12/06/12 12:57		0.02	0.02	0	pCi/g	*	mhm
Bi-212	12/06/12 12:57		0.7	0.27	0.62	pCi/g	*	mhm
Bi-214	12/06/12 12:57		0.55	0.11	0.23	pCi/g	*	mhm
Cd-109	12/06/12 12:57		-0.12	0.44	0.06	pCi/g	*	mhm
Ce-139	12/06/12 12:57		0.0	0.0213	0.0496	pCi/g	*	mhm
Co-56	12/06/12 12:57		-0.14	0.31	0.11	pCi/g	*	mhm
Co-57	12/06/12 12:57		0.0	0.017	0.0343	pCi/g	*	mhm
Co-58	12/06/12 12:57		0.0	0.0245	0.019	pCi/g	*	mhm
Co-60	12/06/12 12:57		0.0	0.0334	0.126	pCi/g	*	mhm
Cs-134	12/06/12 12:57		0.0	0.0036	0.0033	pCi/g	*	mhm
Cs-137	12/06/12 12:57		0.0	0.0914	0.061	pCi/g	*	mhm
I-131	12/06/12 12:57		0.0	0.024	0.0154	pCi/g	*	mhm
K-40	12/06/12 12:57		11.87	1.31	2.53	pCi/g	*	mhm
Pb-210	12/06/12 12:57		0.75	0.45	0.76	pCi/g	*	mhm
PB-212	12/06/12 12:57		0.87	0.09	0.16	pCi/g	*	mhm
PB-214	12/06/12 12:57		0.64	0.1	0.21	pCi/g	*	mhm
Th-227	12/06/12 12:57		-0.42	0.27	0.01	pCi/g	*	mhm
Th-234	12/06/12 12:57		0.88	0.57	1.1	pCi/g	*	mhm
Tl-201	12/06/12 12:57		-0.06	0.06	0	pCi/g	*	mhm
U-235	12/06/12 12:57		0.1	0.04	0.08	pCi/g	*	mhm
Zn-65	12/06/12 12:57		-0.04	0.09	0.02	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:24		5.6	1.3	0.5	pCi/g		zsh
Gross Beta	12/03/12 20:24		4	0.78	0.81	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:04		0.39	0.51	0.28	pCi/g	*	jjg
Uranium 235	11/29/12 0:04		-0.1	0.3	0.28	pCi/g	*	jjg
Uranium 238	11/29/12 0:04		0.16	0.43	0.28	pCi/g	*	jjg

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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6103
Locator:

ACZ Sample ID: ***L97797-03***
Date Sampled: *11/06/12 8:30*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 14:03		1.53	0.31	0.69	pCi/g	*	mhm
Ba-133	12/06/12 14:03		0.05	0.04	0	pCi/g	*	mhm
Bi-212	12/06/12 14:03		1.35	0.61	1.41	pCi/g	*	mhm
Bi-214	12/06/12 14:03		1.57	0.21	0.43	pCi/g	*	mhm
Cd-109	12/06/12 14:03		0.05	0.68	1.58	pCi/g	*	mhm
Ce-139	12/06/12 14:03		0.01	0.03	0.08	pCi/g	*	mhm
Co-56	12/06/12 14:03		-0.29	0.47	0.12	pCi/g	*	mhm
Co-57	12/06/12 14:03		0.01	0.03	0.06	pCi/g	*	mhm
Co-58	12/06/12 14:03		-0.02	0.06	0.01	pCi/g	*	mhm
Co-60	12/06/12 14:03		-0.01	0.06	0.03	pCi/g	*	mhm
Cs-134	12/06/12 14:03		-0.07	0.07	0	pCi/g	*	mhm
Cs-137	12/06/12 14:03		0.01	0.05	0.09	pCi/g	*	mhm
I-131	12/06/12 14:03		0.0	0.0351	2.65	pCi/g	*	mhm
K-40	12/06/12 14:03		14.6	1.69	3.31	pCi/g	*	mhm
Pb-210	12/06/12 14:03		1.61	0.73	1.34	pCi/g	*	mhm
PB-212	12/06/12 14:03		1.55	0.15	0.26	pCi/g	*	mhm
PB-214	12/06/12 14:03		1.73	0.21	0.4	pCi/g	*	mhm
Th-227	12/06/12 14:03		-0.8	0.5	0.01	pCi/g	*	mhm
Th-234	12/06/12 14:03		3.06	1.16	2.41	pCi/g	*	mhm
Tl-201	12/06/12 14:03		-0.08	0.1	0	pCi/g	*	mhm
U-235	12/06/12 14:03		0.27	0.08	0.17	pCi/g	*	mhm
Zn-65	12/06/12 14:03		0.0	0.1176	0.834	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:26		7.9	1.3	0.4	pCi/g		zsh
Gross Beta	12/03/12 20:26		9.1	0.99	0.79	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:05		1.4	0.53	0.26	pCi/g	*	jjg
Uranium 235	11/29/12 0:05		-0.03	0.19	0.26	pCi/g	*	jjg
Uranium 238	11/29/12 0:05		0.9	0.41	0.26	pCi/g	*	jjg

Arizona license number: AZ0102

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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6061
Locator:

ACZ Sample ID: ***L97797-04***
Date Sampled: *11/06/12 8:40*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 15:09		0.61	0.16	0.35	pCi/g	*	mhm
Ba-133	12/06/12 15:09		0.02	0.02	0.02	pCi/g	*	mhm
Bi-212	12/06/12 15:09		0.23	0.23	0.53	pCi/g	*	mhm
Bi-214	12/06/12 15:09		0.35	0.09	0.19	pCi/g	*	mhm
Cd-109	12/06/12 15:09		0.21	0.37	0.86	pCi/g	*	mhm
Ce-139	12/06/12 15:09		0.0	0.0189	0.00417	pCi/g	*	mhm
Co-56	12/06/12 15:09		-0.15	0.35	0.12	pCi/g	*	mhm
Co-57	12/06/12 15:09		0.0	0.0342	0.00878	pCi/g	*	mhm
Co-58	12/06/12 15:09		0.01	0.02	0.04	pCi/g	*	mhm
Co-60	12/06/12 15:09		-0.01	0.03	0.02	pCi/g	*	mhm
Cs-134	12/06/12 15:09		0.02	0.02	0.05	pCi/g	*	mhm
Cs-137	12/06/12 15:09		-0.01	0.05	0.02	pCi/g	*	mhm
I-131	12/06/12 15:09		0.0	0.0166	0.0388	pCi/g	*	mhm
K-40	12/06/12 15:09		5.11	0.82	1.67	pCi/g	*	mhm
Pb-210	12/06/12 15:09		0.53	0.53	0.8	pCi/g	*	mhm
PB-212	12/06/12 15:09		0.52	0.07	0.13	pCi/g	*	mhm
PB-214	12/06/12 15:09		0.3	0.07	0.15	pCi/g	*	mhm
Th-227	12/06/12 15:09		-0.19	0.22	0.01	pCi/g	*	mhm
Th-234	12/06/12 15:09		1.69	0.65	1.32	pCi/g	*	mhm
Tl-201	12/06/12 15:09		-0.02	0.07	0.01	pCi/g	*	mhm
U-235	12/06/12 15:09		0.12	0.04	0.08	pCi/g	*	mhm
Zn-65	12/06/12 15:09		-0.04	0.08	0.02	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:27		2.8	0.84	0.39	pCi/g		zsh
Gross Beta	12/03/12 20:27		3.2	0.69	0.78	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:07		1.9	0.55	0.23	pCi/g	*	jjg
Uranium 235	11/29/12 0:07		0.08	0.22	0.23	pCi/g	*	jjg
Uranium 238	11/29/12 0:07		1.67	0.48	0.23	pCi/g	*	jjg

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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6182
Locator:

ACZ Sample ID: ***L97797-05***
Date Sampled: *11/06/12 8:50*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 16:18		0.6	0.2	0.44	pCi/g	*	mhm
Ba-133	12/06/12 16:18		-0.01	0.04	0.01	pCi/g	*	mhm
Bi-212	12/06/12 16:18		0.41	0.3	0.7	pCi/g	*	mhm
Bi-214	12/06/12 16:18		0.61	0.12	0.25	pCi/g	*	mhm
Cd-109	12/06/12 16:18		0.1	0.5	1.16	pCi/g	*	mhm
Ce-139	12/06/12 16:18		-0.01	0.02	0.01	pCi/g	*	mhm
Co-56	12/06/12 16:18		-0.1	0.34	0.24	pCi/g	*	mhm
Co-57	12/06/12 16:18		-0.01	0.03	0	pCi/g	*	mhm
Co-58	12/06/12 16:18		0.0	0.1823	0.0918	pCi/g	*	mhm
Co-60	12/06/12 16:18		0.0	0.032	0.077	pCi/g	*	mhm
Cs-134	12/06/12 16:18		0.01	0.02	0.22	pCi/g	*	mhm
Cs-137	12/06/12 16:18		0.0	0.2086	0.12	pCi/g	*	mhm
I-131	12/06/12 16:18		-0.01	0.03	0.01	pCi/g	*	mhm
K-40	12/06/12 16:18		4.79	0.94	1.91	pCi/g	*	mhm
Pb-210	12/06/12 16:18		0.6	0.43	0.62	pCi/g	*	mhm
PB-212	12/06/12 16:18		0.51	0.1	0.2	pCi/g	*	mhm
PB-214	12/06/12 16:18		0.52	0.11	0.23	pCi/g	*	mhm
Th-227	12/06/12 16:18		-0.17	0.26	0.02	pCi/g	*	mhm
Th-234	12/06/12 16:18		1.27	0.67	1.27	pCi/g	*	mhm
Tl-201	12/06/12 16:18		-0.04	0.07	0	pCi/g	*	mhm
U-235	12/06/12 16:18		0.11	0.05	0.09	pCi/g	*	mhm
Zn-65	12/06/12 16:18		-0.03	0.09	0.04	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:29		2.5	0.75	0.37	pCi/g		zsh
Gross Beta	12/03/12 20:29		2	0.63	0.77	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:08		-0.03	0.33	0.24	pCi/g	*	jjg
Uranium 235	11/29/12 0:08		-0.05	0.18	0.24	pCi/g	*	jjg
Uranium 238	11/29/12 0:08		0.03	0.25	0.24	pCi/g	*	jjg

Arizona license number: AZ0102

ACZ Laboratories, Inc.
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RadioChemistry Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6185
Locator:

ACZ Sample ID: ***L97797-06***
Date Sampled: *11/06/12 9:05*
Date Received: *11/09/12*
Sample Matrix: *Soil*

Gamma Emitting Nuclides — Prep Method:
EPA 901.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Ac-228	12/06/12 17:23		1.25	0.44	0.96	pCi/g	*	mhm
Ba-133	12/06/12 17:23		-0.03	0.1	0.02	pCi/g	*	mhm
Bi-212	12/06/12 17:23		0.92	0.71	1.64	pCi/g	*	mhm
Bi-214	12/06/12 17:23		1.08	0.31	0.65	pCi/g	*	mhm
Cd-109	12/06/12 17:23		1.3	1.44	3.34	pCi/g	*	mhm
Ce-139	12/06/12 17:23		0.04	0.05	0.11	pCi/g	*	mhm
Co-56	12/06/12 17:23		-0.29	0.95	0.66	pCi/g	*	mhm
Co-57	12/06/12 17:23		0.0	0.1184	0.0584	pCi/g	*	mhm
Co-58	12/06/12 17:23		-0.01	0.53	0.27	pCi/g	*	mhm
Co-60	12/06/12 17:23		0.0	0.0966	0.827	pCi/g	*	mhm
Cs-134	12/06/12 17:23		0.04	0.04	0.06	pCi/g	*	mhm
Cs-137	12/06/12 17:23		-0.04	0.17	0.05	pCi/g	*	mhm
I-131	12/06/12 17:23		0.0	0.0677	0.158	pCi/g	*	mhm
K-40	12/06/12 17:23		9.84	2.22	4.39	pCi/g	*	mhm
Pb-210	12/06/12 17:23		1.23	1.46	1.83	pCi/g	*	mhm
PB-212	12/06/12 17:23		1.08	0.25	0.52	pCi/g	*	mhm
PB-214	12/06/12 17:23		0.92	0.23	0.48	pCi/g	*	mhm
Th-227	12/06/12 17:23		-0.55	0.71	0.05	pCi/g	*	mhm
Th-234	12/06/12 17:23		5.84	2.31	4.62	pCi/g	*	mhm
Tl-201	12/06/12 17:23		-0.12	0.18	0.01	pCi/g	*	mhm
U-235	12/06/12 17:23		0.49	0.13	0.27	pCi/g	*	mhm
Zn-65	12/06/12 17:23		-0.04	0.27	0.22	pCi/g	*	mhm

Gross Alpha & Beta (3050) — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/03/12 20:30		9.5	2.6	1.2	pCi/g		zsh
Gross Beta	12/03/12 20:30		12	2	2	pCi/g		zsh

Uranium, Isotopic (3050) — Prep Method:
Eichrom ACW03

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Uranium 234	11/29/12 0:10		5.5	0.85	0.24	pCi/g	*	jjg
Uranium 235	11/29/12 0:10		0.17	0.27	0.24	pCi/g	*	jjg
Uranium 238	11/29/12 0:10		5.37	0.86	0.24	pCi/g	*	jjg

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Error(+/-)	Calculated sample specific uncertainty
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
LCL	Lower Control Limit, in % (except for LCSS, mg/Kg)
LLD	Calculated sample specific Lower Limit of Detection
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RER	Relative Error Ratio, calculation used for Dup. QC taking into account the error factor.
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
UCL	Upper Control Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

DUP	Sample Duplicate	*MS/MSD*	Matrix Spike/Matrix Spike Duplicate
LCSS	Laboratory Control Sample - Soil	*PBS*	Prep Blank - Soil
LCSW	Laboratory Control Sample - Water	*PBW*	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Matrix Spikes	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

H	Analysis exceeded method hold time.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater.
D	ASTM
RP	DOE
ESM	DOE/ESM

Comments

(1)	Solid matrices are reported on a dry weight basis.
(2)	Preparation method: "Method" indicates preparation defined in analytical method.
(3)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(4)	An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Montgomery and Associates

ACZ Project ID: ***L97797***

Alpha M9310 **Units:** pCi/g

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335239																
WG335001PBS	PBS	12/03/12						.18	0.23	0.29			0.58			
WG335001LCSS	LCSS	12/03/12	RC121002-2	16.21				15	1.5	0.28	92.5	83	133			
L97797-01DUP	DUP-RER	12/03/12			4.3	0.97	0.4	2.9	0.89	0.42				1.06	2	
L97797-02MS	MS	12/03/12	RC121002-2	16.21	5.6	1.3	0.5	25	2.5	0.47	119.7	83	133			

Beta M9310 **Units:** pCi/g

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335239																
WG335001PBS	PBS	12/03/12						-.28	0.5	0.78			1.56			
WG335001LCSS	LCSS	12/03/12	PCN40507	20				18	1.2	0.75	90	70	129			
L97797-01DUP	DUP-RER	12/03/12			6.4	0.85	0.8	6.6	0.9	0.79				0.16	2	
L97797-03MS	MS	12/03/12	PCN40507	20.41	9.1	0.99	0.79	30	1.5	0.79	102.4	70	129			

Uranium 234 Eichrom ACW03 **Units:** pCi/g

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335056																
WG334438PBS	PBS	11/29/12						.05	0.25	0.2			0.4			
WG334438LCSS	LCSS	11/29/12	RC121130-10	39.28				42	2.9	0.37	106.9	77	122			
L97797-01DUP	DUP-RER	11/29/12			-0.08	0.47	0.23	0	0.27	0.22				0.15	2	
L97797-06MS	MS	11/29/12	RC121130-10	40.92	5.5	0.85	0.24	46	3.4	0.47	99	77	122			

Montgomery and Associates

ACZ Project ID: ***L97797***

Uranium 235 Eichrom ACW03 **Units:** pCi/g

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335056																
WG334438PBS	PBS	11/29/12						-.02	0.11	0.2			0.4			
WG334438LCSS	LCSS	11/29/12	RC121130-10	1.79				1.4	0.7	0.37	78.2	42	136			
L97797-01DUP	DUP-RER	11/29/12			0.06	0.36	0.23	-.13	0.18	0.22				0.47	2	
L97797-06MS	MS	11/29/12	RC121130-10	1.87	0.17	0.27	0.24	1.2	0.61	0.47	55.1	42	136			

Uranium 238 Eichrom ACW03 **Units:** pCi/g

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
WG335056																
WG334438PBS	PBS	11/29/12						.01	0.19	0.2			0.4			
WG334438LCSS	LCSS	11/29/12	RC121130-10	38.96				40.8	2.8	0.37	104.7	87	124			
L97797-01DUP	DUP-RER	11/29/12			-0.02	0.48	0.23	-.02	0.22	0.22				0	2	
L97797-06MS	MS	11/29/12	RC121130-10	40.58	5.37	0.86	0.24	50.3	3.5	0.47	110.7	87	124			

Montgomery and Associates

ACZ Project ID: ***L97797***

Method: EPA 901.1
Workgroup: WG335385
Units: pCi/L

L97797-01DUP

Analysis Date: 12/06/12

Nuclide	Type	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
Ac-228	DUP-RER	NONE		0.95	0.27	0.61	1.54	0.36	0.8				1.3	2	
Ba-133	DUP-RER	NONE		0	0.06	0.04	.02	0.03	0.01				0.28	2	
Bi-212	DUP-RER	NONE		0.81	0.49	1.14	1.55	0.63	1.46				0.92	2	
Bi-214	DUP-RER	NONE		0.61	0.18	0.38	.71	0.18	0.37				0.4	2	
Cd-109	DUP-RER	NONE		-0.22	0.7	0.1	.06	0.66	1.55				0.29	2	
Ce-139	DUP-RER	NONE		0	0.04	0.08	-.01	0.04	0.01				0.19	2	
Co-56	DUP-RER	NONE		-0.23	0.5	0.22	-.15	0.47	0.31				0.12	2	
Co-57	DUP-RER	NONE		0	0.05	0.01	0	0.14	0.06				0	2	
Co-58	DUP-RER	NONE		-0.01	2.23	1.15	-.01	0.32	0.14				0	2	
Co-60	DUP-RER	NONE		-0.03	0.08	0.03	-.01	0.06	0.09				0.2	2	
Cs-134	DUP-RER	NONE		-0.05	0.07	0.01	-.05	0.05	0.01				0	2	
Cs-137	DUP-RER	NONE		0.03	0.05	0.1	-.01	0.11	0.04				0.32	2	
I-131	DUP-RER	NONE		-0.01	0.04	0.01	0	0.03	0.08				0.18	2	
K-40	DUP-RER	NONE		18.1	2.25	4.47	19.85	2.38	4.71				0.53	2	
Pb-210	DUP-RER	NONE		1.46	1.01	1.7	1.08	0.72	1.1				0.31	2	
PB-212	DUP-RER	NONE		1.43	0.16	0.29	1.4	0.15	0.29				0.14	2	
PB-214	DUP-RER	NONE		0.62	0.15	0.31	.64	0.14	0.31				0.1	2	
Th-227	DUP-RER	NONE		0.08	0.2	0.46	-.01	0.55	1.12				0.15	2	
Th-234	DUP-RER	NONE		1.38	0.93	1.69	1.33	0.91	1.65				0.04	2	
Tl-201	DUP-RER	NONE		-0.02	0.03	0	-.05	0.1	0				0.28	2	
U-235	DUP-RER	NONE		0.11	0.06	0.12	.11	0.07	0.14				0	2	
Zn-65	DUP-RER	NONE		-0.01	0.16	0.29	-.02	0.15	0.12				0.04	2	

Method: EPA 901.1
Workgroup: WG335385
Units: pCi/g

WG335385LCSS

Analysis Date: 12/06/12

Nuclide	Type	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
Co-60	LCSS	PCN29506	99.73				100.43	3.28	5.43	100.7	90	110			
Cs-137	LCSS	PCN29506	85.05				81.22	3.29	2.9	95.5	90	110			

Method: EPA 901.1
Workgroup: WG335385
Units: pCi/g

WG335385PBS

Analysis Date: 12/06/12

Nuclide	Type	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec	Lower	Upper	RPD/RER	Limit	Qual
Ac-228	PBS						-.01	0.2	0.11			0.218			
Ba-133	PBS						.01	0.03	0.06			0.1184			
Bi-212	PBS						.03	0.15	0.35			0.7			
Bi-214	PBS						-.01	0.13	0.02			0.0412			
Cd-109	PBS						-.04	0.25	0.11			0.214			
Ce-139	PBS						.01	0.01	0.02			0.0488			
Co-56	PBS						0	0.02	1.22			2.44			

Montgomery and Associates

ACZ Project ID: ***L97797***

Co-57	PBS	0	0.01	0.01	0.0179
Co-58	PBS	0	0.07	0.04	0.0882
Co-60	PBS	0	0.02	0.08	0.164
Cs-134	PBS	0	0.02	0.02	0.031
Cs-137	PBS	0	0.21	0.12	0.248
I-131	PBS	.01	0.01	0.03	0.0688
K-40	PBS	-.27	1.27	0.14	0.27
Pb-210	PBS	.2	0.31	0.28	0.562
PB-212	PBS	0	0.03	0.01	0.0199
PB-214	PBS	.01	0.03	0.02	0.0398
Th-227	PBS	.07	0.07	0.16	0.324
Th-234	PBS	.15	0.25	0.24	0.474
Tl-201	PBS	0	0.05	0.01	0.025
U-235	PBS	0	0.02	0	0.0065
Zn-65	PBS	0	0.05	0.18	0.358

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

RadChem Extended Qualifier Report

Montgomery and Associates

ACZ Project ID: ***L97797***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97797-02	WG335385	Ba-133	EPA 901.1	N1	See Case Narrative.
L97797-03	WG335385	Ba-133	EPA 901.1	N1	See Case Narrative.

Metals Analysis

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Uranium, total (3050)	M6020 ICP-MS

Radiochemistry

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Ac-228	EPA 901.1
Ba-133	EPA 901.1
Bi-212	EPA 901.1
Bi-214	EPA 901.1
Cd-109	EPA 901.1
Ce-139	EPA 901.1
Co-56	EPA 901.1
Co-57	EPA 901.1
Co-58	EPA 901.1
Co-60	EPA 901.1
Cs-134	EPA 901.1
Cs-137	EPA 901.1
I-131	EPA 901.1
K-40	EPA 901.1
Pb-210	EPA 901.1
PB-212	EPA 901.1
PB-214	EPA 901.1
Th-227	EPA 901.1
Th-234	EPA 901.1
Tl-201	EPA 901.1
U-235	EPA 901.1
Uranium 234	Eichrom ACW03
Uranium 235	Eichrom ACW03
Uranium 238	Eichrom ACW03
Zn-65	EPA 901.1

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Ac-228	EPA 901.1
Ba-133	EPA 901.1
Bi-212	EPA 901.1
Bi-214	EPA 901.1
Cd-109	EPA 901.1
Ce-139	EPA 901.1
Co-56	EPA 901.1
Co-57	EPA 901.1
Co-58	EPA 901.1
Co-60	EPA 901.1
Cs-134	EPA 901.1
Cs-137	EPA 901.1
I-131	EPA 901.1
K-40	EPA 901.1
Pb-210	EPA 901.1
PB-212	EPA 901.1
PB-214	EPA 901.1

Th-227	EPA 901.1
Th-234	EPA 901.1
Tl-201	EPA 901.1
U-235	EPA 901.1
Uranium 234	Eichrom ACW03
Uranium 235	Eichrom ACW03
Uranium 238	Eichrom ACW03
Zn-65	EPA 901.1

Soil Analysis

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Solids, Percent	CLPSOW390, PART F, D-98

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Montgomery and Associates
1350.13

ACZ Project ID: L97797
Date Received: 11/09/2012 09:47
Received By: ksj
Date Printed: 11/12/2012

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?			X
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA16543	16.7	13	Yes

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

ACZ Laboratories, Inc. 697797

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN OF CUSTODY

Name: Tim Leo	Address: 1550. E. Prince Rd
Company: Montgomery & Assoc.	Tucson AZ 85719
E-mail: tleo@elmontgomery.com	Telephone: 520-881-4912

Name: John Laney	E-mail: jlaney@elmontgomery.com
Company: M & A	Telephone:

Name: SAA	Address:
Company:	
E-mail:	Telephone:

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes [ ] No [X]

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: John Laney Sampler's site Information State [ ] Zip code [ ] Time Zone [ ]

Quote #:

Project/PO #:

Reporting state for compliance testing:

Check box if samples include NRC licensed material? [ ]

				# of Containers	U, total	U, Isotopic	Gamma Spectrum Nuclides	Gross alpha Beta	pH			
6017	11/6/2012	800	1	SO	X	X	X	X	X			
6077		815	1	SO	X	X	X	X	X			
6103		830	1	SO	X	X	X	X	X			
60061		840	1	SO	X	X	X	X	X			
6182		850	1	SO	X	X	X	X	X			
6185	↓	905	1	SO	X	X	X	X	X			
6-BIN-COMPOSITE	11/6/2012	915	1	SO	~~X~~ HOLD							

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Contact Tim Leo before running analyses

LISBON - SO

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

	11/8/12 1430	ACZ 11/9/12	0940

697797 Chain of Custody

FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

MONTGOMERY & ASSOCIATES

APPENDIX C

FIELD SAMPLING DATA SHEETS AND LABORATORY REPORTS

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

Water Level Measurements

Job Number: 1350 Date: 10/29/12 Client: Montgomery & Assoc.

Site: Rio Algom Mine

Well I.D.	Time	Dia	Depth to NAPL	Thickness of NAPL	Depth to water (DTW)	Total Depth (measured)	Total Depth (historical)	Ref Point (TOC/ TOB)	Screen	Depth top of HS set
EF-3A	1016	4			82.37		215	TOC	173-203	190'
EF-6	910	4			71.40		137	TOC	105-135	122'
EF-8	847	4			74.38		244	TOC	212-242	229'
H-63	1511	5			135.84		172	TOC	140-170	157
LW-1	1417	4			146.15		233	TOC	203-233	220
ML-1	No upper screen (confirmed w/ camera)						157	TOC	20-60	
ML-1	950	4			41.31		157	TOC	150-165	148'
MW-13	1520	4			93.92		206	TOC	80-125	108'
MW-5	1725	4			153.36		197	TOC	165-195	182'
OW-UT-9	1743	5			122.90		142	TOC	118-138	132.5'
RL-1	814	5			116.05		124	TOC	104-124	121'
RL-3	1408	5			170.09		183	TOC	163-183	179'
RL-4	1328	5			150.40		178	TOC	137-177	160'
RL-5	1307	5			157.83		186	TOC	150-186	170'
RL-6	1345	5			15.37		20	TOC	7.7-18	18'
MW-100	1415	4			146.96		204.5 203	TOC	~~139.5-204.5~~ 138-203	178'
MW-101	1303	4			150.05	161.00	160.8 159	TOC	~~139.5-204.5~~ ~~140.8-160.8~~ 139-159	158'
MW-102	1757	4			125.28		137.8 136	TOC	~~140.8-160.8~~ ~~117.8-137.8~~ 116-136	133.5
MW-102DB	1754	4			122.08	177.30 177.80	177.3 175	TOC	~~137.8-157.8~~ ~~147.3-177.3~~ 145-175	162'
MW-103	1530	4			83.44		113.2 111.5	TOC	~~83.2-113.2~~ 81.5-111.5	100.5'

Water Level Measurements

Job Number: 1350 Date: 10/29/12 Client: Montgomery + Assoc.

Site: Rio Algom Mine

Well I.D.	Time	Dia	Depth to NAPL	Thickness of NAPL	Depth to water (DTW)	Total Depth (measured)	Total Depth (historical)	Ref Point (TOC/ TOB)	Screen	Depth top of HS set
MW-104	1241	4			97.64		108	TOC	68-98	
MW-105	1505	4			73.53	135 / 134.83	135	TOC	65-135	106
MW-106	1050	4			247.11	267.00	264.5	TOC	234.5-264.5	
11/2 UW-1	930	5			105.30	140.00		TOC	103-140	125 ~~115~~

Confluence Environmental, Inc. 3308 El Camino Ave, Suite 300 #148, Sacramento CA, 95821, 916-760-7641

Well Maintenance Inspection Form

Client: Montgomery Site: Rio Algom Mine Date: 10/29/12

Job #: 1380 Technician: BM Page 1 of 2

Inspection Point	Well Inspected - No Corrective Action Required	Entry Indicates Deficiency													Notes (Note any repairs made while on site)
		Cap non-functional	Lock non-functional	Lock missing	Bolts missing (# missing / # total tabs)	Tabs stripped (# stripped / # total tabs.)	Tabs broken (# broken / # of total tabs)	Annular seal incomplete	Apron damaged	Rim / Lid broken	Trip Hazard	Below Grade	Other (explain in notes)	Well Not Inspected (explain in notes)	
EF-3A	X														
EF-6	X														
EF-8	X														
H-63	X														
LW-1	X														
ML-1															
ML-1	X														
MW-13	X														
MW-5	X														
OW-UT-9	X														
RL-1	X														
RL-3	X														
RL-4	X														
RL-5	X														
RL-6	X														
MW-100	X														
MW-101	X														
MW-102	X														
MW-102DB	X														
MW-103	X														

Notes:

Repair codes: rt=retap/ bolts added or replaced as=annular seal repair,

Well Maintenance Inspection Form

Client: Montgomery Site: Rio Alamo Mine Date: 10/29/12

Job #: 138 Technician: BM Page 2 of 2

Inspection Point	Well Inspected - No Corrective Action Required	Entry Indicates Deficiency												Well Not Inspected (explain in notes)	Notes (Note any repairs made while on site)
		Cap non-functional	Lock non-functional	Lock missing	Bolts missing (# missing / # total tabs)	Tabs stripped (# stripped / # total tabs.)	Tabs broken (# broken / # of total tabs)	Annular seal incomplete	Apron damaged	Rim / Lid broken	Trip Hazard	Below Grade	Other (explain in notes)		
MW-104	X														
MW-105	X														
MW-106	X														

Notes:

Repair codes: rt=retap/ bolts added or replaced as=annular seal repair,

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Equipment Calibration Log

Equipment make/model	Equipment ID/ serial number	Date	Time	Calibration Standards	Equipment Reading	Equipment Calibrated	Temp (°C/ °F)	Tech init.	Comments
Pro Series	#3	10/30/12	600	4, 7, 10	4.0, 7.0, 10.0	Y	20	BH	
				1413	1413				
				100%	100%	Y	D	BH	
				237.5	237.5				
		10/31/12	600	4.0, 7.0, 10.0	4.0, 7.0, 10.0	Y	70	RH	
				1413	1413				
				100%	100%	Y	20	BH	
				237.5	237.5				
	#3	11/1/12	600	4.0, 7.0, 10.0	4.0, 7.0, 10.0	Y	20	BH	
				1413	1413				
				100%	100%	Y	20	BH	
				237.5	237.5				
	#1			4.0, 7.0, 10.0	4.0, 7.0, 10.0	Y	20	BH	
				1413	1413				
				100%	100%	Y	20	BH	
				237.5	237.5				
	#3	11/2/12	600	4, 7, 10	4.0, 7.0, 10.0	Y	70	BH	
				1413	1413				
				100%	100%	Y	70	BH	
				237.5	237.5				
	#1			4, 7, 10	4.0, 7.0, 10.0	Y	70	BH	
				1413	1413				
				100%	100%	X	70	BH	
				237.5	237.5				

Notes/comments:

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Equipment Calibration Log

Equipment make/model	Equipment ID/ serial number	Date	Time	Calibration Standards	Equipment Reading	Equipment Calibrated	Temp (°C / °F)	Tech init.	Comments
Pro Series	#3	11/3/12	600	4, 7, 10 1413	4.0, 7.0, 10.0 1413	X	70	BW	
				100% 237.5	100% 237.5	Y	70	BW	
	#1			4, 7, 10 1413	4.0, 7.0, 10.0 1413	Y	20	BW	
				100% 237.5	100% 237.5	Y	20	BW	
	#3	11/5/12	700	4, 7, 10 1413	4.0, 7.0, 10.0 1413	Y	20	BW	
				100% 237.5	100% 237.5	Y	20	BW	
	#3	11/6/12	530	4.0, 7.0, 10.0 1413	4.0, 7.0, 10.0 1413	Y	20	BW	
				100% 237.5	100% 237.5	Y	20	BW	
	#1			4.0, 7.0, 10.0 1413	4.0, 7.0, 10.0 1413	Y	20	BW	
				100% 237.5	100% 237.5	Y	20	BW	

Notes/comments:

Confluence Environmental, Inc

Equipment Calibration Log

Equipment make/model	Equipment ID/ serial number	Date	Time	Calibration Standards	Equipment Reading	Equipment Calibrated	Temp (°C)/ °F)	Tech init.	Comments
Pro Series	#3	11/7/12	530	4, 7, 10 1413	4.0, 7.0, 10.0 1413	y	20	BM	
	"			100% 237.5	100% 237.5	y	22	BM	
	#1			4, 7, 10 1413	4.0, 7.0, 10.0 1413	y	20	BM	
	"			100% 237.5	100% 237.5	y	20	BM	

Notes/comments:

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: EF-3A	**Date** (DDOct2012): 01/10/2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 82.37 **Total Depth:** 215.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (1.5)		
Pump depth/ intake: 190'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS / S)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
945	10.8	7.3	7091	7	—	—	0.90	-165	82.37	

Did well dewater? YES (NO)	Total volume removed: — (gal / L)	
Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:		
Sample date: 1/10/12	Sample time: 945	DTW at sample: 82.37
Sample ID: 62260	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-3A	**Date** (DDOct2012): 01/NOV/2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 82.37	**Total Depth:** 215.00
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 180	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or (ml) min)	Volume Removed (gal) (L)	DO (mg/l)	ORP (mv)	DTW	Notes
1005	11.6	7.4	9134	7	400ml	1.2L	0.44	-225	82.30	
1008	11.7	7.2	10128	6	|	2.4L	0.41	-176	82.32	
1011	11.8	7.1	10076	6	|	3.6L	0.52	-154	82.30	
1014	11.9	7.1	10074	6	|	4.8L	0.53	-127	82.30	
1017	12.0	7.0	10096	5	|	6L	0.63	-100	82.30	
1020	12.0	7.0	10034	5	|	7.2L	0.77	-75	82.30	
1023	12.1	7.0	10112	5	|	8.4L	0.96	-34	82.30	
1026	12.2	7.0	10100	5	|	9.6L	1.13	-35	82.30	
1029	12.4	7.0	10104	4	|	10.8	1.30	-21	82.30	
1032	12.5	7.0	10080	4	|	12L	1.43	-12	82.30	
1035	12.5	7.0	10015	4	—	13.2L	1.56	-3	82.30	→see page 2

Did well dewater? YES (NO)	Total volume removed: 18L (gal) (L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 11/1/12	Sample time: 1050	DTW at sample: 82.30
Sample ID: 6227	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID: 6228 @ 1100	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-3A	**Date** (DDOct2012): 01NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 82.37	**Total Depth:** 215.00
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1038	12.4	7.0	10010	4	400ml	14.4L	1.64	2	82.30	
1041	12.4	7.0	9996	4	↓	15.6L	1.72	6	82.30	
1044	12.4	7.0	9978	4	↓	16.8L	1.77	9	82.30	
1047	12.5	7.0	9995	4	↓	18L	1.78	12	82.30	

Did well dewater? YES (NO)	Total volume removed: 18L	(gal (L))
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 11/1/12	Sample time: 1050	DTW at sample: ~~83~~ 82.30
Sample ID: 1227	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID: 1228 @ 1100	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-3A	**Date** (DDOct2012): 01/04/2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 82.37	**Total Depth:** 215.08
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 195 X 3 = 585 (Total Purge) 80%=

Time	Temp (°C °F)	pH	Cond (mS µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal/ L)	DO (mg/l)	ORP (mv)	DTW	Notes
1138	12.6	7.2	7907	6	4	195	1.65	-273	82.90	
1226	12.7	7.2	8027	5		390	1.64	-277	82.90	
1314	12.7	7.2	8055	5		585	1.63	-265	82.90	

Did well dewater? YES (NO)	Total volume removed: 585 (gal/ L)		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 1/4/12	Sample time: 1315	DTW at sample: 82.90	
Sample ID: 6229	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: EF-6	**Date** (DDOct2012): 30 Oct 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 71.40 **Total Depth:** 137	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 122	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1210	14.8	7.1	2970	14	—	—	0.7	2	—	

Did well dewater? YES NO Total volume removed: — (gal / L)

Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:

Sample date: 10/30/12	Sample time: 1210	DTW at sample: 71.40
Sample ID: 0214	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-6	**Date** (DDOct2012): 30 Oct 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 71.40 **Total Depth:** 87	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA		
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 120' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or (mL) / min)	Volume Removed (gal / (L))	DO (mg/l)	ORP (mv)	DTW	Notes
1231	13.8	7.1	2362	7	300	900ml	6.6	26	71.89	
1234	13.3	7.0	2614	>1000		1.8L	8.4	26	71.92	
1237	13.3	7.0	2618	>1000		2.7L	8.3	24	71.96	
1240	13.3	7.0	2643	>1000		3.6L	8.9	24	71.96	
1243	13.0	7.0	2728	>1000		4.5L	8.8	33	71.98	
1246	13.0	7.0	2699	249		5.4L	8.8	34	72.00	
1249	12.9	7.0	2665	31		6.3L	9.0	35	72.09	
1252	13.2	7.0	2673	11		7.2L	9.2	36	72.11	
1255	13.2	7.0	2672	8		8.1L	8.8	38	72.13	
1258	13.5	7.0	2692	6		9L	8.7	37	72.14	
1301	13.4	7.0	2692	6	↓	9.9L	9.0	40	72.15	

Did well dewater? YES (NO)	Total volume removed: 9.9L (gal (L))	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port: Other:		
Sample date: 10/30/12	Sample time: 1305	DTW at sample: 72.15
Sample ID: C0215	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-6	**Date** (DDOct2012): 30Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 71.40 **Total Depth:** 137	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 43 X 3 = 129 (Total Purge) 80%= 84.52

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1330	12.8	7.0	2577	5	2gpm	43	7.3	55	83.63	
1355	12.6	7.0	2577	5	2/3	86	7.5	69	90.00	
1410	12.7	7.0	2567	5	3	129	7.5	79	91.82	
	Wated briefly for 80%									

Did well dewater? YES (NO)	Total volume removed: 129 (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 10/30/12	Sample time: 1415	DTW at sample: 84.00
Sample ID: EF216	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-8	**Date** (DDOct2012): 31Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4) 6" Other:	**DTW:** 74.38 **Total Depth:** 241.02	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (#5)		
Pump depth/ intake: (229') **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1052	12.3	7.16	3041	9	—	—	4.4	-179	—	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 10/31/12 Sample time: 1052 DTW at sample: 74.38

Sample ID: 6022 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @ Field blank ID @

Duplicate ID: Pre-purge DO: Post purge DO:

$Fe2^{+}$: Pre-purge ORP: Post purge ORP:

NAPL depth: Volume of NAPL: Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-8	**Date** (DDOct2012): 31Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Wewather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 74.38 **Total Depth:** 244.00	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or ml / min)	Volume Removed (gal (L))	DO (mg/l)	ORP (mv)	DTW	Notes
1111	12.0	7.4	1325	6	400	1.2L	7.0	-109	74.90	
1114	11.9	7.4	1906	6		2.4L	9.2	-126	74.92	
1117	11.9	7.4	1973	6		3.6	8.9	-115	74.91	
1120	11.9	7.4	2013	6		4.8	8.6	-107	74.91	
1123	11.9	7.4	2032	5		6L	8.5	-112	74.91	
1126	12.1	7.4	2025	5		7.2L	8.2	-129	74.91	
1129	12.0	7.4	2015	5		8.4L	8.1	-129	74.91	
1132	12.2	7.4	2016	5		9.6L	8.0	-128	74.91	

Did well dewater? YES (NO) Total volume removed: 9.6L (gal (L))

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 10/31/12	Sample time: 1135	DTW at sample: 74.91
Sample ID: 6223	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH	250 ml HNO3 poly *field filtered - Dissolved Metals	

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: EF-8	**Date** (DDOct2012): 31Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 74.38	**Total Depth:** 244.00
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 110 X 3 = 330 (Total Purge) 80%= 108.32

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or L / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1204	12.6	7.4	2075	4	4gpm	110	7.7	-99	87.58	
1232	12.7	7.4	2090	3	1	220	7.7	-64	87.65	
1300	12.7	7.4	2069	3	1	330	7.6	-54	87.80	

Did well dewater? YES (NO) Total volume removed: 330 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 10/31/12 Sample time: 1300 DTW at sample: 87.80

Sample ID: 6224 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID ~~6225~~ @ 1310 Field blank ID @

Duplicate ID: 6225 @ 1310 Pre-purge DO: Post purge DO:

$Fe2^{+}$: Pre-purge ORP: Post purge ORP:

NAPL depth: Volume of NAPL: Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: LW-1	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: ~~LW-1~~ warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.15 **Total Depth:** 233.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)		
Pump depth/ intake: 220'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1045	10.4	7.5	672	7	—	—	3.68	213	—	

Did well dewater? YES (NO)	Total volume removed: — (gal / L)	
Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:		
Sample date: 02NOV2012	Sample time: 1045	DTW at sample: 146.15
Sample ID: 6230	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: LW-1	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.15 **Total Depth:** 233.02	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / (uS))	Turbidity (NTU)	Purge Rate (gal or (mL) / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1106	11.4	7.4	639	7	400ml	1.2L	3.3	205	146.20	
1111	11.4	7.4	646	6		2.4L	4.3	205	146.20	
1114	11.4	7.4	636	6		3.6L	4.2	205	146.20	
1117	11.5	7.4	649	6		4.8L	4.2	197	146.20	
1120 HH2	11.6	7.4	638	6		6L	4.0	190	146.20	
1123	11.6	7.4	643	5		7.2L	4.0	184	146.20	
1126	12.0	7.4	633	5		8.4L	4.1	177	146.20	
1129	12.3	7.4	642	5		9.6L	4.1	172	146.20	
1132	12.5	7.4	651	5		10.8L	4.2	168	146.20	
1135	12.6	7.4	648	5	—	12L	4.2	166	146.20	

Did well dewater? YES (NO)	Total volume removed: 12L (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 02NOV2012	Sample time: 1135	DTW at sample: 146.20
Sample ID: 6231	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: LW-1	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.15 **Total Depth:** 233.00	
Purge equip: (PS - diam) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 56.5 X 3 = 170 (Total Purge) 80%= 163.52

Time	Temp (°C) / °F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1158	12.4	7.4	639	6	3/m	56.5	3.6	113	149.10	
1218	12.4	7.3	640	6	1	113	3.8	31	149.30	
1238	12.4	7.3	639	5	1	170	3.7	-23	149.40	

Did well dewater? YES (NO)	Total volume removed: 170 (gal / L)		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 02NOV2012	Sample time: 1240	DTW at sample: 149.40	
Sample ID: 0232	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: ML-1	**Date** (DDOct2012): 30Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 41.31	**Total Depth:** 157.00
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: HS	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 146	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F)	pH	Cond (mS /(µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
845	9.4	7.4	1138	21	—	—	4.7	248	—	
										hydrasleeve

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 10/30/12	Sample time: 845	DTW at sample: 41.31
Sample ID: 6211	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: ML-1	**Date** (DDOct2012): 30/10/12	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 41.31 **Total Depth:** 157.00	

Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA

Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:

Pump depth/ intake: 146' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
913	10.6	7.5	1167	15	300	900ml	5.60	243	41.60	
916	10.9	7.4	1158	7	|	1.8L	5.4	241	41.60	
919	11.0	7.4	1164	7	|	2.7L	5.3	239	41.60	
922	11.1	7.4	1156	7	|	3.6L	5.3	238	41.60	
925	11.0	7.4	1176	7	—	4.5L	5.3	235	41.60	

Did well dewater? YES (NO) Total volume removed: 4.5L (gal / L)

Sample method: Diso Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 10/30/12 Sample time: 925 DTW at sample: 41.60

Sample ID: 6212 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: ML-1	**Date** (DDOct2012): 30Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 41.60 **Total Depth:** 157.00	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: (140)	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 75 X 3 = 225 (Total Purge) 80%= 64.68

Time	Temp (°C) (°F)	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1014	11.8	7.4	1251	18	4gpm	75	9.0	83	61.85	
1033	11.8	7.4	1253	15	↓	150	10.3	-129	61.92	
1052	11.8	7.4	1250	14	↓	225	10.5	-144	62.30	

Did well dewater? YES (NO) Total volume removed: 225 (gal) / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 10/31/12	Sample time: 1055	DTW at sample: 62.30
Sample ID: 6213	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns, B Myers	**Client:** Montgomery & Associates
Well ID: MW-13	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 93.92	**Total Depth:** 206

Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA

Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)

Pump depth/ intake: (168') **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
845	9.6	7.3	1002	6	—	—	2.0	216	—	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 03NOV2012 Sample time: 845 DTW at sample: 93.92

Sample ID: 0235 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-13	**Date** (DDOct2012): 03Nov2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 93.92	**Total Depth:** 201.02
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 166'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C / °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
901	10.5	7.4	966	3~~4~~5	400	1.2L	3.3	202	93.95	
904	10.8	7.3	1027	5	|	2.4L	1.5	190	93.95	
907	11.0	7.3	1030	5	|	3.6L	1.2	192	93.95	
910	11.1	7.3	1038	5	|	4.8L	1.2	188	93.95	
913	11.3	7.2	1029	5	|	6L	1.1	181	93.95	
916	11.5	7.2	1030	5	|	7.2L	1.0	175	93.95	
919	11.7	7.2	1029	5	|	8.4L	1.0	168	93.95	
922	11.7	7.2	1027	5	|	9.6L	1.0	162	93.95	
925	11.7	7.2	1023	5	|	10.8L	1.0	157	93.95	
928	11.8	7.2	1031	5	|	12L	1.0	150	93.95	
931	11.8	7.2	1024	5	↓	13.2L	0.97	144	93.95	see next page

Did well dewater? YES (NO)	Total volume removed: 11.0L (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 03Nov2012	Sample time: 940	DTW at sample: 93.95
Sample ID: 0236	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-13	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 93.92 **Total Depth:** 206.00	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 106'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
934	11.6	7.2	1028	4	400 ml	14.4	0.98	138	93.95	
937	11.9	7.2	1034	4	|	15.6 ~~16.0~~	0.97	134	93.95	
940	11.8	7.2	1025	4	L	16.8 ~~17.2~~	0.97	130	93.95	

Did well dewater? YES (NO)	Total volume removed: 16.8L (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 03NOV2012	Sample time: 940	DTW at sample: 93.95
Sample ID: 623Co	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-13	**Date** (DDOct2012): 03Nov2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 93.92 **Total Depth:** 266.02	
Purge equip: (ES - diam): Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 73 X 3 = 219 (Total Purge) 80%= 110.31

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1008	12.1	7.3	981	3	3gpm	73	1.2	126	93.98	
1032	12.2	7.2	1023	3	↓	146	1.0	113	93.98	
1052	12.2	7.2	1019	3	↓	219	0.95	105	93.98	

Did well dewater? YES (NO)	Total volume removed: 219 (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 03Nov2012	Sample time: 1100	DTW at sample: 93.98
Sample ID: 6237	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-5	**Date** (DDOct2012):	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 153.36 **Total Depth:** 197.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)		
Pump depth/ intake: 1821	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1345	12.9	6.9	2992	8	—	—	1.4	101	—	

Did well dewater? YES (NO)	Total volume removed: — (gal / L)		
Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:			
Sample date: 02NOV2012	Sample time: 1345	DTW at sample: 153.36	
Sample ID: 0233	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW5	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 153.36 **Total Depth:** 177.08	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 168'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1406	12.4	6.9	3038	9	400	1.2L	0.92	117	154.67	
1409	12.6	6.8	3003	8	|	2.4L	0.72	123	154.68	
1412	12.4	6.8	3035	6	|	3.6L	0.12	127	154.75	
1415	12.5	6.8	3074	6	|	4.8L	0.74	129	154.81	
1418	12.6	6.8	3004	6	↓	6L	0.82	129	154.86	
1421	12.6	6.9	3036	5	300	6.9L	0.81	131	154.92	
1424	12.8	6.8	3030	5	|	7.8L	0.82	130	155:00	
1427	12.8	6.9	3020	5	|	8.7L	0.81	124	155:09	
1430	12.7	6.9	3034	5	|	~~9.6~~ 9.6L	0.82	120	155.16	
1433	13.3	6.9	3010	5	|	10.5L	0.87	112	155.22	
1436	13.6	6.9	3081	5	↓	11.4L	0.86	110	155.23	see next page

Did well dewater? YES (NO)	Total volume removed: 20.52 (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 02NOV2012	Sample time: 1570	DTW at sample: 155.77
Sample ID: 10234	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B (Myers)	**Client:** Montgomery & Associates
Well ID: MW5	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 153.34 **Total Depth:** 197.02	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1439	13.5	6.9	3036	5	300	12.3L	0.91	107	155.24	
1442	13.3	6.9	3011	5	|	13.2L	0.91	105	155.36	
1445	13.2	6.9	3071	4	|	14.1L	0.93	103	155.45	
1448	13.6	6.9	3051	4	|	15L	0.97	98	155.53	
1451	13.7	6.9	3041	4	|	15.9L	0.98	96	155.62	
1454	13.9	6.9	3029	4	250	16.75L	1.00	94	155.63	
1457	13.8	6.9	3051	4	|	17.5L	1.00	93	155.65	
1500	13.8	6.9	3029	4	|	18.25L	1.09	92	155.72	
1503	13.9	6.9	3023	4	|	19L	1.07	92	155.76	
1506	13.8	6.9	3088	4	|	19.75L	1.09	92	155.77	
1509	14.0	6.9	3062	4	|	20.5L	1.11	92	155.77	

Did well dewater? YES (NO)	Total volume removed: 20.5L (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 02NOV2012	Sample time: 1570	DTW at sample: 155.77
Sample ID: 0234	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW5	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 153.36 **Total Depth:** 197.02	
Purge equip: (ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 64 X ____ = ____ (Total Purge) 80%= 167.09

	Time	Temp (°C) °F	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
11/2/12	1555	13.2	6.9	3047	10	3gpm	64	1.14	112	182.50	Pump dropped to bottom, we dropping
		Well	dewatered	@ 105 gallons		return	next	day			
		to	collect	sample							
11/3	1440	13.2	7.2	2780	10	—	—	2.74	201	155.75	

Did well dewater? (YES) NO	Total volume removed: 105 (gal / L)		
Sample method: (Disp Bailer) Hydrasleeve New Tubing Ext. Port Other:			
Sample date: 11/3/12	Sample time: 1440	DTW at sample: 155.75 (>80%)	
Sample ID: 6251	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-1	**Date** (DDOct2012): 31Oct2012 ~~31Oct~~	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other: 5"	**DTW:** 116.05	**Total Depth:** 124.00
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 121'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
805	10.1	7.0	14577	11	—	—	3.7	164	—	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 10/31/12	Sample time: 805	DTW at sample: 116.05
Sample ID: (0217	Lab: Energy Labs	Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-1	**Date** (DDOct2012): 31Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4) 6" Other: (5)	**DTW:** 116.05 **Total Depth:** 124.00	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 120 **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
826	10.6	6.9	11576	285	400ml	1.2L	3.1	149	116.64	
831	11.3	6.9	11644	31	400	2.4L	3.3	138	116.70	
834	11.6	6.9	11577	22	300ml	3.3L	3.2	132	116.70	
837	12.2	6.9	11597	18	"	4.2L	3.2	125	116.70	
840	12.2	6.9	11592	16	"	5.1L	3.1	121	116.70	
843	12.4	6.9	11585	15	"	6L	3.1	117 ~~118~~	116.70	

Did well dewater? YES (NO) Total volume removed: 6L (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 10/31/12	Sample time: 845	DTW at sample: 116.70
Sample ID: 6218	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
* Duplicate ID: 6219 @ 855	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-1	**Date** (DDOct2012): 31Oct2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 116.05 **Total Depth:** 124.00	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 8 X 3 = 24 (Total Purge) 80%= 117.64

Time	Temp (°C °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
904	14.5	6.9	11267	27	1gpm	8	3.8	128	119.00	lowered pump
924	14.9	7.1	11894	372	0.5gpm	16	0.3	114	121.00	
	Shut pump down & let recover for 5 min. Prior to									
	purging 3rd case volume									
940	14.9	7.1	12117	0.9	0.5	24	0.7	104	120.60	
	Waited for 80% before sampling									
	1°			5						

Did well dewater? (YES) (NO) Total volume removed: 24 (gal / L)

Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:

Sample date: 10/31/12	Sample time: 1000	DTW at sample: 117.64
Sample ID: 10220	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
* Equipment blank ID: 1221 @ 1015	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-3	**Date** (DDOct2012): 05NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 170.09	**Total Depth:** 183.00
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: (HS)	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)		
Pump depth/ intake: (179')	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C/ °F)	pH	Cond (mS /(µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
930	12.4	7.1	8087	6	—	—	4.3	221	—	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 05NOV2012	Sample time: 930	DTW at sample: 170.09
Sample ID: 10252	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH	250 ml HNO3 poly *field filtered - Dissolved Metals	

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-3	**Date** (DDOct2012): 05NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 170.09	**Total Depth:** 183.00
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 177'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
947	12.6	6.9	11433	11	400	1.2L	3.9	8	170.86	
952	12.4	6.9	11489	11		2.4L	4.0	96	170.82	
953	12.6	6.9	11458	10		3.6L	4.1	88	170.76	
956	12.8	6.9	11590	10		4.8L	3.8	59	170.76	
959	14.4	6.9	11633	8		6L	3.7	14	170.76	
1002	14.8	6.9	11893	7		7.2L	3.8	12	170.76	
1005	15.0	6.9	11987 ~~11893~~	7		8.4L	3.9	8	170.76	

Did well dewater? YES (NO)	Total volume removed: 8.4L (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 05NOV2012	Sample time: 1005	DTW at sample: 170.76
Sample ID: 0253	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: RL-3	**Date** (DDOct2012): 05NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 170.09 **Total Depth:** 183.00	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: (177') **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 13 X 3 = 39 (Total Purge) 80%= 172.67

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1014	14.1	7.0	9030	8	2	13	5.0	-5	174.95	
1024	13.9	7.0	9694	7	1	26	5.3	-1	176.24	
1027	13.9	7.0	10671	7	1	39	5.5	93	177.11	
	Waited	briefly	for	80%						

Did well dewater? YES (NO) Total volume removed: 39 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 05NOV2012	Sample time: 1035	DTW at sample: ~~EC~~ 172.67
Sample ID: 6254	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-4	**Date** (DDOct2012): 01NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: BlueSky	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other: 5"	**DTW:** 156.40 **Total Depth:** 173	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: —	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C) °F)	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1300	13.6	7.7	957	4.6	—	—	7.12	80.2	156.40	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 01NOV2012 Sample time: 1300 DTW at sample: 156.40

Sample ID: 6242 Lab: Energy Labs Number of bottles: (2)

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @ Field blank ID @

Duplicate ID: Pre-purge DO: Post purge DO:

$Fe2^+$: Pre-purge ORP: Post purge ORP:

NAPL depth: Volume of NAPL: Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-4	**Date** (DDOct2012): 01NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other: 5"	**DTW:** 156.40 **Total Depth:** 179.60	
Purge equip: ES - diam: 2" Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 167'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1355	14.8	7.7	797	7.2	300	1.0	8.11	15.5	156.83	
1358	14.1	7.6	1054	7.4	300	1.9	9.03	14.3	156.81	
1401	13.7	7.6	958	7.9	300	2.8	9.52	17.3	156.82	
1404	13.7	7.6	902	9.5	300	3.7	9.92	15.1	156.82	
1407	13.9	7.6	927	7.1	300	4.6	9.67	16.8	156.82	
1410	14.2	7.6	922	6.9	300	5.5	9.60	15.3	156.82	
1413	15.3	7.6	921	7.1	300	6.4	9.26	11.7	156.82	
1416	16.0	7.6	933	7.0	300	7.3	9.14	10.0	156.82	
1419	16.1	7.6	938	6.9	300	8.2	9.13	11.3	156.82	
1422	16.1	7.6	940	6.9	300	9.1	9.12	11.5	156.82	

Did well dewater? YES (NO)	Total volume removed: 9.1 (gal (L))		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 01NOV2012	Sample time: 1430	DTW at sample: 156.82	
Sample ID: 6243	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-4	**Date** (DDOct2012): 01NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Windy - warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 156.40 **Total Depth:** 178.00	
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 167 - **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 22 X 3 = 66 (Total Purge) 80%= 160.72

Time	Temp (°C) °F)	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1435	14.1	7.6	928	7.4	2.5	22	8.87	14.1	161.82	
1444	13.1	7.6	931	23.0	2.5	44	8.31	13.7	163.93	
1453	13.0	7.6	932	25.0	2.5	66	8.06	11.9	164.91	

Did well dewater? YES (NO) Total volume removed: 66 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 01NOV2012	Sample time: 1500	DTW at sample:
Sample ID: 6244	Lab: Energy Labs	Number of bottles (2)
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
* Duplicate ID: 6245 @ 1510	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: ~~MW-5~~ RL-5 (3x)	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy - Brisk	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other: 5"	**DTW:** 151.83	**Total Depth:** 186.00
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume —	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
11.50	16.4	7.7	688	3.85	—	—	5.83	37.9	151.83	

Did well dewater? YES NO — Total volume removed: — (gal / L)

Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:

Sample date: 02NOV2012 — Sample time: 1150 — DTW at sample: 151.83

Sample ID: 6246 — Lab: Energy Labs — Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-5	**Date** (DDOct2012):	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy - Breezy	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 151.83	**Total Depth:** 186.00
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 168'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or (mL) min	Volume Removed (gal) (L)	DO (mg/l)	ORP (mv)	DTW	Notes
1220	12.3	7.6	721	10.3	300	1.0	10.53 ~~454.3~~	47.2	151.80	
1223	12.3	7.6	721	7.2	300	1.9	10.36	49.3	151.80	
1226	12.3	7.6	720	8.1	300	2.8	10.26	50.1	151.80	
1229	12.3	7.6	719	8.0	300	3.7	10.24	51.0	151.80	
1232	12.5	7.6	721	8.0	300	4.6	10.00	52.6	151.80	
1235	12.5	7.6	721	8.5	300	5.4	9.64	54.2	151.80	
1238	12.5	7.6	721	8.3	300	6.3	9.64	54.9	151.80	
1241	12.5	7.6	719	8.5	300	7.2	9.22	55.5	151.80	

Did well dewater? YES (NO)	Total volume removed: 7.2 (gal) (L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 02Nov2012	Sample time: 1245	DTW at sample: 151.80
Sample ID: 6247	Lab: Energy Labs	Number of bottles: (2)
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-5	**Date** (DDOct2012): 02 NOV 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")		**DTW:** 152.80 **Total Depth:** 186.00
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 168'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 35 X 3 = 105 (Total Purge) 80%=____

Time	Temp (°C/ °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal) or mL/ min)	Volume Removed (gal) L)	DO (mg/l)	ORP (mv)	DTW	Notes
1311	12.7	7.6	713	6.3	1.5	35	11.09	64.3	152.75	
1334	12.6	7.6	712	5.0	1.5	70	11.21	66.6	152.80	
1357	12.6	7.6	713	5.3	1.5	105	11.18	67.7	152.80	

Did well dewater? YES (NO)	Total volume removed: 105 (gal) / L)		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 02 NOV 2012	Sample time: 1400	DTW at sample: 152.80	
Sample ID: 6248	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-6	**Date** (DDOct2012): 01NOV2017 ~~11OCT~~	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 15.39 **Total Depth:** 20.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: —	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1015	12.9	7.0	7081		—	—	1.90	-50.6	15.39	
~~10~~	~~13.3~~								JS 15.39	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 01NOV2017	Sample time: 1015	DTW at sample: 15.39
Sample ID: 6209	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-6	**Date** (DDOct2012): 01Nov2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" 4" 6" Other:		**DTW:** 15.39 **Total Depth:** 20.60
Purge equip: ES - diam: 2" Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 17.5	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 3.0 X 3 = 9.0 (Total Purge) 80%= 16.31

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1138	12.1	7.1	2075 ~~20.75~~	10.3	1.0	3.0	1.33	-39.3	15.42	
1144	12.0	7.1	2076	7.2	1.0	6.0	1.29	-38.3	15.40	
1148	12.0	7.1	2074	6.9	1.0	9.0	1.27	-36.4	15.40	

Did well dewater? YES NO	Total volume removed: 9.0 (gal / L)	
Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:		
Sample date: 01Nov2012	Sample time: 1150	DTW at sample: 15.40
Sample ID: 6241	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: RL-6	**Date** (DDOct2012): 01NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Partly Cloudy		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" (4") 6" Other:		**DTW:** 15.39 **Total Depth:** 20.0
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 17.5	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume —	80% Recovery (TD - DTW X 0.20 + DTW) —	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C) °F)	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or (mL) min)	Volume Removed (gal (L))	DO (mg/l)	ORP (mv)	DTW	Notes
1104	12.6	7.0	2074	36.0	150	~~0.5~~ ~~5003K~~	1.69	-50.9	15.39	Initial
1107	13.4	7.0	2073	35.9	150	~~0.45~~ ~~0.950~~	1.53	-50.1	15.39	
1110	13.3	7.1	2073	36.3	150	1.40	1.45	-45.7	15.39	
1113	13.2	7.1	2072	21.7	150	1.85	1.40	-45.5	15.39	
1116	13.1	7.1	2076	20.2	150	2.30	1.31	-43.2	15.39	
1119	13.0	7.1	2077	20.1	150	2.75	1.30	-41.3	15.39	

Did well dewater? YES (NO)	Total volume removed: 2.75 (gal (L))	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 01NOV2012	Sample time: 1125	DTW at sample: 15.39
Sample ID: 6210	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-1	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 105.30	**Total Depth:** 140.00
Purge equip: (ES) diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)		
Pump depth/ intake: 125'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (C/F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1145	13.1	7.1	1835	12	—	—	6.0	107	105.30	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 03NOV2012	Sample time: 1145	DTW at sample: 105.30
Sample ID: G236	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-1	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: WARM	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: 5"	**DTW:** 105.34 **Total Depth:** 140 dtw	
Purge equip: ES - diam; Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 123' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1202	13.6	7.1	1809	251	400	1.2L	3.2	126	105.78	
1205	13.3	7.1	1206	89	|	2.4L	2.8	117	105.74	
1208	13.2	7.1	1220	32	|	3.6L	2.9	113	105.74	
1211	13.4	7.1	1227	27	|	4.8L	2.9	106	105.74	
1214	14.4	7.1	1219	29	|	6L	2.9	97	105.74	
1217	14.7	7.1	1219	30	|	7.2L	2.9	92	105.74	
1220	15.1	7.1	1217	30	↓	8.4L	2.9	88	105.74	

Did well dewater? YES NO	Total volume removed: 8.4L (gal / L)	
Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:		
Sample date: 03NOV2012	Sample time: 1220	DTW at sample: 105.74
Sample ID: 6239	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-1	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: (5")	**DTW:** 105.30	**Total Depth:** 140.02
Purge equip: (ES - diam;) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 123'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 35.4 X 3 = 106.2 (Total Purge) 80%= 112.24

Time	Temp (°C) °F	pH	Cond (mS µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1239	13.1	7.1	1612	257	2gpm	35.5	5.6	65	113.82	
1259	12.9	7.2	1803	35	↓	71	5.4	59	114.38	
1319	12.8	7.2	1747	33	↓	107	5.4	30	114.66	
	waited	briefly	for	80%						

Did well dewater? YES (NO) Total volume removed: 107 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 03NOV2012	Sample time: 1326	DTW at sample: 112.24
Sample ID: 0240	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH	250 ml HNO3 poly *field filtered - Dissolved Metals	
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: OW-UT-9	**Date** (DDOct2012): 03NOV2017	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" 4" (6") Other:		**DTW:** 122.90 **Total Depth:** 142.00

Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA

Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:

Pump depth/ intake: 132.5 **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163

(TD - DTW X Multiplier = 1 Volume — | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = — X ___ = — (Total Purge) 80%= —

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1150	14.6	9.9	40145		—	—	1.68	-237.6	122.90	Brown/Tan looks like Apple Juice
—	Reactive	with	HNO3	Preservative.	Added		3 vials	HNO3		
—	to sample	and	3 to	Duplicate.			pH	dropped	to	6.2

Did well dewater? YES NO	Total volume removed: — (gal / L)	
Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:		
Sample date: 03NOV2017	Sample time: 1150	DTW at sample: 122.90
Sample ID: 6762	Lab: Energy Labs	Number of bottles: 2 + 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH	250 ml HNO3 poly *field filtered - Dissolved Metals	
Equipment blank ID @	Field blank ID @	
Duplicate ID: 6763 @ 1155	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: — ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: QwMT-9	**Date** (DDOct2012): 02NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Breeze		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" 4" (6") Other:		**DTW:** 122.90 **Total Depth:** 142.00
Purge equip: (ES - diam:2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 130.5	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or (mL) / min)	Volume Removed (gal / (L))	DO (mg/l)	ORP (mv)	DTW	Notes
1233	13.9	9.9	44627	3.0	300	1.0	Ø.58	-395.6	123.21	Clear/Brown
1236	13.9	9.9	45847	3.0	300	1.9	Ø.56	-394.8	123.21	Looks like
1239	13.7	9.9	46073	3.6	300	2.8	Ø.38	-399.2	123.21	Apple Juice
1242	14.0	9.9	46165	3.7	300	3.7	Ø.48	-395.1	123.21	
1245	14.2	9.9	46166	3.2	300	4.6	Ø.44	-396.5	123.21	
1248	14.2	9.9	46218	3.2	300	5.5	Ø.42	-397.3	123.21	
1251	14.2	9.9	46724	3.5	300	6.4	Ø.40	-397.1	123.21	
—	Add (3) vials HNO_3 to				Metals Bottle		- pH @ 5.8 - Reactive w/ HNO_3			

Did well dewater? YES (NO)	Total volume removed: 6.4 (gal / (L))	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 02NOV2012	Sample time: 1255	DTW at sample: 123.21
Sample ID: 6264	Lab: Energy Labs	Number of bottles: (2)
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO_3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-UT-9	**Date** (DDOct2012): 03Nov 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" (6") Other:	**DTW:** 122.90 **Total Depth:** 142.00	

Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA

Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:

Pump depth/ intake: 130.5 **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = 28.1 X 3 = 84.2 (Total Purge) 80%=

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1319	13.3	9.9	44842	3.7	1.5	28	0.30	-324.8	125.90	
1338	13.1	9.9	44915	3.6	1.5	56	0.38	-277.8	126.50	
1356	13.3	9.9	45007	3.7	1.5	85	0.38	-267.8	125.00	
—	Added (3)	drops of	HNO3	to	Sample	—	pH	= 5.9		

Did well dewater? YES (NO) Total volume removed: 8.5 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 03Nov2012 Sample time: 1400 DTW at sample: 125.00

Sample ID: 6265 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID 6266@ 1430 Field blank ID @

Duplicate ID: Pre-purge DO: Post purge DO:

$Fe2^{+}$: Pre-purge ORP: Post purge ORP:

NAPL depth: Volume of NAPL: Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: 14-63	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: 5"	**DTW:** 135.84 **Total Depth:** 172.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 157'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0835	9.4	8.3	1202	5.7	—	—	5.48	132.0	135.84	

Did well dewater? YES NO	Total volume removed: — (gal / L)		
Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:			
Sample date: 03NOV2012	Sample time: 0835	DTW at sample: 135.84	
Sample ID: 6249	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: 14-63	**Date** (DDOct2012): 03NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Brisk	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: 5"	**DTW:** 135.84	**Total Depth:** 172.00
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 159'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C °F)	pH	Cond (mS µS)	Turbidity (NTU)	Purge Rate (gal (ml) min)	Volume Removed (gal (L))	DO (mg/l)	ORP (mv)	DTW	Notes
0915	10.6	8.1	1252	5.8	300	1.0	4.98	42.8	136.11	
0918	10.6	8.3	1257	5.5	300	1.9	4.53	38.00	136.11	
0921	10.9	8.3	1204	5.1	300	2.8	4.49	33.00	136.11	
0924	11.0	8.3	1207	5.1	300	3.7	4.47	32.6	136.11	
0927	11.1	8.3	1203	5.3	300	4.6	4.46	32.9	136.11	
0930	11.1	8.3	1203	5.2	300	5.5	4.43	32.8	136.11	

Did well dewater? YES (NO)	Total volume removed: 5.5 (gal (L))	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 03NOV2012	Sample time: 0935	DTW at sample: 136.11
Sample ID: 6250	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: 463	**Date** (DDOct2012): 03/NOV/2017	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Warming		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" 4" 6" Other: 5"		**DTW:** 135.84 **Total Depth:** 172.00
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 159'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 36.9 X 3 = 111 (Total Purge) 80%= ____

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal) L)	DO (mg/l)	ORP (mv)	DTW	Notes
0953	12.3	8.0	1137	8.9	2.5	37	7.11	25.6	139.81	
-	Pause purge to offload water						--	—	—	
1038	12.3	7.9	1119	9.3	2.5	74	7.78	-141.0	139.71	
1053	12.3	7.9	1121	9.0	2.5	111	7.53	-138.3	139.81	

Did well dewater? YES (NO)		Total volume removed: 111 (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 03/NOV/2017	Sample time: 1055	DTW at sample: 139.81	
Sample ID: 6261	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @		Field blank ID @	
Duplicate ID:		Pre-purge DO:	Post purge DO:
$Fe2^+$:		Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed:	ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW100	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.96 **Total Depth:** 204.5	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (HS)		
Pump depth/ intake: 178'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F)	pH	Cond (mS / (uS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
855	10.6	7.3	932	8	—	—	1.71	131	—	

Did well dewater? YES (NO) Total volume removed: ~~146.96~~ (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 07NOV2012	Sample time: 855	DTW at sample: 146.96
Sample ID: 0287	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW100	**Date** (DDOct2012): 07Nov2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.80 **Total Depth:** 204.5	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 176'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
905	10.7	7.3	1373	27	400	1.2	1.9	131	147.20	
908	11.1	7.3	1381	10		2.4	1.5	130	147.20	
911	11.2	7.3	1390	7		3.6	1.5	129	147.18	
914	11.2	7.3	1397	6		4.8	1.5	129	147.18	
917	11.2	7.3	1395	6		6	1.5	129	147.18	

Did well dewater? YES (NO)	Total volume removed: 6L (gal / L)		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 07Nov2012	Sample time: 920	DTW at sample: 147.18	
Sample ID: 07880	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-103	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.96 **Total Depth:** 701.5	
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 770' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 37.4 X 3 = 112.2 (Total Purge) 80%= 158.47

Time	Temp (°C) °F)	pH	Cond (mS /(uS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
933	12.3	7.3	1404	25	3	37.5	1.2	125	149.83	
946	12.3	7.3	1396	13	↓	75	1.1	120 ~~200~~	150.05	
959	12.3	7.3	1391	11	↓	112.5	1.0	118	150.55	

Did well dewater? YES (NO)	Total volume removed: 112.5 (gal / L)	
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 07NOV2012	Sample time: 1000	DTW at sample: 150.55
Sample ID: 6289	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-101	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 151.93 **Total Depth:** 161.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: .	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1040	12.8	7.2	20031	23.2	—	—	5.29	-237.8	151.93	

Did well dewater? YES NO — Total volume removed: _____ (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 06NOV2012 — Sample time: 1040 — DTW at sample: 151.93

Sample ID: 6271 — Lab: Energy Labs — Number of bottles: (2)

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-101	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** ~~150.63~~ 151.93	**Total Depth:** 161.00
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 156	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1054	13.1	7.1	19925	721	400	1.2L	4.5	64	151.35	
1057	12.2	7.0	22162	766		2.4L	4.5	67	151.39	
1100 1059	12.2	7.0	22428	856		3.6L	4.6	66	151.38	
1103	12.7	7.0	22372	811		4.8L	4.7	88	151.38	
1106	16.1	7.0	21882	831		6L	4.3	83	151.42	
1109	18.0	7.0	21703	755		7.2L	4.2	81	151.42	
1112	18.0	7.0	21717	731		8.4L	4.3	78	151.42	
1115	18.0	7.0	21708	724	↓	9.6L	4.4	75	151.42	

Did well dewater? YES (NO) Total volume removed: 9.6L (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 1115	DTW at sample: 151.42
Sample ID: 06259	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-101	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 151.38 **Total Depth:** 161.00	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 156 **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 6.3 X 3 = 18.9 (Total Purge) 80%= 153.32

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1123	15.5	7.1	19928	258	1gpm	6.3	4.4	81	152.82	
1129	14.3	7.0	19679	71000	↓	12.6	4.1	76	153.30	
1135	14.0	7.0	19845	71000	↓	19	4.3	71	153.74	
	WAT-d	briefly	for	80%						

Did well dewater? YES (NO) Total volume removed: 19 ((gal) / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 1140	DTW at sample: 153.32
Sample ID: 62600	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID 6282 @ 1215	Field blank ID @	
* Duplicate ID: 62601 @ 1150	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-102	**Date** (DDOct2012): 06 Nov 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 126.13 **Total Depth:** 138.10	

Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: — **Tubing:** OD: New Dedicated NA

Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:

Pump depth/ intake: — **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C/ °F)	pH	Cond (mS/ uS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0735	7.5	9.0	20818	5.9	—	—	1.71	+220.2	126.13	

Did well dewater? ~~YES~~ ~~NO~~ Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 06 Nov 2012 Sample time: 0735 DTW at sample:

Sample ID: 6267 Lab: Energy Labs Number of bottles: 2 + 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @ Field blank ID @

Duplicate ID: 6268 @ 0740 Pre-purge DO: Post purge DO:

$Fe2^{+}$: Pre-purge ORP: Post purge ORP:

NAPL depth: Volume of NAPL: Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-102	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny – Brisk	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** ~~125.38~~ 126.13	**Total Depth:** 138.10
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 133.5	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ____ X ____ = ____ (Total Purge) 80%= ____

Time	Temp (°C) °F)	pH	Cond (mS /(µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal /(L))	DO (mg/l)	ORP (mv)	DTW	Notes
0815 ~~10.7~~	10.7	8.8	21891	6.3	300	1.0	1.69	-455.1	126.23	Yellow/Brown
0818	10.7	8.9	22008	9.3	300	1.9	1.63	-449.3	126.47	
0821	11.1	8.9	21907	8.7	300	2.8	1.49	-476.3	126.65	
0824	12.0	8.9	21853	8.8	300	3.7	1.37	-467.3	126.68	
0827	13.3	8.9	21804	8.5	300	4.6	1.27	-441.7	126.62	
0830	13.5	8.9	21789	8.7	300	5.5	1.26	-435.3	126.62	
0833	14.0	8.9	21759	8.7	300	6.4	1.23	-404.3	126.62	
0836	14.2	8.9	21736	8.6	300	7.3	1.21	-392.6	126.59	
0839	14.5	8.9	21724	8.5	300	8.2	1.18	-369.5	126.60	
0842	14.5	8.9	21651	8.5	300	9.1	1.16	-374.7	126.60	
0845	14.5	8.9	21623	8.7	300	10.0	1.14	-377.3	126.60	

Did well dewater? YES (NO)	Total volume removed:	(gal/(L))
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:		
Sample date: 06NOV2012	Sample time: 0850	DTW at sample:
Sample ID: 6269	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-102	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Brisk	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 126.13 **Total Depth:** 133.10	
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 7.7 X 3 = 23.3 (Total Purge) 80%= 178.52

Time	Temp (°C / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0900	13.8	8.9	21389	10.3	1.0	8	1.18	-381.1	131.89	
0908	13.4	8.8	21924	993	1.0	16	1.18	-401.0	135.22	
0930	13.5	8.8	21875	>1000	0.5	24	1.18	-399.3	137.05	
—	Not @	80%	—	Wait to Collect Sample						—

Did well dewater? YES (NO) Total volume removed: 24 (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 1010	DTW at sample: 127.43
Sample ID: 6270	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-102B	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: CLR	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other:	**DTW:** 122.08 **Total Depth:** ~~177.30~~ 177.90	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: PS		
Pump depth/ intake: 160'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (C° / °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
745	8.6	8.0	8880	17	—	—	3.0	223	122.08	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 06NOV12 Sample time: 745 DTW at sample: 177.90

Sample ID: 6255 / 6291 (Spl. F) Lab: Energy Labs + ATC Number of bottles: 2 + 3 (spl. F)

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns, B Myers	**Client:** Montgomery & Associates
Well ID: MW-102D13	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 122.08 **Total Depth:** 177.90	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 160' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / (L))	DO (mg/l)	ORP (mv)	DTW	Notes
803	10.5	8.1	1527	285	400	1.2L	0.30	161	124.35	
806	10.6	8.1	1406	278		2.4L	0.20	125	124.20	
809	10.8	8.1	1385	279		3.6L	0.22	111	124.26	
812	11.0	8.1	1368	276		4.8L	0.33	87	124.28	
815	11.4	8.1	1399	34		6L	0.29	58	124.29	
818	12.0	8.1	1375	35		7.2L	0.28	19	124.31	
821	12.5	8.1	1327	34		8.4L	0.27	-20	124.32	
824	13.0	8.1	1343	34		9.6L	0.26	-31	124.35	
827	13.1	8.1	1347	26		10.8L	0.27	-50	124.35	
830	13.3	8.1	1341	24		12L	0.260	-59	124.35	
833	13.4	8.1	1343	21		13.2L	0.25	-72	124.35	see pg 2

Did well dewater? YES (NO) Total volume removed: 18L (gal (L))

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 845	DTW at sample: 124.45
Sample ID: 6254/6292 (Split)	Lab: Energy Labs + ACZ	Number of bottles: 2+3 (split)
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		

Equipment blank ID @	Field blank ID @
* Duplicate ID: 6257 @ 855	Pre-purge DO: Post purge DO:
$Fe2^+$:	Pre-purge ORP: Post purge ORP:

NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-102D(1)	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 122.06 **Total Depth:** 177.90	

Purge equip: (ES - diam): Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA

Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:

Pump depth/ intake: **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) / (F)	pH	Cond (mS / (S))	Turbidity (NTU)	Purge Rate (gal or (L) / min)	Volume Removed (gal / (L))	DO (mg/l)	ORP (mv)	DTW	Notes
836	13.5	8.1	1353	23	400	14.4L	0.24	-84	124.42	
839	13.4	8.1	1374	22	|	15.0L	0.23	-85	124.45	
842	13.5	8.1	1378	20	|	16.8L	0.23	-88	124.45	
845	13.4	8.1	1329	20	—	18L	0.22	-87	124.45	

Did well dewater? YES (NO) Total volume removed: 18L (gal (L))

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 845	DTW at sample: 124.45
Sample ID: 60256 / 60292 (spl.t)	Lab: Energy Labs + ACZ	Number of bottles: 2 +3 (spl.t)
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH	250 ml HNO3 poly *field filtered - Dissolved Metals	

Equipment blank ID @	Field blank ID @	
Duplicate ID: 60257 @ 855	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-102DB	**Date** (DDOct2012): 06NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 122.08 **Total Depth:** 177.90	
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 160' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 36.3 X 3 = 109 (Total Purge) 80%= 133.24

Time	Temp (C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal) or mL/ min	Volume Removed (gal) / L	DO (mg/l)	ORP (mv)	DTW	Notes
910	12.2	8.1	1085	13	3gpm	36.3	0.08	-78	136.60	
922	12.2	8.1	977	12	|	72.6	0.10	-83	141.10	
936	12.2	8.1	990	12	|	109	0.10	-80	147.45	
	Waited	for	80%							

Did well dewater? YES (NO) Total volume removed: 109 (gal) / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 06NOV2012	Sample time: 1015	DTW at sample: 133.24	
Sample ID: 6250 / 6293 (Split)	Lab: Energy Labs + ACZ	Number of bottles: 2 + 3 (spl.t)	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-103	**Date** (DDOct2012): ~~30~~ 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky – Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 85.28 **Total Depth:**	

Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA

Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:

Pump depth/ intake: 100.5' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C/ °F)	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0700	9.7	7.0	6620	4.3	—	—	5.23	63.4	85.28	

Did well dewater? YES NO | Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 07NOV2012 | Sample time: 0700 | DTW at sample: 85.28

Sample ID: 6772 | Lab: Energy Labs | Number of bottles (2)

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @ | Field blank ID @

Duplicate ID: | Pre-purge DO: | Post purge DO:

$Fe2^{+}$: | Pre-purge ORP: | Post purge ORP:

NAPL depth: | Volume of NAPL: | Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-103	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Bluesky - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 85.28	**Total Depth:** 113.51

Purge equip: (ES - diam:2") Bladder Peri Waterra Positive Air Displacement Ext. System
disp bailer teflon bailer other: **Tubing:** OD: (New) Dedicated NA

Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:

Pump depth/ intake: 100' **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163

(TD - DTW X Multiplier = 1 Volume | 80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C) °F	pH	Cond (mS /(uS)	Turbidity (NTU)	Purge Rate (gal or (mL)/min)	Volume Removed (gal /(L))	DO (mg/l)	ORP (mv)	DTW	Notes
0723	9.2	7.0	7094	27.6	300	1.0	5.30	107.7	85.82	
0726	8.2	7.0	7295	12.5	300	1.9	5.41	101.8	85.82	
0729	8.2	7.0	7295	9.6	300	2.8	5.30	99.2	85.80	
0732	8.2	7.0	7298	9.3	300	3.7	5.25	97.8	85.80	
0735	8.2	7.0	7308	9.4	300	4.6	5.17	92.2	85.82	
0738	8.0	7.0	7314	9.5	300	5.5	5.08	85.0	85.82	
0741	8.0	7.0	7306	9.5	300	6.4	5.02	83.6	85.82	
0744	8.0	7.0	7300	9.3	300	7.3	5.01	83.2	85.82	

Did well dewater? YES (NO) Total volume removed: 7.3 (gal (L))

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 07NOV2012	Sample time: 0745	DTW at sample: 85.82
Sample ID: 6273	Lab: Energy Labs	Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-103	**Date** (DDOct2012): 07NOV2017	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky - Cold		**Sampler Signature:**
Well diam: 1/4" 1" 2" 3" (4") 6" Other:		**DTW:** 85.28 **Total Depth:** 113.51
Purge equip: (ES - diam: 2") Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:		**Tubing:** OD: (New) Dedicated NA
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 100'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 18.3 X 3 = 55 (Total Purge) 80%= 90.93

Time	Temp (°C) °F	pH	Sp Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal) / L	DO (mg/l)	ORP (mv)	DTW	Notes
0810	12.3	7.1	4580	175	1.5	20	4.13	69.1	98.73	
0821	12.8	7.1	7362	203	1.0	40	2.76	67.4	108.30	
0835	well dewatered @				approx	55 gallons			112.13	
1130	12.7	7.0	7181	13	—	—	3.26	24.9	—	

Did well dewater? (YES) NO	Total volume removed: 55 (gal) / L		
Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:			
Sample date: 07NOV2017	Sample time: 1130	DTW at sample: 89.64	
Sample ID: ~~6274~~ (FR) ~~6275~~ (DUP) (6276)	Lab: Energy Labs	Number of bottles: 2	
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals			
Equipment blank ID @	Field blank ID @		
Duplicate ID:	Pre-purge DO:	Post purge DO:	
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:	
NAPL depth:	Volume of NAPL:	Volume removed: ml	

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-104	**Date** (DDOct2012): 07Nov 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Blue Sky	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 103.30 **Total Depth:** 111.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: Grab **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: Grab		
Pump depth/ intake: — **Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163		
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X — = — (Total Purge) 80%= —

Time	Temp (°C / °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0945	11.1	7.3	1521	6.1	—	—	—	—	103.30	
	well	recovered	@ 60%	- client	request	sample	@	partial		
	recovery									

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: (Disp Bailer) Hydrasleeve New Tubing Ext. Port Other:

Sample date: 07Nov2012 Sample time: 0945 DTW at sample: 103.30

Sample ID: 6275 Lab: Energy Labs Number of bottles: 2

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-105	**Date** (DDOct2012): 07/06/2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 73.53	**Total Depth:** 135.02
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: (PS)		
Pump depth/ intake: 106'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F)	pH	Cond (mS (µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
700	9.9	7.4	1282	8	—	—	1.4	22c	73.53	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: Disp Bailer (Hydrasleeve) New Tubing Ext. Port Other:

Sample date: 07/06/2012	Sample time: 700	DTW at sample: 73.53
Sample ID: 0283	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW105	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 73.53	**Total Depth:** 136.83
Purge equip: (ES - diam:) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 106'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%=_____

Time	Temp (°C) °F	pH	Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal o (mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
715	8.7	7.2	1576	18	400ml	1.2L	0.54	211	73.47	
718	9.3	7.2	1725	17		2.4L	0.33	209	73.47	
721	9.8	7.1	1736	17		3.6L	0.25	204	73.47	
724	9.9	7.1	1732	18		4.8L	0.24	199	73.47	
727	10.2	7.1	1723	18		6L	0.26	188	73.47	
730	10.8	7.1	1697	17		7.2L	0.27	170	73.47	
733	11.0	7.2	1682	16		8.4L	0.27	161	73.47	
736	11.3	7.2	1671	15		9.6L	0.27	147	73.47	
739	11.6	7.2	1659	15		10.8L	0.28	136	73.47	
742	11.8	7.2	1643	14		12L	0.29	124	73.47	
745	12.0	7.2	1625	14		13.2L	0.29	119	73.47	see pg 2

Did well dewater? YES (NO) Total volume removed: 16.8L (gal / L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 07NOV2012	Sample time: 755	DTW at sample: 73.47
Sample ID: 0284	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID: 0285 @ 800	Pre-purge DO:	Post purge DO:
Fe2⁺:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns (B Myers)	**Client:** Montgomery & Associates
Well ID: MW-05	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 73.53 **Total Depth:** 136.83	
Purge equip: (ES - diam): Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other: **Tubing:** OD: New Dedicated NA		
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake: 100'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) (F)	pH	Cond (mS) (µS)	Turbidity (NTU)	Purge Rate (gal) (mL) min)	Volume Removed (gal) (L)	DO (mg/l)	ORP (mv)	DTW	Notes
748	12.0	7.2	11.14	14	4L	14.4L	0.29	110	73.47	
751	12.1	7.2	11.06	14	1	15.6L	0.28	106	73.47	
754	12.1	7.2	11.00	14	1	16.8L	0.28	102	73.47	

Did well dewater? YES (NO) Total volume removed: 16.8L (gal (L))

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 07NOV2012	Sample time: 755	DTW at sample: 73.47
Sample ID: 0284	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID: 0285 @ 800	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-105	**Date** (DDMMM2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Cool	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 73.53	**Total Depth:** 136.83
Purge equip: (ES - diam) Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: (New) Dedicated NA	
Purge method: (3-5 Case Volume) Micro/Low-Flow Extraction Other:		
Pump depth/ intake: 106'	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 41 X 3 = 123 (Total Purge) 80%= 86.19

Time	Temp (°C/ °F)	pH	Cond (mS/ µS)	Turbidity (NTU)	Purge Rate (gal or mL/min)	Volume Removed (gal/ L)	DO (mg/l)	ORP (mv)	DTW	Notes
807	12.2	7.3	1287	11	4gpm	41	0.70	113	73.52	
817	12.0	7.3	1270	10	1	82	1.10	119	73.55	
827	12.0	7.3	1262	10	1	123	1.34	120	73.59	

Did well dewater? YES (NO) Total volume removed: 123 (gal/ L)

Sample method: Disp Bailer Hydrasleeve (New Tubing) Ext. Port Other:

Sample date: 07NOV2012	Sample time: 830	DTW at sample: 73.59
Sample ID: 02BG	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns B Myers	**Client:** Montgomery & Associates
Well ID: MW-106	**Date** (DDOct2012): ~~Blue Sky - Brisk~~ 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: ~~Blue Sky - Brisk~~	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 255.43 **Total Depth:** 267.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: Grab	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other: None		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= (51) ~~271~~ 251

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0915	11.7	7.0	3067	9.9	—	—	—	86	255.43	
—	Recovered to 60% - client request sample @ partial recovery									

Did well dewater? YES NO — Total volume removed: — (gal / L)

Sample method: (Disp Bailer) Hydrasleeve New Tubing Ext. Port Other:

Sample date: 07NOV2012 — Sample time: 0915 — DTW at sample:

Sample ID: 6274 — Lab: Energy Labs — Number of bottles: (2)

Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** (C Kerns) B Myers	**Client:** Montgomery & Associates
Well ID: BAKER TANK	**Date** (DDOct2012): 07NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: warm	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other:	**DTW:** —	**Total Depth:** —
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (C/F)	pH	Cond (mS/uS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1100	14.6	6.8	3341	10	—	—	5.5	-34	—	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: (Disp Bailer) Hydrasleeve New Tubing Ext. Port Other:

Sample date: 07NOV2012	Sample time: 1100	DTW at sample: —
Sample ID: 0294	Lab: ~~Energy Labs~~ ACZ	Number of bottles: #4
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Development Data Sheet

Job#: 1352	**Developer:** T. Higgins	**Client:** Montgomery
Well ID: MW-100	**Date:** 10-31-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 146.96	**TD Before:** 204.5 **TD After:**
Purge equip: ES - diam: Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 30 min.		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 37.4 X 10 = 374 (Total Purge) Meter(s): Myron L Ultrameter, LaMotte 2020 Turbidimeter

Time	Temp (°C) °F)	pH	Cond (mS / (S)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DTW	Notes
1450	13.9	7.4	804	7.4	—	—	146.96	Collect Pre-Dev sample
—	Surge / Swab		well	—	—	—	—	Silty - Dark Brown
1703	12.7	7.9	797	>1000	—	38.0	148.71	Cloudy, Hard Bottom
—	Power	purged to	change to	E.S. pump			—	—
1728	12.4	7.3	880	>1000	3.0	76.0	149.93	cloudy
1742	12.0	7.3	854	681	3.0	114	150.27	clear
1754	12.3	7.3	862	39.2	3.0	152	150.40	"
1805	12.3	7.3	874	25.9	3.0	190	150.59	"

Did well dewater? YES (NO)	Total volume removed: 190 (gal / L)	
Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:		
Sample date: 10-31-12	Sample time: 1450	DTW at sample:
Sample ID: 6208	Lab: Energy	Number of bottles: (2)
Analysis:		

Development Data Sheet

Job#: 1350	**Developer:** J. Ickes	**Client:** Montgomery
Well ID: MW-101	**Date:** 10-30-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 150.65	**TD Before:** 160.8 **TD After:** 161.09
Purge equip: ES - diam: Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 15 minutes		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 6.6 X 10 = 66 (Total Purge) Meter(s): Myron L Ultrameter, LaMotte 2020 Turbidimeter

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/min)	Volume Removed (gal/L)	DTW	Notes
1530	13.6	6.9	15.94	108	—	—	150.65	Pre-Development sample
1612	12.1	6.9	15.71	>1000	Ø.33	6.5	151.85	Silty - Dark Brown
1634	11.7	7.6	16.28	>1000	Ø.33	13.0	152.20	Silty - Dark Brown
1652	11.6	7.3	16.30	>1000	Ø.33	19.5	152.27	Silty - Dark Brown
1704	11.7	6.9	16.26	>1000	Ø.33	26.0	152.33	Turbid - lite Brown
—	Suspended	purge	—	Re-start	~~32.5~~ TIC		purge	10/31/12
0805	Begin	purge	—	—	—	—	150.93	
0820	8.5	7.0	16.39	>1000	Ø.33	32.5	152.00	Turbid - Brown
0835	9.4	7.1	16.38	>1000	Ø.33	39.0	152.22	Turbid - Lite Brown
0853	10.5	7.2	16.38	711	Ø.33	45.5	152.33	Cloudy - Hard Bottom
0910	10.8	7.2	16.42	197	Ø33	52.0	152.05	Less Cloudy
0927	11.2	7.2	16.39	158	Ø.33	59.0	152.10	—
0945	11.1	7.1	16.36	98	Ø.33	66.0	152.10	

Did well dewater? YES (NO) Total volume removed: 66.0 (gal/L)

Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:

Sample date: 10-30-12 Sample time: 1530 DTW at sample: 150.65

Sample ID: 6205 Lab: Energy Number of bottles: (2)

Analysis:

Development Data Sheet

Job#: 1352	**Developer:** J. Kerns	**Client:** Montgomery
Well ID: MW-102	**Date:** 10-30-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 125.28	**TD Before:** 137.3 **TD After:** 138.10
Purge equip: ES - diam: Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 20 min.		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 8.2 X 10 = 82 (Total Purge) Meter(s): LaMotte 2020 / Intrameter

Time	Temp (°C) °F	pH	Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal) or mL/min	Volume Removed (gal / L)	DTW	Notes
0810	8.4	7.8	13.95	9.6	—	—	125.38	Pre-Development Sample
—	Begin Surge / Swab		—	Approx.		—		Pre-Dev sample has a yellow tint
0905	9.4	7.8	14.41	>1000	—	8.5	128.90	Silty - Fishy Odor
0919	10.7	7.7	14.73	>1000	Ø.5	17.0	129.85	Silty - Fish like odor
0939	11.4	7.9	15.62	>1000	Ø.5	25.5	130.33	Turbid - Less Silty
1005	12.0	8.3	16.54	>1000	Ø.33	34.0	130.33	Turbid - Hard Bottom
1020	12.0	8.4	16.73	806	~~Ø.33~~ Ø.50 (SC)	42.5	130.79	Turbid - Yellow Color
1037	11.7	8.5	17.24	>1000	Ø.5	51.0	131.59	Turbid
1057	11.6	8.5	17.76	>1000	Ø.5	59.5	132.25	Turbid - Cloudy
1117	11.7	8.6	17.91	755	Ø.5	68.0	132.55	Cloudy - Yellow Color
1117	paused purge to offload				~~76.5~~ (DL)		—	Restart Purge @ 1150
1134	11.9	8.6	17.70	235	Ø.5	76.5	129.25	
1151	12.0	8.6	17.84	227	Ø.5	85.0	130.70	Cloudy - Hard Bottom

Did well dewater? YES (NO)	Total volume removed:	85.0 ((gal) / L)
Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:		
Sample date: 10-30-12	Sample time: 0810	DTW at sample: 125.28
Sample ID: 6203	Lab: Energy	Number of bottles: (2)
Analysis:		

Development Data Sheet

Job#: 1350	**Developer:** J. Kerns	**Client:** Montgomery
Well ID: MW-1020B	**Date:** 10-30-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 122.08 **TD Before:** 177.3 **TD After:** 177.90	
Purge equip: (ES - diam) Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development:		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 35.9 X **10** = _____ (Total Purge) Meter(s): Ultrameter

Time	Temp (°C) °F)	pH	Cond (mS/(µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal) L)	DTW	Notes
0945	11.1	8.2	1094	8.5	—	—	122.08	Pre-Purge/Dev Sample Clear
–	Surge/Swab well prior to purge							
1324	14.0	8.5	885	>1000	∅.75	36.0	124.95	Silty - Dark Brown
1330	13.4	8.8	761	>1000	∅.50	72.0	126.95	No odor - cloudy
—	Pause purge to offload water						—	
1545	12.5	8.1	619	291	2gpm	108	132.90	clearing w/ ES
1551	12.7	8.1	618	285		120	133.80	clearing
1556	12.8	8.1	612	281		130	134.65	
1601	12.4	8.2	607	33		140	136.20	
1606	12.5	8.2	606	26		150	137.00	
1611	12.5	8.2	607	24		160	137.60	
1616	12.5	8.1	606	23		170	138.10	
1621	12.5	8.1	605	23		180	138.75	
	Per Client - well developed well bottom clear + hand							

Did well dewater? YES (NO) Total volume removed: 180 (gal) L)

Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:

Sample date: 10-30-2012 Sample time: 0945 DTW at sample: 122.08

Sample ID: 6204 Lab: Energy Number of bottles: (2)

Analysis:

Development Data Sheet

Job#: 1350	**Developer:** J. Kerns	**Client:** Montgomery
Well ID: MW-103	**Date:** 10-31-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 83.44	**TD Before:** 113.20 **TD After:**
Purge equip: (ES - diam:) Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 30 min		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 19.3 X 10 = 193 (Total Purge) Meter(s): LaMotte 2020 Turbidimeter, Myron L Ultrameter

Time	Temp (°C) °F	pH	Cond (mS / (µS))	Turbidity (NTU)	Purge Rate (gal) or mL/ min)	Volume Removed ((ga) / L)	DTW	Notes
1015	11.6	8.0	1372	5.8	—	—	83.44	Pre-Development Sample
—	Surge / Swab well				—	—	—	
1115	13.0	7.0	5017	>1000	Ø.66	20.0	91.97	Silty - Brown
1145	~~14~~ 13.2	7.0	5467	>1000	Ø.66	40.0	99.45	Turbid - Tan
1215	13.6	7.3	6055	>1000	Ø.66	60.0	105.76	Turbid
—	~~pa~~ Suspended purge to offload water —							
1629	12.4	6.8	7138	60	1/pm	70	95.10	cleaning w/ F.S.
1638	12.7	6.7	6658	346	1	80	101.80	becoming cloudy w/ V wt
1648	12.6	6.9	7166	>1000	—	90	110.90	Dewatered
	Dewatered at 94 gallons							

Did well dewater? (YES) NO	Total volume removed: 94 ((gal) L)	
Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:		
Sample date: 10-31-12	Sample time: 1015	DTW at sample: 83.44
Sample ID: 6206	Lab: Energy	Number of bottles: (2)
Analysis:		

Development Data Sheet

Job#: 1350	**Developer:** BM	**Client:** Montgomery
Well ID: MW104	**Date:** 10/29/12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 97.04	**TD Before:** 110.00 **TD After:**
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 20 mins		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 8 X 10 = 80 (Total Purge) Meter(s): Lamotte 2020 Turb Muran L Ultrameter

Time	Temp (°C) °f)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DTW	Notes
Per Client request - sample taken prior to dev (slow recharge)								
1625	11.5	7.0	2007	41	—	—	—	
1650	11.7	7.0	1945	>1000	—	8	—	Turbid
	Well dewatered @ 10 gallons							

Did well dewater? (YES) NO	Total volume removed: 10 (ga) / L)	
Sample method (if applicable): Disp Bailer Ded. Tubing New Tubing Ext. Port Other:		
Sample date: 10/29/12	Sample time: 1625	DTW at sample: —
Sample ID: 6202	Lab: Energy	Number of bottles: 2
Analysis:		

Development Data Sheet

Job#: 1350	**Developer:** T. Ikins	**Client:** Montgomery
Well ID: MW-105	**Date:** 10-31-12	**Site:** Rio Algom Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 75.53	**TD Before:** 137.00 **TD After:** 137.00
Purge equip: (ES - diam:) Bladder Peri Waterra (Positive Air Displacement) Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 30 min		
Pump depth/ intake: Bottom	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 40 X 10 = 400 (Total Purge) Meter(s): Myron L Ultrameter, LaMotte 2020 Turbidimeter

Time	Temp (°C) °F	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal/ L)	DTW	Notes
1230	15.3	7.5	895	9.0	—	—	75.53	Pre-Development Sample
—	Surge / Swab use	d —	—	—	—	—	—	Silty - Brown
1415	12.9 ~~7.6~~	7.6	906	680	0.66	40	75.60	Cloudy - Hard Bottom
1501	12.2	7.2	1118	22	3gpm	~~Col~~	73.60	Clearing
1508	12.3	7.2	1125	12	3gpm	82	73.60	clear
1513 ~~1515~~	12.2	7.2	1173	10	4gpm	103	73.60	clear
1518 ~~1522~~	12.3	7.3	1134	5		124	73.60	
1523 ~~1529~~	12.3	7.3	1131	4		146	73.60	
1528	12.3	7.3	1154	3		165	73.60	
1533	12.3	7.3	1159	3		185	73.60	
1537	12.3	7.3	1164	2		200	73.60	
Well	bottom clean + hard							

Did well dewater? YES (NO) Total volume removed: 200 (gal / L)

Sample method (if applicable): (Disp Bailer) Ded. Tubing New Tubing Ext. Port Other:

Sample date: 10-31-12 Sample time: 1230 DTW at sample: 75.53

Sample ID: ~~MW-105~~ 6207 Lab: Energy Number of bottles: (2)

Analysis:

Development Data Sheet

Job#: 1350	**Developer:** Bm	**Client:** Montgomery
Well ID: MW10Ca	**Date:** 10/29/12	**Site:** Rio Alyso Mine
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 247.11	**TD Before:** 267.00 **TD After:**
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System		
disp bailer teflon bailer other:	**Surge block used:** (Y) N	
Length of time surged prior to development: 20 mins		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = 13 X 10 = 130 (Total Purge) Meter(s): Ultrameter, Turbidimeter

Time	Temp (°C) °F)	pH	Cond (mS (µS))	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DTW	Notes
1100	Per client request - sample taken prior to dev (slow recharge)							Grab sample
1300	11.9	6.8	3119	>1000	—	5	251.30 ~~250.90~~	Turbid, Hard bottom # 6201
1350	13.0	7.0	3132	>1000	—	10	—	cleaning, not turbid
1440	13.2	7.0	3140	>1000	—	15	257.00	cleaning
1511	13.2	7.0	3149	>1000	—	20	261.40	
				~~>1000~~		~~25~~		
	Well dewatered @ 25 gallons						DTW =	265.30

Did well dewater? (YES) NO Total volume removed: 25 (gal) / L)

Sample method (if applicable): Disp Bailer Ded. Tubing New Tubing Ext. Port Other:

Sample date: 10/29/12 Sample time: 1100 DTW at sample: —

Sample ID: 6201 Lab: Energy Number of bottles: 2

Analysis:

Chain of Custody and Analytical Request Record

ENERGY LABORATORIES

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc. RIO Algom Mining Lisbon, UT Facility		Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required): Report To: Leilani Bew LBew@ELMontgomery	Contact Name:	Phone/Fax:	Cell:	Sampler: (Please Print) Josh Kern
☐ No Hard Copy Email:	Invoice Contact & Phone:		Purchase Order:	Quote/Bottle Order: 38150

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:

- ☐ DW
- ☐ POTW/WWTP
- ☐ State: ______
- ☐ Other: ______
- ☐ EDD/EDT (Electronic Data) Format: ______
- ☐ LEVEL IV
- ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

ANALYSIS REQUESTED: See attached bottle order #38150 — SEE ATTACHED

Standard Turnaround (TAT) — RUSH: Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO_3 in field

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150
1	6301	28NOV2012	0830	Water	X
2	6302	28NOV2012	0935	Water	X
3					
4					
5					
6					
7					
8					
9					
10					

LABORATORY USE ONLY: Shipped by: / Cooler ID(s): / Receipt Temp: °C / On Ice: Y N / Custody Seal: On Bottle Y N, On Cooler Y N / Intact: Y N / Signature Match: Y N

Custody Record MUST be Signed

Relinquished by (print): Josh Kern	Date/Time: 28NOV2012/1200	Signature: [signature]	Received by (print): Date/Time: Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): Date/Time: Signature:
			Received by Laboratory: Date/Time: Signature:

Sample Disposal: Return to Client: ______ Lab Disposal: ______

...subcontracted to other certified laboratories in order to complete the analysis requested...

ENERGY LABORATORIES
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Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

BOTTLE ORDER 38150

SHIPPED TO: Rio Algom Mining Corporation LLC

Contact: Jason Brown
c/o Confluence Environmental Inc
3308 El Camino Ave Ste 300 #148
Sacramento CA 95821
Phone: (916) 759-8156

Project:

Order Created by: Kerri Schroeder
Shipped From: Casper, WY

Ship Date: 10/24/2012
VIA: Next Day Air
Early AM

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
500 mL Plastic	1	A2320 B	Alkalinity				16
		E300.0	E300.0 Anions				
		A2540 C	Solids, Total Dissolved				
		A2510 B	Conductivity				
		A4500-H B	pH	0.25 hrs			
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Dissolved		HNO3	Filter before preservation	16

Comments

Bicarbonate, Carbonate, Cl, SO4, TDS, pH, Cond Ca, Mg, Na, K, As, Se, Mo, U.
Metals samples will be filtered in the field.

HNO3 - Nitric Acid H2SO4 - Sulfuric Acid NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate HCl - Hydrochloric Acid H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc. RIO Algom Mining Lisbon, UT Facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required): Report to: Leilani Bew LBew@ELMontgomery.com	Contact Name: Phone/Fax:	Cell:	Sampler: (Please Print) Josh Kerns
☐ No Hard Copy Email:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150
Invoice Address (Required):			
☐ No Hard Copy Email:			

Special Report/Formats:
- ☐ DW
- ☐ POTW/WWTP
- ☐ State: ______
- ☐ Other: ______
- ☐ EDD/EDT (Electronic Data) Format: ______
- ☐ LEVEL IV
- ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED: See attached bottle order # 38150

SEE ATTACHED

Standard Turnaround (TAT)

RUSH — Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO_3 in field

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order # 38150
1	6303	28NOV2012	1010	Water	X
2	6304	28NOV2012	1030	Water	X
3					
4					
5					
6					
7					
8					
9					
10					

LABORATORY USE ONLY

Shipped by:
Cooler ID(s):
Receipt Temp: ____ °C
On Ice: Y N
Custody Seal On Bottle Y N / On Cooler Y N
Intact Y N
Signature Match Y N

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Josh Kerns	28NOV2012 / 1200	[signature]			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:

Sample Disposal: Return to Client: ______ Lab Disposal: ______

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

ENERGY LABORATORIES
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Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

BOTTLE ORDER 38150

SHIPPED TO: Rio Algom Mining Corporation LLC

Contact: Jason Brown
c/o Confluence Environmental Inc
3308 El Camino Ave Ste 300 #148
Sacramento CA 95821
Phone: (916) 759-8156

Order Created by: Kerri Schroeder
Shipped From: Casper, WY

Ship Date: 10/24/2012
VIA: Next Day Air
Early AM

Project:

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
500 mL Plastic	1	A2320 B	Alkalinity				16
		E300.0	E300.0 Anions				
		A2540 C	Solids, Total Dissolved				
		A2510 B	Conductivity				
		A4500-H B	pH	0.25 hrs			
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Dissolved		HNO3	Filter before preservation	16

Comments

Bicarbonate, Carbonate, Cl, SO4, TDS, pH, Cond Ca, Mg, Na, K, As, Se, Mo, U.
Metals samples will be filtered in the field.

HNO3 - Nitric Acid | H2SO4 - Sulfuric Acid | NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate | HCl - Hydrochloric Acid | H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

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Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

Confluence Environmental, Inc

Equipment Calibration Log

Equipment make/model	Equipment ID/ serial number	Date	Time	Calibration Standards	Equipment Reading	Equipment Calibrated	Temp (°C) °F)	Tech init.	Comments
YSI Pro	12A100565	11-28-12	0745	pH 4.0/7.0/10.0	4.0/7.0/10.0	✓	19	JK	
			0747	Cond 1413	1413	✓	19	JK	
			0750	DO 100%	100%	✓	20	JK	
			0752	ORP 237.5	237	✓	20	JK	

Notes/comments:

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns T Mulloy	**Client:** Montgomery & Associates
Well ID: RL-1	**Date** (DDOct2012): 28NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" 4" 6" Other: 5"	**DTW:** 116.24	**Total Depth:** 124.00
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement (Ext. System)		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	Temp (°C / °F)	pH	Sp Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0810	8.6	7.7	9781	27.2	150	1.0	7.74	267.2	116.32	
0813	9.6	7.5	9981	20.9	150	1.45	8.32	239.2	116.36	
0816	9.8	7.5	10063	18.1	150	1.90	7.27	228.3	116.38	
0819	9.8	7.4	10106	12.2	150	2.35	7.01	223.7	116.38	
0822	10.0	7.4	10086	12.2	150	2.80	6.82	220.9	116.38	
0825	10.1	7.4	10137	12.0	150	3.25	6.73	216.5	116.38	
0828	10.0	7.4	10127	11.8	150	3.70	6.70	215.3	116.38	

Did well dewater? YES (NO)	Total volume removed: 3.70 (gal / L)	
Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other: System		
Sample date: 28NOV2012	Sample time: 0830	DTW at sample: 116.38
Sample ID: 6301	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns T Mulloy	**Client:** Montgomery & Associates
Well ID: EF-8	**Date** (DDOct2012): 28Nov 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 74.22 **Total Depth:** 242.00	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement (Ext. System)		
disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius² X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = — X —= — (Total Purge) 80%=—

Time	Temp (°C) °F	pH	Sp Cond (mS) µS	Turbidity (NTU)	Purge Rate (gal or mL) min	Volume Removed (gal) L	DO (mg/l)	ORP (mv)	DTW	Notes
0908	9.6	8.1	1807	8.3	125	1.0	7.00	143.8	74.24	
0911	10.3	8.0	1791	2.5	125	1.38	6.17	144.5	74.27	
0915	10.3	7.9	1815	2.9	125	1.75	5.26	145.9	74.29	
0918	10.0	7.8	1818	2.7	125	2.13	5.28	148.5	74.29	
0921	9.8	7.8	1800	2.9	125	2.50	7.95	150.2	74.29	
0924	10.2	7.8	1772	3.2	125	2.88	7.94	149.0	74.29	
0927	10.3	7.7	1768	3.4	125	3.25	7.90	149.4	74.29	
0930	10.3	7.7	1775	3.5	125	3.63	7.91	151.1	74.29	

Did well dewater? YES (NO)	Total volume removed:	(gal (L)
Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other: System		
Sample date: 28Nov2012	Sample time: 0935	DTW at sample:
Sample ID: 6302	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^{+}$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns T Mulloy	**Client:** Montgomery & Associates
Well ID: MW-104	**Date** (DDOct2012): 28 NOV 2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 94.42 **Total Depth:**	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C) °F)	pH	Sp Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1032	10.6	7.8	836	3.8	—	—	4.27	171.9	94.42	

Did well dewater? YES NO Total volume removed: — (gal / L)

Sample method: Disp Bailer Hydrasleeve New Tubing Ext. Port Other:

Sample date: 28/NOV 2012	Sample time: 1030	DTW at sample: 94.42
Sample ID: 6304	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: 1350	**Sampler:** J Kerns T Mulloy	**Client:** Montgomery & Associates
Well ID: MW-106	**Date** (DDOct2012): 28NOV2012	**Site:** Rio Algom Mining, Lisbon, UT
Weather Conditions: Sunny - Cold	**Sampler Signature:**	
Well diam: 1/4" 1" 2" 3" (4") 6" Other:	**DTW:** 245.14 **Total Depth:**	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:	**Tubing:** OD: New Dedicated NA	
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:		
Pump depth/ intake:	**Multipliers:** 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius^2 X 0.163	
(TD - DTW X Multiplier = 1 Volume	80% Recovery (TD - DTW X 0.20 + DTW)	

1 Volume = ___ X ___ = ___ (Total Purge) 80%= ___

Time	~~Temp~~ (°C / °F)	pH	Sp Cond (mS / µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1010	11.3	7.7	2865	5.3	—	—	2.58	262.7	245.14	

Did well dewater? YES (NO) Total volume removed: — (gal / L)

Sample method: (Disp Bailer) Hydrasleeve New Tubing Ext. Port Other:

Sample date: 28NOV2012	Sample time: 1010	DTW at sample: 245.14
Sample ID: 6303	Lab: Energy Labs	Number of bottles: 2
Analysis: 500 ml NP poly - Alkalinity, Cl, SO4, TDS, EC, pH 250 ml HNO3 poly *field filtered - Dissolved Metals		
Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
$Fe2^+$:	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

ANALYTICAL SUMMARY REPORT

December 11, 2012

Rio Algom Mining Corporation LLC
Hwy 605 and 509
Grants, NM 87020

Workorder No.: C12110024
Project Name: Groundwater

-001 mw-106 devel
-002 mw-104 devel
-003 mw-102 devel
-004 mw-102DB devel
-005 mw-101 devel
-006 mw-103 devel.
-007 mw-105 devel
-008 Equipment blank
-009 EF-8 hydrasleeve
-010 EF-8 low flow
-011 EF-8 purge
-012 EF-8 purge dup
-013 ML-1 hydrasleeve
-014 ML-1 low flow
-015 ML-1 purge
-016 EF-6 hydrasleeve
-017 EF-6 low flow
-018 EF-6 purge
-019 RL-1 hydrasleeve
-020 RL-1 low flow
-021 RL-1 low flow dup
-022 RL-1 purge

Energy Laboratories, Inc. Casper WY received the following 22 samples for Rio Algom Mining Corporation LLC on 11/1/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C12110024-001	6201	10/29/12 11:00	11/01/12	Aqueous	Metals by ICP/ICPMS, Dissolved Alkalinity Conductivity E300.0 Anions pH Solids, Total Dissolved
C12110024-002	6202	10/29/12 16:25	11/01/12	Aqueous	Same As Above
C12110024-003	6203	10/30/12 8:10	11/01/12	Aqueous	Same As Above
C12110024-004	6204	10/30/12 9:45	11/01/12	Aqueous	Same As Above
C12110024-005	6205	10/30/12 15:30	11/01/12	Aqueous	Same As Above
C12110024-006	6206	10/31/12 10:15	11/01/12	Aqueous	Same As Above
C12110024-007	6207	10/31/12 12:30	11/01/12	Aqueous	Same As Above
C12110024-008	6221	10/31/12 10:15	11/01/12	Aqueous	Same As Above
C12110024-009	6222	10/31/12 10:50	11/01/12	Aqueous	Same As Above
C12110024-010	6223	10/31/12 11:35	11/01/12	Aqueous	Same As Above
C12110024-011	6224	10/31/12 13:00	11/01/12	Aqueous	Same As Above
C12110024-012	6225	10/31/12 13:10	11/01/12	Aqueous	Same As Above
C12110024-013	6211	10/30/12 8:45	11/01/12	Aqueous	Same As Above
C12110024-014	6212	10/30/12 9:25	11/01/12	Aqueous	Same As Above
C12110024-015	6213	10/30/12 10:55	11/01/12	Aqueous	Same As Above
C12110024-016	6214	10/30/12 12:10	11/01/12	Aqueous	Same As Above
C12110024-017	6215	10/30/12 13:05	11/01/12	Aqueous	Same As Above
C12110024-018	6216	10/30/12 14:15	11/01/12	Aqueous	Same As Above
C12110024-019	6217	10/31/12 8:05	11/01/12	Aqueous	Same As Above
C12110024-020	6218	10/31/12 8:45	11/01/12	Aqueous	Same As Above
C12110024-021	6219	10/31/12 8:55	11/01/12	Aqueous	Same As Above
C12110024-022	6220	10/31/12 10:00	11/01/12	Aqueous	Same As Above

ANALYTICAL SUMMARY REPORT

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.

Report Approved By:

Stephanie D Waldrop
Reporting Supervisor

Digitally signed by
Stephanie Waldrop
Date: 2012.12.11 12:28:10 -07:00

CLIENT: Rio Algom Mining Corporation LLC
Project: Groundwater
Sample Delivery Group: C12110024

Revised Date: 12/11/12
Report Date: 11/14/12

CASE NARRATIVE

REVISED/SUPPLEMENTAL REPORT
The attached analytical report has been revised from a previously submitted report due to the request by Leilani Bew on December 7, 2012 to correct the sample dates on samples -006 and -007 and to correct the conductivity QC to include the RPD.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-001
Client Sample ID: 6201

MW-106
development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/29/12 11:00
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 18:18 / jba
Bicarbonate as HCO3	234	mg/L		5		A2320 B	11/01/12 18:18 / jba
Calcium	133	mg/L		1		E200.7	11/06/12 19:48 / sf
Chloride	85	mg/L	D	2		E300.0	11/01/12 22:58 / wc
Magnesium	56	mg/L		1		E200.7	11/06/12 19:48 / sf
Potassium	22	mg/L		1		E200.7	11/06/12 19:48 / sf
Sodium	479	mg/L		1		E200.7	11/06/12 19:48 / sf
Sulfate	1170	mg/L	D	8		E300.0	11/01/12 22:58 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	2740	umhos/cm		1		A2510 B	11/01/12 15:03 / ab
pH	7.55	s.u.	H	0.01		A4500-H B	11/01/12 15:03 / ab
Solids, Total Dissolved TDS @ 180 C	2050	mg/L		10		A2540 C	11/02/12 12:52 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/07/12 14:01 / cp
Molybdenum	0.014	mg/L		0.001		E200.8	11/07/12 14:01 / cp
Selenium	ND	mg/L		0.001		E200.8	11/07/12 14:01 / cp
Uranium	0.0086	mg/L		0.0003		E200.8	11/07/12 14:01 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-002
Client Sample ID: 6202

MW-104 development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/29/12 16:25
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 18:26 / jba
Bicarbonate as HCO3	465	mg/L		5		A2320 B	11/01/12 18:26 / jba
Calcium	59	mg/L		1		E200.7	11/06/12 19:52 / sf
Chloride	117	mg/L	D	2		E300.0	11/01/12 23:15 / wc
Magnesium	14	mg/L		1		E200.7	11/06/12 19:52 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 19:52 / sf
Sodium	369	mg/L		1		E200.7	11/06/12 19:52 / sf
Sulfate	378	mg/L	D	8		E300.0	11/01/12 23:15 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1760	umhos/cm		1		A2510 B	11/01/12 15:06 / ab
pH	7.69	s.u.	H	0.01		A4500-H B	11/01/12 15:06 / ab
Solids, Total Dissolved TDS @ 180 C	1180	mg/L		10		A2540 C	11/02/12 12:52 / jz
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/07/12 14:23 / cp
Molybdenum	0.122	mg/L		0.001		E200.8	11/07/12 14:23 / cp
Selenium	0.005	mg/L		0.001		E200.8	11/07/12 14:23 / cp
Uranium	0.164	mg/L		0.0003		E200.8	11/07/12 14:23 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-003
Client Sample ID: 6203

MW-102
development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 08:10
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	31	mg/L		5		A2320 B	11/01/12 18:42 / jba
Bicarbonate as HCO3	3320	mg/L		5		A2320 B	11/01/12 18:42 / jba
Calcium	68	mg/L		1		E200.7	11/06/12 19:56 / sf
Chloride	1160	mg/L	D	100		E300.0	11/02/12 19:06 / wc
Magnesium	48	mg/L		1		E200.7	11/06/12 19:56 / sf
Potassium	15	mg/L		1		E200.7	11/06/12 19:56 / sf
Sodium	4070	mg/L	D	3		E200.7	11/06/12 19:56 / sf
Sulfate	4290	mg/L	D	400		E300.0	11/02/12 19:06 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	13500	umhos/cm		1		A2510 B	11/01/12 15:09 / ab
pH	8.21	s.u.	H	0.01		A4500-H B	11/01/12 15:09 / ab
Solids, Total Dissolved TDS @ 180 C	10900	mg/L		10		A2540 C	11/02/12 12:53 / jz
METALS - DISSOLVED							
Arsenic	0.071	mg/L		0.001		E200.8	11/07/12 14:27 / cp
Molybdenum	19.2	mg/L		0.001		E200.8	11/07/12 14:27 / cp
Selenium	0.020	mg/L		0.001		E200.8	11/07/12 14:27 / cp
Uranium	103	mg/L		0.0003		E200.8	11/07/12 14:27 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-004
Client Sample ID: 6204

MW-102DB development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 09:45
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 19:12 / jba
Bicarbonate as HCO3	332	mg/L		5		A2320 B	11/01/12 19:12 / jba
Calcium	14	mg/L		1		E200.7	11/06/12 20:21 / sf
Chloride	36	mg/L		1		E300.0	11/02/12 00:25 / wc
Magnesium	5	mg/L		1		E200.7	11/06/12 20:21 / sf
Potassium	4	mg/L		1		E200.7	11/06/12 20:21 / sf
Sodium	154	mg/L		1		E200.7	11/06/12 20:21 / sf
Sulfate	55	mg/L	D	2		E300.0	11/02/12 00:25 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	728	umhos/cm		1		A2510 B	11/01/12 15:15 / ab
pH	8.48	s.u.	H	0.01		A4500-H B	11/01/12 15:15 / ab
Solids, Total Dissolved TDS @ 180 C	440	mg/L		10		A2540 C	11/02/12 12:53 / jz
METALS - DISSOLVED							
Arsenic	0.006	mg/L		0.001		E200.8	11/07/12 14:32 / cp
Molybdenum	0.016	mg/L		0.001		E200.8	11/07/12 14:32 / cp
Selenium	ND	mg/L		0.001		E200.8	11/07/12 14:32 / cp
Uranium	0.0917	mg/L		0.0003		E200.8	11/07/12 14:32 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-005
Client Sample ID: 6205

MW-101
development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 15:30
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 19:35 / jba
Bicarbonate as HCO3	2950	mg/L		5		A2320 B	11/01/12 19:35 / jba
Calcium	493	mg/L		1		E200.8	11/07/12 14:36 / cp
Chloride	1210	mg/L	D	20		E300.0	11/02/12 01:17 / wc
Magnesium	159	mg/L		1		E200.8	11/07/12 14:36 / cp
Potassium	14	mg/L		1		E200.8	11/07/12 14:36 / cp
Sodium	4160	mg/L	D	6		E200.7	11/06/12 20:25 / sf
Sulfate	7620	mg/L	D	80		E300.0	11/02/12 01:17 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	16100	umhos/cm		1		A2510 B	11/01/12 15:18 / ab
pH	7.25	s.u.	H	0.01		A4500-H B	11/01/12 15:18 / ab
Solids, Total Dissolved TDS @ 180 C	13800	mg/L		10		A2540 C	11/02/12 12:53 / jz
METALS - DISSOLVED							
Arsenic	0.005	mg/L		0.001		E200.8	11/07/12 14:36 / cp
Molybdenum	28.6	mg/L		0.001		E200.8	11/07/12 14:36 / cp
Selenium	0.085	mg/L		0.001		E200.8	11/07/12 14:36 / cp
Uranium	73.4	mg/L		0.0003		E200.8	11/07/12 14:36 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-006
Client Sample ID: 6206

MW-103
development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 10:15
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 19:58 / jba
Bicarbonate as HCO3	263	mg/L		5		A2320 B	11/01/12 19:58 / jba
Calcium	62	mg/L		1		E200.7	11/06/12 20:29 / sf
Chloride	22	mg/L		1		E300.0	11/02/12 01:34 / wc
Magnesium	16	mg/L		1		E200.7	11/06/12 20:29 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 20:29 / sf
Sodium	142	mg/L		1		E200.7	11/06/12 20:29 / sf
Sulfate	240	mg/L	D	2		E300.0	11/02/12 01:34 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	941	umhos/cm		1		A2510 B	11/01/12 15:20 / ab
pH	7.74	s.u.	H	0.01		A4500-H B	11/01/12 15:20 / ab
Solids, Total Dissolved TDS @ 180 C	618	mg/L		10		A2540 C	11/02/12 12:53 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/07/12 14:40 / cp
Molybdenum	0.011	mg/L		0.001		E200.8	11/07/12 14:40 / cp
Selenium	ND	mg/L		0.001		E200.8	11/07/12 14:40 / cp
Uranium	0.0470	mg/L		0.0003		E200.8	11/07/12 14:40 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-007
Client Sample ID: 6207

mw-105
development

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 12:30
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:06 / jba
Bicarbonate as HCO3	239	mg/L		5		A2320 B	11/01/12 20:06 / jba
Calcium	102	mg/L		1		E200.7	11/06/12 20:33 / sf
Chloride	56	mg/L		1		E300.0	11/02/12 01:52 / wc
Magnesium	29	mg/L		1		E200.7	11/06/12 20:33 / sf
Potassium	4	mg/L		1		E200.7	11/06/12 20:33 / sf
Sodium	45	mg/L		1		E200.7	11/06/12 20:33 / sf
Sulfate	166	mg/L	D	2		E300.0	11/02/12 01:52 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	859	umhos/cm		1		A2510 B	11/01/12 15:23 / ab
pH	7.49	s.u.	H	0.01		A4500-H B	11/01/12 15:23 / ab
Solids, Total Dissolved TDS @ 180 C	555	mg/L		10		A2540 C	11/02/12 12:54 / jz
METALS - DISSOLVED							
Arsenic	0.015	mg/L		0.001		E200.8	11/07/12 14:45 / cp
Molybdenum	0.007	mg/L		0.001		E200.8	11/07/12 14:45 / cp
Selenium	0.010	mg/L		0.001		E200.8	11/07/12 14:45 / cp
Uranium	0.0122	mg/L		0.0003		E200.8	11/07/12 14:45 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-008
Client Sample ID: 6221

Equipment Blank

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 10:15
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:11 / jba
Bicarbonate as HCO3	ND	mg/L		5		A2320 B	11/01/12 20:11 / jba
Calcium	ND	mg/L		1		E200.7	11/06/12 20:37 / sf
Chloride	ND	mg/L		1		E300.0	11/02/12 02:09 / wc
Magnesium	ND	mg/L		1		E200.7	11/06/12 20:37 / sf
Potassium	ND	mg/L		1		E200.7	11/06/12 20:37 / sf
Sodium	2	mg/L		1		E200.7	11/06/12 20:37 / sf
Sulfate	ND	mg/L		1		E300.0	11/02/12 02:09 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	2	umhos/cm	B	1		A2510 B	11/01/12 15:26 / ab
pH	5.74	s.u.	H	0.01		A4500-H B	11/01/12 15:26 / ab
Solids, Total Dissolved TDS @ 180 C	74	mg/L		10		A2540 C	11/05/12 15:57 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/07/12 14:49 / cp
Molybdenum	0.001	mg/L		0.001		E200.8	11/07/12 14:49 / cp
Selenium	ND	mg/L		0.001		E200.8	11/07/12 14:49 / cp
Uranium	0.0004	mg/L		0.0003		E200.8	11/07/12 14:49 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-009
Client Sample ID: 6222

EF-8
hydrasleeve

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 10:50
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:20 / jba
Bicarbonate as HCO3	350	mg/L		5		A2320 B	11/01/12 20:20 / jba
Calcium	209	mg/L		1		E200.8	11/07/12 14:54 / cp
Chloride	174	mg/L		1		E300.0	11/02/12 02:27 / wc
Magnesium	51	mg/L		1		E200.8	11/07/12 14:54 / cp
Potassium	5	mg/L		1		E200.8	11/07/12 14:54 / cp
Sodium	135	mg/L		1		E200.8	11/07/12 14:54 / cp
Sulfate	363	mg/L	D	4		E300.0	11/02/12 02:27 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1670	umhos/cm		1		A2510 B	11/01/12 15:28 / ab
pH	7.61	s.u.	H	0.01		A4500-H B	11/01/12 15:28 / ab
Solids, Total Dissolved TDS @ 180 C	1140	mg/L		10		A2540 C	11/02/12 12:54 / jz
METALS - DISSOLVED							
Arsenic	0.036	mg/L		0.001		E200.8	11/07/12 14:54 / cp
Molybdenum	0.009	mg/L		0.001		E200.8	11/07/12 14:54 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/07/12 14:54 / cp
Uranium	0.523	mg/L		0.0003		E200.8	11/07/12 14:54 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-010
Client Sample ID: 6223

EF-8
low flow

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 11:35
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:28 / jba
Bicarbonate as HCO3	370	mg/L		5		A2320 B	11/01/12 20:28 / jba
Calcium	206	mg/L		1		E200.7	11/06/12 20:49 / sf
Chloride	191	mg/L		1		E300.0	11/02/12 02:44 / wc
Magnesium	55	mg/L		1		E200.7	11/06/12 20:49 / sf
Potassium	5	mg/L		1		E200.7	11/06/12 20:49 / sf
Sodium	144	mg/L		1		E200.7	11/06/12 20:49 / sf
Sulfate	413	mg/L	D	4		E300.0	11/02/12 02:44 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1820	umhos/cm		1		A2510 B	11/01/12 15:31 / ab
pH	7.61	s.u.	H	0.01		A4500-H B	11/01/12 15:31 / ab
Solids, Total Dissolved TDS @ 180 C	1270	mg/L		10		A2540 C	11/02/12 12:54 / jz
METALS - DISSOLVED							
Arsenic	0.034	mg/L		0.001		E200.8	11/07/12 14:58 / cp
Molybdenum	0.011	mg/L		0.001		E200.8	11/07/12 14:58 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/07/12 14:58 / cp
Uranium	0.515	mg/L		0.0003		E200.8	11/07/12 14:58 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-011
Client Sample ID: 6224

EF-8 purge

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 13:00
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:36 / jba
Bicarbonate as HCO3	374	mg/L		5		A2320 B	11/01/12 20:36 / jba
Calcium	209	mg/L		1		E200.7	11/06/12 20:53 / sf
Chloride	190	mg/L		1		E300.0	11/02/12 03:01 / wc
Magnesium	56	mg/L		1		E200.7	11/06/12 20:53 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 20:53 / sf
Sodium	144	mg/L		1		E200.7	11/06/12 20:53 / sf
Sulfate	416	mg/L	D	4		E300.0	11/02/12 03:01 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1840	umhos/cm		1		A2510 B	11/01/12 15:34 / ab
pH	7.59	s.u.	H	0.01		A4500-H B	11/01/12 15:34 / ab
Solids, Total Dissolved TDS @ 180 C	1270	mg/L		10		A2540 C	11/02/12 12:55 / jz
METALS - DISSOLVED							
Arsenic	0.036	mg/L		0.001		E200.8	11/07/12 17:36 / cp
Molybdenum	0.008	mg/L		0.001		E200.8	11/07/12 17:36 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/07/12 17:36 / cp
Uranium	0.537	mg/L		0.0003		E200.8	11/07/12 17:36 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-012
Client Sample ID: 6225

EF-8
purge dup

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 13:10
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:44 / jba
Bicarbonate as HCO3	374	mg/L		5		A2320 B	11/01/12 20:44 / jba
Calcium	209	mg/L		1		E200.7	11/06/12 20:57 / sf
Chloride	190	mg/L		1		E300.0	11/02/12 03:19 / wc
Magnesium	55	mg/L		1		E200.7	11/06/12 20:57 / sf
Potassium	5	mg/L		1		E200.7	11/06/12 20:57 / sf
Sodium	146	mg/L		1		E200.7	11/06/12 20:57 / sf
Sulfate	416	mg/L	D	4		E300.0	11/02/12 03:19 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1840	umhos/cm		1		A2510 B	11/01/12 15:36 / ab
pH	7.59	s.u.	H	0.01		A4500-H B	11/01/12 15:36 / ab
Solids, Total Dissolved TDS @ 180 C	1310	mg/L		10		A2540 C	11/02/12 12:55 / jz
METALS - DISSOLVED							
Arsenic	0.035	mg/L		0.001		E200.8	11/07/12 17:40 / cp
Molybdenum	0.008	mg/L		0.001		E200.8	11/07/12 17:40 / cp
Selenium	0.010	mg/L		0.001		E200.8	11/07/12 17:40 / cp
Uranium	0.528	mg/L		0.0003		E200.8	11/07/12 17:40 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-013
Client Sample ID: 6211

ML-1
hydrasleeve

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 08:45
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 20:52 / jba
Bicarbonate as HCO3	250	mg/L		5		A2320 B	11/01/12 20:52 / jba
Calcium	153	mg/L		1		E200.7	11/06/12 21:50 / sf
Chloride	145	mg/L		1		E300.0	11/02/12 03:36 / wc
Magnesium	44	mg/L		1		E200.7	11/06/12 21:50 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 21:50 / sf
Sodium	95	mg/L		1		E200.7	11/06/12 21:50 / sf
Sulfate	312	mg/L	D	4		E300.0	11/02/12 03:36 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1380	umhos/cm		1		A2510 B	11/01/12 15:39 / ab
pH	7.59	s.u.	H	0.01		A4500-H B	11/01/12 15:39 / ab
Solids, Total Dissolved TDS @ 180 C	928	mg/L		10		A2540 C	11/02/12 12:56 / jz
METALS - DISSOLVED							
Arsenic	0.007	mg/L		0.001		E200.8	11/07/12 17:45 / cp
Molybdenum	0.009	mg/L		0.001		E200.8	11/07/12 17:45 / cp
Selenium	0.008	mg/L		0.001		E200.8	11/07/12 17:45 / cp
Uranium	0.0181	mg/L		0.0003		E200.8	11/07/12 17:45 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-014
Client Sample ID: 6212

ML-1
Low Flow

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 09:25
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:00 / jba
Bicarbonate as HCO3	239	mg/L		5		A2320 B	11/01/12 21:00 / jba
Calcium	155	mg/L		1		E200.7	11/06/12 21:54 / sf
Chloride	146	mg/L		1		E300.0	11/02/12 08:22 / wc
Magnesium	44	mg/L		1		E200.7	11/06/12 21:54 / sf
Potassium	7	mg/L		1		E200.7	11/06/12 21:54 / sf
Sodium	93	mg/L		1		E200.7	11/06/12 21:54 / sf
Sulfate	317	mg/L	D	4		E300.0	11/02/12 08:22 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1380	umhos/cm		1		A2510 B	11/01/12 15:53 / ab
pH	7.57	s.u.	H	0.01		A4500-H B	11/01/12 15:53 / ab
Solids, Total Dissolved TDS @ 180 C	922	mg/L		10		A2540 C	11/02/12 12:56 / jz
METALS - DISSOLVED							
Arsenic	0.006	mg/L		0.001		E200.8	11/07/12 17:49 / cp
Molybdenum	0.010	mg/L		0.001		E200.8	11/07/12 17:49 / cp
Selenium	0.008	mg/L		0.001		E200.8	11/07/12 17:49 / cp
Uranium	0.0180	mg/L		0.0003		E200.8	11/07/12 17:49 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-015
Client Sample ID: 6213

ML-1 purge

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 10:55
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:16 / jba
Bicarbonate as HCO3	256	mg/L		5		A2320 B	11/01/12 21:16 / jba
Calcium	176	mg/L		1		E200.7	11/06/12 21:58 / sf
Chloride	156	mg/L		1		E300.0	11/02/12 09:14 / wc
Magnesium	47	mg/L		1		E200.7	11/06/12 21:58 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 21:58 / sf
Sodium	92	mg/L		1		E200.7	11/06/12 21:58 / sf
Sulfate	345	mg/L	D	4		E300.0	11/02/12 09:14 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1480	umhos/cm		1		A2510 B	11/01/12 15:55 / ab
pH	7.49	s.u.	H	0.01		A4500-H B	11/01/12 15:55 / ab
Solids, Total Dissolved TDS @ 180 C	1010	mg/L		10		A2540 C	11/02/12 12:56 / jz
METALS - DISSOLVED							
Arsenic	0.021	mg/L		0.001		E200.8	11/07/12 17:54 / cp
Molybdenum	0.006	mg/L		0.001		E200.8	11/12/12 19:33 / cp
Selenium	0.009	mg/L		0.001		E200.8	11/07/12 17:54 / cp
Uranium	0.0145	mg/L		0.0003		E200.8	11/12/12 19:33 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-016
Client Sample ID: 6214

EF-6
hydrasleeve

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 12:10
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:23 / jba
Bicarbonate as HCO3	479	mg/L		5		A2320 B	11/01/12 21:23 / jba
Calcium	217	mg/L		1		E200.7	11/06/12 22:02 / sf
Chloride	401	mg/L	D	2		E300.0	11/02/12 09:31 / wc
Magnesium	57	mg/L		1		E200.7	11/06/12 22:02 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 22:02 / sf
Sodium	459	mg/L		1		E200.7	11/06/12 22:02 / sf
Sulfate	795	mg/L	D	8		E300.0	11/02/12 09:31 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	3140	umhos/cm		1		A2510 B	11/01/12 15:58 / ab
pH	7.27	s.u.	H	0.01		A4500-H B	11/01/12 15:58 / ab
Solids, Total Dissolved TDS @ 180 C	2170	mg/L		10		A2540 C	11/02/12 12:56 / jz
METALS - DISSOLVED							
Arsenic	0.014	mg/L		0.001		E200.8	11/07/12 17:58 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/07/12 17:58 / cp
Selenium	0.013	mg/L		0.001		E200.8	11/07/12 17:58 / cp
Uranium	2.05	mg/L		0.0003		E200.8	11/12/12 19:55 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-017
Client Sample ID: 6215

EF-6
low flow

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 13:05
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:33 / jba
Bicarbonate as HCO3	487	mg/L		5		A2320 B	11/01/12 21:33 / jba
Calcium	215	mg/L		1		E200.7	11/06/12 22:06 / sf
Chloride	388	mg/L	D	2		E300.0	11/02/12 09:49 / wc
Magnesium	55	mg/L		1		E200.7	11/06/12 22:06 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 22:06 / sf
Sodium	430	mg/L		1		E200.7	11/06/12 22:06 / sf
Sulfate	789	mg/L	D	8		E300.0	11/02/12 09:49 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	3110	umhos/cm		1		A2510 B	11/01/12 16:01 / ab
pH	7.30	s.u.	H	0.01		A4500-H B	11/01/12 16:01 / ab
Solids, Total Dissolved TDS @ 180 C	2180	mg/L		10		A2540 C	11/02/12 12:57 / jz
METALS - DISSOLVED							
Arsenic	0.013	mg/L		0.001		E200.8	11/07/12 18:02 / cp
Molybdenum	0.002	mg/L		0.001		E200.8	11/07/12 18:02 / cp
Selenium	0.013	mg/L		0.001		E200.8	11/07/12 18:02 / cp
Uranium	1.77	mg/L		0.0003		E200.8	11/07/12 18:02 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-018
Client Sample ID: 6216

EF-6 purge

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/30/12 14:15
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:41 / jba
Bicarbonate as HCO3	455	mg/L		5		A2320 B	11/01/12 21:41 / jba
Calcium	218	mg/L		1		E200.7	11/06/12 22:14 / sf
Chloride	373	mg/L	D	2		E300.0	11/02/12 10:06 / wc
Magnesium	58	mg/L		1		E200.7	11/06/12 22:14 / sf
Potassium	6	mg/L		1		E200.7	11/06/12 22:14 / sf
Sodium	388	mg/L		1		E200.7	11/06/12 22:14 / sf
Sulfate	775	mg/L	D	8		E300.0	11/02/12 10:06 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	3010	umhos/cm		1		A2510 B	11/01/12 16:03 / ab
pH	7.21	s.u.	H	0.01		A4500-H B	11/01/12 16:03 / ab
Solids, Total Dissolved TDS @ 180 C	2080	mg/L		10		A2540 C	11/02/12 12:57 / jz
METALS - DISSOLVED							
Arsenic	0.013	mg/L		0.001		E200.8	11/07/12 18:07 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/07/12 18:07 / cp
Selenium	0.012	mg/L		0.001		E200.8	11/07/12 18:07 / cp
Uranium	1.55	mg/L		0.0003		E200.8	11/07/12 18:07 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-019
Client Sample ID: 6217

RL-1
hydrasleeve

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 08:05
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:50 / jba
Bicarbonate as HCO3	1090	mg/L		5		A2320 B	11/01/12 21:50 / jba
Calcium	579	mg/L		1		E200.7	11/06/12 22:18 / sf
Chloride	662	mg/L	D	10		E300.0	11/02/12 10:24 / wc
Magnesium	197	mg/L		1		E200.7	11/06/12 22:18 / sf
Potassium	21	mg/L		1		E200.7	11/06/12 22:18 / sf
Sodium	1990	mg/L	D	3		E200.7	11/06/12 22:18 / sf
Sulfate	4410	mg/L	D	40		E300.0	11/02/12 10:24 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	9710	umhos/cm		1		A2510 B	11/01/12 16:06 / ab
pH	7.19	s.u.	H	0.01		A4500-H B	11/01/12 16:06 / ab
Solids, Total Dissolved TDS @ 180 C	8300	mg/L		10		A2540 C	11/02/12 12:57 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/07/12 18:11 / cp
Molybdenum	10.4	mg/L		0.001		E200.8	11/07/12 18:11 / cp
Selenium	0.069	mg/L		0.001		E200.8	11/07/12 18:11 / cp
Uranium	43	mg/L	D	3		E200.7	11/06/12 22:18 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-020
Client Sample ID: 6218

RL-1
low flow

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 08:45
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 21:59 / jba
Bicarbonate as HCO3	1170	mg/L		5		A2320 B	11/01/12 21:59 / jba
Calcium	589	mg/L		1		E200.7	11/06/12 22:22 / sf
Chloride	685	mg/L	D	10		E300.0	11/02/12 10:41 / wc
Magnesium	209	mg/L		1		E200.7	11/06/12 22:22 / sf
Potassium	22	mg/L		1		E200.7	11/06/12 22:22 / sf
Sodium	2060	mg/L	D	3		E200.7	11/06/12 22:22 / sf
Sulfate	4640	mg/L	D	40		E300.0	11/02/12 10:41 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	10100	umhos/cm		1		A2510 B	11/01/12 16:09 / ab
pH	7.23	s.u.	H	0.01		A4500-H B	11/01/12 16:09 / ab
Solids, Total Dissolved TDS @ 180 C	8680	mg/L		10		A2540 C	11/02/12 12:57 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/07/12 18:33 / cp
Molybdenum	11.2	mg/L		0.001		E200.8	11/07/12 18:33 / cp
Selenium	0.074	mg/L		0.001		E200.8	11/07/12 18:33 / cp
Uranium	43	mg/L	D	3		E200.7	11/06/12 22:22 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-021
Client Sample ID: 6219

RL-1
low flow dup

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 08:55
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 22:09 / jba
Bicarbonate as HCO3	1180	mg/L		5		A2320 B	11/01/12 22:09 / jba
Calcium	596	mg/L		1		E200.7	11/06/12 22:26 / sf
Chloride	685	mg/L	D	10		E300.0	11/02/12 10:59 / wc
Magnesium	209	mg/L		1		E200.7	11/06/12 22:26 / sf
Potassium	22	mg/L		1		E200.7	11/06/12 22:26 / sf
Sodium	2050	mg/L	D	3		E200.7	11/06/12 22:26 / sf
Sulfate	4640	mg/L	D	40		E300.0	11/02/12 10:59 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	10000	umhos/cm		1		A2510 B	11/01/12 16:11 / ab
pH	7.24	s.u.	H	0.01		A4500-H B	11/01/12 16:11 / ab
Solids, Total Dissolved TDS @ 180 C	8820	mg/L		10		A2540 C	11/05/12 15:58 / ab
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/07/12 18:51 / cp
Molybdenum	11.2	mg/L		0.001		E200.8	11/07/12 18:51 / cp
Selenium	0.073	mg/L		0.001		E200.8	11/07/12 18:51 / cp
Uranium	43	mg/L	D	3		E200.7	11/06/12 22:26 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Groundwater
Lab ID: C12110024-022
Client Sample ID: 6220

RL-1
purge

Revised Date: 12/11/12
Report Date: 11/14/12
Collection Date: 10/31/12 10:00
DateReceived: 11/01/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/01/12 22:19 / jba
Bicarbonate as HCO3	1270	mg/L		5		A2320 B	11/01/12 22:19 / jba
Calcium	584	mg/L		1		E200.7	11/06/12 22:54 / sf
Chloride	679	mg/L	D	10		E300.0	11/02/12 11:16 / wc
Magnesium	182	mg/L		1		E200.7	11/06/12 22:54 / sf
Potassium	21	mg/L		1		E200.7	11/06/12 22:54 / sf
Sodium	2080	mg/L	D	3		E200.7	11/06/12 22:54 / sf
Sulfate	4570	mg/L	D	40		E300.0	11/02/12 11:16 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	10100	umhos/cm		1		A2510 B	11/01/12 16:14 / ab
pH	7.35	s.u.	H	0.01		A4500-H B	11/01/12 16:14 / ab
Solids, Total Dissolved TDS @ 180 C	8620	mg/L		10		A2540 C	11/02/12 12:59 / jz
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/07/12 18:55 / cp
Molybdenum	11.6	mg/L		0.001		E200.8	11/07/12 18:55 / cp
Selenium	0.077	mg/L		0.001		E200.8	11/07/12 18:55 / cp
Uranium	42	mg/L	D	3		E200.7	11/06/12 22:54 / sf

Report Definitions:
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QCL - Quality control limit.
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MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R166673
Sample ID: MBLK	3	Method Blank				Run: MANTECH_121101B				11/01/12 14:51
Alkalinity, Total as CaCO3		ND	mg/L	3						
Carbonate as CO3		ND	mg/L	1						
Bicarbonate as HCO3		2	mg/L	1						
Sample ID: LCS_121003		Laboratory Control Sample				Run: MANTECH_121101B				11/01/12 15:06
Alkalinity, Total as CaCO3		207	mg/L	5.0	104	90	110			
Sample ID: C12101254-002AMS		Sample Matrix Spike				Run: MANTECH_121101B				11/01/12 16:15
Alkalinity, Total as CaCO3		277	mg/L	5.0	101	80	120			
Sample ID: C12110024-004ADUP	3	Sample Duplicate				Run: MANTECH_121101B				11/01/12 19:20
Alkalinity, Total as CaCO3		279	mg/L	5.0				0.1	10	
Carbonate as CO3		4.70	mg/L	5.0					10	
Bicarbonate as HCO3		331	mg/L	5.0				0.2	10	
Sample ID: C12110024-005AMS		Sample Matrix Spike				Run: MANTECH_121101B				11/01/12 19:50
Alkalinity, Total as CaCO3		2520	mg/L	5.0	87	80	120			
Sample ID: C12110024-014ADUP	3	Sample Duplicate				Run: MANTECH_121101B				11/01/12 21:08
Alkalinity, Total as CaCO3		196	mg/L	5.0				0.1	10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		239	mg/L	5.0				0.1	10	

Qualifiers:

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ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B										Batch: R166612
Sample ID: SC 2ND 1413	Laboratory Control Sample					Run: PHSC_101-C_121101A				11/01/12 09:07
Conductivity @ 25 C		1390	umhos/cm	1.0	98	90	110			
Sample ID: MBLK	Method Blank					Run: PHSC_101-C_121101A				11/01/12 09:13
Conductivity @ 25 C		2	umhos/cm	0.2						
Sample ID: C12110024-003ADUP	Sample Duplicate					Run: PHSC_101-C_121101A				11/01/12 15:11
Conductivity @ 25 C		13700	umhos/cm	1.0				1.7	10	
Sample ID: C12110024-013ADUP	Sample Duplicate					Run: PHSC_101-C_121101A				11/01/12 15:42
Conductivity @ 25 C		1380	umhos/cm	1.0				0.0	10	

Qualifiers:

RL - Analyte reporting limit.

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QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: TDS121102A
Sample ID: MB-1_121102A		Method Blank				Run: BAL-1_121102A				11/02/12 12:48
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121102A		Laboratory Control Sample				Run: BAL-1_121102A				11/02/12 12:49
Solids, Total Dissolved TDS @ 180 C		1100	mg/L	10	99	90	110			
Sample ID: C12101073-005A MS		Sample Matrix Spike				Run: BAL-1_121102A				11/02/12 12:50
Solids, Total Dissolved TDS @ 180 C		14200	mg/L	10	98	90	110			
Sample ID: C12110024-001A DUP		Sample Duplicate				Run: BAL-1_121102A				11/02/12 12:52
Solids, Total Dissolved TDS @ 180 C		2050	mg/L	10				0.4	5	
Sample ID: C12110024-011A DUP		Sample Duplicate				Run: BAL-1_121102A				11/02/12 12:55
Solids, Total Dissolved TDS @ 180 C		1280	mg/L	10				0.3	5	
Sample ID: C12110024-012A MS		Sample Matrix Spike				Run: BAL-1_121102A				11/02/12 12:56
Solids, Total Dissolved TDS @ 180 C		3210	mg/L	10	95	90	110			
Method: A2540 C										Batch: TDS121105A
Sample ID: MB-1_121105A		Method Blank				Run: BAL-1_121105A				11/05/12 15:57
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121105A		Laboratory Control Sample				Run: BAL-1_121105A				11/05/12 15:57
Solids, Total Dissolved TDS @ 180 C		999	mg/L	10	100	90	110			
Sample ID: C12110024-021A DUP		Sample Duplicate				Run: BAL-1_121105A				11/05/12 15:58
Solids, Total Dissolved TDS @ 180 C		8670	mg/L	10				1.7	5	
Sample ID: C12110103-001A MS		Sample Matrix Spike				Run: BAL-1_121105A				11/05/12 16:00
Solids, Total Dissolved TDS @ 180 C		15600	mg/L	10	95	90	110			

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QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC_101-C_121101A	
Sample ID: pH 6.86		Initial Calibration Verification Standard							11/01/12 08:54	
pH		6.84	s.u.	0.010	100	98	102			
Method: A4500-H B									Batch: R166612	
Sample ID: C12110024-003ADUP		Sample Duplicate				Run: PHSC_101-C_121101A			11/01/12 15:11	
pH		8.21	s.u.	0.010				0.0	3	
Sample ID: C12110024-013ADUP		Sample Duplicate				Run: PHSC_101-C_121101A			11/01/12 15:42	
pH		7.58	s.u.	0.010				0.1	3	

Qualifiers:

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QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP2-C_121106A	
Sample ID: ICV	5	Initial Calibration Verification Standard							11/06/12 14:01	
Calcium		50.9	mg/L	0.50	102	95	105			
Magnesium		49.7	mg/L	0.50	99	95	105			
Potassium		48.7	mg/L	2.7	97	95	105			
Sodium		49.3	mg/L	0.50	99	95	105			
Uranium		5.09	mg/L	1.0	102	95	105			
Sample ID: ICSA	5	Interference Check Sample A							11/06/12 14:42	
Calcium		505	mg/L	0.50	101	80	120			
Magnesium		516	mg/L	0.50	103	80	120			
Potassium		-0.00570	mg/L	0.50						
Sodium		0.222	mg/L	0.50						
Uranium		0.0540	mg/L	1.0						
Sample ID: ICSAB	5	Interference Check Sample AB							11/06/12 14:46	
Calcium		511	mg/L	0.50	102	80	120			
Magnesium		525	mg/L	0.50	105	80	120			
Potassium		-0.00440	mg/L	0.50						
Sodium		0.610	mg/L	0.50						
Uranium		0.0450	mg/L	1.0						
Method: E200.7										Batch: R166838
Sample ID: MB-121105A	5	Method Blank				Run: ICP2-C_121106A			11/06/12 15:10	
Calcium		ND	mg/L	0.06						
Magnesium		ND	mg/L	0.03						
Potassium		ND	mg/L	0.06						
Sodium		ND	mg/L	0.03						
Uranium		ND	mg/L	0.3						
Sample ID: LFB-121105A	5	Laboratory Fortified Blank				Run: ICP2-C_121106A			11/06/12 15:14	
Calcium		49.6	mg/L	0.50	99	85	115			
Magnesium		47.9	mg/L	0.50	96	85	115			
Potassium		46.4	mg/L	0.50	93	85	115			
Sodium		46.8	mg/L	0.50	94	85	115			
Uranium		4.48	mg/L	1.0	90	85	115			
Sample ID: C12110024-003BMS2	5	Sample Matrix Spike				Run: ICP2-C_121106A			11/06/12 20:00	
Calcium		558	mg/L	1.0	96	70	130			
Magnesium		530	mg/L	1.0	95	70	130			
Potassium		506	mg/L	1.0	96	70	130			
Sodium		4640	mg/L	3.2		70	130			A
Uranium		146	mg/L	2.6	96	70	130			
Sample ID: C12110024-003BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_121106A			11/06/12 20:04	
Calcium		562	mg/L	1.0	97	70	130	0.7	20	
Magnesium		549	mg/L	1.0	98	70	130	3.4	20	
Potassium		512	mg/L	1.0	97	70	130	1.2	20	

Qualifiers:

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A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/14/12

Project: Groundwater **Work Order:** C12110024

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Batch: R166838	
Sample ID: C12110024-003BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_121106A			11/06/12 20:04	
Sodium		4620	mg/L	3.2		70	130	0.5	20	A
Uranium		145	mg/L	2.6	94	70	130	0.7	20	
Sample ID: C12110024-012BMS2	5	Sample Matrix Spike				Run: ICP2-C_121106A			11/06/12 21:01	
Calcium		247	mg/L	1.0		70	130			A
Magnesium		104	mg/L	1.0	96	70	130			
Potassium		52.8	mg/L	1.0	93	70	130			
Sodium		195	mg/L	1.0	95	70	130			
Uranium		5.04	mg/L	0.26	92	70	130			
Sample ID: C12110024-012BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_121106A			11/06/12 21:45	
Calcium		255	mg/L	1.0		70	130	3.2	20	A
Magnesium		107	mg/L	1.0	101	70	130	2.6	20	
Potassium		54.3	mg/L	1.0	96	70	130	2.7	20	
Sodium		197	mg/L	1.0	100	70	130	1.1	20	
Uranium		5.07	mg/L	0.26	93	70	130	0.6	20	

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QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS4-C_121107A	
Sample ID: ICV	8	Initial Calibration Verification Standard							11/07/12 07:50	
Arsenic		0.0499	mg/L	0.0010	100	90	110			
Calcium		9.80	mg/L	0.0066	98	90	110			
Magnesium		9.94	mg/L	0.0027	99	90	110			
Molybdenum		0.0487	mg/L	0.0010	97	90	110			
Potassium		9.96	mg/L	0.0041	100	90	110			
Selenium		0.0510	mg/L	0.0010	102	90	110			
Sodium		10.1	mg/L	0.0043	101	90	110			
Uranium		0.0512	mg/L	0.00030	102	90	110			
Method: E200.8									Batch: R166946	
Sample ID: LRB	8	Method Blank				Run: ICPMS4-C_121107A			11/07/12 08:25	
Arsenic		ND	mg/L	5E-05						
Calcium		ND	mg/L	0.007						
Magnesium		0.005	mg/L	0.003						
Molybdenum		ND	mg/L	3E-05						
Potassium		0.006	mg/L	0.004						
Selenium		ND	mg/L	7E-05						
Sodium		0.007	mg/L	0.004						
Uranium		ND	mg/L	9E-06						
Sample ID: LFB	8	Laboratory Fortified Blank				Run: ICPMS4-C_121107A			11/07/12 08:30	
Arsenic		0.0544	mg/L	0.0010	109	85	115			
Calcium		13.3	mg/L	0.0066	106	85	115			
Magnesium		13.5	mg/L	0.0027	108	85	115			
Molybdenum		0.0521	mg/L	0.0010	104	85	115			
Potassium		13.4	mg/L	0.0041	107	85	115			
Selenium		0.0548	mg/L	0.0010	110	85	115			
Sodium		13.5	mg/L	0.0043	108	85	115			
Uranium		0.0543	mg/L	0.00030	109	85	115			
Sample ID: C12110024-010BMS4	8	Sample Matrix Spike				Run: ICPMS4-C_121107A			11/07/12 15:20	
Arsenic		0.0887	mg/L	0.0010	109	70	130			
Calcium		223	mg/L	1.0		70	130			A
Magnesium		62.1	mg/L	1.0		70	130			A
Molybdenum		0.0637	mg/L	0.0010	106	70	130			
Potassium		18.9	mg/L	1.0	109	70	130			
Selenium		0.0621	mg/L	0.0010	102	70	130			
Sodium		147	mg/L	1.0		70	130			A
Uranium		0.576	mg/L	0.00030		70	130			A
Sample ID: C12110024-010BMSD	8	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121107A			11/07/12 15:24	
Arsenic		0.0879	mg/L	0.0010	107	70	130	1.0	20	
Calcium		221	mg/L	1.0		70	130	1.0	20	A
Magnesium		61.6	mg/L	1.0		70	130	0.8	20	A
Molybdenum		0.0642	mg/L	0.0010	107	70	130	0.8	20	

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QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Batch: R166946
Sample ID: C12110024-010BMSD	8	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121107A			11/07/12 15:24	
Potassium		18.7	mg/L	1.0	107	70	130	1.0	20	
Selenium		0.0635	mg/L	0.0010	105	70	130	2.2	20	
Sodium		146	mg/L	1.0		70	130	0.3	20	A
Uranium		0.588	mg/L	0.00030		70	130	2.0	20	A
Sample ID: C12110024-020BMS4	8	Sample Matrix Spike				Run: ICPMS4-C_121107A			11/07/12 18:38	
Arsenic		0.537	mg/L	0.0010	107	70	130			
Calcium		733	mg/L	1.0		70	130			A
Magnesium		334	mg/L	1.0	99	70	130			
Molybdenum		12.0	mg/L	0.0010		70	130			A
Potassium		149	mg/L	1.0	102	70	130			
Selenium		0.568	mg/L	0.0010	99	70	130			
Sodium		2080	mg/L	1.0		70	130			A
Uranium		47.0	mg/L	0.00030		70	130			A
Sample ID: C12110024-020BMSD	8	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121107A			11/07/12 18:42	
Arsenic		0.530	mg/L	0.0010	106	70	130	1.3	20	
Calcium		721	mg/L	1.0		70	130	1.6	20	A
Magnesium		325	mg/L	1.0	92	70	130	2.7	20	
Molybdenum		11.8	mg/L	0.0010		70	130	1.3	20	A
Potassium		146	mg/L	1.0	100	70	130	1.7	20	
Selenium		0.587	mg/L	0.0010	103	70	130	3.3	20	
Sodium		1990	mg/L	1.0		70	130	4.5	20	A
Uranium		46.7	mg/L	0.00030		70	130	0.7	20	A
Method: E200.8										Analytical Run: ICPMS4-C_121112A
Sample ID: ICV	2	Initial Calibration Verification Standard							11/12/12 12:39	
Molybdenum		0.0477	mg/L	0.0010	95	90	110			
Uranium		0.0500	mg/L	0.00030	100	90	110			
Method: E200.8										Batch: R167122
Sample ID: LRB	2	Method Blank				Run: ICPMS4-C_121112A			11/12/12 13:14	
Molybdenum		ND	mg/L	3E-05						
Uranium		0.0006	mg/L	9E-06						
Sample ID: LFB	2	Laboratory Fortified Blank				Run: ICPMS4-C_121112A			11/12/12 13:41	
Molybdenum		0.0495	mg/L	0.0010	99	85	115			
Uranium		0.0521	mg/L	0.00030	104	85	115			
Sample ID: C12101103-003BMS4	2	Sample Matrix Spike				Run: ICPMS4-C_121112A			11/12/12 19:20	
Molybdenum		0.0516	mg/L	0.0010	100	70	130			
Uranium		0.0598	mg/L	0.00030	111	70	130			
Sample ID: C12101103-003BMSD	2	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121112A			11/12/12 19:24	
Molybdenum		0.0532	mg/L	0.0010	103	70	130	3.0	20	
Uranium		0.0605	mg/L	0.00030	113	70	130	1.2	20	

Qualifiers:

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A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC1-C_121101A	
Sample ID: ICV-110112-10	2	Initial Calibration Verification Standard							11/01/12 11:04	
Chloride		9.80	mg/L	1.0	98	90	110			
Sulfate		39.7	mg/L	1.0	99	90	110			
Method: E300.0									Batch: R166708	
Sample ID: ICB-110112-11	2	Method Blank				Run: IC1-C_121101A			11/01/12 11:21	
Chloride		ND	mg/L	0.04						
Sulfate		0.1	mg/L	0.1						
Sample ID: LFB-110112-12	2	Laboratory Fortified Blank				Run: IC1-C_121101A			11/01/12 11:39	
Chloride		10.2	mg/L	1.0	102	90	110			
Sulfate		40.9	mg/L	1.0	102	90	110			
Sample ID: C12110024-004AMS	2	Sample Matrix Spike				Run: IC1-C_121101A			11/02/12 00:42	
Chloride		54.3	mg/L	1.0	93	90	110			
Sulfate		132	mg/L	1.7	96	90	110			
Sample ID: C12110024-004AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121101A			11/02/12 01:00	
Chloride		54.9	mg/L	1.0	96	90	110	1.0	10	
Sulfate		134	mg/L	1.7	99	90	110	1.4	10	
Sample ID: C12110024-014AMS	2	Sample Matrix Spike				Run: IC1-C_121101A			11/02/12 08:39	
Chloride		195	mg/L	1.0	97	90	110			
Sulfate		509	mg/L	4.2	96	90	110			
Sample ID: C12110024-014AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121101A			11/02/12 08:57	
Chloride		194	mg/L	1.0	95	90	110	0.4	10	
Sulfate		508	mg/L	4.2	95	90	110	0.1	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/11/12
Report Date: 11/14/12
Work Order: C12110024

Client: Rio Algom Mining Corporation LLC
Project: Groundwater

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC1-C_121102A	
Sample ID: ICV-110212-10	2	Initial Calibration Verification Standard							11/02/12 15:37	
Chloride		9.78	mg/L	1.0	98	90	110			
Sulfate		39.6	mg/L	1.0	99	90	110			
Method: E300.0									Batch: R166729	
Sample ID: ICB-110212-11	2	Method Blank				Run: IC1-C_121102A			11/02/12 15:54	
Chloride		ND	mg/L	0.04						
Sulfate		0.2	mg/L	0.1						
Sample ID: LFB-110212-12	2	Laboratory Fortified Blank				Run: IC1-C_121102A			11/02/12 16:12	
Chloride		9.59	mg/L	1.0	96	90	110			
Sulfate		38.7	mg/L	1.0	96	90	110			
Sample ID: C12110046-001AMS	2	Sample Matrix Spike				Run: IC1-C_121102A			11/02/12 16:47	
Chloride		37.0	mg/L	1.0	100	90	110			
Sulfate		234	mg/L	1.7	101	90	110			
Sample ID: C12110046-001AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121102A			11/02/12 17:21	
Chloride		36.9	mg/L	1.0	100	90	110	0.1	10	
Sulfate		233	mg/L	1.7	99	90	110	0.4	10	
Sample ID: C12110075-001AMS	2	Sample Matrix Spike				Run: IC1-C_121102A			11/02/12 21:25	
Chloride		104	mg/L	1.0	101	90	110			
Sulfate		380	mg/L	4.2	101	90	110			
Sample ID: C12110075-001AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121102A			11/02/12 21:43	
Chloride		104	mg/L	1.0	100	90	110	0.7	10	
Sulfate		377	mg/L	4.2	100	90	110	0.6	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Chain of Custody and Analytical Request Record

Page 1 of 3

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates

Report Mail Address (Required):

Ph 521-881-4912

☐ No Hard Copy Email: tleo@elmontgomery.com

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ☐ Other:
☐ EDD/EDT (Electronic Data) Format:
☐ LEVEL IV ☐ NELAC

Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility

Contact Name: Phone/Fax:

Invoice Contact & Phone:

Sample Origin: State: Utah

Cell:

Purchase Order:

EPA (State) Compliance: Yes ☒ No ☐

Sampler: (Please Print) John Laney, Brandon Lyons

Quote/Bottle Order: 38150

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See Attached bottle order #38150	SEE ATTACHED
1 6201	10/29/12	1100	W	X	
2 6202	10/29/12	1625	W	X	
3 6203	10/30/12	0810	W	X	
4 6204	10/30/12	0945	W	X	
5 6205	10/30/12	1530	W	X	
6 6206	10/31/12	1015	W	X	
7 6207	10/31/12	1230	W	X	
8					
9					
10					

Standard Turnaround (TAT) — RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO_3 in field

Shipped by: Fedex ES

Cooler ID(s): 2692

Receipt Temp: 1.2 °C

On Ice: (Y) N

Custody Seal: On Bottle Y N; On Cooler (Y) N; Intact Y N; Signature Match Y N

LABORATORY USE ONLY: C12118024

Custody Record MUST be Signed

Relinquished by (print): JOHN LANEY	Date/Time: 10/31/12 14:30	Signature:	
Relinquished by (print):	Date/Time:	Signature:	
Received by (print):	Date/Time:	Signature:	
Received by (print):	Date/Time:	Signature:	
Received by Laboratory:	Date/Time: 11/2/945	Signature:	

Sample Disposal: Return to Client: ____ Lab Disposal: X

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates
Report Mail Address: 520-881-4912
Email Report: tleo@elamontgomery.com
Invoice Address:

Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility
Contact Name: Phone/Fax:
Invoice Contact & Phone:

Sample Origin: State: Utah
Email:
Purchase Order:

EPA/State Compliance: Yes ☒ No ☐
Sampler: (Please Print) John Lamy, Brandon Myers
Quote/Bottle Order: 38150

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ____ ☐ Other: ____
☐ EDD/EDT (Electronic Data) Format: ____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See Attached bottle order # 38150	SEE ATTACHED
1 6221	10/31/12	1015	W	X	
2 6222		1050	W	X	
3 6223		1135	W	X	
4 6224		1300	W	X	
5 6225		1310	W	X	
6					
7					
8					
9					
10					

Standard Turnaround (TAT)

R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO3 in field

Shipped by: Fedex GS
Cooler ID(s): 2692
Receipt Temp: 1.2 °C
On Ice: (Y) N
Custody Seal: On Bottle Y N; On Cooler (Y) N
Intact: Y N
Signature Match: Y N

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): BRANDON MYERS Date/Time: 10/31/12 14:30 Signature:
Relinquished by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:
Received by (print): Date/Time: Signature:
Received by Laboratory: Date/Time: 11/2/945 Signature:

Sample Disposal: Return to Client: ____ Lab Disposal: X

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.
This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
... at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon UT facility	Sample Origin State: Utah	EPA/State Compliance: Yes [X] No [ ]
Report Mail Address: 520.881-4912 Email report tleo@elmontgomery.com	Contact Name: Phone/Fax:	Email:	Sampler: (Please Print) John Laney Brandon Myers
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38152

Special Report/Formats:

- [ ] DW
- [ ] POTW/WWTP
- [ ] State: _____
- [ ] Other: _____
- [ ] EDD/EDT (Electronic Data) Format: _____
- [ ] LEVEL IV
- [ ] NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

See attached bottle order # 38152

SEE ATTACHED

Standard Turnaround (TAT) — R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO3 in field

Shipped by: Fedex-ES

Cooler ID(s): 2692

Receipt Temp: 1.2 °C

On Ice: (Y) N

Custody Seal: On Bottle Y N; On Cooler (Y) N; Intact Y N; Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX
1	6211	10/30/12	845	W
2	6212		925	
3	6213		1055	
4	6214		1210	
5	6215		1305	
6	6216		1415	
7	6217	10/31/12	805	
8	6218		845	
9	6219		855	
10	6220		1000	

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): BRANDON MYERS	Date/Time: 10/31/12 14:30	Signature:	Received by (print):	Date/Time:	Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Sample Disposal: Return to Client: _____ Lab Disposal: X			Received by Laboratory:	Date/Time: 11/12/945	Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.
This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
... energylab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES
www.energylab.com
Analytical Excellence Since 1952
Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

ANALYTICAL SUMMARY REPORT

December 05, 2012

Rio Algom Mining Corporation LLC
Hwy 605 and 509
Grants, NM 87020

Workorder No.: C12110105

Project Name: Lisbon, UT Facility

-001 EF-3A hydrasleeve
-002 EF-3A low flow
-003 EF-3A lowflow dup
-004 EF-3A purge
-005 mw-100 duval.
-006 RL-6 hydrasleeve
-007 RL-6 low flow
-008 RL-6 purge
-009 RL-4 hydrasleeve
-010 RL-4 low flow
-011 RL-4 purge
-012 RL-4 purge dup

Energy Laboratories, Inc. Casper WY received the following 12 samples for Rio Algom Mining Corporation LLC on 11/2/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C12110105-001	6226	11/01/12 9:45	11/02/12	Aqueous	Metals by ICP/ICPMS, Dissolved Alkalinity Conductivity E300.0 Anions pH Solids, Total Dissolved
C12110105-002	6227	11/01/12 10:50	11/02/12	Aqueous	Same As Above
C12110105-003	6228	11/01/12 11:00	11/02/12	Aqueous	Same As Above
C12110105-004	6229	11/01/12 13:15	11/02/12	Aqueous	Same As Above
C12110105-005	6208	10/31/12 14:50	11/02/12	Aqueous	Same As Above
C12110105-006	6209	11/01/12 10:15	11/02/12	Aqueous	Same As Above
C12110105-007	6210	11/01/12 11:25	11/02/12	Aqueous	Same As Above
C12110105-008	6241	11/01/12 11:50	11/02/12	Aqueous	Same As Above
C12110105-009	6242	11/01/12 13:00	11/02/12	Aqueous	Same As Above
C12110105-010	6243	11/01/12 14:30	11/02/12	Aqueous	Same As Above
C12110105-011	6244	11/01/12 15:00	11/02/12	Aqueous	Same As Above
C12110105-012	6245	11/01/12 15:10	11/02/12	Aqueous	Same As Above

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.

Report Approved By:

Stephanie D Waldrop
Reporting Supervisor

Digitally signed by
Stephanie Waldrop
Date: 2012.12.05 14:05:55 -07:00

CLIENT: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Sample Delivery Group: C12110105

Revised Date: 12/05/12
Report Date: 11/14/12

CASE NARRATIVE

REVISED/SUPPLEMENTAL REPORT
The attached analytical report has been revised from a previously submitted report due to the request by the client on December 5, 2012 for the correction of the metals QC.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-001
Client Sample ID: 6226

EF-3A
hydrosleeve

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 09:45
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 17:11 / ljl
Bicarbonate as HCO3	1200	mg/L		5		A2320 B	11/03/12 17:11 / ljl
Calcium	210	mg/L		1		E200.7	11/08/12 17:29 / sf
Chloride	705	mg/L	D	4		E300.0	11/06/12 08:25 / wc
Magnesium	111	mg/L		1		E200.7	11/08/12 17:29 / sf
Potassium	12	mg/L		1		E200.7	11/08/12 17:29 / sf
Sodium	1660	mg/L	D	2		E200.7	11/08/12 17:29 / sf
Sulfate	2100	mg/L	D	20		E300.0	11/06/12 08:25 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	6840	umhos/cm		1		A2510 B	11/05/12 12:24 / ab
pH	7.47	s.u.	H	0.01		A4500-H B	11/05/12 12:24 / ab
Solids, Total Dissolved TDS @ 180 C	4860	mg/L		10		A2540 C	11/05/12 16:07 / ab
METALS - DISSOLVED							
Arsenic	0.16	mg/L	D	0.07		E200.7	11/08/12 17:29 / sf
Molybdenum	2.56	mg/L	D	0.01		E200.7	11/08/12 17:29 / sf
Selenium	0.030	mg/L		0.001		E200.8	11/13/12 05:32 / cp
Uranium	20	mg/L	D	1		E200.7	11/08/12 17:29 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-002
Client Sample ID: 6227

EF-3A
low flow

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 10:50
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 17:20 / ljl
Bicarbonate as HCO3	1090	mg/L		5		A2320 B	11/03/12 17:20 / ljl
Calcium	235	mg/L		1		E200.7	11/08/12 17:45 / sf
Chloride	722	mg/L	D	4		E300.0	11/06/12 08:42 / wc
Magnesium	117	mg/L		1		E200.7	11/08/12 17:45 / sf
Potassium	13	mg/L		1		E200.7	11/08/12 17:45 / sf
Sodium	1550	mg/L	D	2		E200.7	11/08/12 17:45 / sf
Sulfate	2140	mg/L	D	20		E300.0	11/06/12 08:42 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	6770	umhos/cm		1		A2510 B	11/05/12 12:27 / ab
pH	7.39	s.u.	H	0.01		A4500-H B	11/05/12 12:27 / ab
Solids, Total Dissolved TDS @ 180 C	4880	mg/L		10		A2540 C	11/05/12 16:08 / ab
METALS - DISSOLVED							
Arsenic	0.128	mg/L		0.001		E200.8	11/13/12 05:37 / cp
Molybdenum	1.87	mg/L	D	0.01		E200.7	11/08/12 17:45 / sf
Selenium	0.028	mg/L		0.001		E200.8	11/13/12 05:37 / cp
Uranium	19	mg/L	D	1		E200.7	11/08/12 17:45 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-003
Client Sample ID: 6228

EF-3A
low flow dup

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 11:00
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 17:30 / ljl
Bicarbonate as HCO3	1100	mg/L		5		A2320 B	11/03/12 17:30 / ljl
Calcium	233	mg/L		1		E200.7	11/08/12 17:50 / sf
Chloride	702	mg/L	D	4		E300.0	11/06/12 08:59 / wc
Magnesium	116	mg/L		1		E200.7	11/08/12 17:50 / sf
Potassium	13	mg/L		1		E200.7	11/08/12 17:50 / sf
Sodium	1550	mg/L	D	2		E200.7	11/08/12 17:50 / sf
Sulfate	2090	mg/L	D	20		E300.0	11/06/12 08:59 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	6750	umhos/cm		1		A2510 B	11/05/12 12:29 / ab
pH	7.35	s.u.	H	0.01		A4500-H B	11/05/12 12:29 / ab
Solids, Total Dissolved TDS @ 180 C	4770	mg/L		10		A2540 C	11/05/12 16:13 / ab
METALS - DISSOLVED							
Arsenic	0.129	mg/L		0.001		E200.8	11/13/12 05:41 / cp
Molybdenum	1.85	mg/L	D	0.01		E200.7	11/08/12 17:50 / sf
Selenium	0.028	mg/L		0.001		E200.8	11/13/12 05:41 / cp
Uranium	19	mg/L	D	1		E200.7	11/08/12 17:50 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-004
Client Sample ID: 6229

EF-3A purge

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 13:15
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 17:40 / ljl
Bicarbonate as HCO3	1340	mg/L		5		A2320 B	11/03/12 17:40 / ljl
Calcium	205	mg/L		1		E200.7	11/08/12 17:54 / sf
Chloride	740	mg/L	D	10		E300.0	11/06/12 09:17 / wc
Magnesium	108	mg/L		1		E200.7	11/08/12 17:54 / sf
Potassium	12	mg/L		1		E200.7	11/08/12 17:54 / sf
Sodium	1780	mg/L	D	2		E200.7	11/08/12 17:54 / sf
Sulfate	2210	mg/L	D	40		E300.0	11/06/12 09:17 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	7300	umhos/cm		1		A2510 B	11/05/12 12:32 / ab
pH	7.49	s.u.	H	0.01		A4500-H B	11/05/12 12:32 / ab
Solids, Total Dissolved TDS @ 180 C	5060	mg/L		10		A2540 C	11/05/12 16:13 / ab
METALS - DISSOLVED							
Arsenic	0.192	mg/L		0.001		E200.8	11/13/12 05:46 / cp
Molybdenum	2.72	mg/L	D	0.01		E200.7	11/08/12 17:54 / sf
Selenium	0.033	mg/L		0.001		E200.8	11/13/12 05:46 / cp
Uranium	22	mg/L	D	1		E200.7	11/08/12 17:54 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-005
Client Sample ID: 6208

MW-100
development

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 10/31/12 14:50
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 18:09 / ljl
Bicarbonate as HCO3	363	mg/L		5		A2320 B	11/03/12 18:09 / ljl
Calcium	81	mg/L		1		E200.7	11/08/12 17:58 / sf
Chloride	11	mg/L		1		E300.0	11/06/12 10:26 / wc
Magnesium	63	mg/L		1		E200.7	11/08/12 17:58 / sf
Potassium	3	mg/L		1		E200.7	11/08/12 17:58 / sf
Sodium	11	mg/L		1		E200.7	11/08/12 17:58 / sf
Sulfate	148	mg/L	D	2		E300.0	11/06/12 10:26 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	791	umhos/cm		1		A2510 B	11/05/12 12:35 / ab
pH	7.57	s.u.	H	0.01		A4500-H B	11/05/12 12:35 / ab
Solids, Total Dissolved TDS @ 180 C	503	mg/L		10		A2540 C	11/05/12 16:13 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 05:50 / cp
Molybdenum	0.001	mg/L		0.001		E200.8	11/13/12 05:50 / cp
Selenium	0.006	mg/L		0.001		E200.8	11/13/12 05:50 / cp
Uranium	0.0045	mg/L		0.0003		E200.8	11/13/12 05:50 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

RL-6
hydrasleeve

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-006
Client Sample ID: 6209

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 10:15
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 18:27 / ljl
Bicarbonate as HCO3	338	mg/L		5		A2320 B	11/03/12 18:27 / ljl
Calcium	278	mg/L		1		E200.7	11/10/12 02:20 / sf
Chloride	39	mg/L		1		E300.0	11/06/12 11:19 / wc
Magnesium	96	mg/L		1		E200.7	11/10/12 02:20 / sf
Potassium	2	mg/L		1		E200.7	11/10/12 02:20 / sf
Sodium	48	mg/L		1		E200.7	11/10/12 02:20 / sf
Sulfate	769	mg/L	D	4		E300.0	11/06/12 11:19 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1850	umhos/cm		1		A2510 B	11/05/12 12:37 / ab
pH	7.78	s.u.	H	0.01		A4500-H B	11/05/12 12:37 / ab
Solids, Total Dissolved TDS @ 180 C	1540	mg/L		10		A2540 C	11/06/12 15:15 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/13/12 05:55 / cp
Molybdenum	0.018	mg/L		0.001		E200.8	11/13/12 05:55 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 05:55 / cp
Uranium	0.0166	mg/L		0.0003		E200.8	11/13/12 05:55 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-007
Client Sample ID: 6210

RL-6
Low flow

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 11:25
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 18:35 / ljl
Bicarbonate as HCO3	341	mg/L		5		A2320 B	11/03/12 18:35 / ljl
Calcium	280	mg/L		1		E200.7	11/08/12 18:02 / sf
Chloride	38	mg/L		1		E300.0	11/06/12 11:36 / wc
Magnesium	96	mg/L		1		E200.7	11/08/12 18:02 / sf
Potassium	2	mg/L		1		E200.7	11/08/12 18:02 / sf
Sodium	49	mg/L		1		E200.7	11/08/12 18:02 / sf
Sulfate	751	mg/L	D	4		E300.0	11/06/12 11:36 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1810	umhos/cm		1		A2510 B	11/05/12 12:41 / ab
pH	7.41	s.u.	H	0.01		A4500-H B	11/05/12 12:41 / ab
Solids, Total Dissolved TDS @ 180 C	1570	mg/L		10		A2540 C	11/06/12 15:16 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/13/12 05:59 / cp
Molybdenum	0.017	mg/L		0.001		E200.8	11/13/12 05:59 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 05:59 / cp
Uranium	0.0172	mg/L		0.0003		E200.8	11/13/12 05:59 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-008
Client Sample ID: 6241

RL-6
purge

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 11:50
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 18:51 / ljl
Bicarbonate as HCO3	338	mg/L		5		A2320 B	11/03/12 18:51 / ljl
Calcium	282	mg/L		1		E200.7	11/08/12 18:46 / sf
Chloride	40	mg/L		1		E300.0	11/06/12 11:54 / wc
Magnesium	101	mg/L		1		E200.7	11/08/12 18:46 / sf
Potassium	2	mg/L		1		E200.7	11/08/12 18:46 / sf
Sodium	49	mg/L		1		E200.7	11/08/12 18:46 / sf
Sulfate	788	mg/L	D	4		E300.0	11/06/12 11:54 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1800	umhos/cm		1		A2510 B	11/05/12 12:44 / ab
pH	7.27	s.u.	H	0.01		A4500-H B	11/05/12 12:44 / ab
Solids, Total Dissolved TDS @ 180 C	1540	mg/L		10		A2540 C	11/06/12 15:16 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/13/12 06:04 / cp
Molybdenum	0.016	mg/L		0.001		E200.8	11/13/12 06:04 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 06:04 / cp
Uranium	0.0169	mg/L		0.0003		E200.8	11/13/12 06:04 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-009
Client Sample ID: 6242

RL-4
hydrasleeve

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 13:00
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 18:59 / ljl
Bicarbonate as HCO3	224	mg/L		5		A2320 B	11/03/12 18:59 / ljl
Calcium	89	mg/L		1		E200.7	11/08/12 18:50 / sf
Chloride	47	mg/L		1		E300.0	11/06/12 12:11 / wc
Magnesium	31	mg/L		1		E200.7	11/08/12 18:50 / sf
Potassium	4	mg/L		1		E200.7	11/08/12 18:50 / sf
Sodium	49	mg/L		1		E200.7	11/08/12 18:50 / sf
Sulfate	172	mg/L	D	2		E300.0	11/06/12 12:11 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	808	umhos/cm		1		A2510 B	11/05/12 12:50 / ab
pH	7.66	s.u.	H	0.01		A4500-H B	11/05/12 12:50 / ab
Solids, Total Dissolved TDS @ 180 C	528	mg/L		10		A2540 C	11/06/12 15:17 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 06:26 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 06:26 / cp
Selenium	0.005	mg/L		0.001		E200.8	11/13/12 06:26 / cp
Uranium	0.0031	mg/L		0.0003		E200.8	11/13/12 06:26 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-010
Client Sample ID: 6243

RL-4
low flow

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 14:30
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 19:07 / ljl
Bicarbonate as HCO3	225	mg/L		5		A2320 B	11/03/12 19:07 / ljl
Calcium	89	mg/L		1		E200.7	11/08/12 18:54 / sf
Chloride	46	mg/L		1		E300.0	11/06/12 12:28 / wc
Magnesium	32	mg/L		1		E200.7	11/08/12 18:54 / sf
Potassium	4	mg/L		1		E200.7	11/08/12 18:54 / sf
Sodium	49	mg/L		1		E200.7	11/08/12 18:54 / sf
Sulfate	170	mg/L	D	2		E300.0	11/06/12 12:28 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	810	umhos/cm		1		A2510 B	11/05/12 12:53 / ab
pH	7.75	s.u.	H	0.01		A4500-H B	11/05/12 12:53 / ab
Solids, Total Dissolved TDS @ 180 C	532	mg/L		10		A2540 C	11/06/12 15:17 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 06:44 / cp
Molybdenum	0.003	mg/L		0.001		E200.8	11/13/12 06:44 / cp
Selenium	0.005	mg/L		0.001		E200.8	11/13/12 06:44 / cp
Uranium	0.0029	mg/L		0.0003		E200.8	11/13/12 06:44 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-011
Client Sample ID: 6244

RL-4
purge

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 15:00
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 19:15 / ljl
Bicarbonate as HCO3	224	mg/L		5		A2320 B	11/03/12 19:15 / ljl
Calcium	91	mg/L		1		E200.7	11/08/12 18:58 / sf
Chloride	48	mg/L		1		E300.0	11/06/12 12:46 / wc
Magnesium	32	mg/L		1		E200.7	11/08/12 18:58 / sf
Potassium	4	mg/L		1		E200.7	11/08/12 18:58 / sf
Sodium	50	mg/L		1		E200.7	11/08/12 18:58 / sf
Sulfate	174	mg/L	D	2		E300.0	11/06/12 12:46 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	818	umhos/cm		1		A2510 B	11/05/12 12:55 / ab
pH	7.70	s.u.	H	0.01		A4500-H B	11/05/12 12:55 / ab
Solids, Total Dissolved TDS @ 180 C	546	mg/L		10		A2540 C	11/06/12 15:17 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 06:48 / cp
Molybdenum	0.001	mg/L		0.001		E200.8	11/13/12 06:48 / cp
Selenium	0.005	mg/L		0.001		E200.8	11/13/12 06:48 / cp
Uranium	0.0030	mg/L		0.0003		E200.8	11/13/12 06:48 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110105-012
Client Sample ID: 6245

RL-4
purge dup

Revised Date: 12/05/12
Report Date: 11/14/12
Collection Date: 11/01/12 15:10
DateReceived: 11/02/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/03/12 19:23 / ljl
Bicarbonate as HCO3	225	mg/L		5		A2320 B	11/03/12 19:23 / ljl
Calcium	90	mg/L		1		E200.7	11/08/12 19:14 / sf
Chloride	48	mg/L		1		E300.0	11/06/12 13:03 / wc
Magnesium	32	mg/L		1		E200.7	11/08/12 19:14 / sf
Potassium	4	mg/L		1		E200.7	11/08/12 19:14 / sf
Sodium	49	mg/L		1		E200.7	11/08/12 19:14 / sf
Sulfate	175	mg/L	D	2		E300.0	11/06/12 13:03 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	819	umhos/cm		1		A2510 B	11/05/12 12:58 / ab
pH	7.72	s.u.	H	0.01		A4500-H B	11/05/12 12:58 / ab
Solids, Total Dissolved TDS @ 180 C	547	mg/L		10		A2540 C	11/06/12 15:17 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 06:53 / cp
Molybdenum	0.001	mg/L		0.001		E200.8	11/13/12 06:53 / cp
Selenium	0.005	mg/L		0.001		E200.8	11/13/12 06:53 / cp
Uranium	0.0030	mg/L		0.0003		E200.8	11/13/12 06:53 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R166720
Sample ID: MBLK	3	Method Blank				Run: MANTECH_121103A				11/03/12 14:03
Alkalinity, Total as CaCO3		ND	mg/L	3						
Carbonate as CO3		ND	mg/L	1						
Bicarbonate as HCO3		1	mg/L	1						
Sample ID: LCS_121003		Laboratory Control Sample				Run: MANTECH_121103A				11/03/12 14:18
Alkalinity, Total as CaCO3		206	mg/L	5.0	103	90	110			
Sample ID: C12110103-001ADUP	3	Sample Duplicate				Run: MANTECH_121103A				11/03/12 14:24
Alkalinity, Total as CaCO3		ND	mg/L	5.0					10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		ND	mg/L	5.0					10	
Sample ID: C12110103-002AMS		Sample Matrix Spike				Run: MANTECH_121103A				11/03/12 14:54
Alkalinity, Total as CaCO3		544	mg/L	5.0	97	80	120			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B										Batch: R166731
Sample ID: SC 2ND 1413	Laboratory Control Sample					Run: PHSC_101-C_121105A				11/05/12 09:20
Conductivity @ 25 C		1400	umhos/cm	1.0	99	90	110			
Sample ID: MBLK	Method Blank					Run: PHSC_101-C_121105A				11/05/12 09:26
Conductivity @ 25 C		2	umhos/cm	0.2						
Sample ID: C12110105-008ADUP	Sample Duplicate					Run: PHSC_101-C_121105A				11/05/12 12:46
Conductivity @ 25 C		1830	umhos/cm	1.0				1.7	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: TDS121105A
Sample ID: MB-1_121105A		Method Blank				Run: BAL-1_121105A				11/05/12 15:57
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121105A		Laboratory Control Sample				Run: BAL-1_121105A				11/05/12 15:57
Solids, Total Dissolved TDS @ 180 C		999	mg/L	10	100	90	110			
Sample ID: C12110104-001A DUP		Sample Duplicate				Run: BAL-1_121105A				11/05/12 16:05
Solids, Total Dissolved TDS @ 180 C		4090	mg/L	10				3.7	5	
Sample ID: C12110104-002A MS		Sample Matrix Spike				Run: BAL-1_121105A				11/05/12 16:05
Solids, Total Dissolved TDS @ 180 C		13600	mg/L	10	93	90	110			
Method: A2540 C										Batch: TDS121106A
Sample ID: MB-1_121106A		Method Blank				Run: BAL-1_121106A				11/06/12 15:15
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121106A		Laboratory Control Sample				Run: BAL-1_121106A				11/06/12 15:15
Solids, Total Dissolved TDS @ 180 C		1110	mg/L	10	100	90	110			
Sample ID: C12110105-007A DUP		Sample Duplicate				Run: BAL-1_121106A				11/06/12 15:16
Solids, Total Dissolved TDS @ 180 C		1560	mg/L	10				0.5	5	
Sample ID: C12110105-008A MS		Sample Matrix Spike				Run: BAL-1_121106A				11/06/12 15:16
Solids, Total Dissolved TDS @ 180 C		3520	mg/L	10	99	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC_101-C_121105A	
Sample ID: pH 6.86		Initial Calibration Verification Standard							11/05/12 09:07	
pH		6.84	s.u.	0.010	100	98	102			
Method: A4500-H B									Batch: R166731	
Sample ID: C12110105-008ADUP		Sample Duplicate				Run: PHSC_101-C_121105A			11/05/12 12:46	
pH		7.28	s.u.	0.010				0.1	3	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP2-C_121108C	
Sample ID: ICV	7	Initial Calibration Verification Standard							11/08/12 14:11	
Arsenic		1.02	mg/L	0.10	102	95	105			
Calcium		49.6	mg/L	0.50	99	95	105			
Magnesium		51.7	mg/L	0.50	103	95	105			
Molybdenum		1.05	mg/L	0.10	105	95	105			
Potassium		47.2	mg/L	0.50	95	95	105			
Sodium		52.6	mg/L	0.50	105	95	105			
Uranium		5.02	mg/L	1.0	100	95	105			
Sample ID: ICSA	7	Interference Check Sample A							11/08/12 14:40	
Arsenic		-0.0197	mg/L	0.10						
Calcium		493	mg/L	0.50	99	80	120			
Magnesium		533	mg/L	0.50	107	80	120			
Molybdenum		-0.0189	mg/L	0.10						
Potassium		-0.00720	mg/L	0.50						
Sodium		0.0329	mg/L	0.50						
Uranium		0.0121	mg/L	1.0						
Sample ID: ICSAB	7	Interference Check Sample AB							11/08/12 14:44	
Arsenic		-0.0241	mg/L	0.10						
Calcium		497	mg/L	0.50	99	80	120			
Magnesium		518	mg/L	0.50	104	80	120			
Molybdenum		-0.0186	mg/L	0.10						
Potassium		-0.00620	mg/L	0.50						
Sodium		0.0282	mg/L	0.50						
Uranium		0.00440	mg/L	1.0						
Method: E200.7										Batch: R166967
Sample ID: MB-121108A	7	Method Blank				Run: ICP2-C_121108C			11/08/12 15:08	
Arsenic		ND	mg/L	0.01						
Calcium		ND	mg/L	0.06						
Magnesium		ND	mg/L	0.03						
Molybdenum		ND	mg/L	0.004						
Potassium		ND	mg/L	0.06						
Sodium		ND	mg/L	0.3						
Uranium		ND	mg/L	0.3						
Sample ID: LFB-121108A	7	Laboratory Fortified Blank				Run: ICP2-C_121108C			11/08/12 15:12	
Arsenic		0.972	mg/L	0.10	97	85	115			
Calcium		48.4	mg/L	0.50	97	85	115			
Magnesium		50.0	mg/L	0.50	100	85	115			
Molybdenum		1.01	mg/L	0.10	101	85	115			
Potassium		46.0	mg/L	0.50	92	85	115			
Sodium		49.5	mg/L	0.50	99	85	115			
Uranium		4.80	mg/L	1.0	96	85	115			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R166967
Sample ID: C12110105-011BMS2	7	Sample Matrix Spike				Run: ICP2-C_121108C				11/08/12 19:02
Arsenic		1.02	mg/L	0.015	100	70	130			
Calcium		134	mg/L	1.0	84	70	130			
Magnesium		81.4	mg/L	1.0	98	70	130			
Molybdenum		0.750	mg/L	0.0036	74	70	130			
Potassium		50.3	mg/L	1.0	92	70	130			
Sodium		100	mg/L	1.0	99	70	130			
Uranium		4.44	mg/L	0.26	87	70	130			
Sample ID: C12110105-011BMSD	7	Sample Matrix Spike Duplicate				Run: ICP2-C_121108C				11/08/12 19:06
Arsenic		1.03	mg/L	0.015	101	70	130	0.7	20	
Calcium		135	mg/L	1.0	86	70	130	0.8	20	
Magnesium		81.0	mg/L	1.0	97	70	130	0.5	20	
Molybdenum		0.775	mg/L	0.0036	76	70	130	3.3	20	
Potassium		51.5	mg/L	1.0	94	70	130	2.3	20	
Sodium		101	mg/L	1.0	100	70	130	0.8	20	
Uranium		4.35	mg/L	0.26	85	70	130	2.2	20	
Sample ID: C12100761-001BMS2	7	Sample Matrix Spike				Run: ICP2-C_121108C				11/08/12 20:59
Arsenic		1.03	mg/L	0.015	100	70	130			
Calcium		69.0	mg/L	1.0	96	70	130			
Magnesium		53.7	mg/L	1.0	99	70	130			
Molybdenum		0.737	mg/L	0.0036	72	70	130			
Potassium		50.0	mg/L	1.0	93	70	130			
Sodium		186	mg/L	1.0	104	70	130			
Uranium		4.18	mg/L	0.26	82	70	130			
Sample ID: C12100761-001BMSD	7	Sample Matrix Spike Duplicate				Run: ICP2-C_121108C				11/08/12 21:03
Arsenic		1.05	mg/L	0.015	103	70	130	2.5	20	
Calcium		69.6	mg/L	1.0	97	70	130	0.9	20	
Magnesium		54.1	mg/L	1.0	100	70	130	0.8	20	
Molybdenum		0.768	mg/L	0.0036	75	70	130	4.1	20	
Potassium		51.1	mg/L	1.0	95	70	130	2.2	20	
Sodium		181	mg/L	1.0	93	70	130	3.0	20	
Uranium		4.22	mg/L	0.26	83	70	130	0.9	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP2-C_121109B	
Sample ID: ICV	4	Initial Calibration Verification Standard							11/09/12 13:45	
Calcium		50.0	mg/L	0.50	100	95	105			
Magnesium		51.5	mg/L	0.50	103	95	105			
Potassium		49.4	mg/L	2.7	99	95	105			
Sodium		52.7	mg/L	0.50	105	95	105			
Sample ID: ICSA	4	Interference Check Sample A							11/09/12 14:25	
Calcium		503	mg/L	0.50	101	80	120			
Magnesium		535	mg/L	0.50	107	80	120			
Potassium		-0.00200	mg/L	0.50						
Sodium		-0.0409	mg/L	0.50						
Sample ID: ICSAB	4	Interference Check Sample AB							11/09/12 14:29	
Calcium		504	mg/L	0.50	101	80	120			
Magnesium		545	mg/L	0.50	109	80	120			
Potassium		-0.00180	mg/L	0.50						
Sodium		0.102	mg/L	0.50						
Method: E200.7										Batch: R167033
Sample ID: MB-121109A	4	Method Blank				Run: ICP2-C_121109B			11/09/12 14:53	
Calcium		ND	mg/L	0.06						
Magnesium		ND	mg/L	0.03						
Potassium		ND	mg/L	0.06						
Sodium		ND	mg/L	0.03						
Sample ID: LFB-121109A	4	Laboratory Fortified Blank				Run: ICP2-C_121109B			11/09/12 14:58	
Calcium		48.2	mg/L	0.50	96	85	115			
Magnesium		48.4	mg/L	0.50	97	85	115			
Potassium		44.5	mg/L	0.50	89	85	115			
Sodium		47.6	mg/L	0.50	95	85	115			
Sample ID: C12110106-003BMS2	4	Sample Matrix Spike				Run: ICP2-C_121109B			11/10/12 02:45	
Calcium		125	mg/L	1.0	94	70	130			
Magnesium		99.1	mg/L	1.0	93	70	130			
Potassium		94.6	mg/L	1.0	91	70	130			
Sodium		591	mg/L	1.0		70	130			A
Sample ID: C12110106-003BMSD	4	Sample Matrix Spike Duplicate				Run: ICP2-C_121109B			11/10/12 02:49	
Calcium		122	mg/L	1.0	91	70	130	2.3	20	
Magnesium		99.7	mg/L	1.0	93	70	130	0.6	20	
Potassium		95.4	mg/L	1.0	92	70	130	0.9	20	
Sodium		592	mg/L	1.0		70	130	0.2	20	A

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS4-C_121112A	
Sample ID: ICV	4	Initial Calibration Verification Standard							11/12/12 12:39	
Arsenic		0.0512	mg/L	0.0010	102	90	110			
Molybdenum		0.0477	mg/L	0.0010	95	90	110			
Selenium		0.0516	mg/L	0.0010	103	90	110			
Uranium		0.0500	mg/L	0.00030	100	90	110			
Method: E200.8									Batch: R167122	
Sample ID: LRB	4	Method Blank				Run: ICPMS4-C_121112A			11/12/12 13:14	
Arsenic		ND	mg/L	5E-05						
Molybdenum		ND	mg/L	3E-05						
Selenium		ND	mg/L	7E-05						
Uranium		0.0006	mg/L	9E-06						
Sample ID: LFB	4	Laboratory Fortified Blank				Run: ICPMS4-C_121112A			11/12/12 13:41	
Arsenic		0.0529	mg/L	0.0010	106	85	115			
Molybdenum		0.0495	mg/L	0.0010	99	85	115			
Selenium		0.0529	mg/L	0.0010	106	85	115			
Uranium		0.0521	mg/L	0.00030	104	85	115			
Sample ID: C12110104-008BMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121112A			11/13/12 03:50	
Arsenic		0.271	mg/L	0.0010	106	70	130			
Molybdenum		0.269	mg/L	0.0010	102	70	130			
Selenium		0.310	mg/L	0.0010	102	70	130			
Uranium		0.676	mg/L	0.00030	98	70	130			
Sample ID: C12110104-008BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121112A			11/13/12 03:54	
Arsenic		0.275	mg/L	0.0010	108	70	130	1.7	20	
Molybdenum		0.278	mg/L	0.0010	106	70	130	3.4	20	
Selenium		0.316	mg/L	0.0010	105	70	130	2.0	20	
Uranium		0.684	mg/L	0.00030	101	70	130	1.2	20	
Sample ID: C12110105-009BMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121112A			11/13/12 06:30	
Arsenic		0.0593	mg/L	0.0010	118	70	130			
Molybdenum		0.0549	mg/L	0.0010	108	70	130			
Selenium		0.0623	mg/L	0.0010	114	70	130			
Uranium		0.0621	mg/L	0.00030	118	70	130			
Sample ID: C12110105-009BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121112A			11/13/12 06:35	
Arsenic		0.0590	mg/L	0.0010	117	70	130	0.5	20	
Molybdenum		0.0561	mg/L	0.0010	110	70	130	2.2	20	
Selenium		0.0629	mg/L	0.0010	116	70	130	0.9	20	
Uranium		0.0630	mg/L	0.00030	120	70	130	1.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Revised Date: 12/05/12
Report Date: 11/14/12
Work Order: C12110105

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC1-C_121105A	
Sample ID: ICV-110512-10	2	Initial Calibration Verification Standard							11/05/12 16:27	
Chloride		9.84	mg/L	1.0	98	90	110			
Sulfate		40.0	mg/L	1.0	100	90	110			
Method: E300.0									Batch: R166833	
Sample ID: ICB-110512-11	2	Method Blank				Run: IC1-C_121105A			11/05/12 16:45	
Chloride		ND	mg/L	0.04						
Sulfate		ND	mg/L	0.1						
Sample ID: LFB-110512-12	2	Laboratory Fortified Blank				Run: IC1-C_121105A			11/05/12 17:02	
Chloride		9.78	mg/L	1.0	98	90	110			
Sulfate		39.5	mg/L	1.0	99	90	110			
Sample ID: C12110103-012AMS	2	Sample Matrix Spike				Run: IC1-C_121105A			11/06/12 02:19	
Chloride		71.1	mg/L	1.0	98	90	110			
Sulfate		931	mg/L	4.2	97	90	110			
Sample ID: C12110103-012AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121105A			11/06/12 02:36	
Chloride		71.8	mg/L	1.0	100	90	110	0.9	10	
Sulfate		931	mg/L	4.2	97	90	110	0.0	10	
Sample ID: C12110104-006AMS	2	Sample Matrix Spike				Run: IC1-C_121105A			11/06/12 06:23	
Chloride		1650	mg/L	10	97	90	110			
Sulfate		6170	mg/L	42	95	90	110			
Sample ID: C12110104-006AMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_121105A			11/06/12 06:40	
Chloride		1660	mg/L	10	100	90	110	0.8	10	
Sulfate		6210	mg/L	42	98	90	110	0.8	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Chain of Custody and Analytical Request Record

Page 2 of 2

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates

Report Mail Address (Required):

520-881-4912

☒ No Hard Copy Email: tlee@emontgomery.com

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ☐ Other: ☐ EDD/EDT (Electronic Data) Format: ☐ LEVEL IV ☐ NELAC

Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility

Contact Name: Phone/Fax:

Invoice Contact & Phone:

Sample Origin: State: Utah

Cell:

Purchase Order:

EPA/State Compliance: Yes ☒ No ☐

Sampler: (Please Print) Josh Kerns

Quote/Bottle Order: 38150

Shipped by: FedEx

Cooler ID(s): 3721

Receipt Temp: 3.4 °C

On Ice: Y N

Custody Seal: On Bottle Y N; On Cooler Y N; Intact Y N; Signature Match Y N

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO3 in field

Standard Turnaround (TAT) — RUSH

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150	SEE ATTACHED
1	6208	10/31/12	1450	W	X	
2	6209	01NOV2012	1015	W	X	
3	6210	01NOV2012	1125	W	X	
4	6241	01NOV2012	1150	W	X	
5	6242	01NOV2012	1300	W	X	
6	6243	01NOV2012	1430	W	X	
7	6244	01NOV2012	1500	W	X	
8	6245	01NOV2012	1510	W	X	
9						
10						

Partial Volume (Raw) Insufficient Sample

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): Josh Kerns Date/Time: 01NOV2012 / 1520 Signature:

Relinquished by (print): Date/Time: Signature:

Sample Disposal: Return to Client: Lab Disposal:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Date/Time: 11212/1010 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Page 26 of 27

Chain of Custody and Analytical Request Record

Page 1 of 2

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility	Sample Origin State: UTAH	EPA/State Compliance: Yes ☒ No ☐
Report Mail Address: 520-881-4912	Contact Name: Phone/Fax:	Email:	Sampler: (Please Print) BRANDON MYERS
Email Report: tleo@elmontgomery.com			
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150

Special Report/Formats:

☐ DW ☐ POTW/WWTP ☐ State: _____ ☐ Other: _____

☐ EDD/EDT (Electronic Data) Format: _____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150											SEE ATTACHED
1 6226	11/1/12	945	W	X											
2 6227		1050		X											
3 6228		1100		X											
4 6229		1315		X											
5															
6															
7															
8															
9															
10															

Standard Turnaround (TAT) — R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO_3 in field

Shipped by: Fed ex ES

Cooler ID(s): 3791

Receipt Temp: 3.4 °C

On Ice: (Y) N

Custody Seal: On Bottle Y N; On Cooler Y N; Intact Y N; Signature Match Y N

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Sample Disposal: Return to Client: _____	Lab Disposal: _____		Received by Laboratory:	Date/Time: 11/2/12 1010	Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.
This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES
www.energylab.com
Analytical Excellence Since 1952
Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

ANALYTICAL SUMMARY REPORT

November 19, 2012

-001 LW-1 purge
-002 MW-5 purge
-003 RL-3 hydrasleeve
-004 RL-3 low flow
-005 RL-3 purge
-006 LW-1 hydrasleeve
-007 LW-1 low flow
-008 LW-1 purge
-009 MW-5 hydrasleeve
-010 MW-5 low flow
-011 MW-13 hydrasleeve
-012 MW-13 low flow
-013 MW-13 purge
-014 LW-1 hydrasleeve
-015 LW-1 low flow
-016 Equipment Blank
-017 RL-5 hydrasleeve
-018 RL-5 low flow
-019 RL-5 purge
-020 H-63 hydrasleeve
-021 H-63 low flow
-022 H-63 purge
-023 OW-UT-9 hydrasleeve
-024 OW-UT-9 " dup

Rio Algom Mining Corporation LLC
Hwy 605 and 509
Grants, NM 87020

Workorder No.: C12110279

Project Name: Lisbon, UT Facility

Energy Laboratories, Inc. Casper WY received the following 26 samples for Rio Algom Mining Corporation LLC on 11/7/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C12110279-001	6240	11/03/12 13:25	11/07/12	Aqueous	Metals by ICP/ICPMS, Dissolved Alkalinity Conductivity E300.0 Anions pH Solids, Total Dissolved
C12110279-002	6251	11/03/12 14:40	11/07/12	Aqueous	Same As Above
C12110279-003	6252	11/05/12 9:30	11/07/12	Aqueous	Same As Above
C12110279-004	6253	11/05/12 10:05	11/07/12	Aqueous	Same As Above
C12110279-005	6254	11/05/12 10:35	11/07/12	Aqueous	Same As Above
C12110279-006	6230	11/02/12 10:45	11/07/12	Aqueous	Same As Above
C12110279-007	6231	11/02/12 11:35	11/07/12	Aqueous	Same As Above
C12110279-008	6232	11/02/12 12:40	11/07/12	Aqueous	Same As Above
C12110279-009	6233	11/02/12 13:45	11/07/12	Aqueous	Same As Above
C12110279-010	6234	11/02/12 15:10	11/07/12	Aqueous	Same As Above
C12110279-011	6235	11/03/12 8:45	11/07/12	Aqueous	Same As Above
C12110279-012	6236	11/03/12 9:40	11/07/12	Aqueous	Same As Above
C12110279-013	6237	11/03/12 11:00	11/07/12	Aqueous	Same As Above
C12110279-014	6238	11/03/12 11:45	11/07/12	Aqueous	Same As Above
C12110279-015	6239	11/03/12 12:20	11/07/12	Aqueous	Same As Above
C12110279-016	6266	11/03/12 14:30	11/07/12	Aqueous	Same As Above
C12110279-017	6246	11/02/12 11:50	11/07/12	Aqueous	Same As Above
C12110279-018	6247	11/02/12 12:45	11/07/12	Aqueous	Same As Above
C12110279-019	6248	11/02/12 14:00	11/07/12	Aqueous	Same As Above
C12110279-020	6249	11/03/12 8:35	11/07/12	Aqueous	Same As Above
C12110279-021	6250	11/03/12 9:35	11/07/12	Aqueous	Same As Above
C12110279-022	6261	11/03/12 10:55	11/07/12	Aqueous	Same As Above
C12110279-023	6262	11/03/12 11:50	11/07/12	Aqueous	Same As Above
C12110279-024	6263	11/03/12 11:55	11/07/12	Aqueous	Same As Above

ANALYTICAL SUMMARY REPORT

-025 DW-WT-9 low flow
-026 DW-WT-9 purge

C12110279-025	6264	11/03/12 12:55 11/07/12	Aqueous	Same As Above
C12110279-026	6265	11/03/12 14:00 11/07/12	Aqueous	Same As Above

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.

Report Approved By:

Report Proofing Specialist

Digitally signed by
Sheri Mead
Date: 2012.11.19 15:46:28 -07:00

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-001
Client Sample ID: 6240

MW-1 purge

Report Date: 11/19/12
Collection Date: 11/03/12 13:25
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 19:18 / jba
Bicarbonate as HCO3	394	mg/L		5		A2320 B	11/07/12 19:18 / jba
Calcium	114	mg/L		1		E200.7	11/15/12 19:58 / sf
Chloride	20	mg/L		1		E300.0	11/08/12 18:37 / wc
Magnesium	61	mg/L		1		E200.7	11/15/12 19:58 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 19:58 / sf
Sodium	30	mg/L		1		E200.7	11/15/12 19:58 / sf
Sulfate	221	mg/L	D	2		E300.0	11/08/12 18:37 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	985	umhos/cm		1		A2510 B	11/07/12 16:28 / ab
pH	7.38	s.u.	H	0.01		A4500-H B	11/07/12 16:28 / ab
Solids, Total Dissolved TDS @ 180 C	690	mg/L		10		A2540 C	11/08/12 15:50 / jz
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/13/12 17:40 / cp
Molybdenum	0.005	mg/L		0.001		E200.8	11/13/12 17:40 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/13/12 17:40 / cp
Uranium	0.0364	mg/L		0.0003		E200.8	11/16/12 10:11 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-002
Client Sample ID: 6251

MW-5 purge

Report Date: 11/19/12
Collection Date: 11/03/12 14:40
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 19:26 / jba
Bicarbonate as HCO3	321	mg/L		5		A2320 B	11/07/12 19:26 / jba
Calcium	268	mg/L		1		E200.7	11/15/12 20:42 / sf
Chloride	13	mg/L		1		E300.0	11/08/12 18:52 / wc
Magnesium	88	mg/L		1		E200.7	11/15/12 20:42 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:42 / sf
Sodium	17	mg/L		1		E200.7	11/15/12 20:42 / sf
Sulfate	687	mg/L	D	4		E300.0	11/08/12 18:52 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1570	umhos/cm		1		A2510 B	11/07/12 16:31 / ab
pH	7.13	s.u.	H	0.01		A4500-H B	11/07/12 16:31 / ab
Solids, Total Dissolved TDS @ 180 C	1350	mg/L		10		A2540 C	11/08/12 15:51 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 17:43 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 17:43 / cp
Selenium	0.061	mg/L		0.001		E200.8	11/13/12 17:43 / cp
Uranium	0.0087	mg/L		0.0003		E200.8	11/16/12 10:15 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-003
Client Sample ID: 6252

RL-3
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/05/12 09:30
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 19:34 / jba
Bicarbonate as HCO3	902	mg/L		5		A2320 B	11/07/12 19:34 / jba
Calcium	540	mg/L		1		E200.7	11/15/12 20:46 / sf
Chloride	533	mg/L	D	10		E300.0	11/08/12 19:08 / wc
Magnesium	219	mg/L		1		E200.8	11/16/12 10:20 / cp
Potassium	20	mg/L		1		E200.8	11/16/12 10:20 / cp
Sodium	1450	mg/L		1		E200.8	11/16/12 10:20 / cp
Sulfate	2920	mg/L	D	40		E300.0	11/08/12 19:08 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	7100	umhos/cm		1		A2510 B	11/07/12 16:34 / ab
pH	7.21	s.u.	H	0.01		A4500-H B	11/07/12 16:34 / ab
Solids, Total Dissolved TDS @ 180 C	5900	mg/L		10		A2540 C	11/08/12 15:51 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/13/12 17:45 / cp
Molybdenum	3.62	mg/L		0.001		E200.8	11/13/12 17:45 / cp
Selenium	0.073	mg/L		0.001		E200.8	11/13/12 17:45 / cp
Uranium	25	mg/L	D	1		E200.7	11/15/12 20:46 / sf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-004
Client Sample ID: 6253

RL-3
low flow

Report Date: 11/19/12
Collection Date: 11/05/12 10:05
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 19:45 / jba
Bicarbonate as HCO3	1300	mg/L		5		A2320 B	11/07/12 19:45 / jba
Calcium	581	mg/L		1		E200.7	11/15/12 20:50 / sf
Chloride	695	mg/L	D	10		E300.0	11/08/12 19:23 / wc
Magnesium	249	mg/L		1		E200.7	11/15/12 20:50 / sf
Potassium	19	mg/L		1		E200.7	11/15/12 20:50 / sf
Sodium	2000	mg/L	D	3		E200.7	11/15/12 20:50 / sf
Sulfate	4140	mg/L	D	40		E300.0	11/08/12 19:23 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	9600	umhos/cm		1		A2510 B	11/07/12 16:36 / ab
pH	7.17	s.u.	H	0.01		A4500-H B	11/07/12 16:36 / ab
Solids, Total Dissolved TDS @ 180 C	8280	mg/L		10		A2540 C	11/08/12 15:51 / jz
METALS - DISSOLVED							
Arsenic	0.005	mg/L		0.001		E200.8	11/13/12 18:45 / cp
Molybdenum	6.21	mg/L		0.001		E200.8	11/13/12 18:45 / cp
Selenium	0.080	mg/L		0.001		E200.8	11/13/12 18:45 / cp
Uranium	34.8	mg/L	D	0.0005		E200.8	11/13/12 18:45 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-005
Client Sample ID: 6254

RL-3
purge

Report Date: 11/19/12
Collection Date: 11/05/12 10:35
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 19:55 / jba
Bicarbonate as HCO3	1150	mg/L		5		A2320 B	11/07/12 19:55 / jba
Calcium	501	mg/L		1		E200.7	11/15/12 20:54 / sf
Chloride	616	mg/L	D	10		E300.0	11/08/12 19:38 / wc
Magnesium	216	mg/L		1		E200.7	11/15/12 20:54 / sf
Potassium	18	mg/L		1		E200.7	11/15/12 20:54 / sf
Sodium	1750	mg/L	D	3		E200.7	11/15/12 20:54 / sf
Sulfate	3530	mg/L	D	40		E300.0	11/08/12 19:38 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	8490	umhos/cm		1		A2510 B	11/07/12 16:39 / ab
pH	7.31	s.u.	H	0.01		A4500-H B	11/07/12 16:39 / ab
Solids, Total Dissolved TDS @ 180 C	7090	mg/L		10		A2540 C	11/08/12 15:52 / jz
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/13/12 18:48 / cp
Molybdenum	4.52	mg/L		0.001		E200.8	11/13/12 18:48 / cp
Selenium	0.069	mg/L		0.001		E200.8	11/13/12 18:48 / cp
Uranium	27.2	mg/L	D	0.0005		E200.8	11/13/12 18:48 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-006
Client Sample ID: 6230

LW-1
hydrosleeve

Report Date: 11/19/12
Collection Date: 11/02/12 10:45
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:03 / jba
Bicarbonate as HCO3	208	mg/L		5		A2320 B	11/07/12 20:03 / jba
Calcium	70	mg/L		1		E200.7	11/15/12 20:58 / sf
Chloride	10	mg/L		1		E300.0	11/08/12 19:54 / wc
Magnesium	19	mg/L		1		E200.7	11/15/12 20:58 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 20:58 / sf
Sodium	31	mg/L		1		E200.7	11/15/12 20:58 / sf
Sulfate	113	mg/L	D	2		E300.0	11/08/12 19:54 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	555	umhos/cm		1		A2510 B	11/07/12 16:42 / ab
pH	7.54	s.u.	H	0.01		A4500-H B	11/07/12 16:42 / ab
Solids, Total Dissolved TDS @ 180 C	352	mg/L		10		A2540 C	11/08/12 15:52 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 18:51 / cp
Molybdenum	0.014	mg/L		0.001		E200.8	11/13/12 18:51 / cp
Selenium	0.002	mg/L		0.001		E200.8	11/13/12 18:51 / cp
Uranium	0.0053	mg/L		0.0003		E200.8	11/13/12 18:51 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-007
Client Sample ID: 6231

LW-1
Low flow

Report Date: 11/19/12
Collection Date: 11/02/12 11:35
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:10 / jba
Bicarbonate as HCO3	207	mg/L		5		A2320 B	11/07/12 20:10 / jba
Calcium	73	mg/L		1		E200.7	11/15/12 21:14 / sf
Chloride	10	mg/L		1		E300.0	11/08/12 20:40 / wc
Magnesium	17	mg/L		1		E200.7	11/15/12 21:14 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 21:14 / sf
Sodium	31	mg/L		1		E200.7	11/15/12 21:14 / sf
Sulfate	112	mg/L	D	2		E300.0	11/08/12 20:40 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	552	umhos/cm		1		A2510 B	11/07/12 16:47 / ab
pH	7.60	s.u.	H	0.01		A4500-H B	11/07/12 16:47 / ab
Solids, Total Dissolved TDS @ 180 C	362	mg/L		10		A2540 C	11/08/12 15:52 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 18:53 / cp
Molybdenum	0.004	mg/L		0.001		E200.8	11/13/12 18:53 / cp
Selenium	0.002	mg/L		0.001		E200.8	11/13/12 18:53 / cp
Uranium	0.0045	mg/L		0.0003		E200.8	11/13/12 18:53 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-008
Client Sample ID: 6232

LW-1 purge

Report Date: 11/19/12
Collection Date: 11/02/12 12:40
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:18 / jba
Bicarbonate as HCO3	225	mg/L		5		A2320 B	11/07/12 20:18 / jba
Calcium	70	mg/L		1		E200.7	11/15/12 21:18 / sf
Chloride	10	mg/L		1		E300.0	11/08/12 21:26 / wc
Magnesium	18	mg/L		1		E200.7	11/15/12 21:18 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 21:18 / sf
Sodium	31	mg/L		1		E200.7	11/15/12 21:18 / sf
Sulfate	112	mg/L	D	2		E300.0	11/08/12 21:26 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	554	umhos/cm		1		A2510 B	11/07/12 16:50 / ab
pH	7.54	s.u.	H	0.01		A4500-H B	11/07/12 16:50 / ab
Solids, Total Dissolved TDS @ 180 C	358	mg/L		10		A2540 C	11/08/12 15:52 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 18:56 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 18:56 / cp
Selenium	0.002	mg/L		0.001		E200.8	11/13/12 18:56 / cp
Uranium	0.0020	mg/L		0.0003		E200.8	11/13/12 18:56 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-009
Client Sample ID: 6233

MW-5
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/02/12 13:45
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:26 / jba
Bicarbonate as HCO3	317	mg/L		5		A2320 B	11/07/12 20:26 / jba
Calcium	296	mg/L		1		E200.7	11/15/12 21:22 / sf
Chloride	12	mg/L		1		E300.0	11/08/12 21:42 / wc
Magnesium	91	mg/L		1		E200.7	11/15/12 21:22 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:22 / sf
Sodium	18	mg/L		1		E200.7	11/15/12 21:22 / sf
Sulfate	780	mg/L	D	4		E300.0	11/08/12 21:42 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1680	umhos/cm		1		A2510 B	11/07/12 16:52 / ab
pH	7.15	s.u.	H	0.01		A4500-H B	11/07/12 16:52 / ab
Solids, Total Dissolved TDS @ 180 C	1460	mg/L		10		A2540 C	11/08/12 15:53 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 18:59 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 18:59 / cp
Selenium	0.066	mg/L		0.001		E200.8	11/13/12 18:59 / cp
Uranium	0.0070	mg/L		0.0003		E200.8	11/13/12 18:59 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-010
Client Sample ID: 6234

MW-5
low flow

Report Date: 11/19/12
Collection Date: 11/02/12 15:10
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:34 / jba
Bicarbonate as HCO3	318	mg/L		5		A2320 B	11/07/12 20:34 / jba
Calcium	300	mg/L		1		E200.7	11/15/12 21:39 / sf
Chloride	12	mg/L		1		E300.0	11/08/12 21:57 / wc
Magnesium	92	mg/L		1		E200.7	11/15/12 21:39 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:39 / sf
Sodium	18	mg/L		1		E200.7	11/15/12 21:39 / sf
Sulfate	771	mg/L	D	4		E300.0	11/08/12 21:57 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1680	umhos/cm		1		A2510 B	11/07/12 16:55 / ab
pH	7.15	s.u.	H	0.01		A4500-H B	11/07/12 16:55 / ab
Solids, Total Dissolved TDS @ 180 C	1490	mg/L		10		A2540 C	11/08/12 15:53 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 19:02 / cp
Molybdenum	0.001	mg/L		0.001		E200.8	11/13/12 19:02 / cp
Selenium	0.064	mg/L		0.001		E200.8	11/13/12 19:02 / cp
Uranium	0.0084	mg/L		0.0003		E200.8	11/13/12 19:02 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-011
Client Sample ID: 6235

MW-13
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/03/12 08:45
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:51 / jba
Bicarbonate as HCO3	243	mg/L		5		A2320 B	11/07/12 20:51 / jba
Calcium	86	mg/L		1		E200.7	11/15/12 21:43 / sf
Chloride	50	mg/L		1		E300.0	11/08/12 22:13 / wc
Magnesium	33	mg/L		1		E200.7	11/15/12 21:43 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:43 / sf
Sodium	59	mg/L		1		E200.7	11/15/12 21:43 / sf
Sulfate	174	mg/L	D	2		E300.0	11/08/12 22:13 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	850	umhos/cm		1		A2510 B	11/07/12 16:58 / ab
pH	7.48	s.u.	H	0.01		A4500-H B	11/07/12 16:58 / ab
Solids, Total Dissolved TDS @ 180 C	549	mg/L		10		A2540 C	11/08/12 15:53 / jz
METALS - DISSOLVED							
Arsenic	0.029	mg/L		0.001		E200.8	11/13/12 19:04 / cp
Molybdenum	0.012	mg/L		0.001		E200.8	11/13/12 19:04 / cp
Selenium	0.009	mg/L		0.001		E200.8	11/13/12 19:04 / cp
Uranium	0.0117	mg/L		0.0003		E200.8	11/13/12 19:04 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-012
Client Sample ID: 6236

MW-13
Low flow

Report Date: 11/19/12
Collection Date: 11/03/12 09:40
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 20:59 / jba
Bicarbonate as HCO3	243	mg/L		5		A2320 B	11/07/12 20:59 / jba
Calcium	89	mg/L		1		E200.7	11/15/12 21:47 / sf
Chloride	51	mg/L		1		E300.0	11/08/12 22:28 / wc
Magnesium	33	mg/L		1		E200.7	11/15/12 21:47 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:47 / sf
Sodium	63	mg/L		1		E200.7	11/15/12 21:47 / sf
Sulfate	167	mg/L	D	2		E300.0	11/08/12 22:28 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	861	umhos/cm		1		A2510 B	11/07/12 17:00 / ab
pH	7.46	s.u.	H	0.01		A4500-H B	11/07/12 17:00 / ab
Solids, Total Dissolved TDS @ 180 C	565	mg/L		10		A2540 C	11/08/12 15:53 / jz
METALS - DISSOLVED							
Arsenic	0.028	mg/L		0.001		E200.8	11/13/12 19:07 / cp
Molybdenum	0.012	mg/L		0.001		E200.8	11/13/12 19:07 / cp
Selenium	0.009	mg/L		0.001		E200.8	11/13/12 19:07 / cp
Uranium	0.0119	mg/L		0.0003		E200.8	11/13/12 19:07 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-013
Client Sample ID: 6237

MW-13
purge

Report Date: 11/19/12
Collection Date: 11/03/12 11:00
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:07 / jba
Bicarbonate as HCO3	240	mg/L		5		A2320 B	11/07/12 21:07 / jba
Calcium	88	mg/L		1		E200.7	11/15/12 21:51 / sf
Chloride	47	mg/L		1		E300.0	11/08/12 22:43 / wc
Magnesium	32	mg/L		1		E200.7	11/15/12 21:51 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:51 / sf
Sodium	57	mg/L		1		E200.7	11/15/12 21:51 / sf
Sulfate	168	mg/L	D	2		E300.0	11/08/12 22:43 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	833	umhos/cm		1		A2510 B	11/07/12 17:03 / ab
pH	7.45	s.u.	H	0.01		A4500-H B	11/07/12 17:03 / ab
Solids, Total Dissolved TDS @ 180 C	538	mg/L		10		A2540 C	11/08/12 15:54 / jz
METALS - DISSOLVED							
Arsenic	0.027	mg/L		0.001		E200.8	11/13/12 19:20 / cp
Molybdenum	0.011	mg/L		0.001		E200.8	11/13/12 19:20 / cp
Selenium	0.009	mg/L		0.001		E200.8	11/13/12 19:20 / cp
Uranium	0.0108	mg/L		0.0003		E200.8	11/13/12 19:20 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-014
Client Sample ID: 6238

MW-1
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/03/12 11:45
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:16 / jba
Bicarbonate as HCO3	401	mg/L		5		A2320 B	11/07/12 21:16 / jba
Calcium	111	mg/L		1		E200.7	11/15/12 21:59 / sf
Chloride	20	mg/L		1		E300.0	11/08/12 22:59 / wc
Magnesium	71	mg/L		1		E200.7	11/15/12 21:59 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:59 / sf
Sodium	30	mg/L		1		E200.7	11/15/12 21:59 / sf
Sulfate	228	mg/L	D	4		E300.0	11/08/12 22:59 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1000	umhos/cm		1		A2510 B	11/07/12 17:06 / ab
pH	7.33	s.u.	H	0.01		A4500-H B	11/07/12 17:06 / ab
Solids, Total Dissolved TDS @ 180 C	672	mg/L		10		A2540 C	11/08/12 15:54 / jz
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/13/12 19:31 / cp
Molybdenum	0.005	mg/L		0.001		E200.8	11/13/12 19:31 / cp
Selenium	0.012	mg/L		0.001		E200.8	11/13/12 19:31 / cp
Uranium	0.0244	mg/L		0.0003		E200.8	11/13/12 19:31 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-015
Client Sample ID: 6239

UW-1
Low flow

Report Date: 11/19/12
Collection Date: 11/03/12 12:20
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:24 / jba
Bicarbonate as HCO3	401	mg/L		5		A2320 B	11/07/12 21:24 / jba
Calcium	120	mg/L		1		E200.7	11/15/12 22:03 / sf
Chloride	19	mg/L		1		E300.0	11/08/12 23:14 / wc
Magnesium	66	mg/L		1		E200.7	11/15/12 22:03 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 22:03 / sf
Sodium	30	mg/L		1		E200.7	11/15/12 22:03 / sf
Sulfate	223	mg/L	D	4		E300.0	11/08/12 23:14 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1010	umhos/cm		1		A2510 B	11/07/12 17:08 / ab
pH	7.31	s.u.	H	0.01		A4500-H B	11/07/12 17:08 / ab
Solids, Total Dissolved TDS @ 180 C	707	mg/L		10		A2540 C	11/08/12 16:25 / jz
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/13/12 19:33 / cp
Molybdenum	0.006	mg/L		0.001		E200.8	11/13/12 19:33 / cp
Selenium	0.013	mg/L		0.001		E200.8	11/13/12 19:33 / cp
Uranium	0.0261	mg/L		0.0003		E200.8	11/13/12 19:33 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-016
Client Sample ID: 6266

Equipment Blank

Report Date: 11/19/12
Collection Date: 11/03/12 14:30
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:29 / jba
Bicarbonate as HCO3	8	mg/L		5		A2320 B	11/07/12 21:29 / jba
Calcium	ND	mg/L		1		E200.7	11/15/12 22:15 / sf
Chloride	1	mg/L		1		E300.0	11/08/12 23:30 / wc
Magnesium	ND	mg/L		1		E200.7	11/15/12 22:15 / sf
Potassium	ND	mg/L		1		E200.7	11/15/12 22:15 / sf
Sodium	ND	mg/L		1		E200.7	11/15/12 22:15 / sf
Sulfate	ND	mg/L		1		E300.0	11/08/12 23:30 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	12	umhos/cm	B	1		A2510 B	11/07/12 17:11 / ab
pH	6.80	s.u.	H	0.01		A4500-H B	11/07/12 17:11 / ab
Solids, Total Dissolved TDS @ 180 C	72	mg/L		10		A2540 C	11/09/12 13:50 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 19:36 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 19:36 / cp
Selenium	ND	mg/L		0.001		E200.8	11/13/12 19:36 / cp
Uranium	ND	mg/L		0.0003		E200.8	11/13/12 19:36 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-017
Client Sample ID: 6246

RL-5
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/02/12 11:50
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:37 / jba
Bicarbonate as HCO3	226	mg/L		5		A2320 B	11/07/12 21:37 / jba
Calcium	73	mg/L		1		E200.7	11/15/12 22:19 / sf
Chloride	15	mg/L		1		E300.0	11/09/12 00:16 / wc
Magnesium	18	mg/L		1		E200.7	11/15/12 22:19 / sf
Potassium	2	mg/L		1		E200.7	11/15/12 22:19 / sf
Sodium	37	mg/L		1		E200.7	11/15/12 22:19 / sf
Sulfate	100	mg/L	D	2		E300.0	11/09/12 00:16 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	572	umhos/cm		1		A2510 B	11/07/12 17:25 / ab
pH	7.66	s.u.	H	0.01		A4500-H B	11/07/12 17:25 / ab
Solids, Total Dissolved TDS @ 180 C	360	mg/L		10		A2540 C	11/08/12 16:26 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 19:39 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 19:39 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 19:39 / cp
Uranium	0.0020	mg/L		0.0003		E200.8	11/13/12 19:39 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-018
Client Sample ID: 6247

RL-5
low flow

Report Date: 11/19/12
Collection Date: 11/02/12 12:45
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:45 / jba
Bicarbonate as HCO3	251	mg/L		5		A2320 B	11/07/12 21:45 / jba
Calcium	73	mg/L		1		E200.7	11/15/12 22:35 / sf
Chloride	15	mg/L		1		E300.0	11/09/12 01:02 / wc
Magnesium	18	mg/L		1		E200.7	11/15/12 22:35 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 22:35 / sf
Sodium	43	mg/L		1		E200.7	11/15/12 22:35 / sf
Sulfate	104	mg/L	D	2		E300.0	11/09/12 01:02 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	599	umhos/cm		1		A2510 B	11/07/12 17:28 / ab
pH	7.66	s.u.	H	0.01		A4500-H B	11/07/12 17:28 / ab
Solids, Total Dissolved TDS @ 180 C	379	mg/L		10		A2540 C	11/08/12 16:26 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 19:41 / cp
Molybdenum	0.002	mg/L		0.001		E200.8	11/13/12 19:41 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 19:41 / cp
Uranium	0.0021	mg/L		0.0003		E200.8	11/13/12 19:41 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-019
Client Sample ID: 6248

RL-5
purge

Report Date: 11/19/12
Collection Date: 11/02/12 14:00
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 21:53 / jba
Bicarbonate as HCO3	237	mg/L		5		A2320 B	11/07/12 21:53 / jba
Calcium	73	mg/L		1		E200.7	11/15/12 22:39 / sf
Chloride	15	mg/L		1		E300.0	11/09/12 01:18 / wc
Magnesium	18	mg/L		1		E200.7	11/15/12 22:39 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 22:39 / sf
Sodium	42	mg/L		1		E200.7	11/15/12 22:39 / sf
Sulfate	102	mg/L	D	2		E300.0	11/09/12 01:18 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	598	umhos/cm		1		A2510 B	11/07/12 17:30 / ab
pH	7.69	s.u.	H	0.01		A4500-H B	11/07/12 17:30 / ab
Solids, Total Dissolved TDS @ 180 C	369	mg/L		10		A2540 C	11/08/12 16:26 / jz
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/13/12 19:55 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/13/12 19:55 / cp
Selenium	0.003	mg/L		0.001		E200.8	11/13/12 19:55 / cp
Uranium	0.0021	mg/L		0.0003		E200.8	11/13/12 19:55 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-020
Client Sample ID: 6249

H-63
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/03/12 08:35
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 22:22 / jba
Bicarbonate as HCO3	263	mg/L		5		A2320 B	11/07/12 22:22 / jba
Calcium	26	mg/L		1		E200.7	11/15/12 22:43 / sf
Chloride	67	mg/L		1		E300.0	11/09/12 01:33 / wc
Magnesium	5	mg/L		1		E200.7	11/15/12 22:43 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 22:43 / sf
Sodium	212	mg/L		1		E200.7	11/15/12 22:43 / sf
Sulfate	188	mg/L	D	4		E300.0	11/09/12 01:33 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1000	umhos/cm		1		A2510 B	11/07/12 17:33 / ab
pH	8.11	s.u.	H	0.01		A4500-H B	11/07/12 17:33 / ab
Solids, Total Dissolved TDS @ 180 C	629	mg/L		10		A2540 C	11/08/12 16:26 / jz
METALS - DISSOLVED							
Arsenic	0.065	mg/L		0.001		E200.8	11/13/12 19:58 / cp
Molybdenum	0.007	mg/L		0.001		E200.8	11/13/12 19:58 / cp
Selenium	0.008	mg/L		0.001		E200.8	11/13/12 19:58 / cp
Uranium	0.0099	mg/L		0.0003		E200.8	11/13/12 19:58 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-021
Client Sample ID: 6250

H-63
low flow

Report Date: 11/19/12
Collection Date: 11/03/12 09:35
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 22:39 / jba
Bicarbonate as HCO3	259	mg/L		5		A2320 B	11/07/12 22:39 / jba
Calcium	26	mg/L		1		E200.7	11/15/12 22:47 / sf
Chloride	66	mg/L		1		E300.0	11/09/12 01:48 / wc
Magnesium	5	mg/L		1		E200.7	11/15/12 22:47 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 22:47 / sf
Sodium	209	mg/L		1		E200.7	11/15/12 22:47 / sf
Sulfate	183	mg/L	D	4		E300.0	11/09/12 01:48 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1000	umhos/cm		1		A2510 B	11/07/12 17:36 / ab
pH	8.11	s.u.	H	0.01		A4500-H B	11/07/12 17:36 / ab
Solids, Total Dissolved TDS @ 180 C	640	mg/L		10		A2540 C	11/08/12 16:26 / jz
METALS - DISSOLVED							
Arsenic	0.065	mg/L		0.001		E200.8	11/13/12 20:00 / cp
Molybdenum	0.008	mg/L		0.001		E200.8	11/13/12 20:00 / cp
Selenium	0.008	mg/L		0.001		E200.8	11/13/12 20:00 / cp
Uranium	0.0097	mg/L		0.0003		E200.8	11/13/12 20:00 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-022
Client Sample ID: 6261

H-63
purge

Report Date: 11/19/12
Collection Date: 11/03/12 10:55
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/07/12 22:56 / jba
Bicarbonate as HCO3	230	mg/L		5		A2320 B	11/07/12 22:56 / jba
Calcium	75	mg/L		1		E200.7	11/15/12 22:51 / sf
Chloride	63	mg/L		1		E300.0	11/09/12 02:04 / wc
Magnesium	15	mg/L		1		E200.7	11/15/12 22:51 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 22:51 / sf
Sodium	118	mg/L		1		E200.7	11/15/12 22:51 / sf
Sulfate	184	mg/L	D	2		E300.0	11/09/12 02:04 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	914	umhos/cm		1		A2510 B	11/07/12 17:38 / ab
pH	7.76	s.u.	H	0.01		A4500-H B	11/07/12 17:38 / ab
Solids, Total Dissolved TDS @ 180 C	585	mg/L		10		A2540 C	11/08/12 16:27 / jz
METALS - DISSOLVED							
Arsenic	0.032	mg/L		0.001		E200.8	11/13/12 20:03 / cp
Molybdenum	0.005	mg/L		0.001		E200.8	11/13/12 20:03 / cp
Selenium	0.008	mg/L		0.001		E200.8	11/13/12 20:03 / cp
Uranium	0.0089	mg/L		0.0003		E200.8	11/13/12 20:03 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-023
Client Sample ID: 6262

OW-UT-9
hydrasleeve

Report Date: 11/19/12
Collection Date: 11/03/12 11:50
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	6240	mg/L		5		A2320 B	11/08/12 14:34 / jba
Bicarbonate as HCO3	8170	mg/L		5		A2320 B	11/08/12 14:34 / jba
Calcium	4	mg/L		1		E200.7	11/15/12 22:59 / sf
Chloride	1390	mg/L	D	100		E300.0	11/09/12 02:19 / wc
Magnesium	22	mg/L	D	2		E200.7	11/15/12 22:59 / sf
Potassium	18	mg/L	D	3		E200.7	11/15/12 22:59 / sf
Sodium	15100	mg/L	D	20		E200.7	11/15/12 22:59 / sf
Sulfate	10600	mg/L	D	400		E300.0	11/09/12 02:19 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	36400	umhos/cm		1		A2510 B	11/07/12 17:41 / ab
pH	9.49	s.u.	H	0.01		A4500-H B	11/07/12 17:41 / ab
Solids, Total Dissolved TDS @ 180 C	36200	mg/L		10		A2540 C	11/08/12 16:27 / jz
METALS - DISSOLVED							
Arsenic	3.28	mg/L		0.001		E200.8	11/16/12 10:24 / cp
Molybdenum	51.6	mg/L		0.001		E200.8	11/13/12 20:06 / cp
Selenium	0.055	mg/L	D	0.003		E200.8	11/13/12 20:06 / cp
Uranium	93.4	mg/L	D	0.001		E200.8	11/13/12 20:06 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-024
Client Sample ID: 6263

DW-UT-9
hydrasleeve
dup

Report Date: 11/19/12
Collection Date: 11/03/12 11:55
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	6420	mg/L		5		A2320 B	11/08/12 14:44 / jba
Bicarbonate as HCO3	8050	mg/L		5		A2320 B	11/08/12 14:44 / jba
Calcium	3	mg/L		1		E200.7	11/15/12 23:03 / sf
Chloride	1390	mg/L	D	100		E300.0	11/09/12 02:35 / wc
Magnesium	22	mg/L	D	2		E200.7	11/15/12 23:03 / sf
Potassium	18	mg/L	D	3		E200.7	11/15/12 23:03 / sf
Sodium	15000	mg/L	D	20		E200.7	11/15/12 23:03 / sf
Sulfate	10700	mg/L	D	400		E300.0	11/09/12 02:35 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	36900	umhos/cm		1		A2510 B	11/07/12 17:44 / ab
pH	9.49	s.u.	H	0.01		A4500-H B	11/07/12 17:44 / ab
Solids, Total Dissolved TDS @ 180 C	37000	mg/L		10		A2540 C	11/08/12 16:27 / jz
METALS - DISSOLVED							
Arsenic	3.66	mg/L		0.001		E200.8	11/13/12 20:16 / cp
Molybdenum	51.7	mg/L		0.001		E200.8	11/13/12 20:16 / cp
Selenium	0.044	mg/L		0.001		E200.8	11/16/12 10:47 / cp
Uranium	93.6	mg/L	D	0.001		E200.8	11/13/12 20:16 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-025
Client Sample ID: 6264

DW-UT-9
Low Flow

Report Date: 11/19/12
Collection Date: 11/03/12 12:55
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	6600	mg/L		5		A2320 B	11/08/12 14:48 / jba
Bicarbonate as HCO3	8530	mg/L		5		A2320 B	11/08/12 14:48 / jba
Calcium	5	mg/L		1		E200.7	11/15/12 23:16 / sf
Chloride	1420	mg/L	D	100		E300.0	11/09/12 02:50 / wc
Magnesium	21	mg/L	D	2		E200.7	11/15/12 23:16 / sf
Potassium	18	mg/L	D	3		E200.7	11/15/12 23:16 / sf
Sodium	14900	mg/L	D	20		E200.7	11/15/12 23:16 / sf
Sulfate	10700	mg/L	D	400		E300.0	11/09/12 02:50 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	37200	umhos/cm		1		A2510 B	11/07/12 17:46 / ab
pH	9.48	s.u.	H	0.01		A4500-H B	11/07/12 17:46 / ab
Solids, Total Dissolved TDS @ 180 C	35400	mg/L		10		A2540 C	11/08/12 16:27 / jz
METALS - DISSOLVED							
Arsenic	2.90	mg/L		0.001		E200.8	11/13/12 20:29 / cp
Molybdenum	39.4	mg/L		0.001		E200.8	11/13/12 20:29 / cp
Selenium	0.022	mg/L		0.001		E200.8	11/16/12 11:04 / cp
Uranium	92.1	mg/L	D	0.001		E200.8	11/13/12 20:29 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110279-026
Client Sample ID: 6265

OW-UT-9
purge

Report Date: 11/19/12
Collection Date: 11/03/12 14:00
DateReceived: 11/07/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	6720	mg/L		5		A2320 B	11/08/12 14:52 / jba
Bicarbonate as HCO3	7370	mg/L		5		A2320 B	11/08/12 14:52 / jba
Calcium	4	mg/L		1		E200.7	11/16/12 00:00 / sf
Chloride	1380	mg/L	D	100		E300.0	11/09/12 03:06 / wc
Magnesium	21	mg/L	D	2		E200.7	11/16/12 00:00 / sf
Potassium	18	mg/L	D	3		E200.7	11/16/12 00:00 / sf
Sodium	14700	mg/L	D	20		E200.7	11/16/12 00:00 / sf
Sulfate	10600	mg/L	D	400		E300.0	11/09/12 03:06 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	36600	umhos/cm		1		A2510 B	11/07/12 17:49 / ab
pH	9.49	s.u.	H	0.01		A4500-H B	11/07/12 17:49 / ab
Solids, Total Dissolved TDS @ 180 C	35900	mg/L		10		A2540 C	11/08/12 16:28 / jz
METALS - DISSOLVED							
Arsenic	3.58	mg/L		0.001		E200.8	11/13/12 20:31 / cp
Molybdenum	51.4	mg/L		0.001		E200.8	11/13/12 20:31 / cp
Selenium	0.046	mg/L		0.001		E200.8	11/16/12 11:09 / cp
Uranium	88.6	mg/L	D	0.001		E200.8	11/13/12 20:31 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R166893
Sample ID: MBLK	2	Method Blank				Run: MANTECH_121107A				11/07/12 14:44
Carbonate as CO3		ND	mg/L	1						
Bicarbonate as HCO3		2	mg/L	1						
Sample ID: C12110279-010ADUP	2	Sample Duplicate				Run: MANTECH_121107A				11/07/12 20:42
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		319	mg/L	5.0				0.0	10	
Sample ID: C12110279-020ADUP	2	Sample Duplicate				Run: MANTECH_121107A				11/07/12 22:30
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		263	mg/L	5.0				0.0	10	
Method: A2320 B										Batch: 121108_1_ALK-W
Sample ID: MBLK1_121108_	3	Method Blank				Run: TTR-ALK_121108A				11/08/12 14:23
Alkalinity, Total as CaCO3		1.25	mg/L	5.0						
Carbonate as CO3		ND	mg/L	5.0						
Bicarbonate as HCO3		1.52	mg/L	5.0						
Sample ID: LCS_121003_121108_		Laboratory Control Sample				Run: TTR-ALK_121108A				11/08/12 14:29
Alkalinity, Total as CaCO3		1000	mg/L	5.0	100	90	110			
Sample ID: C12110279-023ADUP	3	Sample Duplicate				Run: TTR-ALK_121108A				11/08/12 14:38
Alkalinity, Total as CaCO3		17000	mg/L	5.0				0.3	10	
Carbonate as CO3		6240	mg/L	5.0				0.0	10	
Bicarbonate as HCO3		8110	mg/L	5.0				0.7	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B										Batch: R166835
Sample ID: SC 2ND 1413		Laboratory Control Sample				Run: PHSC_101-C_121107A				11/07/12 09:01
Conductivity @ 25 C		1410	umhos/cm	1.0	99	90	110			
Sample ID: MBLK		Method Blank				Run: PHSC_101-C_121107A				11/07/12 09:06
Conductivity @ 25 C		2	umhos/cm	0.2						
Sample ID: C12110279-006ADUP		Sample Duplicate				Run: PHSC_101-C_121107A				11/07/12 16:44
Conductivity @ 25 C		553	umhos/cm	1.0				0.3	10	
Sample ID: C12110279-016ADUP		Sample Duplicate				Run: PHSC_101-C_121107A				11/07/12 17:14
Conductivity @ 25 C		12.2	umhos/cm	1.0				2.4	10	
Sample ID: C12110279-026ADUP		Sample Duplicate				Run: PHSC_101-C_121107A				11/07/12 17:52
Conductivity @ 25 C		36600	umhos/cm	1.0				0.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: TDS121108A
Sample ID: MB-1_121108A		Method Blank				Run: BAL-1_121108B				11/08/12 15:47
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121108A		Laboratory Control Sample				Run: BAL-1_121108B				11/08/12 15:48
Solids, Total Dissolved TDS @ 180 C		1090	mg/L	10	98	90	110			
Sample ID: C12110259-001B MS		Sample Matrix Spike				Run: BAL-1_121108B				11/08/12 15:49
Solids, Total Dissolved TDS @ 180 C		8260	mg/L	10	99	90	110			
Sample ID: C12110279-004A DUP		Sample Duplicate				Run: BAL-1_121108B				11/08/12 15:52
Solids, Total Dissolved TDS @ 180 C		8030	mg/L	10				3.1	5	
Sample ID: C12110279-014A DUP		Sample Duplicate				Run: BAL-1_121108B				11/08/12 16:25
Solids, Total Dissolved TDS @ 180 C		685	mg/L	10				1.9	5	
Sample ID: C12110279-015A MS		Sample Matrix Spike				Run: BAL-1_121108B				11/08/12 16:25
Solids, Total Dissolved TDS @ 180 C		1770	mg/L	10	96	90	110			
Method: A2540 C										Batch: TDS121109A
Sample ID: MB-1_121109A		Method Blank				Run: BAL-1_121109C				11/09/12 13:49
Solids, Total Dissolved TDS @ 180 C		5	mg/L	4						
Sample ID: LCS-2_121109A		Laboratory Control Sample				Run: BAL-1_121109C				11/09/12 13:49
Solids, Total Dissolved TDS @ 180 C		1110	mg/L	10	99	90	110			
Sample ID: C12110285-008A DUP		Sample Duplicate				Run: BAL-1_121109C				11/09/12 13:50
Solids, Total Dissolved TDS @ 180 C		6180	mg/L	10					5	
Sample ID: C12110285-009A MS		Sample Matrix Spike				Run: BAL-1_121109C				11/09/12 13:51
Solids, Total Dissolved TDS @ 180 C		4250	mg/L	10	100	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC_101-C_121107A	
Sample ID: pH 6.86		Initial Calibration Verification Standard							11/07/12 08:47	
pH		6.84	s.u.	0.010	100	98	102			
Method: A4500-H B									Batch: R166835	
Sample ID: C12110279-006ADUP		Sample Duplicate				Run: PHSC_101-C_121107A			11/07/12 16:44	
pH		7.53	s.u.	0.010				0.1	3	
Sample ID: C12110279-016ADUP		Sample Duplicate				Run: PHSC_101-C_121107A			11/07/12 17:14	
pH		6.79	s.u.	0.010				0.1	3	
Sample ID: C12110279-026ADUP		Sample Duplicate				Run: PHSC_101-C_121107A			11/07/12 17:52	
pH		9.48	s.u.	0.010				0.1	3	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP2-C_121115A	
Sample ID: ICV	5	Initial Calibration Verification Standard							11/15/12 12:39	
Calcium		50.8	mg/L	0.50	102	95	105			
Magnesium		49.9	mg/L	0.50	100	95	105			
Potassium		47.6	mg/L	0.50	95	95	105			
Sodium		51.9	mg/L	0.50	104	95	105			
Uranium		4.94	mg/L	1.0	99	95	105			
Sample ID: ICSA	5	Interference Check Sample A							11/15/12 13:09	
Calcium		509	mg/L	0.50	102	80	120			
Magnesium		492	mg/L	0.50	98	80	120			
Potassium		0.00170	mg/L	0.50						
Sodium		0.237	mg/L	0.50						
Uranium		-0.0250	mg/L	1.0						
Sample ID: ICSAB	5	Interference Check Sample AB							11/15/12 13:13	
Calcium		506	mg/L	0.50	101	80	120			
Magnesium		498	mg/L	0.50	100	80	120			
Potassium		0.00170	mg/L	0.50						
Sodium		0.143	mg/L	0.50						
Uranium		-0.0390	mg/L	1.0						
Method: E200.7									Batch: R167269	
Sample ID: MB-121115A	5	Method Blank				Run: ICP2-C_121115A			11/15/12 13:37	
Calcium		ND	mg/L	0.06						
Magnesium		ND	mg/L	0.03						
Potassium		ND	mg/L	0.06						
Sodium		ND	mg/L	0.3						
Uranium		ND	mg/L	0.3						
Sample ID: LFB-121115A	5	Laboratory Fortified Blank				Run: ICP2-C_121115A			11/15/12 13:41	
Calcium		49.1	mg/L	0.50	98	85	115			
Magnesium		46.0	mg/L	0.50	92	85	115			
Potassium		43.9	mg/L	0.50	88	85	115			
Sodium		48.3	mg/L	0.50	97	85	115			
Uranium		4.38	mg/L	1.0	88	85	115			
Sample ID: C12110279-006BMS2	5	Sample Matrix Spike				Run: ICP2-C_121115A			11/15/12 21:02	
Calcium		117	mg/L	1.0	92	70	130			
Magnesium		68.6	mg/L	1.0	98	70	130			
Potassium		49.9	mg/L	1.0	92	70	130			
Sodium		80.4	mg/L	1.0	97	70	130			
Uranium		3.99	mg/L	0.26	78	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R167269
Sample ID: C12110279-006BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_121115A				11/15/12 21:06
Calcium		119	mg/L	1.0	96	70	130	1.6	20	
Magnesium		69.1	mg/L	1.0	99	70	130	0.6	20	
Potassium		49.7	mg/L	1.0	92	70	130	0.4	20	
Sodium		82.1	mg/L	1.0	101	70	130	2.1	20	
Uranium		4.08	mg/L	0.26	80	70	130	2.3	20	
Sample ID: C12110279-015BMS2	5	Sample Matrix Spike				Run: ICP2-C_121115A				11/15/12 22:07
Calcium		164	mg/L	1.0	88	70	130			
Magnesium		116	mg/L	1.0	99	70	130			
Potassium		52.7	mg/L	1.0	95	70	130			
Sodium		81.7	mg/L	1.0	101	70	130			
Uranium		4.19	mg/L	0.26	82	70	130			
Sample ID: C12110279-015BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_121115A				11/15/12 22:11
Calcium		161	mg/L	1.0	82	70	130	2.0	20	
Magnesium		113	mg/L	1.0	94	70	130	2.1	20	
Potassium		52.5	mg/L	1.0	94	70	130	0.4	20	
Sodium		81.9	mg/L	1.0	101	70	130	0.2	20	
Uranium		4.20	mg/L	0.26	82	70	130	0.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS2-C_121113A	
Sample ID: ICV	4	Initial Calibration Verification Standard							11/13/12 13:17	
Arsenic		0.0501	mg/L	0.0010	100	90	110			
Molybdenum		0.0525	mg/L	0.0010	105	90	110			
Selenium		0.0520	mg/L	0.0010	104	90	110			
Uranium		0.0503	mg/L	0.00030	101	90	110			
Method: E200.8									Batch: R167164	
Sample ID: LRB	4	Method Blank				Run: ICPMS2-C_121113A			11/13/12 13:39	
Arsenic		ND	mg/L	0.00010						
Molybdenum		6E-05	mg/L	4E-05						
Selenium		ND	mg/L	0.0002						
Uranium		ND	mg/L	1E-05						
Sample ID: LFB	4	Laboratory Fortified Blank				Run: ICPMS2-C_121113A			11/13/12 13:41	
Arsenic		0.0522	mg/L	0.0010	104	85	115			
Molybdenum		0.0526	mg/L	0.0010	105	85	115			
Selenium		0.0540	mg/L	0.0010	108	85	115			
Uranium		0.0520	mg/L	0.00030	104	85	115			
Sample ID: C12110279-003BMS4	4	Sample Matrix Spike				Run: ICPMS2-C_121113A			11/13/12 17:59	
Arsenic		0.258	mg/L	0.0010	102	70	130			
Molybdenum		3.78	mg/L	0.0010		70	130			A
Selenium		0.332	mg/L	0.0013	104	70	130			
Uranium		24.9	mg/L	0.00050		70	130			A
Sample ID: C12110279-003BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS2-C_121113A			11/13/12 18:01	
Arsenic		0.260	mg/L	0.0010	103	70	130	0.8	20	
Molybdenum		3.86	mg/L	0.0010		70	130	2.1	20	A
Selenium		0.331	mg/L	0.0013	103	70	130	0.5	20	
Uranium		25.1	mg/L	0.00050		70	130	1.0	20	A
Sample ID: C12110279-013BMS4	4	Sample Matrix Spike				Run: ICPMS2-C_121113A			11/13/12 19:23	
Arsenic		0.0819	mg/L	0.0010	110	70	130			
Molybdenum		0.0639	mg/L	0.0010	106	70	130			
Selenium		0.0640	mg/L	0.0010	109	70	130			
Uranium		0.0639	mg/L	0.00030	106	70	130			
Sample ID: C12110279-013BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS2-C_121113A			11/13/12 19:26	
Arsenic		0.0819	mg/L	0.0010	110	70	130	0.1	20	
Molybdenum		0.0656	mg/L	0.0010	109	70	130	2.6	20	
Selenium		0.0650	mg/L	0.0010	111	70	130	1.5	20	
Uranium		0.0644	mg/L	0.00030	107	70	130	0.7	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/19/12
Project: Lisbon, UT Facility
Work Order: C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS4-C_121115A	
Sample ID: ICV	6	Initial Calibration Verification Standard							11/15/12 14:05	
Arsenic		0.0484	mg/L	0.0010	97	90	110			
Magnesium		9.58	mg/L	0.0027	96	90	110			
Potassium		9.50	mg/L	0.0041	95	90	110			
Selenium		0.0491	mg/L	0.0010	98	90	110			
Sodium		9.50	mg/L	0.0043	95	90	110			
Uranium		0.0496	mg/L	0.00030	99	90	110			
Method: E200.8									Batch: R167319	
Sample ID: LRB	6	Method Blank				Run: ICPMS4-C_121115A			11/15/12 14:40	
Arsenic		ND	mg/L	5E-05						
Magnesium		0.009	mg/L	0.003						
Potassium		ND	mg/L	0.004						
Selenium		ND	mg/L	7E-05						
Sodium		ND	mg/L	0.004						
Uranium		2E-05	mg/L	9E-06						
Sample ID: LFB	6	Laboratory Fortified Blank				Run: ICPMS4-C_121115A			11/15/12 14:45	
Arsenic		0.0502	mg/L	0.0010	100	85	115			
Magnesium		12.5	mg/L	0.0027	100	85	115			
Potassium		12.4	mg/L	0.0041	99	85	115			
Selenium		0.0505	mg/L	0.0010	101	85	115			
Sodium		12.6	mg/L	0.0043	100	85	115			
Uranium		0.0512	mg/L	0.00030	102	85	115			
Sample ID: C12110213-004BMS4	6	Sample Matrix Spike				Run: ICPMS4-C_121115A			11/16/12 08:28	
Arsenic		0.145	mg/L	0.0010	108	70	130			
Magnesium		23.9	mg/L	1.0	100	70	130			
Potassium		17.6	mg/L	1.0	98	70	130			
Selenium		0.0525	mg/L	0.0010	93	70	130			
Sodium		30.2	mg/L	1.0	102	70	130			
Uranium		0.327	mg/L	0.00030		70	130			A
Sample ID: C12110213-004BMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121115A			11/16/12 08:33	
Arsenic		0.146	mg/L	0.0010	109	70	130	0.1	20	
Magnesium		23.7	mg/L	1.0	98	70	130	0.8	20	
Potassium		17.5	mg/L	1.0	98	70	130	0.1	20	
Selenium		0.0559	mg/L	0.0010	99	70	130	6.3	20	
Sodium		29.9	mg/L	1.0	99	70	130	1.1	20	
Uranium		0.329	mg/L	0.00030		70	130	0.5	20	A
Sample ID: C12110279-024BMS4	5	Sample Matrix Spike				Run: ICPMS4-C_121115A			11/16/12 10:51	
Arsenic		3.54	mg/L	0.0010		70	130			A
Magnesium		140	mg/L	1.0	95	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Batch: R167319	
Sample ID: C12110279-024BMS4	5	Sample Matrix Spike				Run: ICPMS4-C_121115A			11/16/12 10:51	
Potassium		157	mg/L	1.0	111	70	130			
Selenium		0.564	mg/L	0.0010	104	70	130			
Uranium		103	mg/L	0.00030		70	130			A
Sample ID: C12110279-024BMSD	5	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121115A			11/16/12 10:55	
Arsenic		3.50	mg/L	0.0010		70	130	1.1	20	A
Magnesium		136	mg/L	1.0	92	70	130	2.8	20	
Potassium		159	mg/L	1.0	112	70	130	1.1	20	
Selenium		0.611	mg/L	0.0010	114	70	130	8.1	20	
Uranium		102	mg/L	0.00030		70	130	1.2	20	A

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/19/12

Project: Lisbon, UT Facility **Work Order:** C12110279

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC2-C_121108A	
Sample ID: ICV-110812-10	2	Initial Calibration Verification Standard							11/08/12 16:18	
Chloride		9.80	mg/L	1.0	98	90	110			
Sulfate		40.2	mg/L	1.0	100	90	110			
Method: E300.0									Batch: R166991	
Sample ID: ICB-110812-11	2	Method Blank				Run: IC2-C_121108A			11/08/12 16:33	
Chloride		ND	mg/L	0.03						
Sulfate		0.1	mg/L	0.10						
Sample ID: LFB-110812-12	2	Laboratory Fortified Blank				Run: IC2-C_121108A			11/08/12 16:49	
Chloride		9.77	mg/L	1.0	98	90	110			
Sulfate		39.5	mg/L	1.0	99	90	110			
Sample ID: C12110298-001AMS	2	Sample Matrix Spike				Run: IC2-C_121108A			11/08/12 17:20	
Chloride		38.3	mg/L	1.0	99	90	110			
Sulfate		245	mg/L	1.7	97	90	110			
Sample ID: C12110298-001AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121108A			11/08/12 17:35	
Chloride		38.2	mg/L	1.0	98	90	110	0.2	10	
Sulfate		245	mg/L	1.7	97	90	110	0.1	10	
Sample ID: C12110279-007AMS	2	Sample Matrix Spike				Run: IC2-C_121108A			11/08/12 20:55	
Chloride		29.3	mg/L	1.0	98	90	110			
Sulfate		189	mg/L	1.7	97	90	110			
Sample ID: C12110279-007AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121108A			11/08/12 21:11	
Chloride		29.6	mg/L	1.0	99	90	110	1.1	10	
Sulfate		190	mg/L	1.7	98	90	110	0.4	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Chain of Custody and Analytical Request Record

Page 1 of 4

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery & Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon UT Facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required): 520-881-4912	Contact Name: Phone/Fax:	Cell:	Sampler: (Please Print) BRANDON MYERS
☒ No Hard Copy Email: tleo@elmontgomery.com	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150
Invoice Address (Required): ☐ No Hard Copy Email:			

Special Report/Formats:

☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150									SEE ATTACHED	Standard Turnaround (TAT)
1	6240	03/NOV/2012	1325	W	X										
2	6251	1	1440	W	X										
3	6252	05/NOV/2012	930	W	X										
4	6253	1	1005	W	X										
5	6254	1	1035	W	X										
6															
7															
8															
9															
10															

R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO3 in field

Samples in cooler 1 of 2

Shipped by: Fedex
Cooler ID(s): 4681
Receipt Temp: 0.4 °C
On Ice: Y (N)
Custody Seal: On Bottle Y N; On Cooler Y N
Intact: Y N
Signature Match: Y N

LABORATORY USE ONLY
C12110279

Custody Record MUST be Signed

Relinquished by (print): BRANDON MYERS	Date/Time: 11/5/12 1400	Signature:	Received by (print): / Date/Time: / Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
Sample Disposal: Return to Client: _____	Lab Disposal: _____		Received by Laboratory: 11-7-12 10:45 / Date/Time: / Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Montgomery + Associates	Rio Algom Mining Lisbon UT Facility	State: Utah	Yes ☐ No ☐
Report Mail Address: 520-881-4912	Contact Name: Phone/Fax:	Email:	Sampler: (Please Print)
Email Report: tlco@elmontgomery.com			Brandon Myers
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order:
			38150

Special Report/Formats:

☐ DW ☐ POTW/WWTP ☐ State: _____ ☐ Other: _____

☐ EDD/EDT (Electronic Data) Format: _____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO3 in field

Shipped by: Fed Ex

Cooler ID(s): 4081

Receipt Temp 0.4 °C

On Ice: (Y) N

Custody Seal On Bottle Y N / On Cooler Y N

Intact Y N

Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150	
1	6230	07NOV2012	1045	W	X	Samples in cooler 1 of 2
2	6231		1135		X	
3	6232		1240		X	
4	6233		1345		X	
5	6234		1570		X	
6	6235	23NOV2012	845		X	
7	6236		940		X	
8	6237		1100		X	
9	6238		1145		X	
10	6239		1220		X	

LABORATORY USE ONLY C12110279

Custody Record MUST be Signed

	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
	[illegible]	11/5/12 1400	Brandon Myers			
	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
				Received by Laboratory:	Date/Time: 11712/1045	Signature: [signature]

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon UT facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required): 520-881-4912	Contact Name: / Phone/Fax:	Cell:	Sampler: (Please Print) Josh Kerns
☒ No Hard Copy Email: tleo@elmontgomery.com	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:
- ☐ DW
- ☐ POTW/WWTP
- ☐ State: ______
- ☐ Other: ______
- ☐ EDD/EDT (Electronic Data) Format: ______
- ☐ LEVEL IV
- ☐ NELAC

ANALYSIS REQUESTED: See attached bottle order # 38150 — SEE ATTACHED

Standard Turnaround (TAT) — RUSH: Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO3 in field. 3 Samples in Cooler 1 of 2

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW — Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	See attached bottle order # 38150
1	U2ULL	03NOV2010	1430	W	X
2					
3					
4					
5					
6					
7					
8					
9					
10					

LABORATORY USE ONLY: Shipped by: FedEx; Cooler ID(s): 4061; Receipt Temp 0.4 °C; On Ice: (Y) N; Custody Seal On Bottle Y (N); On Cooler Y (N); Intact Y N; Signature Match Y N; C12110279

Custody Record MUST be Signed			
Relinquished by (print): Josh Kerns	Date/Time: 1400 05NOV2010	Signature: [signature]	Received by (print): / Date/Time: / Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
Sample Disposal:	Return to Client:	Lab Disposal:	Received by Laboratory: / Date/Time: 11-7-12 / 1045 / Signature: [signature]

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates

Report/Mail Address (Required): 520-881-4912

No Hard Copy Email: tleo@elmontgomery.com

Invoice Address (Required):

No Hard Copy Email:

Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, Ut facility

Contact Name: Phone/Fax:

Invoice Contact & Phone:

Sample Origin State: Utah

Cell:

Purchase Order:

EPA/State Compliance: Yes ☐ No ☐

Sampler: (Please Print) Josh Kerns

Quote/Bottle Order: 38158

Special Report/Formats:

☐ DW ☐ POTW/WWTP ☐ State: ☐ Other:

☐ EDD/EDT (Electronic Data) Format: ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO_3 in field

Shipped by: Fedex - NDA

Cooler ID(s): 3848

Receipt Temp: 6 TB °C

On Ice: (Y) N

Custody Seal: On Bottle Y N; On Cooler (Y) N; Intact (Y) N; Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38158										
1	6246	02NOV2012	1150	W	X										
2	6247	02NOV2012	1245 ~~1150~~ (TK)	W	X										
3	6248	02NOV2012	1400	W	X										
4	6249	03NOV2012	0835	W	X										
5	6250	03NOV2012	0935	W	X										
6	6261	03NOV2012	1055	W	X										
7	6262	03NOV2012	1150	W	X										
8	6263	03NOV2012	1155	W	X										
9	6264	03NOV2012	1255	W	X										
10	6265	03NOV2012	1400	W	X										

Samples in Cooler 1 OF 2

Samples in Cooler 2 OF 2

High pH; additional HNO_3 preserv. added. 3 vials added for each metals bottle double volume rcvd

LABORATORY USE ONLY

C12110279

Custody Record MUST be Signed

	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
	Josh Kerns	05NOV2012/1400				
	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
				Received by Laboratory: 11-6-12	Date/Time: 9:45	Signature: WJC

Sample Disposal: Return to Client: ☐ Lab Disposal: ☐

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

ENERGY LABORATORIES
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Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

ANALYTICAL SUMMARY REPORT

November 16, 2012

Rio Algom Mining Corporation LLC
Hwy 605 and 509
Grants, NM 87020

Workorder No.: C12110375

Project Name: Lisbon, UT Facility

-001 MW-102 hydrasleeve
-002 MW-102 " dup
-003 MW-102 low flow
-004 MW-102 purge
-005 MW-101 hydrasleeve
-006 MW-103 hydrasleeve
-007 MW-103 low flow
-008 MW-106 purge
-009 MW-104 purge
-010 MW-103 purge
-011 MW-105 low flow dup
-012 MW-105 purge
-013 MW-100 hydrasleeve
-014 MW-100 low flow
-015 MW-100 purge
-016 MW-102DB hydrasleeve
-017 MW-102DB low flow
-018 MW-102DB " dup
-019 MW-102DB purge
-020 MW-101 low flow
-021 MW-104 purge
-022 MW-101 purge dup
-023 Equipment Blank
-024 MW-105 hydrasleeve
-025 MW-105 low flow

Energy Laboratories, Inc. Casper WY received the following 25 samples for Rio Algom Mining Corporation LLC on 11/8/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C12110375-001	6267	11/06/12 7:35	11/08/12	Aqueous	Metals by ICP/ICPMS, Dissolved Alkalinity Conductivity E300.0 Anions pH Solids, Total Dissolved
C12110375-002	6268	11/06/12 7:40	11/08/12	Aqueous	Same As Above
C12110375-003	6269	11/06/12 8:50	11/08/12	Aqueous	Same As Above
C12110375-004	6270	11/06/12 10:10	11/08/12	Aqueous	Same As Above
C12110375-005	6271	11/06/12 10:40	11/08/12	Aqueous	Same As Above
C12110375-006	6272	11/07/12 7:00	11/08/12	Aqueous	Same As Above
C12110375-007	6273	11/07/12 7:45	11/08/12	Aqueous	Same As Above
C12110375-008	6274	11/07/12 9:15	11/08/12	Aqueous	Same As Above
C12110375-009	6275	11/07/12 9:45	11/08/12	Aqueous	Same As Above
C12110375-010	6276	11/07/12 11:30	11/08/12	Aqueous	Same As Above
C12110375-011	6285	11/07/12 8:00	11/08/12	Aqueous	Same As Above
C12110375-012	6286	11/07/12 8:30	11/08/12	Aqueous	Same As Above
C12110375-013	6287	11/07/12 8:55	11/08/12	Aqueous	Same As Above
C12110375-014	6288	11/07/12 9:20	11/08/12	Aqueous	Same As Above
C12110375-015	6289	11/07/12 10:00	11/08/12	Aqueous	Same As Above
C12110375-016	6255	11/06/12 7:45	11/08/12	Aqueous	Same As Above
C12110375-017	6256	11/06/12 8:45	11/08/12	Aqueous	Same As Above
C12110375-018	6257	11/06/12 8:55	11/08/12	Aqueous	Same As Above
C12110375-019	6258	11/06/12 10:15	11/08/12	Aqueous	Same As Above
C12110375-020	6259	11/06/12 11:15	11/08/12	Aqueous	Same As Above
C12110375-021	6260	11/06/12 11:40	11/08/12	Aqueous	Same As Above
C12110375-022	6281	11/06/12 11:50	11/08/12	Aqueous	Same As Above
C12110375-023	6282	11/06/12 12:15	11/08/12	Aqueous	Same As Above
C12110375-024	6283	11/07/12 7:00	11/08/12	Aqueous	Same As Above
C12110375-025	6284	11/07/12 7:55	11/08/12	Aqueous	Same As Above

ANALYTICAL SUMMARY REPORT

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.

Report Approved By:

Report Proofing Specialist

Digitally signed by
Sheri Mead
Date: 2012.11.16 15:07:36 -07:00

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-001
Client Sample ID: 6267

MW-102
hydrasleeve

Report Date: 11/16/12
Collection Date: 11/06/12 07:35
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	360	mg/L		5		A2320 B	11/09/12 09:18 / jba
Bicarbonate as HCO3	4270	mg/L		5		A2320 B	11/09/12 09:18 / jba
Calcium	40	mg/L		1		E200.7	11/15/12 18:59 / sf
Chloride	1260	mg/L	D	20		E300.0	11/09/12 20:36 / ljl
Magnesium	56	mg/L		1		E200.7	11/15/12 18:59 / sf
Potassium	9	mg/L		1		E200.7	11/15/12 18:59 / sf
Sodium	5110	mg/L	D	4		E200.7	11/15/12 18:59 / sf
Sulfate	6280	mg/L	D	80		E300.0	11/09/12 20:36 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	17800	umhos/cm		1		A2510 B	11/09/12 09:28 / ab
pH	8.64	s.u.	H	0.01		A4500-H B	11/09/12 09:28 / ab
Solids, Total Dissolved TDS @ 180 C	14400	mg/L		10		A2540 C	11/09/12 13:58 / ab
METALS - DISSOLVED							
Arsenic	0.175	mg/L		0.001		E200.8	11/14/12 20:44 / cp
Molybdenum	28.3	mg/L		0.001		E200.8	11/14/12 20:44 / cp
Selenium	0.189	mg/L		0.001		E200.8	11/14/12 20:44 / cp
Uranium	146	mg/L		0.0003		E200.8	11/14/12 20:44 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-002
Client Sample ID: 6268

MW-102 hydrasleeve dup

Report Date: 11/16/12
Collection Date: 11/06/12 07:40
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	300	mg/L		5		A2320 B	11/09/12 09:23 / jba
Bicarbonate as HCO3	4390	mg/L		5		A2320 B	11/09/12 09:23 / jba
Calcium	40	mg/L		1		E200.7	11/15/12 19:20 / sf
Chloride	1210	mg/L	D	20		E300.0	11/09/12 20:51 / ljl
Magnesium	57	mg/L		1		E200.7	11/15/12 19:20 / sf
Potassium	10	mg/L		1		E200.7	11/15/12 19:20 / sf
Sodium	5360	mg/L	D	4		E200.7	11/15/12 19:20 / sf
Sulfate	6060	mg/L	D	80		E300.0	11/09/12 20:51 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	17700	umhos/cm		1		A2510 B	11/09/12 09:31 / ab
pH	8.67	s.u.	H	0.01		A4500-H B	11/09/12 09:31 / ab
Solids, Total Dissolved TDS @ 180 C	15000	mg/L		10		A2540 C	11/09/12 13:59 / ab
METALS - DISSOLVED							
Arsenic	0.133	mg/L		0.001		E200.8	11/14/12 20:48 / cp
Molybdenum	28.4	mg/L		0.001		E200.8	11/14/12 20:48 / cp
Selenium	0.189	mg/L		0.001		E200.8	11/14/12 20:48 / cp
Uranium	143	mg/L		0.0003		E200.8	11/14/12 20:48 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-003
Client Sample ID: 6269

MW-102
low flow

Report Date: 11/16/12
Collection Date: 11/06/12 08:50
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	360	mg/L		5		A2320 B	11/09/12 09:26 / jba
Bicarbonate as HCO3	4330	mg/L		5		A2320 B	11/09/12 09:26 / jba
Calcium	34	mg/L		1		E200.7	11/15/12 19:24 / sf
Chloride	1260	mg/L	D	20		E300.0	11/09/12 21:07 / ljl
Magnesium	51	mg/L		1		E200.7	11/15/12 19:24 / sf
Potassium	9	mg/L		1		E200.7	11/15/12 19:24 / sf
Sodium	5330	mg/L	D	4		E200.7	11/15/12 19:24 / sf
Sulfate	6280	mg/L	D	80		E300.0	11/09/12 21:07 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	17600	umhos/cm		1		A2510 B	11/09/12 09:33 / ab
pH	8.64	s.u.	H	0.01		A4500-H B	11/09/12 09:33 / ab
Solids, Total Dissolved TDS @ 180 C	14400	mg/L		10		A2540 C	11/09/12 13:59 / ab
METALS - DISSOLVED							
Arsenic	0.212	mg/L		0.001		E200.8	11/14/12 20:52 / cp
Molybdenum	27.9	mg/L		0.001		E200.8	11/14/12 20:52 / cp
Selenium	0.189	mg/L		0.001		E200.8	11/14/12 20:52 / cp
Uranium	148	mg/L		0.0003		E200.8	11/14/12 20:52 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-004
Client Sample ID: 6270

MW-102
purge

Report Date: 11/16/12
Collection Date: 11/06/12 10:10
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	240	mg/L		5		A2320 B	11/09/12 09:28 / jba
Bicarbonate as HCO3	4630	mg/L		5		A2320 B	11/09/12 09:28 / jba
Calcium	48	mg/L		1		E200.7	11/15/12 19:28 / sf
Chloride	1320	mg/L	D	20		E300.0	11/09/12 21:22 / ljl
Magnesium	56	mg/L		1		E200.7	11/15/12 19:28 / sf
Potassium	10	mg/L		1		E200.7	11/15/12 19:28 / sf
Sodium	5340	mg/L	D	4		E200.7	11/15/12 19:28 / sf
Sulfate	6620	mg/L	D	80		E300.0	11/09/12 21:22 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	17700	umhos/cm		1		A2510 B	11/09/12 09:36 / ab
pH	8.61	s.u.	H	0.01		A4500-H B	11/09/12 09:36 / ab
Solids, Total Dissolved TDS @ 180 C	13700	mg/L		10		A2540 C	11/09/12 13:59 / ab
METALS - DISSOLVED							
Arsenic	0.109	mg/L		0.001		E200.8	11/14/12 20:57 / cp
Molybdenum	27.3	mg/L		0.001		E200.8	11/14/12 20:57 / cp
Selenium	0.191	mg/L		0.001		E200.8	11/14/12 20:57 / cp
Uranium	136	mg/L		0.0003		E200.8	11/14/12 20:57 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-005
Client Sample ID: 6271

MW-101
hydrasleeve

Report Date: 11/16/12
Collection Date: 11/06/12 10:40
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:02 / jba
Bicarbonate as HCO3	2940	mg/L		5		A2320 B	11/08/12 23:02 / jba
Calcium	463	mg/L		1		E200.7	11/15/12 19:32 / sf
Chloride	1130	mg/L	D	20		E300.0	11/09/12 21:38 / ljl
Magnesium	159	mg/L		1		E200.7	11/15/12 19:32 / sf
Potassium	13	mg/L		1		E200.7	11/15/12 19:32 / sf
Sodium	4280	mg/L	D	4		E200.7	11/15/12 19:32 / sf
Sulfate	7260	mg/L	D	80		E300.0	11/09/12 21:38 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	16000	umhos/cm		1		A2510 B	11/09/12 09:39 / ab
pH	7.34	s.u.	H	0.01		A4500-H B	11/09/12 09:39 / ab
Solids, Total Dissolved TDS @ 180 C	13500	mg/L		10		A2540 C	11/09/12 14:00 / ab
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/14/12 21:01 / cp
Molybdenum	27.0	mg/L		0.001		E200.8	11/14/12 21:01 / cp
Selenium	0.089	mg/L		0.001		E200.8	11/14/12 21:01 / cp
Uranium	77.0	mg/L		0.0003		E200.8	11/14/12 21:01 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-006
Client Sample ID: 6272

MW-103
hydrasleeve

Report Date: 11/16/12
Collection Date: 11/07/12 07:00
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:25 / jba
Bicarbonate as HCO3	456	mg/L		5		A2320 B	11/08/12 23:25 / jba
Calcium	655	mg/L		1		E200.7	11/15/12 19:35 / sf
Chloride	1180	mg/L	D	10		E300.0	11/12/12 15:52 / wc
Magnesium	213	mg/L		1		E200.7	11/15/12 19:35 / sf
Potassium	18	mg/L		1		E200.7	11/15/12 19:35 / sf
Sodium	529	mg/L		1		E200.7	11/15/12 19:35 / sf
Sulfate	1580	mg/L	D	20		E300.0	11/09/12 21:53 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	5850	umhos/cm		1		A2510 B	11/09/12 09:41 / ab
pH	7.05	s.u.	H	0.01		A4500-H B	11/09/12 09:41 / ab
Solids, Total Dissolved TDS @ 180 C	4380	mg/L		10		A2540 C	11/09/12 14:00 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 21:06 / cp
Molybdenum	0.036	mg/L		0.001		E200.8	11/14/12 21:06 / cp
Selenium	0.023	mg/L		0.001		E200.8	11/14/12 21:06 / cp
Uranium	8.81	mg/L		0.0003		E200.8	11/14/12 21:06 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-007
Client Sample ID: 6273

MW-103
low flow

Report Date: 11/16/12
Collection Date: 11/07/12 07:45
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:33 / jba
Bicarbonate as HCO3	471	mg/L		5		A2320 B	11/08/12 23:33 / jba
Calcium	654	mg/L		1		E200.7	11/15/12 19:39 / sf
Chloride	1200	mg/L	D	10		E300.0	11/12/12 16:09 / wc
Magnesium	214	mg/L		1		E200.7	11/15/12 19:39 / sf
Potassium	18	mg/L		1		E200.7	11/15/12 19:39 / sf
Sodium	537	mg/L		1		E200.7	11/15/12 19:39 / sf
Sulfate	1540	mg/L	D	20		E300.0	11/09/12 22:09 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	5930	umhos/cm		1		A2510 B	11/09/12 09:44 / ab
pH	7.13	s.u.	H	0.01		A4500-H B	11/09/12 09:44 / ab
Solids, Total Dissolved TDS @ 180 C	4310	mg/L		10		A2540 C	11/09/12 14:00 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 22:48 / cp
Molybdenum	0.012	mg/L		0.001		E200.8	11/14/12 22:48 / cp
Selenium	0.020	mg/L		0.001		E200.8	11/14/12 22:48 / cp
Uranium	8.55	mg/L		0.0003		E200.8	11/14/12 22:48 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-008
Client Sample ID: 6274

MW-106 purge

Report Date: 11/16/12
Collection Date: 11/07/12 09:15
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:41 / jba
Bicarbonate as HCO3	243	mg/L		5		A2320 B	11/08/12 23:41 / jba
Calcium	115	mg/L		1		E200.7	11/15/12 19:43 / sf
Chloride	77	mg/L	D	2		E300.0	11/09/12 22:24 / ljl
Magnesium	55	mg/L		1		E200.7	11/15/12 19:43 / sf
Potassium	16	mg/L		1		E200.7	11/15/12 19:43 / sf
Sodium	442	mg/L		1		E200.7	11/15/12 19:43 / sf
Sulfate	1290	mg/L	D	8		E300.0	11/09/12 22:24 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	2840	umhos/cm		1		A2510 B	11/09/12 09:50 / ab
pH	7.85	s.u.	H	0.01		A4500-H B	11/09/12 09:50 / ab
Solids, Total Dissolved TDS @ 180 C	2170	mg/L		10		A2540 C	11/09/12 14:00 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 22:52 / cp
Molybdenum	0.007	mg/L		0.001		E200.8	11/14/12 22:52 / cp
Selenium	ND	mg/L		0.001		E200.8	11/14/12 22:52 / cp
Uranium	0.0043	mg/L		0.0003		E200.8	11/14/12 22:52 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-009
Client Sample ID: 6275

MW-104 purge

Report Date: 11/16/12
Collection Date: 11/07/12 09:45
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:50 / jba
Bicarbonate as HCO3	474	mg/L		5		A2320 B	11/08/12 23:50 / jba
Calcium	88	mg/L		1		E200.7	11/15/12 19:47 / sf
Chloride	113	mg/L		1		E300.0	11/09/12 22:39 / ljl
Magnesium	21	mg/L		1		E200.7	11/15/12 19:47 / sf
Potassium	5	mg/L		1		E200.7	11/15/12 19:47 / sf
Sodium	250	mg/L		1		E200.7	11/15/12 19:47 / sf
Sulfate	247	mg/L	D	4		E300.0	11/09/12 22:39 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1490	umhos/cm		1		A2510 B	11/09/12 09:53 / ab
pH	7.72	s.u.	H	0.01		A4500-H B	11/09/12 09:53 / ab
Solids, Total Dissolved TDS @ 180 C	968	mg/L		10		A2540 C	11/09/12 14:00 / ab
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	11/14/12 22:57 / cp
Molybdenum	0.119	mg/L		0.001		E200.8	11/14/12 22:57 / cp
Selenium	0.004	mg/L		0.001		E200.8	11/14/12 22:57 / cp
Uranium	0.210	mg/L		0.0003		E200.8	11/14/12 22:57 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-010
Client Sample ID: 6276

mw-103
purge

Report Date: 11/16/12
Collection Date: 11/07/12 11:30
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/08/12 23:58 / jba
Bicarbonate as HCO3	467	mg/L		5		A2320 B	11/08/12 23:58 / jba
Calcium	676	mg/L		1		E200.7	11/15/12 19:51 / sf
Chloride	1210	mg/L	D	10		E300.0	11/12/12 16:27 / wc
Magnesium	222	mg/L		1		E200.7	11/15/12 19:51 / sf
Potassium	18	mg/L		1		E200.7	11/15/12 19:51 / sf
Sodium	515	mg/L		1		E200.7	11/15/12 19:51 / sf
Sulfate	1500	mg/L	D	20		E300.0	11/09/12 23:26 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	5970	umhos/cm		1		A2510 B	11/09/12 09:56 / ab
pH	6.99	s.u.	H	0.01		A4500-H B	11/09/12 09:56 / ab
Solids, Total Dissolved TDS @ 180 C	4440	mg/L		10		A2540 C	11/09/12 14:01 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 23:01 / cp
Molybdenum	0.013	mg/L		0.001		E200.8	11/14/12 23:01 / cp
Selenium	0.025	mg/L		0.001		E200.8	11/14/12 23:01 / cp
Uranium	9.66	mg/L		0.0003		E200.8	11/14/12 23:01 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-011
Client Sample ID: 6285

MW-105 Low flow dup

Report Date: 11/16/12
Collection Date: 11/07/12 08:00
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 00:06 / jba
Bicarbonate as HCO3	260	mg/L		5		A2320 B	11/09/12 00:06 / jba
Calcium	146	mg/L		1		E200.7	11/15/12 20:14 / sf
Chloride	126	mg/L		1		E300.0	11/10/12 00:12 / ljl
Magnesium	38	mg/L		1		E200.7	11/15/12 20:14 / sf
Potassium	5	mg/L		1		E200.7	11/15/12 20:14 / sf
Sodium	91	mg/L		1		E200.7	11/15/12 20:14 / sf
Sulfate	204	mg/L	D	4		E300.0	11/10/12 00:12 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1340	umhos/cm		1		A2510 B	11/09/12 09:58 / ab
pH	7.47	s.u.	H	0.01		A4500-H B	11/09/12 09:58 / ab
Solids, Total Dissolved TDS @ 180 C	856	mg/L		10		A2540 C	11/09/12 14:01 / ab
METALS - DISSOLVED							
Arsenic	0.008	mg/L		0.001		E200.8	11/14/12 23:06 / cp
Molybdenum	0.006	mg/L		0.001		E200.8	11/14/12 23:06 / cp
Selenium	0.012	mg/L		0.001		E200.8	11/14/12 23:06 / cp
Uranium	0.0248	mg/L		0.0003		E200.8	11/14/12 23:06 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-012
Client Sample ID: 6286

MW-105 purge

Report Date: 11/16/12
Collection Date: 11/07/12 08:30
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 00:14 / jba
Bicarbonate as HCO3	240	mg/L		5		A2320 B	11/09/12 00:14 / jba
Calcium	114	mg/L		1		E200.7	11/15/12 20:17 / sf
Chloride	83	mg/L		1		E300.0	11/10/12 00:27 / ljl
Magnesium	31	mg/L		1		E200.7	11/15/12 20:17 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:17 / sf
Sodium	67	mg/L		1		E200.7	11/15/12 20:17 / sf
Sulfate	183	mg/L	D	4		E300.0	11/10/12 00:27 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1050	umhos/cm		1		A2510 B	11/09/12 10:01 / ab
pH	7.47	s.u.	H	0.01		A4500-H B	11/09/12 10:01 / ab
Solids, Total Dissolved TDS @ 180 C	686	mg/L		10		A2540 C	11/12/12 15:52 / ab
METALS - DISSOLVED							
Arsenic	0.016	mg/L		0.001		E200.8	11/14/12 23:10 / cp
Molybdenum	0.004	mg/L		0.001		E200.8	11/14/12 23:10 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/14/12 23:10 / cp
Uranium	0.0155	mg/L		0.0003		E200.8	11/14/12 23:10 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-013
Client Sample ID: 6287

MW-100
hydrasleeve

Report Date: 11/16/12
Collection Date: 11/07/12 08:55
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 00:22 / jba
Bicarbonate as HCO3	357	mg/L		5		A2320 B	11/09/12 00:22 / jba
Calcium	80	mg/L		1		E200.7	11/15/12 20:21 / sf
Chloride	11	mg/L		1		E300.0	11/10/12 00:43 / ljl
Magnesium	58	mg/L		1		E200.7	11/15/12 20:21 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 20:21 / sf
Sodium	11	mg/L		1		E200.7	11/15/12 20:21 / sf
Sulfate	150	mg/L	D	2		E300.0	11/10/12 00:43 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	783	umhos/cm		1		A2510 B	11/09/12 10:04 / ab
pH	7.51	s.u.	H	0.01		A4500-H B	11/09/12 10:04 / ab
Solids, Total Dissolved TDS @ 180 C	504	mg/L		10		A2540 C	11/12/12 15:52 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 23:15 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/14/12 23:15 / cp
Selenium	0.006	mg/L		0.001		E200.8	11/14/12 23:15 / cp
Uranium	0.0029	mg/L		0.0003		E200.8	11/14/12 23:15 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-014
Client Sample ID: 6288

MW-100
Low Flow

Report Date: 11/16/12
Collection Date: 11/07/12 09:20
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 00:52 / jba
Bicarbonate as HCO3	356	mg/L		5		A2320 B	11/09/12 00:52 / jba
Calcium	80	mg/L		1		E200.7	11/15/12 20:25 / sf
Chloride	11	mg/L		1		E300.0	11/10/12 00:58 / ljl
Magnesium	58	mg/L		1		E200.7	11/15/12 20:25 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 20:25 / sf
Sodium	11	mg/L		1		E200.7	11/15/12 20:25 / sf
Sulfate	150	mg/L	D	2		E300.0	11/10/12 00:58 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	787	umhos/cm		1		A2510 B	11/09/12 10:06 / ab
pH	7.52	s.u.	H	0.01		A4500-H B	11/09/12 10:06 / ab
Solids, Total Dissolved TDS @ 180 C	505	mg/L		10		A2540 C	11/12/12 15:52 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 23:19 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/14/12 23:19 / cp
Selenium	0.006	mg/L		0.001		E200.8	11/14/12 23:19 / cp
Uranium	0.0058	mg/L		0.0003		E200.8	11/14/12 23:19 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-015
Client Sample ID: 6289

MW-100 purge

Report Date: 11/16/12
Collection Date: 11/07/12 10:00
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 01:08 / jba
Bicarbonate as HCO3	356	mg/L		5		A2320 B	11/09/12 01:08 / jba
Calcium	78	mg/L		1		E200.7	11/15/12 20:28 / sf
Chloride	11	mg/L		1		E300.0	11/10/12 01:14 / ljl
Magnesium	58	mg/L		1		E200.7	11/15/12 20:28 / sf
Potassium	3	mg/L		1		E200.7	11/15/12 20:28 / sf
Sodium	11	mg/L		1		E200.7	11/15/12 20:28 / sf
Sulfate	149	mg/L	D	2		E300.0	11/10/12 01:14 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	780	umhos/cm		1		A2510 B	11/09/12 10:09 / ab
pH	7.54	s.u.	H	0.01		A4500-H B	11/09/12 10:09 / ab
Solids, Total Dissolved TDS @ 180 C	505	mg/L		10		A2540 C	11/12/12 15:52 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/14/12 23:23 / cp
Molybdenum	ND	mg/L		0.001		E200.8	11/14/12 23:23 / cp
Selenium	0.007	mg/L		0.001		E200.8	11/14/12 23:23 / cp
Uranium	0.0038	mg/L		0.0003		E200.8	11/14/12 23:23 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-016
Client Sample ID: 6255

MW-102DB
hydra sleeve

Report Date: 11/16/12
Collection Date: 11/06/12 07:45
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 01:25 / jba
Bicarbonate as HCO3	344	mg/L		5		A2320 B	11/09/12 01:25 / jba
Calcium	14	mg/L		1		E200.7	11/15/12 20:32 / sf
Chloride	39	mg/L		1		E300.0	11/10/12 01:29 / ljl
Magnesium	5	mg/L		1		E200.7	11/15/12 20:32 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:32 / sf
Sodium	159	mg/L		1		E200.7	11/15/12 20:32 / sf
Sulfate	64	mg/L	D	2		E300.0	11/10/12 01:29 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	749	umhos/cm		1		A2510 B	11/09/12 10:12 / ab
pH	8.10	s.u.	H	0.01		A4500-H B	11/09/12 10:12 / ab
Solids, Total Dissolved TDS @ 180 C	459	mg/L		10		A2540 C	11/12/12 15:52 / ab
METALS - DISSOLVED							
Arsenic	0.005	mg/L		0.001		E200.8	11/14/12 23:46 / cp
Molybdenum	0.017	mg/L		0.001		E200.8	11/14/12 23:46 / cp
Selenium	ND	mg/L		0.001		E200.8	11/14/12 23:46 / cp
Uranium	0.0814	mg/L		0.0003		E200.8	11/14/12 23:46 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-017
Client Sample ID: 6256

MW-102DB
low flow

Report Date: 11/16/12
Collection Date: 11/06/12 08:45
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 01:34 / jba
Bicarbonate as HCO3	355	mg/L		5		A2320 B	11/09/12 01:34 / jba
Calcium	13	mg/L		1		E200.7	11/15/12 20:36 / sf
Chloride	36	mg/L		1		E300.0	11/10/12 01:44 / ljl
Magnesium	5	mg/L		1		E200.7	11/15/12 20:36 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:36 / sf
Sodium	159	mg/L		1		E200.7	11/15/12 20:36 / sf
Sulfate	60	mg/L	D	2		E300.0	11/10/12 01:44 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	740	umhos/cm		1		A2510 B	11/09/12 10:14 / ab
pH	8.13	s.u.	H	0.01		A4500-H B	11/09/12 10:14 / ab
Solids, Total Dissolved TDS @ 180 C	460	mg/L		10		A2540 C	11/12/12 15:53 / ab
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/15/12 00:04 / cp
Molybdenum	0.010	mg/L		0.001		E200.8	11/15/12 00:04 / cp
Selenium	ND	mg/L		0.001		E200.8	11/15/12 00:04 / cp
Uranium	0.0416	mg/L		0.0003		E200.8	11/15/12 00:04 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-018
Client Sample ID: 6257

MW-102DB
low flow
dup

Report Date: 11/16/12
Collection Date: 11/06/12 08:55
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 01:42 / jba
Bicarbonate as HCO3	344	mg/L		5		A2320 B	11/09/12 01:42 / jba
Calcium	13	mg/L		1		E200.7	11/15/12 20:39 / sf
Chloride	36	mg/L		1		E300.0	11/10/12 02:00 / ljl
Magnesium	5	mg/L		1		E200.7	11/15/12 20:39 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:39 / sf
Sodium	159	mg/L		1		E200.7	11/15/12 20:39 / sf
Sulfate	60	mg/L	D	2		E300.0	11/10/12 02:00 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	739	umhos/cm		1		A2510 B	11/09/12 10:29 / ab
pH	8.11	s.u.	H	0.01		A4500-H B	11/09/12 10:29 / ab
Solids, Total Dissolved TDS @ 180 C	455	mg/L		10		A2540 C	11/12/12 15:53 / ab
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/15/12 00:08 / cp
Molybdenum	0.011	mg/L		0.001		E200.8	11/15/12 00:08 / cp
Selenium	ND	mg/L		0.001		E200.8	11/15/12 00:08 / cp
Uranium	0.0416	mg/L		0.0003		E200.8	11/15/12 00:08 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-019
Client Sample ID: 6258

MW-102DB
Purge

Report Date: 11/16/12
Collection Date: 11/06/12 10:15
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	56	mg/L		5		A2320 B	11/09/12 01:53 / jba
Bicarbonate as HCO3	1080	mg/L		5		A2320 B	11/09/12 01:53 / jba
Calcium	15	mg/L		1		E200.7	11/15/12 20:43 / sf
Chloride	270	mg/L	D	4		E300.0	11/10/12 02:15 / ljl
Magnesium	9	mg/L		1		E200.7	11/15/12 20:43 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 20:43 / sf
Sodium	599	mg/L		1		E200.7	11/15/12 20:43 / sf
Sulfate	1230	mg/L	D	20		E300.0	11/10/12 02:15 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	4470	umhos/cm		1		A2510 B	11/09/12 10:32 / ab
pH	8.69	s.u.	H	0.01		A4500-H B	11/09/12 10:32 / ab
Solids, Total Dissolved TDS @ 180 C	3150	mg/L		10		A2540 C	11/12/12 15:53 / ab
METALS - DISSOLVED							
Arsenic	0.028	mg/L		0.001		E200.8	11/15/12 00:13 / cp
Molybdenum	2.25	mg/L		0.001		E200.8	11/15/12 00:13 / cp
Selenium	0.015	mg/L		0.001		E200.8	11/15/12 00:13 / cp
Uranium	11.4	mg/L		0.0003		E200.8	11/15/12 00:13 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-020
Client Sample ID: 6259

MW-101
low flow

Report Date: 11/16/12
Collection Date: 11/06/12 11:15
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 02:08 / jba
Bicarbonate as HCO3	2900	mg/L		5		A2320 B	11/09/12 02:08 / jba
Calcium	445	mg/L		1		E200.7	11/15/12 21:31 / sf
Chloride	1060	mg/L	D	20		E300.0	11/10/12 03:02 / ljl
Magnesium	156	mg/L		1		E200.7	11/15/12 21:31 / sf
Potassium	12	mg/L		1		E200.7	11/15/12 21:31 / sf
Sodium	4120	mg/L	D	4		E200.7	11/15/12 21:31 / sf
Sulfate	6680	mg/L	D	80		E300.0	11/10/12 03:02 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	16100	umhos/cm		1		A2510 B	11/09/12 10:34 / ab
pH	7.31	s.u.	H	0.01		A4500-H B	11/09/12 10:34 / ab
Solids, Total Dissolved TDS @ 180 C	14100	mg/L		10		A2540 C	11/12/12 15:54 / ab
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/15/12 00:17 / cp
Molybdenum	27.5	mg/L		0.001		E200.8	11/15/12 00:17 / cp
Selenium	0.080	mg/L		0.001		E200.8	11/15/12 00:17 / cp
Uranium	76.3	mg/L		0.0003		E200.8	11/15/12 00:17 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-021
Client Sample ID: 6260

mw-101 purge

Report Date: 11/16/12
Collection Date: 11/06/12 11:40
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 02:23 / jba
Bicarbonate as HCO3	2870	mg/L		5		A2320 B	11/09/12 02:23 / jba
Calcium	441	mg/L		1		E200.7	11/15/12 21:34 / sf
Chloride	1050	mg/L	D	20		E300.0	11/10/12 03:48 / ljl
Magnesium	155	mg/L		1		E200.7	11/15/12 21:34 / sf
Potassium	12	mg/L		1		E200.7	11/15/12 21:34 / sf
Sodium	4120	mg/L	D	4		E200.7	11/15/12 21:34 / sf
Sulfate	6710	mg/L	D	80		E300.0	11/10/12 03:48 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	16100	umhos/cm		1		A2510 B	11/09/12 10:37 / ab
pH	7.30	s.u.	H	0.01		A4500-H B	11/09/12 10:37 / ab
Solids, Total Dissolved TDS @ 180 C	13700	mg/L		10		A2540 C	11/12/12 15:54 / ab
METALS - DISSOLVED							
Arsenic	0.004	mg/L		0.001		E200.8	11/15/12 00:22 / cp
Molybdenum	28.0	mg/L		0.001		E200.8	11/15/12 00:22 / cp
Selenium	0.082	mg/L		0.001		E200.8	11/15/12 00:22 / cp
Uranium	78.0	mg/L		0.0003		E200.8	11/15/12 00:22 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-022
Client Sample ID: 6281

MW-101 purge dup

Report Date: 11/16/12
Collection Date: 11/06/12 11:50
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 02:37 / jba
Bicarbonate as HCO3	2870	mg/L		5		A2320 B	11/09/12 02:37 / jba
Calcium	442	mg/L		1		E200.7	11/15/12 21:38 / sf
Chloride	1060	mg/L	D	20		E300.0	11/10/12 04:03 / ljl
Magnesium	156	mg/L		1		E200.7	11/15/12 21:38 / sf
Potassium	12	mg/L		1		E200.7	11/15/12 21:38 / sf
Sodium	4110	mg/L	D	4		E200.7	11/15/12 21:38 / sf
Sulfate	6790	mg/L	D	80		E300.0	11/10/12 04:03 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	16100	umhos/cm		1		A2510 B	11/09/12 10:40 / ab
pH	7.31	s.u.	H	0.01		A4500-H B	11/09/12 10:40 / ab
Solids, Total Dissolved TDS @ 180 C	13100	mg/L		10		A2540 C	11/12/12 15:54 / ab
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	11/15/12 00:44 / cp
Molybdenum	28.1	mg/L		0.001		E200.8	11/15/12 00:44 / cp
Selenium	0.079	mg/L		0.001		E200.8	11/15/12 00:44 / cp
Uranium	76.3	mg/L		0.0003		E200.8	11/15/12 00:44 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-023
Client Sample ID: 6282

Equipment Blank

Report Date: 11/16/12
Collection Date: 11/06/12 12:15
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 09:31 / jba
Bicarbonate as HCO3	ND	mg/L		5		A2320 B	11/09/12 09:31 / jba
Calcium	ND	mg/L		1		E200.7	11/15/12 21:42 / sf
Chloride	ND	mg/L		1		E300.0	11/10/12 04:19 / ljl
Magnesium	ND	mg/L		1		E200.7	11/15/12 21:42 / sf
Potassium	ND	mg/L		1		E200.7	11/15/12 21:42 / sf
Sodium	ND	mg/L		1		E200.7	11/15/12 21:42 / sf
Sulfate	ND	mg/L		1		E300.0	11/10/12 04:19 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	13	umhos/cm	B	1		A2510 B	11/09/12 10:42 / ab
pH	5.85	s.u.	H	0.01		A4500-H B	11/09/12 10:42 / ab
Solids, Total Dissolved TDS @ 180 C	67	mg/L		10		A2540 C	11/12/12 15:55 / ab
METALS - DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	11/15/12 00:49 / cp
Molybdenum	0.002	mg/L		0.001		E200.8	11/15/12 00:49 / cp
Selenium	ND	mg/L		0.001		E200.8	11/15/12 00:49 / cp
Uranium	0.0022	mg/L		0.0003		E200.8	11/15/12 00:49 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-024
Client Sample ID: 6283

MW-105
Hydrasleeve

Report Date: 11/16/12
Collection Date: 11/07/12 07:00
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 02:51 / jba
Bicarbonate as HCO3	244	mg/L		5		A2320 B	11/09/12 02:51 / jba
Calcium	122	mg/L		1		E200.7	11/15/12 21:45 / sf
Chloride	98	mg/L		1		E300.0	11/10/12 04:34 / ljl
Magnesium	32	mg/L		1		E200.7	11/15/12 21:45 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:45 / sf
Sodium	74	mg/L		1		E200.7	11/15/12 21:45 / sf
Sulfate	191	mg/L	D	4		E300.0	11/10/12 04:34 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1140	umhos/cm		1		A2510 B	11/09/12 10:45 / ab
pH	7.48	s.u.	H	0.01		A4500-H B	11/09/12 10:45 / ab
Solids, Total Dissolved TDS @ 180 C	748	mg/L		10		A2540 C	11/12/12 15:55 / ab
METALS - DISSOLVED							
Arsenic	0.011	mg/L		0.001		E200.8	11/15/12 00:53 / cp
Molybdenum	0.006	mg/L		0.001		E200.8	11/15/12 00:53 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/15/12 00:53 / cp
Uranium	0.0169	mg/L		0.0003		E200.8	11/15/12 00:53 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12110375-025
Client Sample ID: 6284

MW-105
low flow

Report Date: 11/16/12
Collection Date: 11/07/12 07:55
DateReceived: 11/08/12
Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/09/12 03:07 / jba
Bicarbonate as HCO3	249	mg/L		5		A2320 B	11/09/12 03:07 / jba
Calcium	138	mg/L		1		E200.7	11/15/12 21:49 / sf
Chloride	124	mg/L		1		E300.0	11/10/12 04:49 / ljl
Magnesium	36	mg/L		1		E200.7	11/15/12 21:49 / sf
Potassium	4	mg/L		1		E200.7	11/15/12 21:49 / sf
Sodium	84	mg/L		1		E200.7	11/15/12 21:49 / sf
Sulfate	203	mg/L	D	4		E300.0	11/10/12 04:49 / ljl
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1330	umhos/cm		1		A2510 B	11/09/12 10:48 / ab
pH	7.43	s.u.	H	0.01		A4500-H B	11/09/12 10:48 / ab
Solids, Total Dissolved TDS @ 180 C	862	mg/L		10		A2540 C	11/12/12 15:55 / ab
METALS - DISSOLVED							
Arsenic	0.008	mg/L		0.001		E200.8	11/15/12 00:58 / cp
Molybdenum	0.007	mg/L		0.001		E200.8	11/15/12 00:58 / cp
Selenium	0.011	mg/L		0.001		E200.8	11/15/12 00:58 / cp
Uranium	0.0231	mg/L		0.0003		E200.8	11/15/12 00:58 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B									Batch: R166953	
Sample ID: MBLK	3	Method Blank				Run: MANTECH_121108A			11/08/12 16:29	
Alkalinity, Total as CaCO3		2.94	mg/L	5.0						
Carbonate as CO3		ND	mg/L	5.0						
Bicarbonate as HCO3		3.58	mg/L	5.0						
Sample ID: LCS_121003		Laboratory Control Sample				Run: MANTECH_121108A			11/08/12 16:45	
Alkalinity, Total as CaCO3		205	mg/L	5.0	101	90	110			
Sample ID: C12110298-001ADUP	3	Sample Duplicate				Run: MANTECH_121108A			11/08/12 17:01	
Alkalinity, Total as CaCO3		160	mg/L	5.0				0.1	10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		195	mg/L	5.0				0.1	10	
Sample ID: C12110358-003AMS		Sample Matrix Spike				Run: MANTECH_121108A			11/08/12 20:44	
Alkalinity, Total as CaCO3		428	mg/L	5.0	102	80	120			
Sample ID: C12110375-005ADUP	3	Sample Duplicate				Run: MANTECH_121108A			11/08/12 23:17	
Alkalinity, Total as CaCO3		2400	mg/L	5.0				0.3	10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		2930	mg/L	5.0				0.3	10	
Sample ID: C12110375-014ADUP	3	Sample Duplicate				Run: MANTECH_121108A			11/09/12 01:01	
Alkalinity, Total as CaCO3		302	mg/L	5.0				3.4	10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		368	mg/L	5.0				3.4	10	
Method: A2320 B									Batch: 121109_1_ALK-W	
Sample ID: MBLK1_121109_	3	Method Blank				Run: TTR-ALK_121109A			11/09/12 09:11	
Alkalinity, Total as CaCO3		1.25	mg/L	5.0						
Carbonate as CO3		ND	mg/L	5.0						
Bicarbonate as HCO3		1.52	mg/L	5.0						
Sample ID: LCS_121003_121109_		Laboratory Control Sample				Run: TTR-ALK_121109A			11/09/12 09:16	
Alkalinity, Total as CaCO3		1000	mg/L	5.0	100	90	110			
Sample ID: C12110375-001ADUP	3	Sample Duplicate				Run: TTR-ALK_121109A			11/09/12 09:21	
Alkalinity, Total as CaCO3		4120	mg/L	5.0				0.6	10	
Carbonate as CO3		300	mg/L	5.0				18	10	R
Bicarbonate as HCO3		4420	mg/L	5.0				3.5	10	

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
R - RPD exceeds advisory limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B										Batch: R166968
Sample ID: SC 2ND 1413	Laboratory Control Sample					Run: PHSC_101-C_121109A				11/09/12 09:12
Conductivity @ 25 C		1410	umhos/cm	1.0	99	90	110			
Sample ID: MBLK	Method Blank					Run: PHSC_101-C_121109A				11/09/12 09:17
Conductivity @ 25 C		2	umhos/cm	0.2						
Sample ID: C12110375-007ADUP	Sample Duplicate					Run: PHSC_101-C_121109A				11/09/12 09:47
Conductivity @ 25 C		6050	umhos/cm	1.0				2.0	10	
Sample ID: C12110375-017ADUP	Sample Duplicate					Run: PHSC_101-C_121109A				11/09/12 10:17
Conductivity @ 25 C		749	umhos/cm	1.0				1.2	10	
Sample ID: C12110375-025ADUP	Sample Duplicate					Run: PHSC_101-C_121109A				11/09/12 10:50
Conductivity @ 25 C		1350	umhos/cm	1.0				0.8	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/16/12

Project: Lisbon, UT Facility **Work Order:** C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: TDS121109A
Sample ID: MB-1_121109A		Method Blank				Run: BAL-1_121109C				11/09/12 13:49
Solids, Total Dissolved TDS @ 180 C		5	mg/L	4						
Sample ID: LCS-2_121109A		Laboratory Control Sample				Run: BAL-1_121109C				11/09/12 13:49
Solids, Total Dissolved TDS @ 180 C		1110	mg/L	10	99	90	110			
Sample ID: C12110359-002A MS		Sample Matrix Spike				Run: BAL-1_121109C				11/09/12 13:57
Solids, Total Dissolved TDS @ 180 C		82700	mg/L	10	99	90	110			
Sample ID: C12110375-002A DUP		Sample Duplicate				Run: BAL-1_121109C				11/09/12 13:59
Solids, Total Dissolved TDS @ 180 C		15500	mg/L	10				3.1	5	
Method: A2540 C										Batch: TDS121112A
Sample ID: MB-1_121112A		Method Blank				Run: BAL-1_121112A				11/12/12 15:50
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	4						
Sample ID: LCS-2_121112A		Laboratory Control Sample				Run: BAL-1_121112A				11/12/12 15:50
Solids, Total Dissolved TDS @ 180 C		1070	mg/L	10	97	90	110			
Sample ID: C12110348-002A MS		Sample Matrix Spike				Run: BAL-1_121112A				11/12/12 15:51
Solids, Total Dissolved TDS @ 180 C		1310	mg/L	10	95	90	110			
Sample ID: C12110375-019A DUP		Sample Duplicate				Run: BAL-1_121112A				11/12/12 15:54
Solids, Total Dissolved TDS @ 180 C		3180	mg/L	10				0.9	5	
Sample ID: C12110433-004A MS		Sample Matrix Spike				Run: BAL-1_121112A				11/12/12 16:01
Solids, Total Dissolved TDS @ 180 C		5170	mg/L	10	96	90	110			
Sample ID: C12110433-012A DUP		Sample Duplicate				Run: BAL-1_121112A				11/12/12 16:03
Solids, Total Dissolved TDS @ 180 C		1520	mg/L	10				1.7	5	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/16/12

Project: Lisbon, UT Facility **Work Order:** C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B								Analytical Run: PHSC_101-C_121109A		
Sample ID: pH 6.86		Initial Calibration Verification Standard							11/09/12 08:57	
pH		6.84	s.u.	0.010	100	98	102			
Method: A4500-H B									Batch: R166968	
Sample ID: C12110375-007ADUP		Sample Duplicate				Run: PHSC_101-C_121109A			11/09/12 09:47	
pH		7.14	s.u.	0.010				0.1	3	
Sample ID: C12110375-017ADUP		Sample Duplicate				Run: PHSC_101-C_121109A			11/09/12 10:17	
pH		8.13	s.u.	0.010				0.0	3	
Sample ID: C12110375-025ADUP		Sample Duplicate				Run: PHSC_101-C_121109A			11/09/12 10:50	
pH		7.43	s.u.	0.010				0.0	3	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/16/12

Project: Lisbon, UT Facility **Work Order:** C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP4-C_121115A	
Sample ID: ICV	4	Initial Calibration Verification Standard							11/15/12 15:07	
Calcium		49.1	mg/L	0.50	98	95	105			
Magnesium		48.9	mg/L	0.50	98	95	105			
Potassium		47.8	mg/L	0.50	96	95	105			
Sodium		49.7	mg/L	0.50	99	95	105			
Sample ID: ICSA	4	Interference Check Sample A							11/15/12 15:21	
Calcium		428	mg/L	0.50	86	80	120			
Magnesium		472	mg/L	0.50	94	80	120			
Potassium		-0.0231	mg/L	0.50						
Sodium		-0.377	mg/L	0.50						
Sample ID: ICSAB	4	Interference Check Sample AB							11/15/12 15:25	
Calcium		430	mg/L	0.50	86	80	120			
Magnesium		469	mg/L	0.50	94	80	120			
Potassium		0.0337	mg/L	0.50						
Sodium		-0.293	mg/L	0.50						
Method: E200.7									Batch: R167278	
Sample ID: MB-121115A	4	Method Blank				Run: ICP4-C_121115A			11/15/12 15:43	
Calcium		ND	mg/L	0.02						
Magnesium		0.07	mg/L	0.01						
Potassium		ND	mg/L	0.04						
Sodium		ND	mg/L	0.2						
Sample ID: LFB-121115A	4	Laboratory Fortified Blank				Run: ICP4-C_121115A			11/15/12 15:47	
Calcium		45.2	mg/L	0.50	90	85	115			
Magnesium		45.4	mg/L	0.50	91	85	115			
Potassium		43.9	mg/L	0.50	88	85	115			
Sodium		44.7	mg/L	0.50	89	85	115			
Sample ID: C12110375-001BMS2	4	Sample Matrix Spike				Run: ICP4-C_121115A			11/15/12 19:03	
Calcium		982	mg/L	1.0	92	70	130			
Magnesium		992	mg/L	1.0	92	70	130			
Potassium		966	mg/L	1.0	94	70	130			
Sodium		6080	mg/L	4.2		70	130			A
Sample ID: C12110375-001BMSD	4	Sample Matrix Spike Duplicate				Run: ICP4-C_121115A			11/15/12 19:06	
Calcium		983	mg/L	1.0	92	70	130	0.1	20	
Magnesium		994	mg/L	1.0	92	70	130	0.2	20	
Potassium		972	mg/L	1.0	94	70	130	0.6	20	
Sodium		6100	mg/L	4.2		70	130	0.2	20	A
Sample ID: C12110375-010BMS2	4	Sample Matrix Spike				Run: ICP4-C_121115A			11/15/12 19:55	
Calcium		857	mg/L	1.0	71	70	130			
Magnesium		440	mg/L	1.0	85	70	130			
Potassium		268	mg/L	1.0	98	70	130			
Sodium		716	mg/L	1.0	79	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC **Report Date:** 11/16/12

Project: Lisbon, UT Facility **Work Order:** C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Batch: R167278	
Sample ID: C12110375-010BMSD	4	Sample Matrix Spike Duplicate				Run: ICP4-C_121115A			11/15/12 20:10	
Calcium		862	mg/L	1.0	73	70	130	0.5	20	
Magnesium		448	mg/L	1.0	88	70	130	1.8	20	
Potassium		272	mg/L	1.0	100	70	130	1.8	20	
Sodium		730	mg/L	1.0	84	70	130	2.0	20	
Sample ID: C12110375-019BMS2	4	Sample Matrix Spike				Run: ICP4-C_121115A			11/15/12 21:24	
Calcium		253	mg/L	1.0	93	70	130			
Magnesium		246	mg/L	1.0	93	70	130			
Potassium		241	mg/L	1.0	93	70	130			
Sodium		783	mg/L	1.0	72	70	130			
Sample ID: C12110375-019BMSD	4	Sample Matrix Spike Duplicate				Run: ICP4-C_121115A			11/15/12 21:27	
Calcium		254	mg/L	1.0	93	70	130	0.0	20	
Magnesium		247	mg/L	1.0	93	70	130	0.3	20	
Potassium		243	mg/L	1.0	94	70	130	0.8	20	
Sodium		783	mg/L	1.0	72	70	130	0.0	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS4-C_121114A	
Sample ID: ICV	4	Initial Calibration Verification Standard							11/14/12 13:50	
Arsenic		0.0506	mg/L	0.0010	101	90	110			
Molybdenum		0.0468	mg/L	0.0010	94	90	110			
Selenium		0.0519	mg/L	0.0010	104	90	110			
Uranium		0.0498	mg/L	0.00030	100	90	110			
Method: E200.8									Batch: R167233	
Sample ID: LRB	4	Method Blank				Run: ICPMS4-C_121114A			11/14/12 14:25	
Arsenic		ND	mg/L	5E-05						
Molybdenum		ND	mg/L	3E-05						
Selenium		ND	mg/L	7E-05						
Uranium		1E-05	mg/L	9E-06						
Sample ID: LFB	4	Laboratory Fortified Blank				Run: ICPMS4-C_121114A			11/14/12 14:30	
Arsenic		0.0490	mg/L	0.0010	98	85	115			
Molybdenum		0.0451	mg/L	0.0010	90	85	115			
Selenium		0.0494	mg/L	0.0010	99	85	115			
Uranium		0.0474	mg/L	0.00030	95	85	115			
Sample ID: C12110375-006BMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121114A			11/14/12 21:28	
Arsenic		0.288	mg/L	0.0010	115	70	130			
Molybdenum		0.281	mg/L	0.0010	98	70	130			
Selenium		0.292	mg/L	0.0010	108	70	130			
Uranium		9.17	mg/L	0.00030		70	130			A
Sample ID: C12110375-006BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121114A			11/14/12 21:32	
Arsenic		0.283	mg/L	0.0010	113	70	130	1.7	20	
Molybdenum		0.281	mg/L	0.0010	98	70	130	0.2	20	
Selenium		0.297	mg/L	0.0010	109	70	130	1.5	20	
Uranium		9.15	mg/L	0.00030		70	130	0.2	20	A
Sample ID: C12110375-016BMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121114A			11/14/12 23:50	
Arsenic		0.0617	mg/L	0.0010	114	70	130			
Molybdenum		0.0724	mg/L	0.0010	112	70	130			
Selenium		0.0534	mg/L	0.0010	106	70	130			
Uranium		0.140	mg/L	0.00030	117	70	130			
Sample ID: C12110375-016BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121114A			11/14/12 23:55	
Arsenic		0.0626	mg/L	0.0010	115	70	130	1.4	20	
Molybdenum		0.0770	mg/L	0.0010	121	70	130	6.1	20	
Selenium		0.0571	mg/L	0.0010	114	70	130	6.8	20	
Uranium		0.145	mg/L	0.00030	128	70	130	3.6	20	
Sample ID: C12110375-025BMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121114A			11/15/12 01:02	
Arsenic		0.0604	mg/L	0.0010	105	70	130			
Molybdenum		0.0598	mg/L	0.0010	105	70	130			
Selenium		0.0628	mg/L	0.0010	104	70	130			
Uranium		0.0816	mg/L	0.00030	117	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Batch: R167233
Sample ID: C12110375-025BMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121114A				11/15/12 01:07
Arsenic		0.0625	mg/L	0.0010	109	70	130	3.4	20	
Molybdenum		0.0610	mg/L	0.0010	107	70	130	1.9	20	
Selenium		0.0635	mg/L	0.0010	105	70	130	1.0	20	
Uranium		0.0812	mg/L	0.00030	116	70	130	0.5	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC1-C_121112A	
Sample ID: ICV-111212-10		Initial Calibration Verification Standard							11/12/12 13:15	
Chloride		9.82	mg/L	1.0	98	90	110			
Method: E300.0									Batch: R167080	
Sample ID: ICB-111212-11		Method Blank				Run: IC1-C_121112A			11/12/12 13:33	
Chloride		ND	mg/L	0.04						
Sample ID: LFB-111212-12		Laboratory Fortified Blank				Run: IC1-C_121112A			11/12/12 13:50	
Chloride		9.74	mg/L	1.0	97	90	110			
Sample ID: C12110483-001AMS		Sample Matrix Spike				Run: IC1-C_121112A			11/12/12 14:25	
Chloride		38.4	mg/L	1.0	90	90	110			
Sample ID: C12110483-001AMSD		Sample Matrix Spike Duplicate				Run: IC1-C_121112A			11/12/12 14:42	
Chloride		38.6	mg/L	1.0	91	90	110	0.7	10	
Sample ID: C12110438-001AMS		Sample Matrix Spike				Run: IC1-C_121112A			11/12/12 18:29	
Chloride		525	mg/L	4.2	103	90	110			
Sample ID: C12110438-001AMSD		Sample Matrix Spike Duplicate				Run: IC1-C_121112A			11/12/12 18:46	
Chloride		526	mg/L	4.2	104	90	110	0.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 11/16/12
Project: Lisbon, UT Facility
Work Order: C12110375

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC2-C_121109A	
Sample ID: ICV-110912-10	2	Initial Calibration Verification Standard							11/09/12 18:48	
Chloride		9.73	mg/L	1.0	97	90	110			
Sulfate		40.0	mg/L	1.0	100	90	110			
Method: E300.0									Batch: R167023	
Sample ID: ICB-110912-11	2	Method Blank				Run: IC2-C_121109A			11/09/12 19:04	
Chloride		ND	mg/L	0.03						
Sulfate		ND	mg/L	0.10						
Sample ID: LFB-110912-12	2	Laboratory Fortified Blank				Run: IC2-C_121109A			11/09/12 19:19	
Chloride		9.65	mg/L	1.0	96	90	110			
Sulfate		39.0	mg/L	1.0	97	90	110			
Sample ID: LFBD-110912-13	2	Laboratory Fortified Blank Duplicate				Run: IC2-C_121109A			11/09/12 19:34	
Chloride		9.57	mg/L	1.0	96	90	110	0.8	10	
Sulfate		39.1	mg/L	1.0	98	90	110	0.3	10	
Sample ID: C12110363-001AMS	2	Sample Matrix Spike				Run: IC2-C_121109A			11/09/12 20:05	
Chloride		305	mg/L	1.0		90	110			A
Sulfate		198	mg/L	4.2	98	90	110			
Sample ID: C12110363-001AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121109A			11/09/12 20:21	
Chloride		313	mg/L	1.0		90	110	2.6	10	A
Sulfate		207	mg/L	4.2	103	90	110	4.5	10	
Sample ID: C12110375-010AMS	2	Sample Matrix Spike				Run: IC2-C_121109A			11/09/12 23:41	
Chloride		1410	mg/L	4.2		90	110			A
Sulfate		2270	mg/L	17	95	90	110			
Sample ID: C12110375-010AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121109A			11/09/12 23:56	
Chloride		1380	mg/L	4.2		90	110	1.9	10	A
Sulfate		2260	mg/L	17	95	90	110	0.3	10	
Sample ID: C12110375-020AMS	2	Sample Matrix Spike				Run: IC2-C_121109A			11/10/12 03:17	
Chloride		2040	mg/L	21	98	90	110			
Sulfate		10500	mg/L	83	96	90	110			
Sample ID: C12110375-020AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121109A			11/10/12 03:32	
Chloride		2010	mg/L	21	95	90	110	1.4	10	
Sulfate		10400	mg/L	83	94	90	110	0.9	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon Ut facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address:	Contact Name: Phone/Fax:	Email:	Sampler: (Please Print) Josh Kerns
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: ____
☐ Other: ____
☐ EDD/EDT (Electronic Data)
Format: ____
☐ LEVEL IV
☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other
DW - Drinking Water

ANALYSIS REQUESTED: See attached bottle order #38150 — SEE ATTACHED

Standard Turnaround (TAT) — RUSH: Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO3 in field

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150	Comments
1	6267	06NOV2012	0735	W	X	High pH (samples 1–3)
2	6268	06NOV2012	0740	W	X	
3	6269	06NOV2012	0850	W	X	
4	6270	06NOV2012	1010	W	X	
5	6271	06NOV2012	1040	W	X	
6	6272	07NOV2012 (06 struck)	0700	W	X	
7	6273	07NOV2012 (06 struck)	0745	W	X	
8	6274	07NOV2012 (06 struck)	0915	W	X	
9	6275	07NOV2012	0945	W	X	
10	6276	07NOV2012	1130	W	X	

LABORATORY USE ONLY:
Shipped by: Fed Ex
Cooler ID(s): 2721
Receipt Temp: 0.6 °C (IR1)
On Ice: (Y) N
Custody Seal On Bottle: Y N
On Cooler: (Y) N
Intact: (Y) N
Signature Match: (Y) N

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Josh Kerns	07NOV2012 / 1200	[signature]			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Sample Disposal: Return to Client: ____		Lab Disposal: ____	Received by Laboratory: 11-8-12 9:45	Date/Time:	Signature: [signature]

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required):	Contact Name: Phone/Fax:	Cell:	Sampler: (Please Print) BRANDON MYERS
☐ No Hard Copy Email:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150
Invoice Address (Required): ☐ No Hard Copy Email:			

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ☐ Other: ☐ EDD/EDT (Electronic Data) Format: ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

Standard Turnaround (TAT) — R U S H

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO_3 in field

Shipped by:
Cooler ID(s):
Receipt Temp: °C
On Ice: Y N
Custody Seal: On Bottle Y N; On Cooler Y N
Intact Y N
Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order # 38150	SEE ATTACHED
1	6285	07NOV2012	800	W	X	
2	6286		830	W	X	
3	6287		855	W	X	
4	6288		920	W	X	
5	6289		1000	W	X	
6						
7						
8						
9						
10						

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): BRANDON MYERS	Date/Time: 11/7/12 1200	Signature:	Received by (print):	Date/Time: Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time: Signature:
Sample Disposal: Return to Client: Lab Disposal:			Received by Laboratory: 11-8-12	Date/Time: 945 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Chain of Custody and Analytical Request Record

ENERGY LABORATORIES

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery + Associates

Report Mail Address (Required):

☐ No Hard Copy Email:

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ☐ Other:
☐ EDD/EDT (Electronic Data) Format:
☐ LEVEL IV ☐ NELAC

Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon 4+ facility

Contact Name: Phone/Fax:

Invoice Contact & Phone:

Sample Origin State: Utah

Cell:

Purchase Order:

EPA/State Compliance: Yes ☐ No ☐

Sampler: (Please Print) BRANDON MYERS

Quote/Bottle Order: 38150

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other D DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered + preserved w/ HNO3 in field

Shipped by:

Cooler ID(s):

Receipt Temp °C

On Ice: Y N

Custody Seal On Bottle Y N On Cooler Y N

Intact Y N

Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order # 38150
1	6255	07NOV12	745	W	X
2	6256		845		X
3	6257		855		X
4	6258		1015		X
5	6259		1115		X
6	6260		1140		X
7	6281		1150		X
8	6282		1215		X
9	6283	07NOV12	705		X
10	6284	"	755		X

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): BRANDON MYERS Date/Time: 11/7/12 1200 Signature:

Relinquished by (print): Date/Time: Signature:

Sample Disposal: Return to Client: Lab Disposal:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: 11-8-12 945 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.
This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Lab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES
www.energylab.com
Analytical Excellence Since 1952
Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

ANALYTICAL SUMMARY REPORT

December 07, 2012

Rio Algom Mining Corporation LLC
Hwy 605 and 509
Grants, NM 87020

Workorder No.: C12111026

Project Name: Lisbon, UT Facility

-001 RL-1 low flow
-002 EF-8 low flow
-003 MW-104 purge
-004 MW-106 purge

Energy Laboratories, Inc. Casper WY received the following 4 samples for Rio Algom Mining Corporation LLC on 11/29/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C12111026-001	6301	11/28/12 8:30	11/29/12	Aqueous	Metals by ICP/ICPMS, Dissolved Alkalinity QA Calculations Conductivity E300.0 Anions pH Solids, Total Dissolved Solids, Total Dissolved - Calculated
C12111026-002	6302	11/28/12 9:35	11/29/12	Aqueous	Same As Above
C12111026-003	6303	11/28/12 10:10	11/29/12	Aqueous	Same As Above
C12111026-004	6304	11/28/12 10:30	11/29/12	Aqueous	Same As Above

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.

Report Approved By:

Kathryn Hamre
Report Proofing Specialist

Digitally signed by
Kathy Hamre
Date: 2012.12.07 13:42:44 -07:00

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12111026-001
Client Sample ID: 6301

RL-1
low flow

Report Date: 12/07/12
Collection Date: 11/28/12 08:30
DateReceived: 11/29/12
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/29/12 19:19 / jba
Bicarbonate as HCO3	1240	mg/L		5		A2320 B	11/29/12 19:19 / jba
Calcium	565	mg/L		1		E200.7	11/30/12 19:13 / sf
Chloride	673	mg/L	D	10		E300.0	11/30/12 14:06 / wc
Magnesium	182	mg/L		1		E200.7	11/30/12 19:13 / sf
Potassium	20	mg/L		1		E200.7	11/30/12 19:13 / sf
Sodium	2280	mg/L	D	2		E200.7	12/04/12 13:19 / sf
Sulfate	4550	mg/L	D	40		E300.0	11/30/12 14:06 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	9960	umhos/cm		1		A2510 B	11/30/12 09:12 / ab
pH	7.38	s.u.	H	0.01		A4500-H B	11/30/12 09:12 / ab
Solids, Total Dissolved TDS @ 180 C	9100	mg/L		10		A2540 C	11/30/12 11:25 / ab
METALS - DISSOLVED							
Arsenic	0.003	mg/L		0.001		E200.8	12/05/12 23:27 / cp
Molybdenum	10.2	mg/L	D	0.006		E200.7	11/30/12 19:13 / sf
Selenium	0.074	mg/L		0.001		E200.8	12/05/12 23:27 / cp
Uranium	41.2	mg/L	D	0.5		E200.7	11/30/12 19:13 / sf
DATA QUALITY							
A/C Balance (± 5)	2.62	%				A1030 E	12/07/12 09:05 / kbh
Anions	136	meq/L				A1030 E	12/07/12 09:05 / kbh
Cations	143	meq/L				A1030 E	12/07/12 09:05 / kbh
Solids, Total Dissolved Calculated	9000	mg/L				A1030 E	12/07/12 09:05 / kbh
TDS Balance (0.80 - 1.20)	1.01					A1030 E	12/07/12 09:05 / kbh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12111026-002
Client Sample ID: 6302

EF-8
Low flow

Report Date: 12/07/12
Collection Date: 11/28/12 09:35
DateReceived: 11/29/12
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/29/12 19:27 / jba
Bicarbonate as HCO3	384	mg/L		5		A2320 B	11/29/12 19:27 / jba
Calcium	205	mg/L		1		E200.7	11/30/12 19:29 / sf
Chloride	195	mg/L		1		E300.0	11/30/12 14:21 / wc
Magnesium	54	mg/L		1		E200.7	11/30/12 19:29 / sf
Potassium	5	mg/L		1		E200.7	11/30/12 19:29 / sf
Sodium	150	mg/L		1		E200.7	11/30/12 19:29 / sf
Sulfate	428	mg/L	D	4		E300.0	11/30/12 14:21 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1860	umhos/cm		1		A2510 B	11/30/12 09:14 / ab
pH	7.70	s.u.	H	0.01		A4500-H B	11/30/12 09:14 / ab
Solids, Total Dissolved TDS @ 180 C	1330	mg/L		10		A2540 C	11/30/12 11:25 / ab
METALS - DISSOLVED							
Arsenic	0.031	mg/L		0.001		E200.8	12/05/12 23:31 / cp
Molybdenum	0.015	mg/L		0.001		E200.8	12/05/12 23:31 / cp
Selenium	0.011	mg/L		0.001		E200.8	12/05/12 23:31 / cp
Uranium	0.592	mg/L		0.0003		E200.8	12/05/12 23:31 / cp
DATA QUALITY							
A/C Balance (± 5)	0.497	%				A1030 E	12/05/12 07:15 / kbh
Anions	21.2	meq/L				A1030 E	12/05/12 07:15 / kbh
Cations	21.4	meq/L				A1030 E	12/05/12 07:15 / kbh
Solids, Total Dissolved Calculated	1300	mg/L				A1030 E	12/05/12 07:15 / kbh
TDS Balance (0.80 - 1.20)	1.05					A1030 E	12/05/12 07:15 / kbh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12111026-003
Client Sample ID: 6303

MW-104 purge

Report Date: 12/07/12
Collection Date: 11/28/12 10:10
DateReceived: 11/29/12
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/29/12 19:35 / jba
Bicarbonate as HCO3	241	mg/L		5		A2320 B	11/29/12 19:35 / jba
Calcium	125	mg/L		1		E200.7	11/30/12 19:33 / sf
Chloride	75	mg/L	D	2		E300.0	11/30/12 14:37 / wc
Magnesium	60	mg/L		1		E200.7	11/30/12 19:33 / sf
Potassium	17	mg/L		1		E200.7	11/30/12 19:33 / sf
Sodium	498	mg/L		1		E200.7	11/30/12 19:33 / sf
Sulfate	1230	mg/L	D	8		E300.0	11/30/12 14:37 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	2820	umhos/cm		1		A2510 B	11/30/12 09:17 / ab
pH	7.77	s.u.	H	0.01		A4500-H B	11/30/12 09:17 / ab
Solids, Total Dissolved TDS @ 180 C	2220	mg/L		10		A2540 C	11/30/12 11:25 / ab
METALS - DISSOLVED							
Arsenic	0.001	mg/L		0.001		E200.8	12/05/12 23:40 / cp
Molybdenum	0.007	mg/L		0.001		E200.8	12/05/12 23:40 / cp
Selenium	ND	mg/L		0.001		E200.8	12/05/12 23:40 / cp
Uranium	0.0034	mg/L		0.0003		E200.8	12/05/12 23:40 / cp
DATA QUALITY							
A/C Balance (± 5)	2.20	%				A1030 E	12/05/12 07:15 / kbh
Anions	31.8	meq/L				A1030 E	12/05/12 07:15 / kbh
Cations	33.2	meq/L				A1030 E	12/05/12 07:15 / kbh
Solids, Total Dissolved Calculated	2100	mg/L				A1030 E	12/05/12 07:15 / kbh
TDS Balance (0.80 - 1.20)	1.04					A1030 E	12/05/12 07:15 / kbh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Project: Lisbon, UT Facility
Lab ID: C12111026-004
Client Sample ID: 6304

MW-106
Purge

Report Date: 12/07/12
Collection Date: 11/28/12 10:30
DateReceived: 11/29/12
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		5		A2320 B	11/29/12 19:43 / jba
Bicarbonate as HCO3	470	mg/L		5		A2320 B	11/29/12 19:43 / jba
Calcium	84	mg/L		1		E200.7	11/30/12 19:37 / sf
Chloride	109	mg/L		1		E300.0	11/30/12 14:52 / wc
Magnesium	23	mg/L		1		E200.7	11/30/12 19:37 / sf
Potassium	4	mg/L		1		E200.7	11/30/12 19:37 / sf
Sodium	202	mg/L		1		E200.7	11/30/12 19:37 / sf
Sulfate	209	mg/L	D	4		E300.0	11/30/12 14:52 / wc
PHYSICAL PROPERTIES							
Conductivity @ 25 C	1410	umhos/cm		1		A2510 B	11/30/12 09:20 / ab
pH	7.76	s.u.	H	0.01		A4500-H B	11/30/12 09:20 / ab
Solids, Total Dissolved TDS @ 180 C	925	mg/L		10		A2540 C	11/30/12 11:26 / ab
METALS - DISSOLVED							
Arsenic	0.002	mg/L		0.001		E200.8	12/05/12 23:36 / cp
Molybdenum	0.096	mg/L	D	0.006		E200.7	11/30/12 19:37 / sf
Selenium	0.004	mg/L		0.001		E200.8	12/05/12 23:36 / cp
Uranium	0.215	mg/L		0.0003		E200.8	12/05/12 23:36 / cp
DATA QUALITY							
A/C Balance (± 5)	-1.52	%				A1030 E	12/05/12 07:15 / kbh
Anions	15.4	meq/L				A1030 E	12/05/12 07:15 / kbh
Cations	14.9	meq/L				A1030 E	12/05/12 07:15 / kbh
Solids, Total Dissolved Calculated	900	mg/L				A1030 E	12/05/12 07:15 / kbh
TDS Balance (0.80 - 1.20)	1.03					A1030 E	12/05/12 07:15 / kbh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R167702
Sample ID: MBLK	3	Method Blank				Run: MANTECH_121129A				11/29/12 14:43
Alkalinity, Total as CaCO3		ND	mg/L	3						
Carbonate as CO3		ND	mg/L	1						
Bicarbonate as HCO3		3	mg/L	1						
Sample ID: LCS_121003		Laboratory Control Sample				Run: MANTECH_121129A				11/29/12 14:59
Alkalinity, Total as CaCO3		203	mg/L	5.0	102	90	110			
Sample ID: C12111008-001ADUP	3	Sample Duplicate				Run: MANTECH_121129A				11/29/12 15:17
Alkalinity, Total as CaCO3		829	mg/L	5.0				3.3	10	
Carbonate as CO3		ND	mg/L	5.0					10	
Bicarbonate as HCO3		1010	mg/L	5.0				3.3	10	
Sample ID: C12111024-003AMS		Sample Matrix Spike				Run: MANTECH_121129A				11/29/12 19:00
Alkalinity, Total as CaCO3		408	mg/L	5.0	100	80	120			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B									Analytical Run: PHSC_101-C_121130A	
Sample ID: SC 100		Continuing Calibration Verification Standard								11/30/12 08:53
Conductivity @ 25 C		100	umhos/cm	1.0	100	90	110			
Method: A2510 B										Batch: R167713
Sample ID: SC 2ND 1413		Laboratory Control Sample				Run: PHSC_101-C_121130A				11/30/12 09:04
Conductivity @ 25 C		1400	umhos/cm	1.0	99	90	110			
Sample ID: MBLK		Method Blank				Run: PHSC_101-C_121130A				11/30/12 09:09
Conductivity @ 25 C		2	umhos/cm	0.2						
Sample ID: C12111033-001ADUP		Sample Duplicate				Run: PHSC_101-C_121130A				11/30/12 09:36
Conductivity @ 25 C		2860	umhos/cm	1.0				0.2	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C									Batch: TDS121130A	
Sample ID: MB-1_121130A		Method Blank				Run: BAL-1_121130A			11/30/12 11:24	
Solids, Total Dissolved TDS @ 180 C		5	mg/L	4						
Sample ID: LCS-2_121130A		Laboratory Control Sample				Run: BAL-1_121130A			11/30/12 11:24	
Solids, Total Dissolved TDS @ 180 C		1110	mg/L	10	100	90	110			
Sample ID: C12110976-001B DUP		Sample Duplicate				Run: BAL-1_121130A			11/30/12 11:24	
Solids, Total Dissolved TDS @ 180 C		309000	mg/L	10				0.6	5	
Sample ID: C12111026-001A MS		Sample Matrix Spike				Run: BAL-1_121130A			11/30/12 11:25	
Solids, Total Dissolved TDS @ 180 C		18900	mg/L	10	98	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC_101-C_121130A	
Sample ID: pH 6.86		Initial Calibration Verification Standard							11/30/12 08:50	
pH		6.85	s.u.	0.010	100	98	102			
Method: A4500-H B									Batch: R167713	
Sample ID: C12111033-001ADUP		Sample Duplicate				Run: PHSC_101-C_121130A			11/30/12 09:36	
pH		7.88	s.u.	0.010				0.0	3	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7									Analytical Run: ICP2-C_121130A	
Sample ID: ICV	6	Initial Calibration Verification Standard							11/30/12 11:39	
Calcium		51.5	mg/L	0.50	103	95	105			
Magnesium		50.0	mg/L	0.50	100	95	105			
Molybdenum		1.05	mg/L	0.10	105	95	105			
Potassium		47.6	mg/L	0.50	95	95	105			
Sodium		52.1	mg/L	0.50	104	95	105			
Uranium		5.19	mg/L	1.0	104	95	105			
Sample ID: ICSA	6	Interference Check Sample A							11/30/12 12:09	
Calcium		494	mg/L	0.50	99	80	120			
Magnesium		511	mg/L	0.50	102	80	120			
Molybdenum		-0.0157	mg/L	0.10						
Potassium		0.00160	mg/L	0.50						
Sodium		-0.0492	mg/L	0.50						
Uranium		0.00720	mg/L	1.0						
Sample ID: ICSAB	6	Interference Check Sample AB							11/30/12 12:13	
Calcium		505	mg/L	0.50	101	80	120			
Magnesium		515	mg/L	0.50	103	80	120			
Molybdenum		-0.0167	mg/L	0.10						
Potassium		0.000700	mg/L	0.50						
Sodium		-0.0382	mg/L	0.50						
Uranium		0.00840	mg/L	1.0						
Method: E200.7									Batch: R167761	
Sample ID: MB-121130A	6	Method Blank				Run: ICP2-C_121130A			11/30/12 12:37	
Calcium		ND	mg/L	0.06						
Magnesium		ND	mg/L	0.03						
Molybdenum		ND	mg/L	0.004						
Potassium		ND	mg/L	0.06						
Sodium		ND	mg/L	0.3						
Uranium		ND	mg/L	0.3						
Sample ID: LFB-121130A	6	Laboratory Fortified Blank				Run: ICP2-C_121130A			11/30/12 12:41	
Calcium		50.3	mg/L	0.50	101	85	115			
Magnesium		48.7	mg/L	0.50	97	85	115			
Molybdenum		1.00	mg/L	0.10	100	85	115			
Potassium		46.0	mg/L	0.50	92	85	115			
Sodium		48.9	mg/L	0.50	98	85	115			
Uranium		5.10	mg/L	1.0	102	85	115			
Sample ID: C12111032-001CMS2	6	Sample Matrix Spike				Run: ICP2-C_121130A			11/30/12 19:49	
Calcium		198	mg/L	1.0	99	70	130			
Magnesium		119	mg/L	1.0	97	70	130			
Molybdenum		1.80	mg/L	0.0072	88	70	130			
Potassium		103	mg/L	1.0	94	70	130			
Sodium		135	mg/L	1.0	102	70	130			
Uranium		9.66	mg/L	0.53	95	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R167761
Sample ID: C12111032-001CMSD	6	Sample Matrix Spike Duplicate				Run: ICP2-C_121130A				11/30/12 19:53
Calcium		194	mg/L	1.0	94	70	130	2.2	20	
Magnesium		121	mg/L	1.0	99	70	130	1.4	20	
Molybdenum		1.86	mg/L	0.0072	91	70	130	3.6	20	
Potassium		102	mg/L	1.0	93	70	130	1.3	20	
Sodium		134	mg/L	1.0	102	70	130	0.3	20	
Uranium		9.78	mg/L	0.53	96	70	130	1.3	20	
Method: E200.7										Analytical Run: ICP2-C_121204A
Sample ID: ICV		Initial Calibration Verification Standard								12/04/12 11:37
Sodium		51.7	mg/L	0.50	103	95	105			
Sample ID: ICSA		Interference Check Sample A								12/04/12 12:07
Sodium		-0.0186	mg/L	0.50						
Sample ID: ICSAB		Interference Check Sample AB								12/04/12 12:11
Sodium		-0.110	mg/L	0.50						
Method: E200.7										Batch: R167847
Sample ID: MB-121204A		Method Blank				Run: ICP2-C_121204A				12/04/12 12:35
Sodium		ND	mg/L	0.3						
Sample ID: LFB-121204A		Laboratory Fortified Blank				Run: ICP2-C_121204A				12/04/12 12:39
Sodium		49.0	mg/L	0.50	98	85	115			
Sample ID: C12111026-001BMS2		Sample Matrix Spike				Run: ICP2-C_121204A				12/04/12 13:23
Sodium		2370	mg/L	1.6		70	130			A
Sample ID: C12111026-001BMSD		Sample Matrix Spike Duplicate				Run: ICP2-C_121204A				12/04/12 13:39
Sodium		2400	mg/L	1.6		70	130	1.0	20	A

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS4-C_121205A	
Sample ID: ICV	4	Initial Calibration Verification Standard							12/05/12 10:26	
Arsenic		0.0528	mg/L	0.0010	105	90	110			
Molybdenum		0.504	mg/L	0.0010	101	90	110			
Selenium		0.0532	mg/L	0.0010	106	90	110			
Uranium		0.514	mg/L	0.00030	103	90	110			
Method: E200.8									Batch: R167885	
Sample ID: LRB	4	Method Blank				Run: ICPMS4-C_121205A			12/05/12 11:14	
Arsenic		ND	mg/L	5E-05						
Molybdenum		ND	mg/L	3E-05						
Selenium		ND	mg/L	7E-05						
Uranium		ND	mg/L	9E-06						
Sample ID: LFB	4	Laboratory Fortified Blank				Run: ICPMS4-C_121205A			12/05/12 11:18	
Arsenic		0.0512	mg/L	0.0010	102	85	115			
Molybdenum		0.0523	mg/L	0.0010	105	85	115			
Selenium		0.0501	mg/L	0.0010	100	85	115			
Uranium		0.0543	mg/L	0.00030	109	85	115			
Sample ID: C12100976-005LMS4	4	Sample Matrix Spike				Run: ICPMS4-C_121205A			12/05/12 22:31	
Arsenic		0.0543	mg/L	0.0010	108	70	130			
Molybdenum		0.0561	mg/L	0.0010	108	70	130			
Selenium		0.0558	mg/L	0.0010	112	70	130			
Uranium		0.0601	mg/L	0.00030	120	70	130			
Sample ID: C12100976-005LMSD	4	Sample Matrix Spike Duplicate				Run: ICPMS4-C_121205A			12/05/12 22:35	
Arsenic		0.0538	mg/L	0.0010	107	70	130	1.0	20	
Molybdenum		0.0566	mg/L	0.0010	109	70	130	1.0	20	
Selenium		0.0522	mg/L	0.0010	104	70	130	6.6	20	
Uranium		0.0597	mg/L	0.00030	119	70	130	0.6	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rio Algom Mining Corporation LLC
Report Date: 12/07/12
Project: Lisbon, UT Facility
Work Order: C12111026

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC2-C_121130A	
Sample ID: ICV-113012-10	2	Initial Calibration Verification Standard							11/30/12 11:32	
Chloride		10.00	mg/L	1.0	100	90	110			
Sulfate		40.4	mg/L	1.0	101	90	110			
Method: E300.0									Batch: R167758	
Sample ID: ICB-113012-11	2	Method Blank				Run: IC2-C_121130A			11/30/12 11:47	
Chloride		ND	mg/L	0.03						
Sulfate		ND	mg/L	0.10						
Sample ID: LFB-113012-13	2	Laboratory Fortified Blank				Run: IC2-C_121130A			11/30/12 12:18	
Chloride		9.96	mg/L	1.0	100	90	110			
Sulfate		40.1	mg/L	1.0	100	90	110			
Sample ID: LFBD-113012-14	2	Laboratory Fortified Blank Duplicate				Run: IC2-C_121130A			11/30/12 12:33	
Chloride		10.0	mg/L	1.0	100	90	110	0.5	20	
Sulfate		40.5	mg/L	1.0	101	90	110	1.0	20	
Sample ID: C12111048-001AMS	2	Sample Matrix Spike				Run: IC2-C_121130A			11/30/12 13:04	
Chloride		38.2	mg/L	1.0	101	90	110			
Sulfate		236	mg/L	1.7	98	90	110			
Sample ID: C12111048-001AMSD	2	Sample Matrix Spike Duplicate				Run: IC2-C_121130A			11/30/12 13:20	
Chloride		38.3	mg/L	1.0	101	90	110	0.2	20	
Sulfate		238	mg/L	1.7	101	90	110	0.9	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery & Associates

Project Name, PWS, Permit, Etc.: RIO Algom Mining Lisbon, UT Facility

Sample Origin: State: Utah

EPA/State Compliance: Yes ☐ No ☐

Report Mail Address (Required): Report To: Leilani Bew LBew@ELMontgomery

Contact Name: Phone/Fax: Cell:

Sampler: (Please Print): Josh Kerns

☐ No Hard Copy Email:

Invoice Contact & Phone:

Purchase Order:

Quote/Bottle Order: 38150

Invoice Address (Required):

☐ No Hard Copy Email:

Special Report/Formats:

☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format:
☐ State: ☐ LEVEL IV
☐ Other: ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO_3 in field

Shipped by: Fedex E

Cooler ID(s): Client

Receipt Temp: 8.6 °C (3)

On Ice: (Y) N

Custody Seal: On Bottle Y (N) / On Cooler Y (N)

Intact: Y N

Signature Match: Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150
1	6301	28NOV2012	0830	Water	X
2	6302	28NOV2012	0935	Water	X
3					
4					
5					
6					
7					
8					
9					
10					

C12111026

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): Josh Kerns Date/Time: 28NOV2012/1200 Signature:

Relinquished by (print): Date/Time: Signature:

Sample Disposal: Return to Client: Lab Disposal:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Date/Time: 11-29-12 930 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT (Provide as much information as possible.)

Company Name: Montgomery & Associates	Project Name, PWS, Permit, Etc.: Rio Algom Mining Lisbon, UT Facility	Sample Origin State: Utah	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address (Required): Report to: Leilani Bew LBew@ELMontgomery.com ☐ No Hard Copy Email:	Contact Name: Phone/Fax:	Cell:	Sampler: (Please Print) Josh Kerns
Invoice Address (Required): ☐ No Hard Copy Email:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: 38150

Special Report/Formats:
☐ DW ☐ POTW/WWTP ☐ State: ☐ Other: ☐ EDD/EDT (Electronic Data) Format: ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached bottle order #38150	SEE ATTACHED
1 6303	28NOV2012	1010	water	X	
2 6304	28NOV2012	1030	water	X	
3					
4					
5					
6					
7					
8					
9					
10					

Standard Turnaround (TAT)

R U S H → Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Metals samples were field filtered & preserved w/ HNO3 in field

C12111020

Shipped by: Fedex E
Cooler ID(s): Client
Receipt Temp: 8-6 °C (3)
On Ice: (Y) N
Custody Seal: On Bottle Y N (N) / On Cooler Y (N)
Intact Y N
Signature Match Y N

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): Josh Kerns	Date/Time: 28 Nov 2012 1200	Signature:	Received by (print):	Date/Time:	Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time: 11-29-12 930	Signature:

Sample Disposal: Return to Client: ____ Lab Disposal: ____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 16, 2012

Report to:
Tim Leo
Montgomery and Associates
1550 E. Prince Rd.
Tuscon, AZ 85719

Bill to:
Accounts Payable
Montgomery and Associates
1550 E. Prince Rd.
Tucson, AZ 85719

cc: Leilani Bew

Project ID: 1350.13
ACZ Project ID: L97753

Tim Leo:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 08, 2012. This project has been assigned to ACZ's project number, L97753. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L97753. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 16, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6291

MW-102DB
hydrasleeve
split

ACZ Sample ID: ***L97753-01***
Date Sampled: *11/06/12 07:45*
Date Received: *11/08/12*
Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0051			mg/L	0.0002	0.001	11/10/12 3:26	pmc
Calcium, dissolved	M200.7 ICP	14.2			mg/L	0.2	1	11/14/12 12:26	aeb
Magnesium, dissolved	M200.7 ICP	5.2			mg/L	0.2	1	11/14/12 12:26	aeb
Molybdenum, dissolved	M200.8 ICP-MS	0.0169			mg/L	0.0005	0.003	11/10/12 3:26	pmc
Potassium, dissolved	M200.7 ICP	4.4			mg/L	0.3	2	11/14/12 12:26	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	11/10/12 3:26	pmc
Sodium, dissolved	M200.7 ICP	151			mg/L	0.3	2	11/14/12 12:26	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0761			mg/L	0.0001	0.0005	11/10/12 3:26	pmc

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		256			mg/L	2	20	11/10/12 0:00	las
Carbonate as CaCO3		7	B		mg/L	2	20	11/10/12 0:00	las
Hydroxide as CaCO3			U		mg/L	2	20	11/10/12 0:00	las
Total Alkalinity		263			mg/L	2	20	11/10/12 0:00	las
Chloride	SM4500Cl-E	43			mg/L	1	5	11/16/12 11:42	lhb
Conductivity @25C	SM2510B	725			umhos/cm	1	10	11/10/12 0:10	las
pH (lab)	SM4500H+ B								
pH		8.4	H		units	0.1	0.1	11/10/12 0:00	las
pH measured at		22.0			C	0.1	0.1	11/10/12 0:00	las
Residue, Filterable (TDS) @180C	SM2540C	490			mg/L	10	20	11/08/12 15:55	ljr
Sulfate	D516-02 - Turbidimetric	63		*	mg/L	5	30	11/13/12 16:24	mpb

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6292

mw-102DB
low-flow split

ACZ Sample ID: ***L97753-02***
Date Sampled: *11/06/12 08:45*
Date Received: *11/08/12*
Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0045			mg/L	0.0002	0.001	11/10/12 3:29	pmc
Calcium, dissolved	M200.7 ICP	13.4			mg/L	0.2	1	11/14/12 12:29	aeb
Magnesium, dissolved	M200.7 ICP	5.0			mg/L	0.2	1	11/14/12 12:29	aeb
Molybdenum, dissolved	M200.8 ICP-MS	0.0108			mg/L	0.0005	0.003	11/10/12 3:29	pmc
Potassium, dissolved	M200.7 ICP	4.1			mg/L	0.3	2	11/14/12 12:29	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0004			mg/L	0.0001	0.0003	11/10/12 3:29	pmc
Sodium, dissolved	M200.7 ICP	150			mg/L	0.3	2	11/14/12 12:29	aeb
Uranium, dissolved	M200.8 ICP-MS	0.0364			mg/L	0.0001	0.0005	11/10/12 3:29	pmc

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		254			mg/L	2	20	11/10/12 0:00	las
Carbonate as CaCO3		9	B		mg/L	2	20	11/10/12 0:00	las
Hydroxide as CaCO3			U		mg/L	2	20	11/10/12 0:00	las
Total Alkalinity		263			mg/L	2	20	11/10/12 0:00	las
Chloride	SM4500Cl-E	41			mg/L	1	5	11/16/12 11:42	lhb
Conductivity @25C	SM2510B	713			umhos/cm	1	10	11/10/12 0:19	las
pH (lab)	SM4500H+ B								
pH		8.4	H		units	0.1	0.1	11/10/12 0:00	las
pH measured at		22.0			C	0.1	0.1	11/10/12 0:00	las
Residue, Filterable (TDS) @180C	SM2540C	480			mg/L	10	20	11/08/12 15:56	ljr
Sulfate	D516-02 - Turbidimetric	62		*	mg/L	5	30	11/13/12 16:24	mpb

Arizona license number: AZ0102

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Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 6293

MW-102 DB
purge
split

ACZ Sample ID: ***L97753-03***
Date Sampled: *11/06/12 10:15*
Date Received: *11/08/12*
Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0286			mg/L	0.0002	0.001	11/10/12 3:32	pmc
Calcium, dissolved	M200.7 ICP	14.9			mg/L	0.4	2	11/14/12 12:32	aeb
Magnesium, dissolved	M200.7 ICP	8.3			mg/L	0.4	2	11/14/12 12:32	aeb
Molybdenum, dissolved	M200.8 ICP-MS	1.82			mg/L	0.05	0.3	11/13/12 18:24	pmc
Potassium, dissolved	M200.7 ICP	4.4			mg/L	0.6	3	11/14/12 12:32	aeb
Selenium, dissolved	M200.8 ICP-MS	0.0131			mg/L	0.0001	0.0003	11/10/12 3:32	pmc
Sodium, dissolved	M200.7 ICP	486			mg/L	0.6	3	11/14/12 12:32	aeb
Uranium, dissolved	M200.8 ICP-MS	9.02			mg/L	0.01	0.05	11/13/12 18:24	pmc

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		720			mg/L	2	20	11/10/12 0:00	las
Carbonate as CaCO3		77			mg/L	2	20	11/10/12 0:00	las
Hydroxide as CaCO3			U		mg/L	2	20	11/10/12 0:00	las
Total Alkalinity		797			mg/L	2	20	11/10/12 0:00	las
Chloride	SM4500Cl-E	190			mg/L	10	50	11/16/12 11:50	lhb
Conductivity @25C	SM2510B	3510			umhos/cm	1	10	11/10/12 0:32	las
pH (lab)	SM4500H+ B								
pH		8.8	H		units	0.1	0.1	11/10/12 0:00	las
pH measured at		22.0			C	0.1	0.1	11/10/12 0:00	las
Residue, Filterable (TDS) @180C	SM2540C	2580			mg/L	10	20	11/08/12 15:58	ljr
Sulfate	D516-02 - Turbidimetric	730		*	mg/L	50	300	11/13/12 16:25	mpb

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Inorganic Reference

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

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ACZ Project ID: ***L97753***

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333858													
WG333858PBW1	PBW	11/09/12 15:47				U	mg/L		-20	20			
WG333858LCSW2	LCSW	11/09/12 16:00	WC121025-	820.0001		759.8	mg/L	92.7	90	110			
WG333858LCSW5	LCSW	11/09/12 19:50	WC121025-	820.0001		789.9	mg/L	96.3	90	110			
WG333858PBW2	PBW	11/09/12 19:59				3.5	mg/L		-20	20			
WG333858LCSW8	LCSW	11/09/12 23:07	WC121025-	820.0001		769	mg/L	93.8	90	110			
WG333858PBW3	PBW	11/09/12 23:15				U	mg/L		-20	20			
L97753-03DUP	DUP	11/10/12 0:45			797	800.6	mg/L				0.5	20	
WG333858LCSW11	LCSW	11/10/12 2:34	WC121025-	820.0001		792.4	mg/L	96.6	90	110			
WG333858PBW4	PBW	11/10/12 2:42				U	mg/L		-20	20			
WG333858LCSW14	LCSW	11/10/12 4:49	WC121025-	820.0001		778.8	mg/L	95	90	110			

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333881													
WG333881ICV	ICV	11/10/12 2:07	MS121001-5	.05		.05293	mg/L	105.9	90	110			
WG333881ICB	ICB	11/10/12 2:10				U	mg/L		-0.0006	0.0006			
WG333881LFB	LFB	11/10/12 2:13	MS121009-6	.05005		.04958	mg/L	99.1	85	115			
L97749-02AS	AS	11/10/12 3:02	MS121009-6	.05005	.0053	.06349	mg/L	116.3	70	130			
L97749-02ASD	ASD	11/10/12 3:05	MS121009-6	.05005	.0053	.06007	mg/L	109.4	70	130	5.54	20	

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	100		99.14	mg/L	99.1	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.6	0.6			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	67.97554		70.43	mg/L	103.6	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	67.97554	140	205.28	mg/L	96	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	67.97554	140	205.3	mg/L	96.1	85	115	0.01	20	

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334271													
WG334271ICB	ICB	11/16/12 10:30				U	mg/L		-3	3			
WG334271ICV	ICV	11/16/12 10:30	WI120904-1	54.945		57.8	mg/L	105.2	90	110			
WG334271LFB1	LFB	11/16/12 11:32	WI120716-1	30		31.8	mg/L	106	90	110			
WG334271LFB2	LFB	11/16/12 11:36	WI120716-1	30		32.2	mg/L	107.3	90	110			
L97746-02AS	AS	11/16/12 11:36	WI120716-1	30	16	45.5	mg/L	98.3	90	110			
L97746-03DUP	DUP	11/16/12 11:36			10	10.3	mg/L				3	20	

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ACZ Project ID: ***L97753***

Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333858													
WG333858LCSW1	LCSW	11/09/12 15:48	PCN40827	1408.8		1418.1	umhos/cm	100.7	90	110			
WG333858LCSW4	LCSW	11/09/12 19:39	PCN40827	1408.8		1364.8	umhos/cm	96.9	90	110			
WG333858LCSW7	LCSW	11/09/12 22:56	PCN40827	1408.8		1348.4	umhos/cm	95.7	90	110			
L97753-03DUP	DUP	11/10/12 0:45			3510	3560	umhos/cm				1.4	20	
WG333858LCSW10	LCSW	11/10/12 2:21	PCN40827	1408.8		1304.2	umhos/cm	92.6	90	110			
WG333858LCSW13	LCSW	11/10/12 4:38	PCN40827	1408.8		1302.2	umhos/cm	92.4	90	110			

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	100		100.09	mg/L	100.1	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.6	0.6			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	50.00131		51.12	mg/L	102.2	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	50.00131	26.8	79.15	mg/L	104.7	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	50.00131	26.8	79.04	mg/L	104.5	85	115	0.14	20	

Molybdenum, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333881													
WG333881ICV	ICV	11/10/12 2:07	MS121001-5	.02004		.01969	mg/L	98.3	90	110			
WG333881ICB	ICB	11/10/12 2:10				U	mg/L		-0.0015	0.0015			
WG333881LFB	LFB	11/10/12 2:13	MS121009-6	.05		.04945	mg/L	98.9	85	115			
L97749-02AS	AS	11/10/12 3:02	MS121009-6	.05	.0239	.0758	mg/L	103.8	70	130			
L97749-02ASD	ASD	11/10/12 3:05	MS121009-6	.05	.0239	.07192	mg/L	96	70	130	5.25	20	
WG333979													
WG333979ICV	ICV	11/13/12 18:09	MS121001-5	.02004		.02038	mg/L	101.7	90	110			
WG333979ICB	ICB	11/13/12 18:12				U	mg/L		-0.0015	0.0015			
WG333979LFB	LFB	11/13/12 18:15	MS121009-6	.05		.04694	mg/L	93.9	85	115			
L97776-01AS	AS	11/13/12 18:30	MS121009-6	.05	U	.04918	mg/L	98.4	70	130			
L97776-01ASD	ASD	11/13/12 18:33	MS121009-6	.05	U	.04954	mg/L	99.1	70	130	0.73	20	

pH (lab) SM4500H+ B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333858													
WG333858LCSW3	LCSW	11/09/12 16:03	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW6	LCSW	11/09/12 19:54	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW9	LCSW	11/09/12 23:11	PCN39825	6		6.04	units	100.7	98	102			
L97753-03DUP	DUP	11/10/12 0:45			8.8	8.78	units				0.2	20	
WG333858LCSW12	LCSW	11/10/12 2:37	PCN39825	6		6.04	units	100.7	98	102			
WG333858LCSW15	LCSW	11/10/12 4:53	PCN39825	6		6.03	units	100.5	98	102			

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ACZ Project ID: ***L97753***

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	20		19.89	mg/L	99.5	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.9	0.9			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	99.90868		100.73	mg/L	100.8	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	99.90868	2.3	103.93	mg/L	101.7	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	99.90868	2.3	104.7	mg/L	102.5	85	115	0.74	20	

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333766													
WG333766PBW	PBW	11/08/12 15:21				U	mg/L		-20	20			
WG333766LCSW	LCSW	11/08/12 15:22	PCN41154	260		260	mg/L	100	80	120			
L97753-03DUP	DUP	11/08/12 16:00			2580	2584	mg/L				0.2	20	

Selenium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333881													
WG333881ICV	ICV	11/10/12 2:07	MS121001-5	.05		.05099	mg/L	102	90	110			
WG333881ICB	ICB	11/10/12 2:10				U	mg/L		-0.0003	0.0003			
WG333881LFB	LFB	11/10/12 2:13	MS121009-6	.05005		.04816	mg/L	96.2	85	115			
L97749-02AS	AS	11/10/12 3:02	MS121009-6	.05005	.0001	.06338	mg/L	126.4	70	130			
L97749-02ASD	ASD	11/10/12 3:05	MS121009-6	.05005	.0001	.06057	mg/L	120.8	70	130	4.53	20	

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334092													
WG334092ICV	ICV	11/14/12 11:14	II120914-1	100		100.26	mg/L	100.3	95	105			
WG334092ICB	ICB	11/14/12 11:18				U	mg/L		-0.9	0.9			
WG334092LFB	LFB	11/14/12 11:30	II121029-3	100.0416		100.08	mg/L	100	85	115			
L97746-04AS	AS	11/14/12 12:20	II121029-3	100.0416	23.3	122.42	mg/L	99.1	85	115			
L97746-04ASD	ASD	11/14/12 12:23	II121029-3	100.0416	23.3	123.2	mg/L	99.9	85	115	0.64	20	

Sulfate D516-02 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG334038													
WG334038ICB	ICB	11/13/12 11:20				U	mg/L		-3	3			
WG334038ICV	ICV	11/13/12 11:20	WI121109-4	20		20.3	mg/L	101.5	90	110			
WG334038LFB	LFB	11/13/12 16:10	WI121025-3	10		10.3	mg/L	103	90	110			
L97723-03DUP	DUP	11/13/12 16:22			750	755	mg/L				0.7	20	
L97733-01AS	AS	11/13/12 16:45	WI121025-3	10	U	4.8	mg/L	48	90	110			M2

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ACZ Project ID: ***L97753***

Uranium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333881													
WG333881ICV	ICV	11/10/12 2:07	MS121001-5	.05		.05253	mg/L	105.1	90	110			
WG333881ICB	ICB	11/10/12 2:10				U	mg/L		-0.0003	0.0003			
WG333881LFB	LFB	11/10/12 2:13	MS121009-6	.05		.05051	mg/L	101	85	115			
L97749-02AS	AS	11/10/12 3:02	MS121009-6	.05	.0015	.05827	mg/L	113.5	70	130			
L97749-02ASD	ASD	11/10/12 3:05	MS121009-6	.05	.0015	.05502	mg/L	107	70	130	5.74	20	
WG333979													
WG333979ICV	ICV	11/13/12 18:09	MS121001-5	.05		.05355	mg/L	107.1	90	110			
WG333979ICB	ICB	11/13/12 18:12				U	mg/L		-0.0003	0.0003			
WG333979LFB	LFB	11/13/12 18:15	MS121009-6	.05		.04795	mg/L	95.9	85	115			
L97776-01AS	AS	11/13/12 18:30	MS121009-6	.05	U	.05047	mg/L	100.9	70	130			
L97776-01ASD	ASD	11/13/12 18:33	MS121009-6	.05	U	.05128	mg/L	102.6	70	130	1.59	20	

ACZ Laboratories, Inc.
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Inorganic Extended Qualifier Report

Montgomery and Associates

ACZ Project ID: ***L97753***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97753-01	WG334038	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97753-02	WG334038	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L97753-03	WG334038	Sulfate	D516-02 - Turbidimetric	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.

No certification qualifiers associated with this analysis

ACZ Laboratories, Inc. L97753

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Tim Leo	Address: 1550 E. Prince Rd
Company: Montgomery & Assoc.	Tucson AZ
E-mail: tleo@elmontgomery.com	Telephone: 520-881-4912
Name: Leilani Bew	E-mail:
Company: lbew@elmontgomery.com	Telephone:
Name: SAA	Address:
Company:	
E-mail:	Telephone:

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes [ ] No [X]

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Brenda Alger Sampler's site Information: State: UT Zip code: Time Zone:

Quote #: LISBON-GW

Project/PO #: 1350.13

Reporting state for compliance testing: UTAH

Check box if samples include NRC licensed material? [ ]

				# of Containers	LISBON-GW
~~6255~~ 6291	06NOV2012 0745	W	3	X	
~~6256~~ 6292	06NOV2012 0845	W	3	X	
~~6256~~ 6293	06NOV2012 1015	W	3	X	

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

	11/7/12 1200		11:8:12 9:40

L97753 Chain of Custody

FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

Laboratory Report for

Montgomery & Associates

Rio Algom Lisbon 1350.13

November 5, 2012

Daniel B. Stephens & Associates, Inc.

5840 Osuna Road NE • Albuquerque, New Mexico 87109

November 5, 2012

Tim Leo
Montgomery & Associates
1550 East Prince Rd.
Tucson, AZ 85719
(520) 881-4912

Re: DBS&A Laboratory Report for Montgomery & Associates Rio Algom Lisbon 1350.13

Dear Mr. Leo:

Enclosed is the final report for the Montgomery & Associates Rio Algom Lisbon 1350.13 samples. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Montgomery & Associates and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
SOIL TESTING & RESEARCH LABORATORY

Celina Sessa
Assistant Laboratory Manager
Enclosure

Daniel B. Stephens & Associates, Inc.
Soil Testing & Research Laboratory
5840 Osuna Rd. NE
Albuquerque, NM 87109
505-889-7752
FAX 505-889-0258

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C			
102DB-130-131 (Vertical)	X	X				X																
102DB-130-131 (Horizontal)	X	X				X																
102DB-145-146 (Vertical)	X	X				X																
102DB-145-146 (Horizontal)	X	X				X																
102DB-156-156.9 (Vertical)	X	X				X																
102DB-156-156.9 (Horizontal)	X	X				X																

[1] G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method

[2] CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall

[3] HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity

[4] DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer

[5] F = Fine (<4.75mm), C = Coarse (>4.75mm)

Notes

Sample Receipt:

Three rock core samples arrived on October 12, 2012.

Sample Preparation and Testing:

Two sub-samples were obtained for each sample for testing. A chop saw was used to trim each sample in both the vertical and horizontal directions for initial properties and saturated hydraulic conductivity testing.

Total porosity calculations in this report are based on the use of an assumed specific gravity value of 2.65.

Summary of Sample Preparation/Volume Changes

Sample Number	Initial Sample Data[1]		Volume Change Post Saturation[2]		
	Moisture Content (%, g/g)	Dry Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	% Volume Change (%)	% of Initial Density (%)
102DB-130-131 (Vertical)	0.5	2.04	2.02	+0.8%	99.2%
102DB-130-131 (Horizontal)	0.8	2.12	2.12	+0.3%	99.7%
102DB-145-146 (Vertical)	4.1	2.38	2.30	+3.7%	96.4%
102DB-145-146 (Horizontal)	3.7	2.40	2.34	+2.5%	97.6%
102DB-156-156.9 (Vertical)	3.4	2.39	2.38	+0.1%	99.9%
102DB-156-156.9 (Horizontal)	3.5	2.40	2.40	---	100.0%

[1]Initial Sample Data: The 'as received' dry bulk density and moisture content.

[2]Volume Change Post Saturation: Volume change measurements were obtained after saturated hydraulic conductivity testing.

Notes:
"+" indicates sample swelling, "-" indicates sample settling, and "---" indicates no volume change occurred.

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Flexible Wall	Method of Analysis: Falling Head Flexible Wall
102DB-130-131 (Vertical)	1.23E-04	NA		X
102DB-130-131 (Horizontal)	2.18E-04	NA		X
102DB-145-146 (Vertical)	2.15E-05	NA		X
102DB-145-146 (Horizontal)	3.09E-05	NA		X
102DB-156-156.9 (Vertical)	7.93E-09	NA		X
102DB-156-156.9 (Horizontal)	3.60E-09	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Flexible Wall	Method of Analysis: Falling Head Flexible Wall
102DB-130-131 (Vertical)	1.23E-04	NA		X
102DB-130-131 (Horizontal)	2.18E-04	NA		X
102DB-145-146 (Vertical)	2.15E-05	NA		X
102DB-145-146 (Horizontal)	3.09E-05	NA		X
102DB-156-156.9 (Vertical)	7.93E-09	NA		X
102DB-156-156.9 (Horizontal)	3.60E-09	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-130-131 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	343.35
Diameter (cm):	7.376
Length (cm):	3.926
Area (cm^2):	42.73
Volume (cm^3):	167.76
Dry Density (g/cm^3):	2.04
Dry Density (pcf):	127.16
Water Content (%, g/g):	0.5
Water Content (%, vol):	1.0
Void Ratio (e):	0.30
Porosity (%, vol):	23.1
Saturation (%):	4.2

Post Permeation Sample Properties	
Saturated Mass (g):	376.63
Dry Mass (g):	341.72
Diameter (cm):	7.376
Length (cm):	3.957
*Deformation (%)**:*	0.78
Area (cm^2):	42.73
Volume (cm^3):	169.08
Dry Density (g/cm^3):	2.02
Dry Density (pcf):	126.17
Water Content (%, g/g):	10.2
Water Content (%, vol):	20.6
Void Ratio(e):	0.31
Porosity (%, vol):	23.7
Saturation (%):*	87.0

Test and Sample Conditions

Permeant liquid used: Tap Water
Sample Preparation: ☑ In situ sample, extruded ☐ Remolded Sample
Number of Lifts: NA
Split: NA
Percent Coarse Material (%): NA
Particle Density(g/cm^3): 2.65 ☑ Assumed ☐ Measured
Cell pressure (PSI): 82.0
Influent pressure (PSI): 80.0
Effluent pressure (PSI): 80.0
Panel Used: ☐ D ☐ E ☑ F
Reading: ☐ Annulus ☑ Pipette

		Date/Time
B-Value (% saturation) prior to test*:	0.95	10/25/12 1415
B-Value (% saturation) post to test:	0.98	10/26/12 1310

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

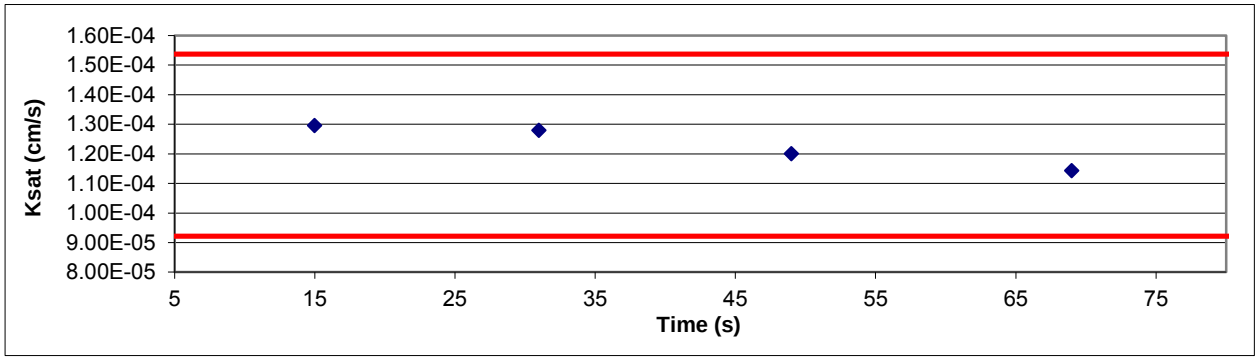
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-130-131 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
26-Oct-12	12:52:51	21.5	13.40	21.60	2.39	0.17	15	1.00	5%	1.34E-04	1.30E-04
26-Oct-12	12:53:06	21.5	13.60	21.40	2.28						
Test # 2:											
26-Oct-12	12:53:06	21.5	13.60	21.40	2.28	0.17	16	1.00	5%	1.32E-04	1.28E-04
26-Oct-12	12:53:22	21.5	13.80	21.20	2.16						
Test # 3:											
26-Oct-12	12:53:22	21.5	13.80	21.20	2.16	0.17	18	1.00	5%	1.24E-04	1.20E-04
26-Oct-12	12:53:40	21.5	14.00	21.00	2.04						
Test # 4:											
26-Oct-12	12:53:40	21.5	14.00	21.00	2.04	0.17	20	1.00	6%	1.18E-04	1.14E-04
26-Oct-12	12:54:00	21.5	14.20	20.80	1.93						

***Average Ksat* (cm/sec):** **1.23E-04**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 9.22E-05

Ksat (+25%) (cm/s): 1.54E-04

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-130-131 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	282.4
Diameter (cm):	5.287
Length (cm):	6.006
Area (cm^2):	21.95
Volume (cm^3):	131.85
Dry Density (g/cm^3):	2.12
Dry Density (pcf):	132.58
Water Content (%, g/g):	0.8
Water Content (%, vol):	1.8
Void Ratio (e):	0.25
Porosity (%, vol):	19.9
Saturation (%):	9.1

Post Permeation Sample Properties	
Saturated Mass (g):	305.21
Dry Mass (g):	280.02
Diameter (cm):	5.287
Length (cm):	6.025
*Deformation (%)**:*	0.32
Area (cm^2):	21.95
Volume (cm^3):	132.27
Dry Density (g/cm^3):	2.12
Dry Density (pcf):	132.16
Water Content (%, g/g):	9.0
Water Content (%, vol):	19.0
Void Ratio(e):	0.25
Porosity (%, vol):	20.1
Saturation (%):*	94.7

Test and Sample Conditions		
Permeant liquid used:	Tap Water	
Sample Preparation:	☑ In situ sample, extruded	
	☐ Remolded Sample	
Number of Lifts:	NA	
Split:	NA	
Percent Coarse Material (%):	NA	
Particle Density(g/cm^3):	2.65 ☑ Assumed ☐ Measured	
Cell pressure (PSI):	82.0	
Influent pressure (PSI):	80.0	
Effluent pressure (PSI):	80.0	
Panel Used:	☐ D ☑ E ☐ F	
Reading:	☐ Annulus ☑ Pipette	
		Date/Time
B-Value (% saturation) prior to test*:	0.98	10/25/12 1411
B-Value (% saturation) post to test:	0.98	10/26/12 1306

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

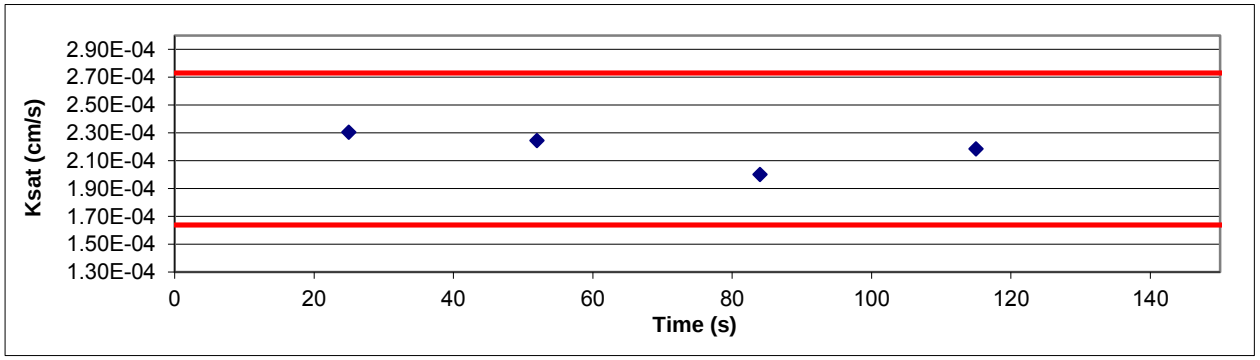
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-130-131 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
26-Oct-12	12:49:39	21.5	13.40	21.60	1.57	0.17	25	1.00	5%	2.39E-04	2.30E-04
26-Oct-12	12:50:04	21.5	13.60	21.40	1.49						
Test # 2:											
26-Oct-12	12:50:04	21.5	13.60	21.40	1.49	0.17	27	1.00	5%	2.32E-04	2.25E-04
26-Oct-12	12:50:31	21.5	13.80	21.20	1.42						
Test # 3:											
26-Oct-12	12:50:31	21.5	13.80	21.20	1.42	0.17	32	1.00	5%	2.07E-04	2.00E-04
26-Oct-12	12:51:03	21.5	14.00	21.00	1.34						
Test # 4:											
26-Oct-12	12:51:03	21.5	14.00	21.00	1.34	0.17	31	1.00	6%	2.26E-04	2.19E-04
26-Oct-12	12:51:34	21.5	14.20	20.80	1.26						

***Average Ksat* (cm/sec):** **2.18E-04**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 1.64E-04

Ksat (+25%) (cm/s): 2.73E-04

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-145-146 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	287.9
Diameter (cm):	7.507
Length (cm):	2.622
Area (cm^2):	44.26
Volume (cm^3):	116.05
Dry Density (g/cm^3):	2.38
Dry Density (pcf):	148.72
Water Content (%, g/g):	4.1
Water Content (%, vol):	9.9
Void Ratio (e):	0.11
Porosity (%, vol):	10.1
Saturation (%):	97.5

Post Permeation Sample Properties	
Saturated Mass (g):	293.3
Dry Mass (g):	276.46
Diameter (cm):	7.507
Length (cm):	2.720
*Deformation (%)**:*	3.60
Area (cm^2):	44.26
Volume (cm^3):	120.39
Dry Density (g/cm^3):	2.30
Dry Density (pcf):	143.36
Water Content (%, g/g):	6.1
Water Content (%, vol):	14.0
Void Ratio(e):	0.15
Porosity (%, vol):	13.3
Saturation (%):*	104.8

Test and Sample Conditions

Permeant liquid used: Tap Water
Sample Preparation: ☑ In situ sample, extruded ☐ Remolded Sample
Number of Lifts: NA
Split: NA
Percent Coarse Material (%): NA
Particle Density(g/cm^3): 2.65 ☑ Assumed ☐ Measured
Cell pressure (PSI): 82.0
Influent pressure (PSI): 80.0
Effluent pressure (PSI): 80.0
Panel Used: ☑ D ☐ E ☐ F
Reading: ☐ Annulus ☑ Pipette

		Date/Time
B-Value (% saturation) prior to test*:	0.98	10/25/12 1408
B-Value (% saturation) post to test:	1.00	10/26/12 1302

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

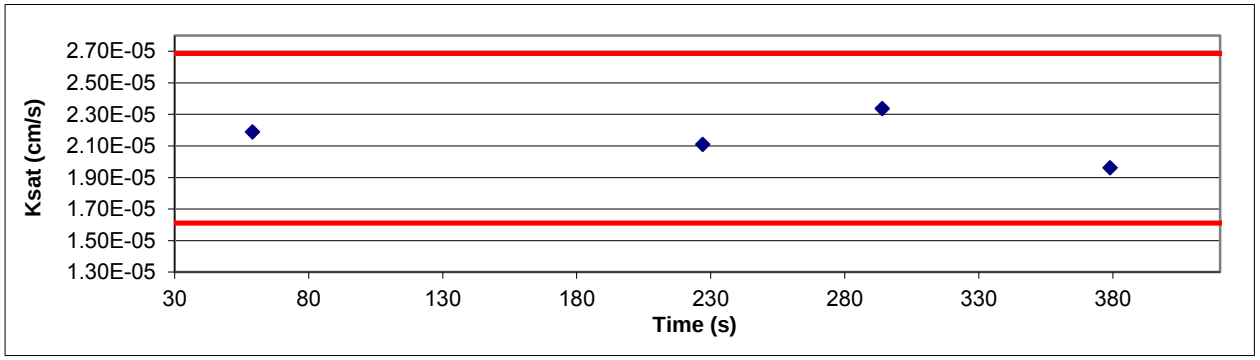
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-145-146 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
26-Oct-12	12:41:39	21.4	13.40	21.60	3.48	0.17	59	1.00	5%	2.26E-05	2.19E-05
26-Oct-12	12:42:38	21.4	13.60	21.40	3.31						
Test # 2:											
26-Oct-12	12:42:38	21.4	13.60	21.40	3.31	0.43	168	1.00	13%	2.18E-05	2.11E-05
26-Oct-12	12:45:26	21.4	14.10	20.90	2.89						
Test # 3:											
26-Oct-12	12:45:26	21.4	14.10	20.90	2.89	0.17	67	1.00	6%	2.42E-05	2.34E-05
26-Oct-12	12:46:33	21.4	14.30	20.70	2.72						
Test # 4:											
26-Oct-12	12:46:33	21.4	14.30	20.70	2.72	0.17	85	1.00	6%	2.03E-05	1.96E-05
26-Oct-12	12:47:58	21.4	14.50	20.50	2.55						

***Average Ksat* (cm/sec):** **2.15E-05**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 1.61E-05

Ksat (+25%) (cm/s): 2.69E-05

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-145-146 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	145.25
Diameter (cm):	5.164
Length (cm):	2.788
Area (cm^2):	20.94
Volume (cm^3):	58.39
Dry Density (g/cm^3):	2.40
Dry Density (pcf):	149.72
Water Content (%, g/g):	3.7
Water Content (%, vol):	8.9
Void Ratio (e):	0.10
Porosity (%, vol):	9.5
Saturation (%):	93.9

Post Permeation Sample Properties	
Saturated Mass (g):	147.27
Dry Mass (g):	140.04
Diameter (cm):	5.164
Length (cm):	2.857
*Deformation (%)**:*	2.42
Area (cm^2):	20.94
Volume (cm^3):	59.84
Dry Density (g/cm^3):	2.34
Dry Density (pcf):	146.10
Water Content (%, g/g):	5.2
Water Content (%, vol):	12.1
Void Ratio(e):	0.13
Porosity (%, vol):	11.7
Saturation (%):*	103.4

Test and Sample Conditions

Permeant liquid used: Tap Water
Sample Preparation: ☑ In situ sample, extruded ☐ Remolded Sample
Number of Lifts: NA
Split: NA
Percent Coarse Material (%): NA
Particle Density(g/cm^3): 2.65 ☑ Assumed ☐ Measured
Cell pressure (PSI): 82.0
Influent pressure (PSI): 80.0
Effluent pressure (PSI): 80.0
Panel Used: ☐ A ☐ B ☑ C
Reading: ☐ Annulus ☑ Pipette

		Date/Time
B-Value (% saturation) prior to test*:	1.00	10/25/12 1407
B-Value (% saturation) post to test:	1.00	10/26/12 1300

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated or skewed during depressurizing and sample removal.
**Percent Deformation: based on initial sample length and post permeation sample length.

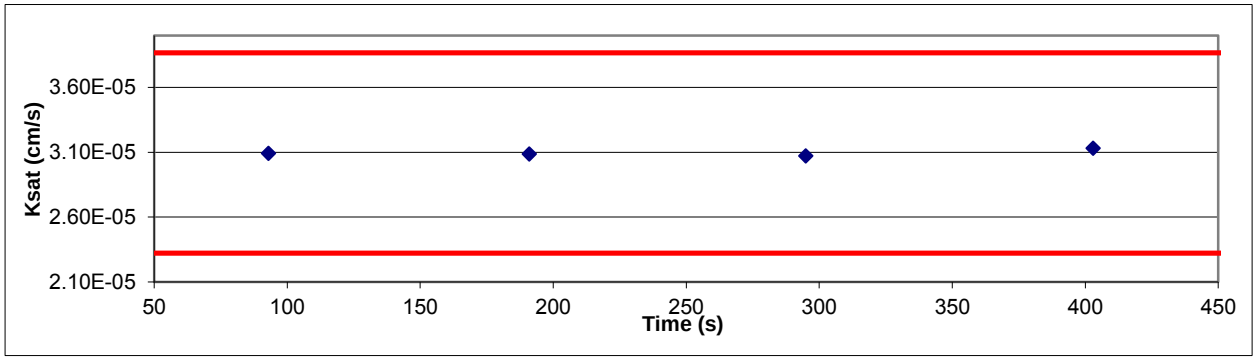
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-145-146 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
26-Oct-12	11:01:42	21.2	13.40	21.60	3.31	0.17	93	1.00	5%	3.18E-05	3.09E-05
26-Oct-12	11:03:15	21.2	13.60	21.40	3.15						
Test # 2:											
26-Oct-12	11:03:15	21.2	13.60	21.40	3.15	0.17	98	1.00	5%	3.17E-05	3.09E-05
26-Oct-12	11:04:53	21.2	13.80	21.20	2.99						
Test # 3:											
26-Oct-12	11:04:53	21.2	13.80	21.20	2.99	0.17	104	1.00	5%	3.16E-05	3.07E-05
26-Oct-12	11:06:37	21.2	14.00	21.00	2.83						
Test # 4:											
26-Oct-12	11:06:37	21.2	14.00	21.00	2.83	0.17	108	1.00	6%	3.22E-05	3.13E-05
26-Oct-12	11:08:25	21.2	14.20	20.80	2.67						

***Average Ksat* (cm/sec):** **3.09E-05**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 2.32E-05

Ksat (+25%) (cm/s): 3.87E-05

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-156-156.9 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	308.43
Diameter (cm):	7.487
Length (cm):	2.840
Area (cm^2):	44.03
Volume (cm^3):	125.03
Dry Density (g/cm^3):	2.39
Dry Density (pcf):	148.91
Water Content (%, g/g):	3.4
Water Content (%, vol):	8.1
Void Ratio (e):	0.11
Porosity (%, vol):	10.0
Saturation (%):	81.6

Post Permeation Sample Properties	
Saturated Mass (g):	310.95
Dry Mass (g):	298.24
Diameter (cm):	7.487
Length (cm):	2.842
*Deformation (%)**:*	0.07
Area (cm^2):	44.03
Volume (cm^3):	125.12
Dry Density (g/cm^3):	2.38
Dry Density (pcf):	148.80
Water Content (%, g/g):	4.3
Water Content (%, vol):	10.2
Void Ratio(e):	0.11
Porosity (%, vol):	10.1
Saturation (%):*	101.1

Test and Sample Conditions

Permeant liquid used: Tap Water
Sample Preparation: ☑ In situ sample, extruded ☐ Remolded Sample
Number of Lifts: NA
Split: NA
Percent Coarse Material (%): NA
Particle Density(g/cm^3): 2.65 ☑ Assumed ☐ Measured
Cell pressure (PSI): 84.0
Influent pressure (PSI): 83.0
Effluent pressure (PSI): 80.0
Panel Used: ☐ A ☑ B ☐ C
Reading: ☐ Annulus ☑ Pipette

		Date/Time
B-Value (% saturation) prior to test*:	0.98	10/29/12 828
B-Value (% saturation) post to test:	1.00	10/30/12 1325

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated or skewed during depressurizing and sample removal.
**Percent Deformation: based on initial sample length and post permeation sample length.

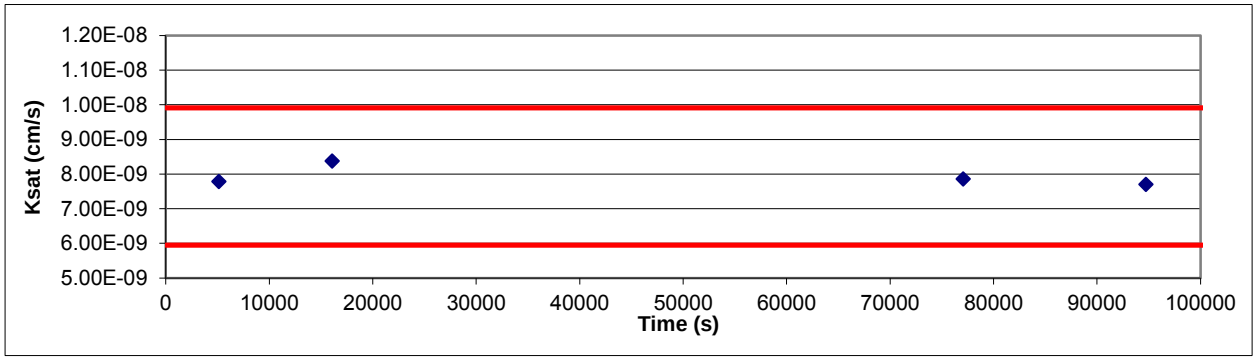
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-156-156.9 (Vertical)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
29-Oct-12	11:02:02	21.3	3.35	22.65	82.09	0.13	5148	1.00	0%	8.07E-09	7.78E-09
29-Oct-12	12:27:50	21.7	3.50	22.50	81.97						
Test # 2:											
29-Oct-12	12:27:50	21.7	3.50	22.50	81.97	0.30	10939	1.00	0%	8.88E-09	8.38E-09
29-Oct-12	15:30:09	23.2	3.85	22.15	81.69						
Test # 3:											
29-Oct-12	15:30:09	23.2	3.85	22.15	81.69	1.56	60981	0.95	2%	8.28E-09	7.86E-09
30-Oct-12	08:26:30	21.2	5.70	20.40	80.22						
Test # 4:											
30-Oct-12	08:26:30	21.2	5.70	20.40	80.22	0.43	17670	1.00	1%	8.03E-09	7.70E-09
30-Oct-12	13:21:00	22.3	6.20	19.90	79.82						

***Average Ksat* (cm/sec):** **7.93E-09**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 5.95E-09

Ksat (+25%) (cm/s): 9.91E-09

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-156-156.9 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Remolded or Initial Sample Properties	
Initial Mass (g):	145.26
Diameter (cm):	5.217
Length (cm):	2.736
Area (cm^2):	21.38
Volume (cm^3):	58.49
Dry Density (g/cm^3):	2.40
Dry Density (pcf):	149.80
Water Content (%, g/g):	3.5
Water Content (%, vol):	8.4
Void Ratio (e):	0.10
Porosity (%, vol):	9.5
Saturation (%):	89.0

Post Permeation Sample Properties	
Saturated Mass (g):	146.38
Dry Mass (g):	140.34
Diameter (cm):	5.217
Length (cm):	2.736
*Deformation (%)**:*	0.00
Area (cm^2):	21.38
Volume (cm^3):	58.49
Dry Density (g/cm^3):	2.40
Dry Density (pcf):	149.80
Water Content (%, g/g):	4.3
Water Content (%, vol):	10.3
Void Ratio(e):	0.10
Porosity (%, vol):	9.5
Saturation (%):*	109.3

Test and Sample Conditions

Permeant liquid used: Tap Water
Sample Preparation: ☑ In situ sample, extruded ☐ Remolded Sample
Number of Lifts: NA
Split: NA
Percent Coarse Material (%): NA
Particle Density(g/cm^3): 2.65 ☑ Assumed ☐ Measured
Cell pressure (PSI): 84.0
Influent pressure (PSI): 83.0
Effluent pressure (PSI): 80.0
Panel Used: ☑ A ☐ B ☐ C
Reading: ☐ Annulus ☑ Pipette

		Date/Time
B-Value (% saturation) prior to test*:	1.00	10/29/12 825
B-Value (% saturation) post to test:	1.00	10/30/12 1558

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated or skewed during depressurizing and sample removal.
**Percent Deformation: based on initial sample length and post permeation sample length.

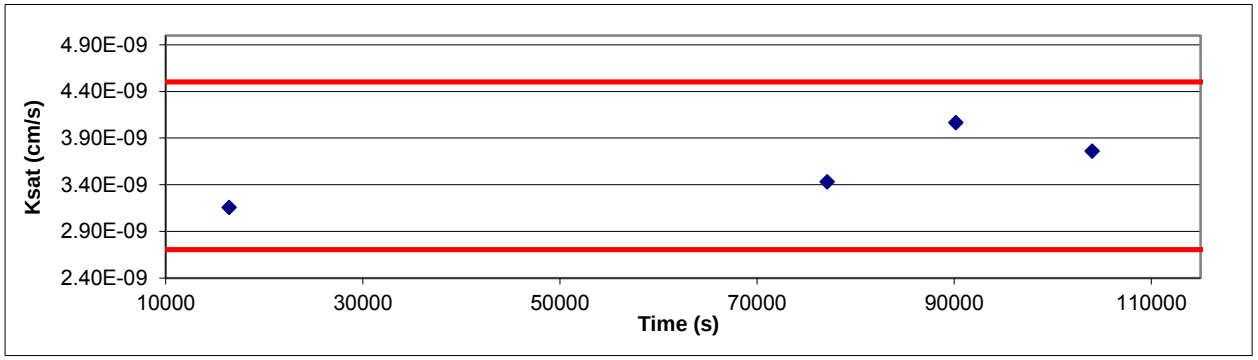
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: Montgomery & Associates
Job Number: LB12.0210.00
Sample Number: 102DB-156-156.9 (Horizontal)
Project Name: Rio Algom Lisbon 1350.13
Depth: NA

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
29-Oct-12	11:02:34	21.3	3.10	22.90	85.48	0.09	16436	1.00	0%	3.33E-09	3.16E-09
29-Oct-12	15:36:30	23.2	3.20	22.80	85.40						
Test # 2:											
29-Oct-12	15:36:30	23.2	3.20	22.80	85.40	0.35	60705	1.00	0%	3.62E-09	3.43E-09
30-Oct-12	08:28:15	21.2	3.60	22.40	85.06						
Test # 3:											
30-Oct-12	08:28:15	21.2	3.60	22.40	85.06	0.09	13025	1.00	0%	4.22E-09	4.07E-09
30-Oct-12	12:05:20	22.0	3.70	22.30	84.98						
Test # 4:											
30-Oct-12	12:05:20	22.0	3.70	22.30	84.98	0.09	13840	1.00	0%	3.98E-09	3.76E-09
30-Oct-12	15:56:00	22.8	3.80	22.20	84.89						

***Average Ksat* (cm/sec):** **3.60E-09**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 2.70E-09

Ksat (+25%) (cm/s): 4.50E-09

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D7263
Moisture Content:	ASTM D7263
Calculated Porosity:	ASTM D7263
Saturated Hydraulic Conductivity:	
Falling Head Rising Tail: (Flexible Wall)	ASTM D5084

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 08, 2012

Report to:
Tim Leo
Montgomery and Associates
1550 E. Prince Rd.
Tuscon, AZ 85719

Bill to:
Accounts Payable
Montgomery and Associates
1550 E. Prince Rd.
Tucson, AZ 85719

cc: Leilani Bew

Project ID: 1350.13
ACZ Project ID: L97378

Tim Leo:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 12, 2012. This project has been assigned to ACZ's project number, L97378. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L97378. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 08, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 102-DB-123-123.5

Hard Rock from MW-102DB

ACZ Sample ID: ***L97378-01***
Date Sampled: *10/10/12 14:50*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 10:12	jjc
Total Hot Plate Digestion	M3010A ICP-MS			*				10/31/12 10:14	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0213			mg/L	0.0002	0.001	11/07/12 14:16	msh
Barium (1312)	M6010B ICP	0.031		*	mg/L	0.003	0.02	10/29/12 12:27	jjc
Cadmium (1312)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	11/07/12 14:16	msh
Chromium (1312)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0005	0.002	11/07/12 14:16	msh
Lead (1312)	M6020 ICP-MS	0.0224		*	mg/L	0.0001	0.0005	11/07/12 14:16	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 15:56	mfm
Molybdenum (1312)	M6010B ICP	0.04	B	*	mg/L	0.01	0.05	10/29/12 12:27	jjc
Selenium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/07/12 14:16	msh
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 12:27	jjc
Uranium (1312)	M6020 ICP-MS	0.0005		*	mg/L	0.0001	0.0005	11/07/12 14:16	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312			*				10/25/12 3:06	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-74-74.8

Hard rock from mw-103

ACZ Sample ID: ***L97378-02***
Date Sampled: *10/10/12 15:00*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 11:30	jjc
Total Hot Plate Digestion	M3010A ICP-MS							10/31/12 10:41	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0052			mg/L	0.0002	0.001	11/07/12 14:23	msh
Barium (1312)	M6010B ICP		U	*	mg/L	0.003	0.02	10/29/12 12:36	jjc
Cadmium (1312)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	11/07/12 14:23	msh
Chromium (1312)	M6020 ICP-MS	0.0014	B	*	mg/L	0.0005	0.002	11/07/12 14:23	msh
Lead (1312)	M6020 ICP-MS	0.0009		*	mg/L	0.0001	0.0005	11/07/12 14:23	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:02	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 12:36	jjc
Selenium (1312)	M6020 ICP-MS	0.0003	B	*	mg/L	0.0001	0.0003	11/07/12 14:23	msh
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 12:36	jjc
Uranium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:23	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312							10/25/12 7:00	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-69.2-70

Hard rock from MW-103

ACZ Sample ID: ***L97378-03***
Date Sampled: *10/10/12 15:05*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 12:22	jjc
Total Hot Plate Digestion	M3010A ICP-MS							10/31/12 11:36	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.1158			mg/L	0.0002	0.001	11/07/12 14:29	msh
Barium (1312)	M6010B ICP		U	*	mg/L	0.003	0.02	10/29/12 12:42	jjc
Cadmium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:29	msh
Chromium (1312)	M6020 ICP-MS	0.0032		*	mg/L	0.0005	0.002	11/07/12 14:29	msh
Lead (1312)	M6020 ICP-MS	0.0210		*	mg/L	0.0001	0.0005	11/07/12 14:29	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:06	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 12:42	jjc
Selenium (1312)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0003	11/07/12 14:29	msh
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 12:42	jjc
Uranium (1312)	M6020 ICP-MS	0.0039		*	mg/L	0.0001	0.0005	11/07/12 14:29	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312							10/25/12 9:36	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-56-56.8

Hard rock from MW-103

ACZ Sample ID: ***L97378-04***
Date Sampled: *10/10/12 15:15*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 12:48	jjc
Total Hot Plate Digestion	M3010A ICP-MS							10/31/12 12:03	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0515			mg/L	0.0002	0.001	11/07/12 14:33	msh
Barium (1312)	M6010B ICP	0.097		*	mg/L	0.003	0.02	10/29/12 12:46	jjc
Cadmium (1312)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	11/07/12 14:33	msh
Chromium (1312)	M6020 ICP-MS	0.0016	B	*	mg/L	0.0005	0.002	11/07/12 14:33	msh
Lead (1312)	M6020 ICP-MS	0.0195		*	mg/L	0.0001	0.0005	11/07/12 14:33	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:09	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 12:46	jjc
Selenium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/07/12 14:33	msh
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 12:46	jjc
Uranium (1312)	M6020 ICP-MS	0.0003	B	*	mg/L	0.0001	0.0005	11/07/12 14:33	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312							10/25/12 10:54	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-44-44.8

Hard rock from MW-103

ACZ Sample ID: ***L97378-05***
Date Sampled: *10/10/12 15:20*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 13:14	jjc
Total Hot Plate Digestion	M3010A ICP-MS							10/31/12 12:30	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0088			mg/L	0.0002	0.001	11/07/12 14:36	msh
Barium (1312)	M6010B ICP	0.119		*	mg/L	0.003	0.02	10/29/12 12:58	jjc
Cadmium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:36	msh
Chromium (1312)	M6020 ICP-MS	0.0015	B	*	mg/L	0.0005	0.002	11/07/12 14:36	msh
Lead (1312)	M6020 ICP-MS	0.0006		*	mg/L	0.0001	0.0005	11/07/12 14:36	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:11	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 12:58	jjc
Selenium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/07/12 14:36	msh
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 12:58	jjc
Uranium (1312)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	11/07/12 14:36	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312							10/25/12 12:12	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-35.3-36

Hard Rock from MW-103

ACZ Sample ID: ***L97378-06***
Date Sampled: *10/10/12 15:25*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 13:40	jjc
Total Hot Plate Digestion	M3010A ICP-MS			*				10/31/12 12:58	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0090			mg/L	0.0002	0.001	11/07/12 14:46	msh
Barium (1312)	M6010B ICP	0.008	B	*	mg/L	0.003	0.02	10/29/12 13:01	jjc
Cadmium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:46	msh
Chromium (1312)	M6020 ICP-MS	0.0007	B	*	mg/L	0.0005	0.002	11/07/12 14:46	msh
Lead (1312)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	11/07/12 14:46	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:17	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 13:01	jjc
Selenium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/07/12 19:21	pmc
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 13:01	jjc
Uranium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:46	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312			*				10/25/12 13:30	nrc

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Montgomery and Associates
Project ID: 1350.13
Sample ID: 103-22-22.8

Hard rock from mw-103

ACZ Sample ID: ***L97378-07***
Date Sampled: *10/10/12 15:30*
Date Received: *10/12/12*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							10/27/12 14:06	jjc
Total Hot Plate Digestion	M3010A ICP-MS			*				10/31/12 13:25	las

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic (1312)	M6020 ICP-MS	0.0065			mg/L	0.0002	0.001	11/07/12 14:50	msh
Barium (1312)	M6010B ICP	0.397		*	mg/L	0.003	0.02	10/29/12 13:04	jjc
Cadmium (1312)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0001	0.0005	11/07/12 14:50	msh
Chromium (1312)	M6020 ICP-MS	0.0006	B	*	mg/L	0.0005	0.002	11/07/12 14:50	msh
Lead (1312)	M6020 ICP-MS	0.0015		*	mg/L	0.0001	0.0005	11/07/12 14:50	msh
Mercury (1312)	M7470A CVAA		U	*	mg/L	0.0002	0.001	11/01/12 16:19	mfm
Molybdenum (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	10/29/12 13:04	jjc
Selenium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/07/12 19:23	pmc
Silver (1312)	M6010B ICP		U	*	mg/L	0.01	0.03	10/29/12 13:04	jjc
Uranium (1312)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/07/12 14:50	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312			*				10/25/12 16:06	nrc

Arizona license number: AZ0102

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

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ACZ Project ID: ***L97378***

Arsenic (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.0525	mg/L	105	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0006	0.0006			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0006	0.0006			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.05005		.05429	mg/L	108.5	80	120			
L97378-02DUP	DUP	11/07/12 14:26			.0052	.00443	mg/L				16	20	
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.05005	.0065	.05621	mg/L	99.3	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.05005	.0065	.05651	mg/L	99.9	75	125	0.53	20	

Barium (1312) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333053													
WG333053ICV	ICV	10/29/12 12:06	II120914-3	2		2.002	mg/L	100.1	90	110			
WG333053ICB	ICB	10/29/12 12:09				U	mg/L		-0.009	0.009			
WG332841PBS	PBS	10/29/12 12:21				U	mg/L		-0.009	0.009			
WG332841LFB1	LFB	10/29/12 12:24	II121001-3	.5		.5089	mg/L	101.8	85	115			
L97378-01MS	MS	10/29/12 12:30	II121001-3	.5	.031	.5341	mg/L	100.6	75	125			
L97378-01MSD	MSD	10/29/12 12:33	II121001-3	.5	.031	.5332	mg/L	100.4	75	125	0.17	20	
L97378-02DUP	DUP	10/29/12 12:39			U	.0052	mg/L				200	20	RA

Cadmium (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.0494	mg/L	98.8	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0003	0.0003			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0003	0.0003			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.0501		.04989	mg/L	99.6	80	120			
L97378-02DUP	DUP	11/07/12 14:26			.0001	.00012	mg/L				18.2	20	RA
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.0501	.0004	.04646	mg/L	91.9	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.0501	.0004	.04725	mg/L	93.5	75	125	1.69	20	

Chromium (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.0502	mg/L	100.4	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0015	0.0015			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0015	0.0015			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.05005		.04897	mg/L	97.8	80	120			
L97378-02DUP	DUP	11/07/12 14:26			.0014	.00185	mg/L				27.7	20	RA
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.05005	.0006	.04924	mg/L	97.2	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.05005	.0006	.04978	mg/L	98.3	75	125	1.09	20	

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ACZ Project ID: ***L97378***

Lead (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.05333	mg/L	106.7	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0003	0.0003			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0003	0.0003			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.05005		.04801	mg/L	95.9	80	120			
L97378-02DUP	DUP	11/07/12 14:26			.0009	.00073	mg/L				20.9	20	RA
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.05005	.0015	.0497	mg/L	96.3	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.05005	.0015	.0507	mg/L	98.3	75	125	1.99	20	

Mercury (1312) M7470A CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333327													
WG333327ICV	ICV	11/01/12 14:50	II121022-2	.005025		.00478	mg/L	95.1	90	110			
WG333327ICB	ICB	11/01/12 14:52				U	mg/L		-0.0006	0.0006			
WG333324													
WG332841PBS	PBS	11/01/12 15:52				U	mg/Kg		-0.0006	0.0006			
WG332841LFB1	LFB	11/01/12 15:54	II121030-3	.002002		.00217	mg/L	108.4	85	115			
L97378-01MS	MS	11/01/12 15:58	II121030-3	.002002	U	.00204	mg/L	101.9	85	115			
L97378-01MSD	MSD	11/01/12 16:00	II121030-3	.002002	U	.00192	mg/L	95.9	85	115	6.06	20	
L97378-02DUP	DUP	11/01/12 16:04			U	U	mg/L				0	20	RA

Molybdenum (1312) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333053													
WG333053ICV	ICV	10/29/12 12:06	II120914-3	2		2.017	mg/L	100.9	90	110			
WG333053ICB	ICB	10/29/12 12:09				U	mg/L		-0.03	0.03			
WG332841PBS	PBS	10/29/12 12:21				U	mg/L		-0.03	0.03			
WG332841LFB1	LFB	10/29/12 12:24	II121001-3	.5		.509	mg/L	101.8	85	115			
L97378-01MS	MS	10/29/12 12:30	II121001-3	.5	.04	.547	mg/L	101.4	75	125			
L97378-01MSD	MSD	10/29/12 12:33	II121001-3	.5	.04	.545	mg/L	101	75	125	0.37	20	
L97378-02DUP	DUP	10/29/12 12:39			U	U	mg/L				0	20	RA

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ACZ Project ID: ***L97378***

Selenium (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.05207	mg/L	104.1	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0003	0.0003			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0003	0.0003			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.05005		.04852	mg/L	96.9	80	120			
L97378-02DUP	DUP	11/07/12 14:26			.0003	.00025	mg/L				18.2	20	RA
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.05005	U	.04661	mg/L	93.1	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.05005	U	.04574	mg/L	91.4	75	125	1.88	20	
WG333699													
WG333699ICV	ICV	11/07/12 18:56	MS121001-5	.05		.05077	mg/L	101.5	90	110			
WG333699ICB	ICB	11/07/12 18:59				U	mg/L		-0.0003	0.0003			
WG332841PBS	PBS	11/07/12 19:10				U	mg/L		-0.0003	0.0003			
WG332841LFB2	LFB	11/07/12 19:13	MS121009-6	.05005		.05611	mg/L	112.1	80	120			
L97378-02DUP	DUP	11/07/12 19:18			.0003	.00027	mg/L				10.5	20	RA
L97378-07MS	MS	11/07/12 19:26	MS121009-6	.05005	U	.04846	mg/L	96.8	75	125			
L97378-07MSD	MSD	11/07/12 19:29	MS121009-6	.05005	U	.04809	mg/L	96.1	75	125	0.77	20	
WG333275LFB2	LFB	11/07/12 19:39	MS121009-6	.05005		.05568	mg/L	111.2	80	120			

Silver (1312) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333053													
WG333053ICV	ICV	10/29/12 12:06	II120914-3	.998		1.02	mg/L	102.2	90	110			
WG333053ICB	ICB	10/29/12 12:09				U	mg/L		-0.03	0.03			
WG332841PBS	PBS	10/29/12 12:21				U	mg/L		-0.03	0.03			
WG332841LFB1	LFB	10/29/12 12:24	II121001-3	.5		.506	mg/L	101.2	85	115			
L97378-01MS	MS	10/29/12 12:30	II121001-3	.5	U	.496	mg/L	99.2	75	125			
L97378-01MSD	MSD	10/29/12 12:33	II121001-3	.5	U	.532	mg/L	106.4	75	125	7	20	
L97378-02DUP	DUP	10/29/12 12:39			U	U	mg/L				0	20	RA

Uranium (1312) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333678													
WG333678ICV	ICV	11/07/12 13:52	MS121001-5	.05		.05178	mg/L	103.6	90	110			
WG333678ICB	ICB	11/07/12 13:55				U	mg/L		-0.0003	0.0003			
WG332841PBS	PBS	11/07/12 14:09				U	mg/L		-0.0003	0.0003			
WG332841LFB2	LFB	11/07/12 14:12	MS121009-6	.05		.04853	mg/L	97.1	80	120			
L97378-02DUP	DUP	11/07/12 14:26			U	U	mg/L				0	20	RA
L97378-07MS	MS	11/07/12 14:53	MS121009-6	.05	U	.04976	mg/L	99.5	75	125			
L97378-07MSD	MSD	11/07/12 14:56	MS121009-6	.05	U	.04992	mg/L	99.8	75	125	0.32	20	

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ACZ Project ID: ***L97378***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97378-01	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L97378-02	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: ***L97378***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97378-03	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L97378-04	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ Project ID: ***L97378***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97378-05	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L97378-06	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333699	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Montgomery and Associates

ACZ Project ID: ***L97378***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97378-07	WG333053	Barium (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Cadmium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Chromium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Lead (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333324	Mercury (1312)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Molybdenum (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333699	Selenium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333053	Silver (1312)	M6010B ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG333678	Uranium (1312)	M6020 ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Metals Analysis

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Selenium (1312)	M6020 ICP-MS
Uranium (1312)	M6020 ICP-MS

ERROL

ACZ Laboratories, Inc. L97348

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN OF CUSTODY

Name: Tim Leo	Address: 1550 E. Prince Rd
Company: Montgomery & Assoc.	Tucson AZ 85719
E-mail: tleo@elmontgomery.com	Telephone: 520-881-4912

Name: Leilani Baw	E-mail: lbaw@elmontgomery.com
Company: M&A	Telephone: SAD

Name: Tim Leo	Address: SAA
Company: SAA	
E-mail: SAD	Telephone: SAA

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes [ ] No [X]

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: J. LANEY Sampler's site Information State: UT Zip code: Time Zone: MT

Quote #: Not set up - SPLP

Project/PO #: 1350.13

Reporting state for compliance testing: Utah

Check box if samples include NRC licensed material? [ ]

				# of Containers	1311 TCLP (**)							
102DB-123-123.5	10/10/12	1450	Other (*)	1	X							
103-74-74.8		1500		1	X							
103-69.2-70		1505		1	X							
103-56-56.8		1515		1	X							
103-44-44.8		1520		1	X							
103-35.3-36		1525		1	X							
103-22-22.8	↓	1530	↓	1	X							

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

(*) Hard rock core

(**) Contact Tim Leo (520)-881-4912 for required analysis

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

J. Laney	10/11/12 1100		10.12.12 9:54

L97348 Chain of Custody

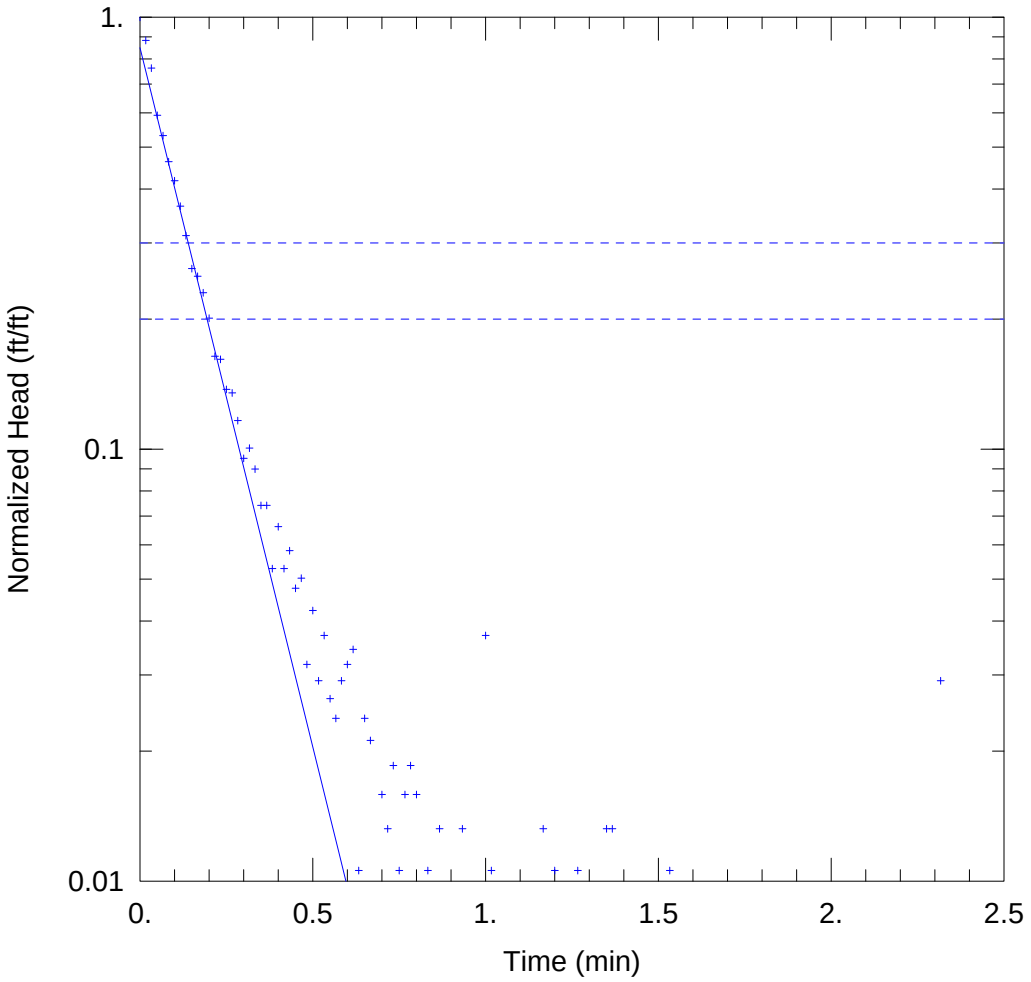
FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

MONTGOMERY & ASSOCIATES

APPENDIX D

SLUG TEST GRAPHS

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugBFallingHead.aqt
Date: 02/19/13 Time: 12:58:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

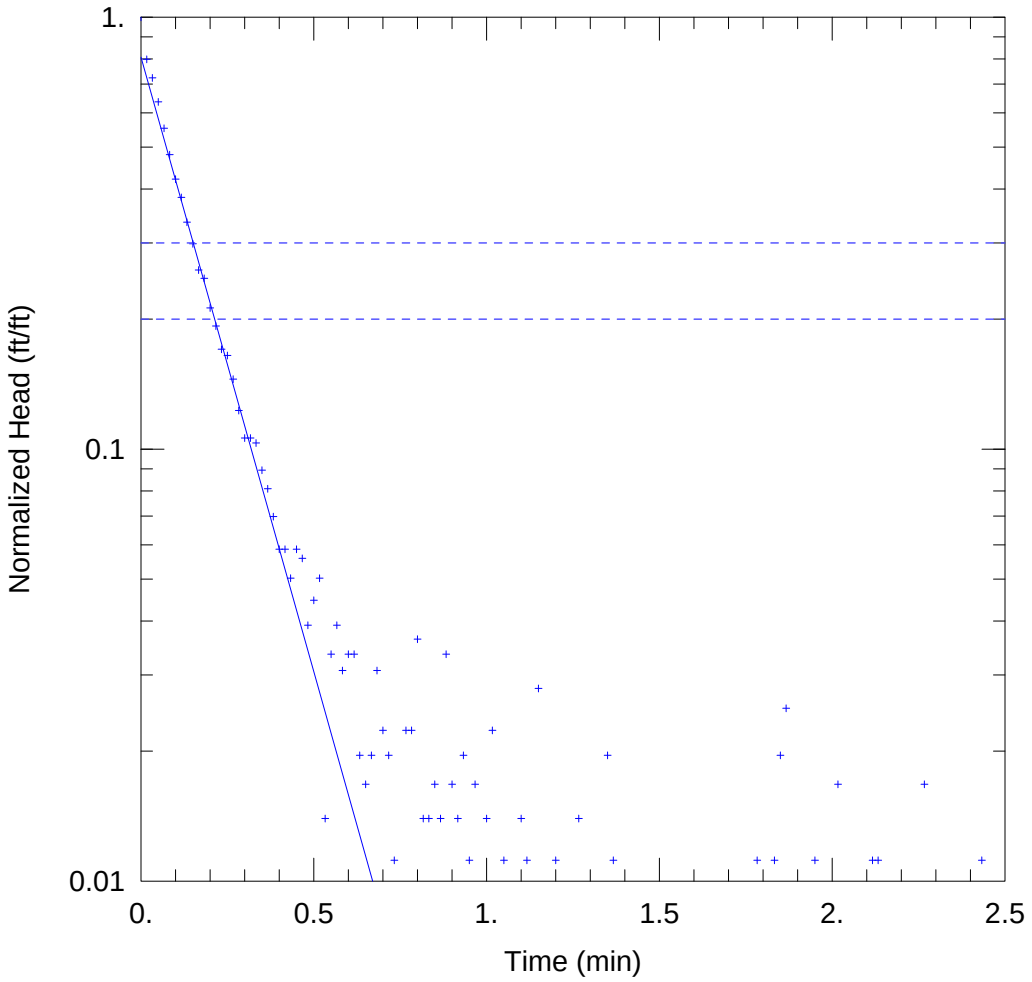
Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-3A Slug B Falling Head)

Initial Displacement: 0.378 ft
Total Well Penetration Depth: 121.8 ft
Casing Radius: 0.25 ft
Static Water Column Height: 121.8 ft
Screen Length: 30. ft
Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 47.37 ft/day
y0 = 0.3211 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugBRisingHead.aqt
Date: 02/19/13 Time: 12:58:24

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

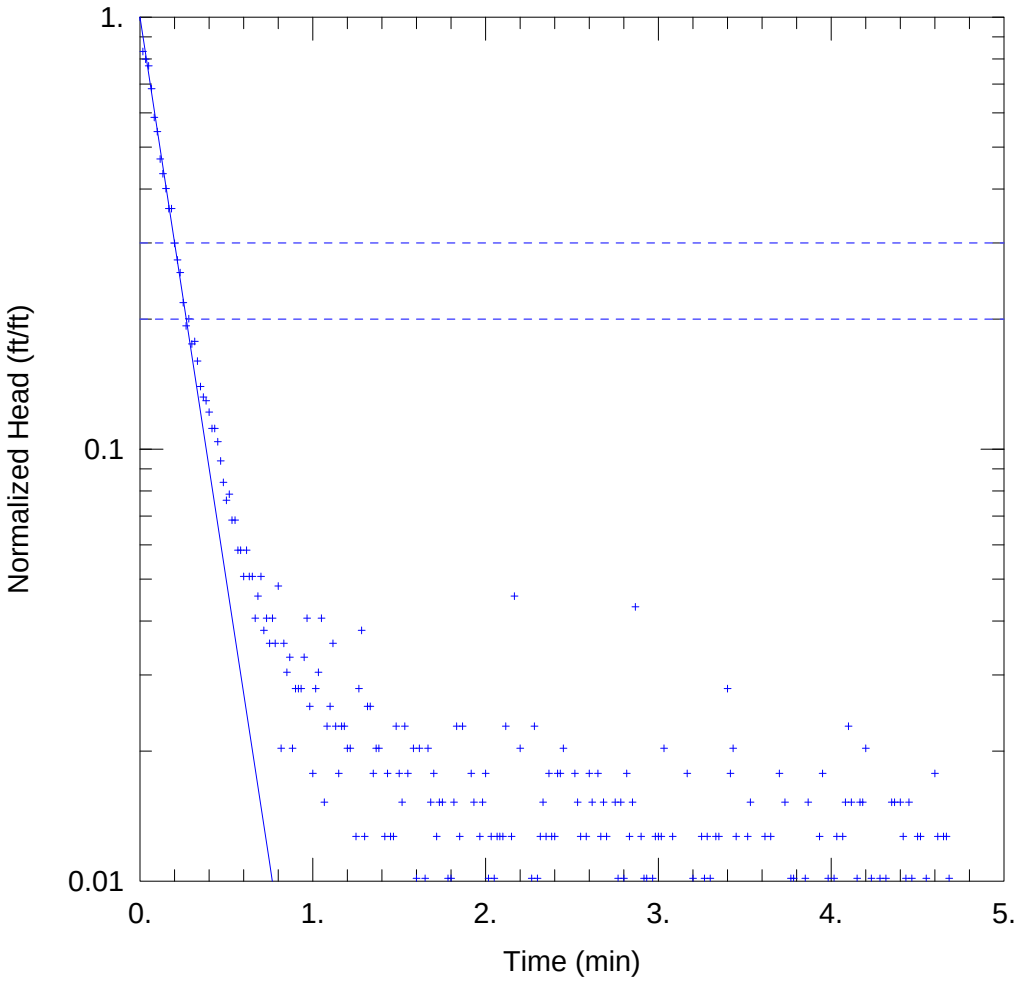
Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-3A Slug B Rising Head)

Initial Displacement: 0.358 ft Static Water Column Height: 121.8 ft
Total Well Penetration Depth: 121.8 ft Screen Length: 30. ft
Casing Radius: 0.25 ft Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 41.64 ft/day y0 = 0.2892 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugCFallingHead.aqt
Date: 02/19/13 Time: 12:58:14

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

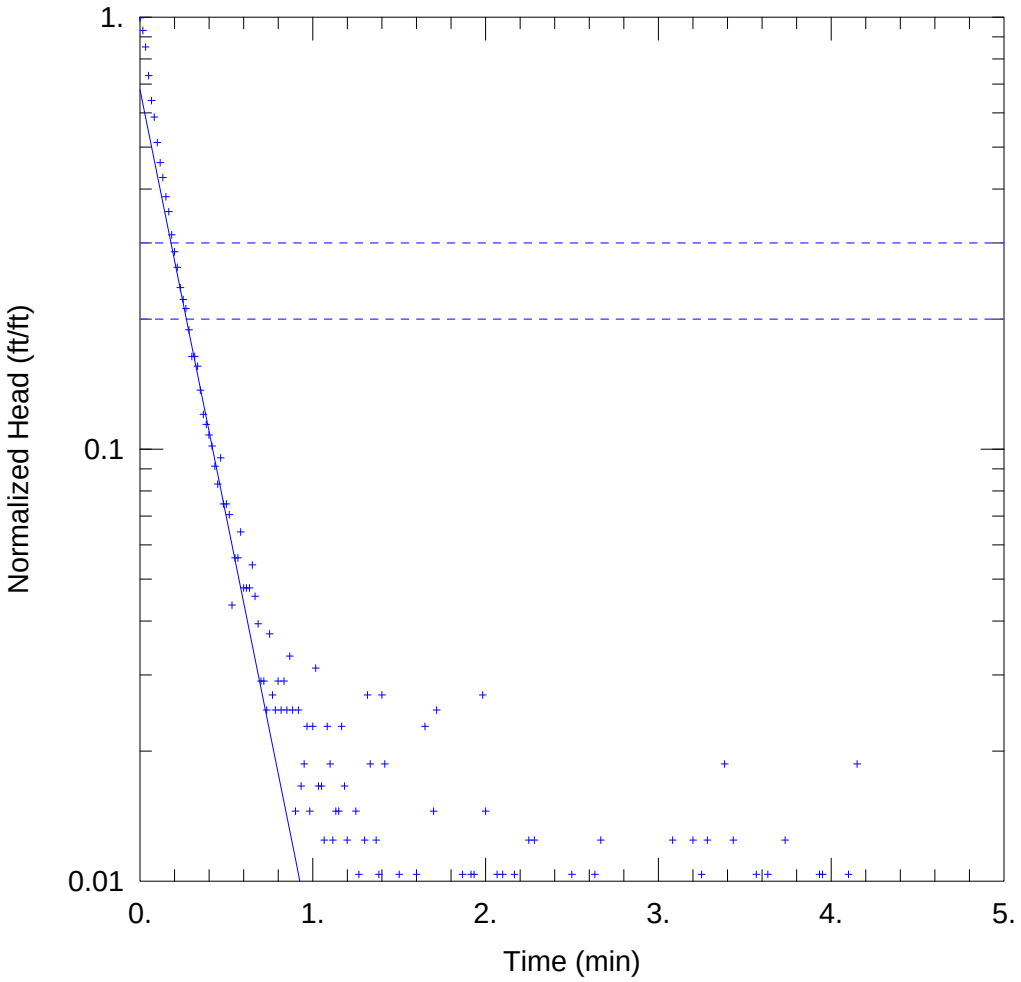
WELL DATA (EF-3A Slug C Falling Head)

Initial Displacement: 0.394 ft
Total Well Penetration Depth: 121.8 ft
Casing Radius: 0.25 ft
Static Water Column Height: 121.8 ft
Screen Length: 30. ft
Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 38.19 ft/day y0 = 0.3938 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugCRisingHead.aqt
Date: 02/19/13 Time: 12:58:00

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

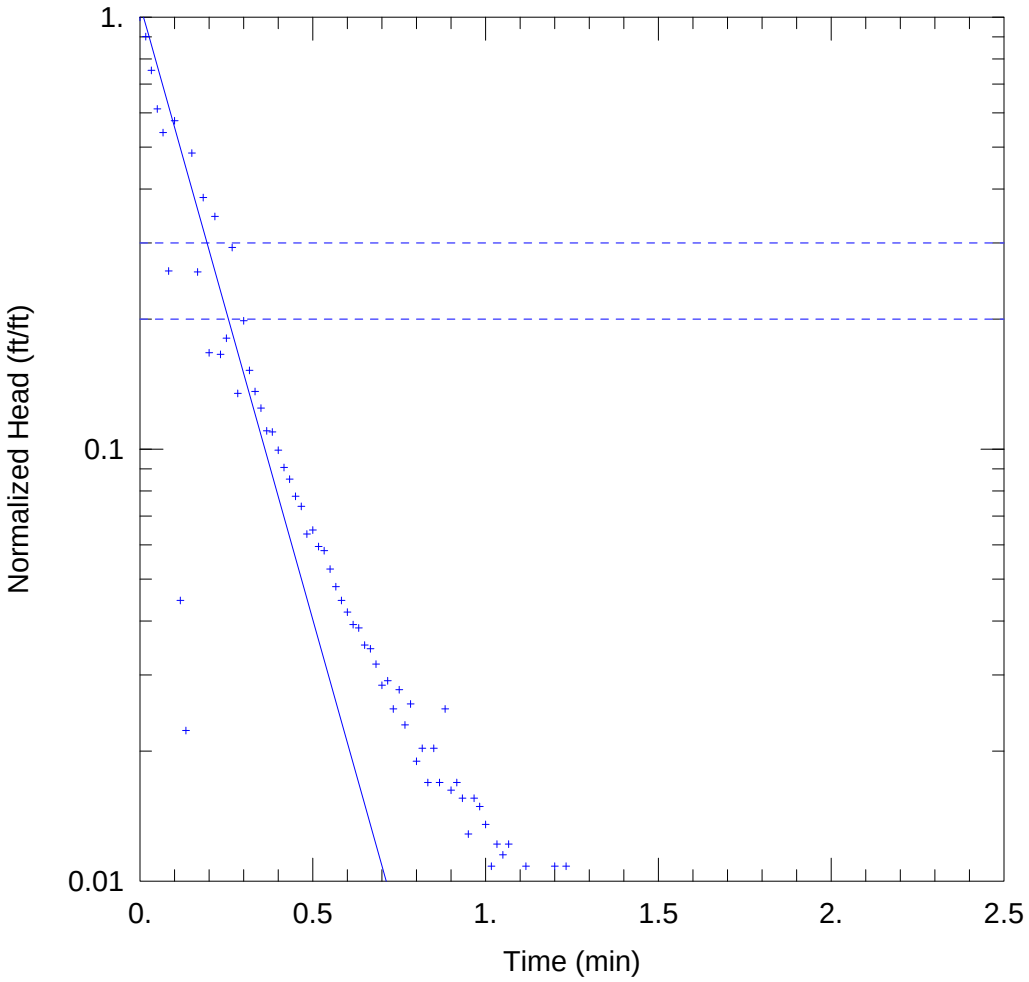
Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-3A Slug C Rising Head)

Initial Displacement: 0.482 ft
Total Well Penetration Depth: 121.8 ft
Casing Radius: 0.25 ft
Static Water Column Height: 121.8 ft
Screen Length: 30. ft
Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 28.97 ft/day
y0 = 0.3275 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugEFallingHead.aqt
Date: 02/19/13 Time: 12:57:51

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

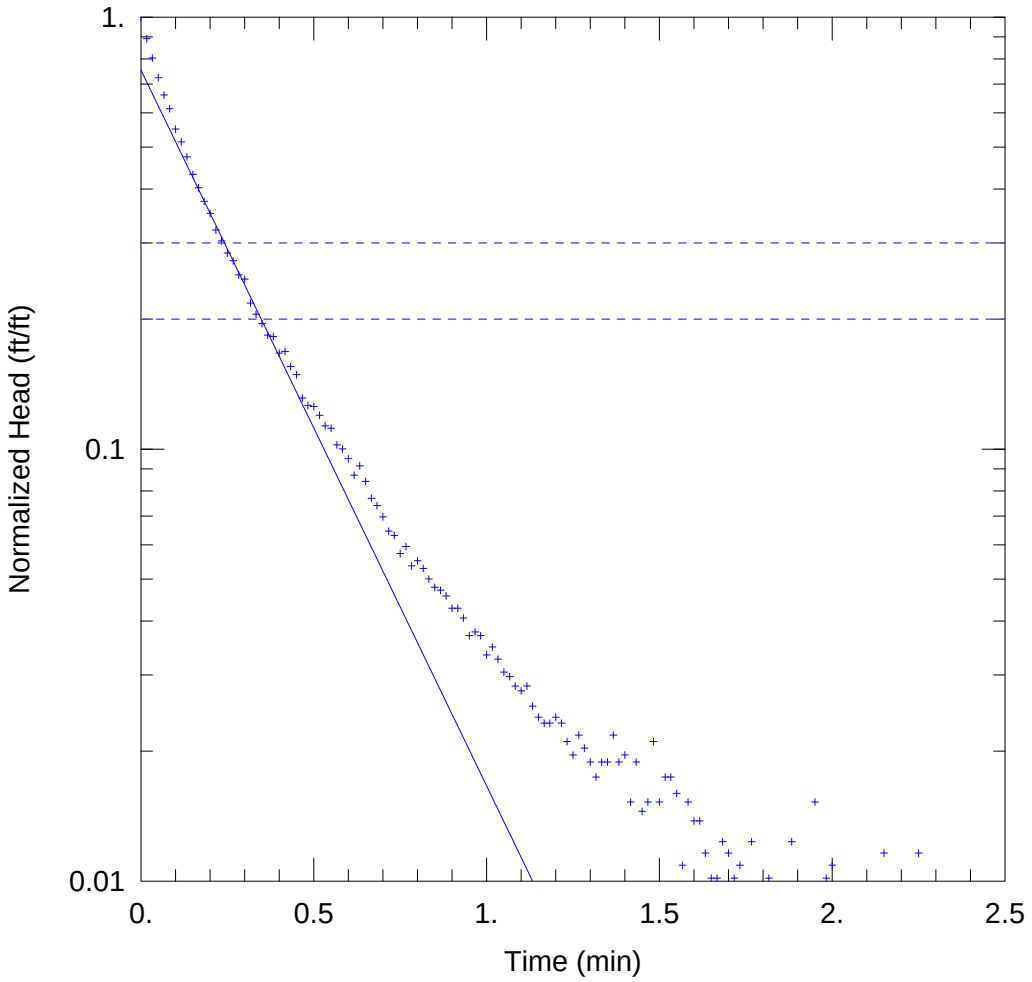
WELL DATA (EF-3A Slug E Falling Head)

Initial Displacement: 1.478 ft
Total Well Penetration Depth: 121.8 ft
Casing Radius: 0.25 ft
Static Water Column Height: 121.8 ft
Screen Length: 30. ft
Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 41.69 ft/day y0 = 1.583 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-3A_SlugERisingHead.aqt
Date: 02/19/13 Time: 12:57:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-3A
Test Date: 28 Aug 2012

AQUIFER DATA

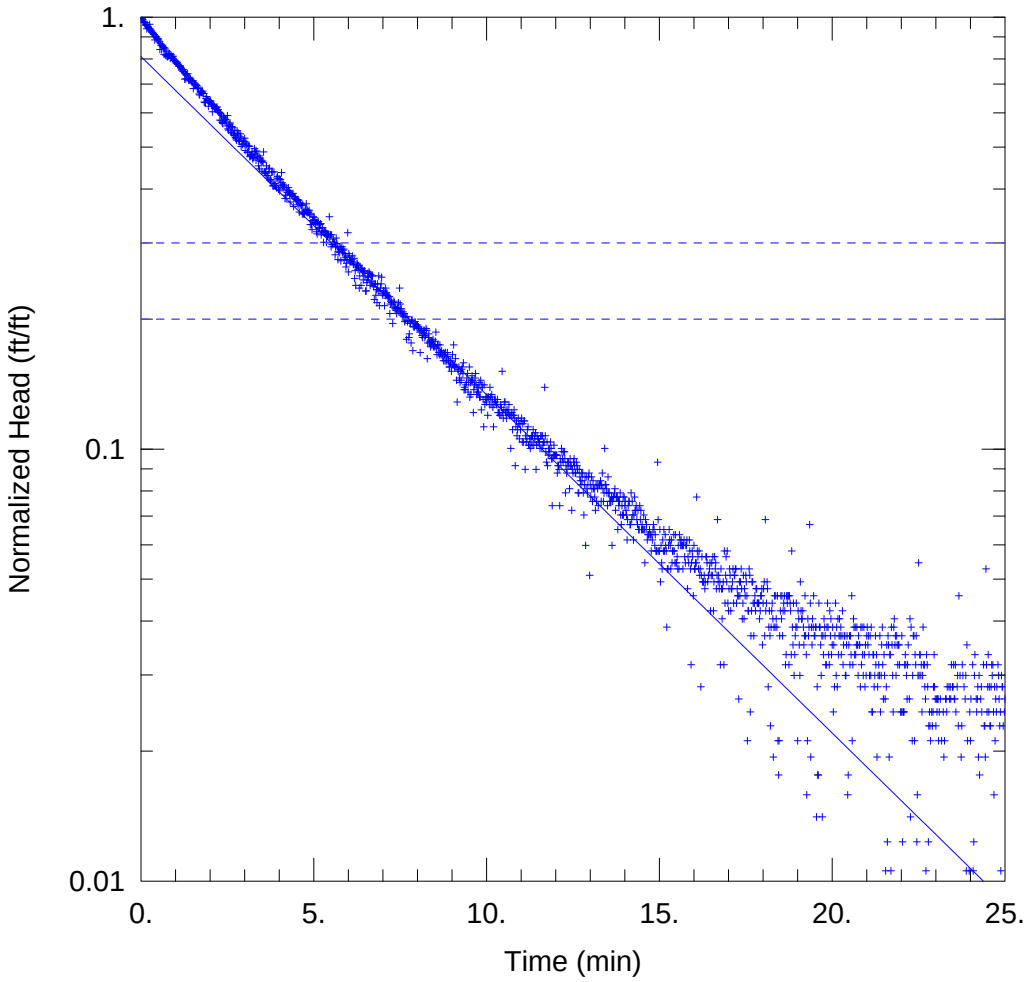
Saturated Thickness: 121.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-3A Slug E Rising Head)

Initial Displacement: 1.378 ft
Total Well Penetration Depth: 121.8 ft
Casing Radius: 0.25 ft
Static Water Column Height: 121.8 ft
Screen Length: 30. ft
Well Radius: 0.458 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 24.25 ft/day
y0 = 1.039 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-6_SlugAFallingHead.aqt
Date: 02/19/13 Time: 12:59:58

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

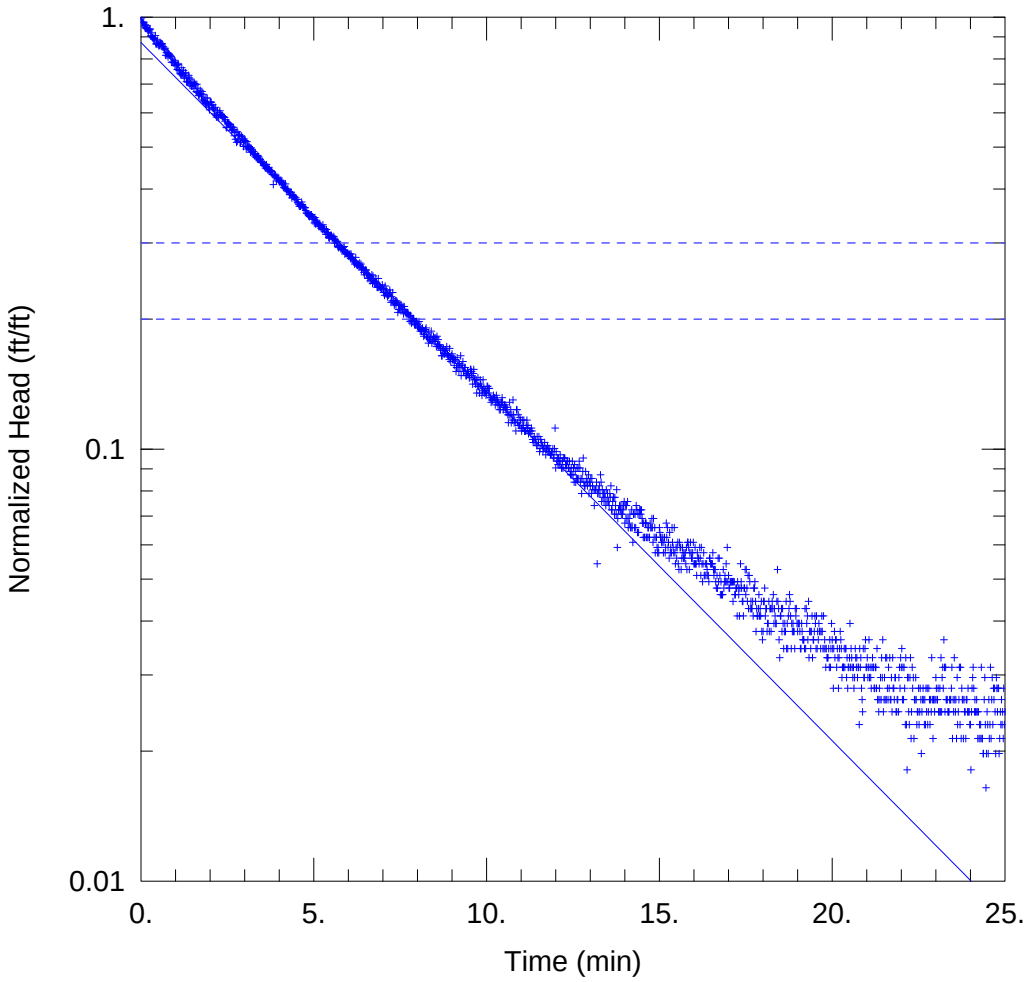
Saturated Thickness: 65.36 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug A Falling Head)

Initial Displacement: 0.568 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4786 ft/day
y0 = 0.4602 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-6_SlugARisingHead.aqt
Date: 02/19/13 Time: 12:59:52

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

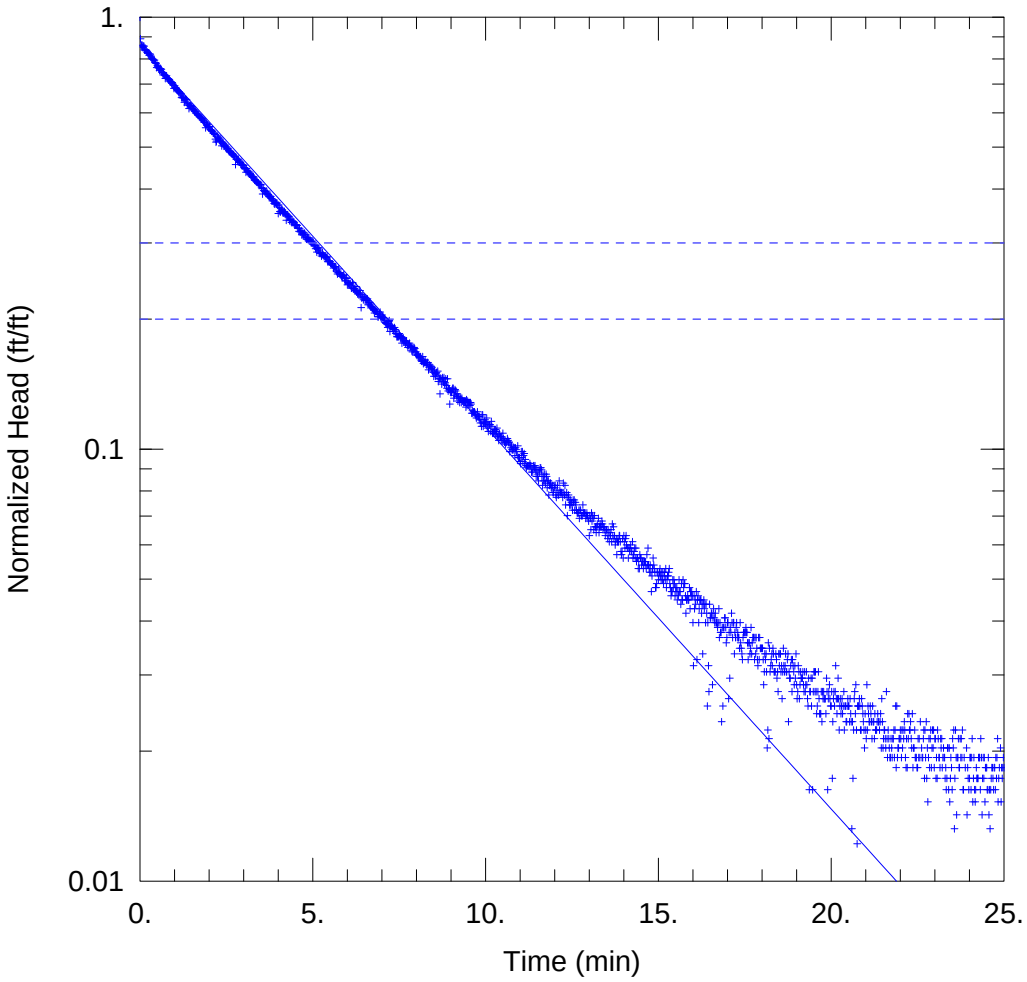
Saturated Thickness: 65.36 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug A Rising Head)

Initial Displacement: 0.608 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.494 ft/day
y0 = 0.5311 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-6_SlugBFallingHead.aqt
Date: 02/19/13 Time: 12:59:45

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

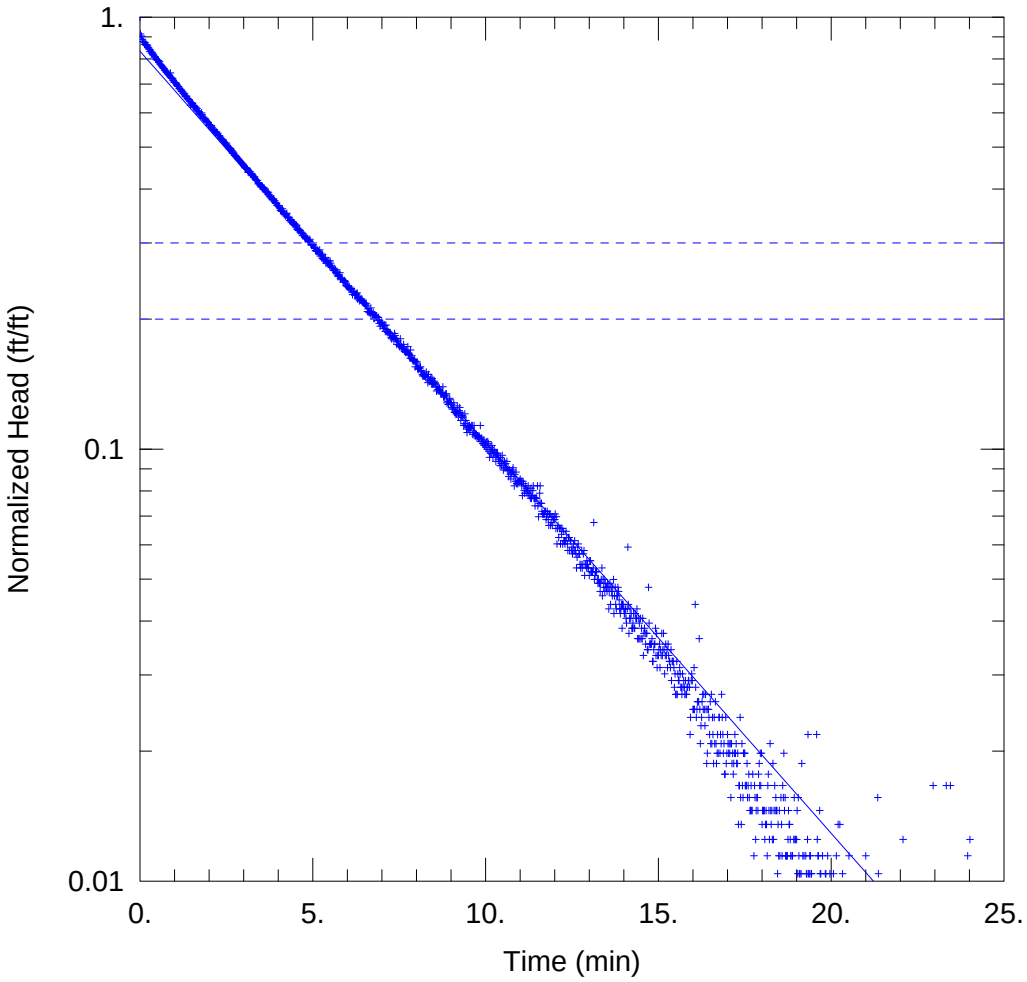
Saturated Thickness: 65.36 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug B Falling Head)

Initial Displacement: 0.983 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5403 ft/day
y0 = 0.8459 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-6_SlugBRisingHead.aqt
Date: 02/19/13 Time: 12:59:39

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

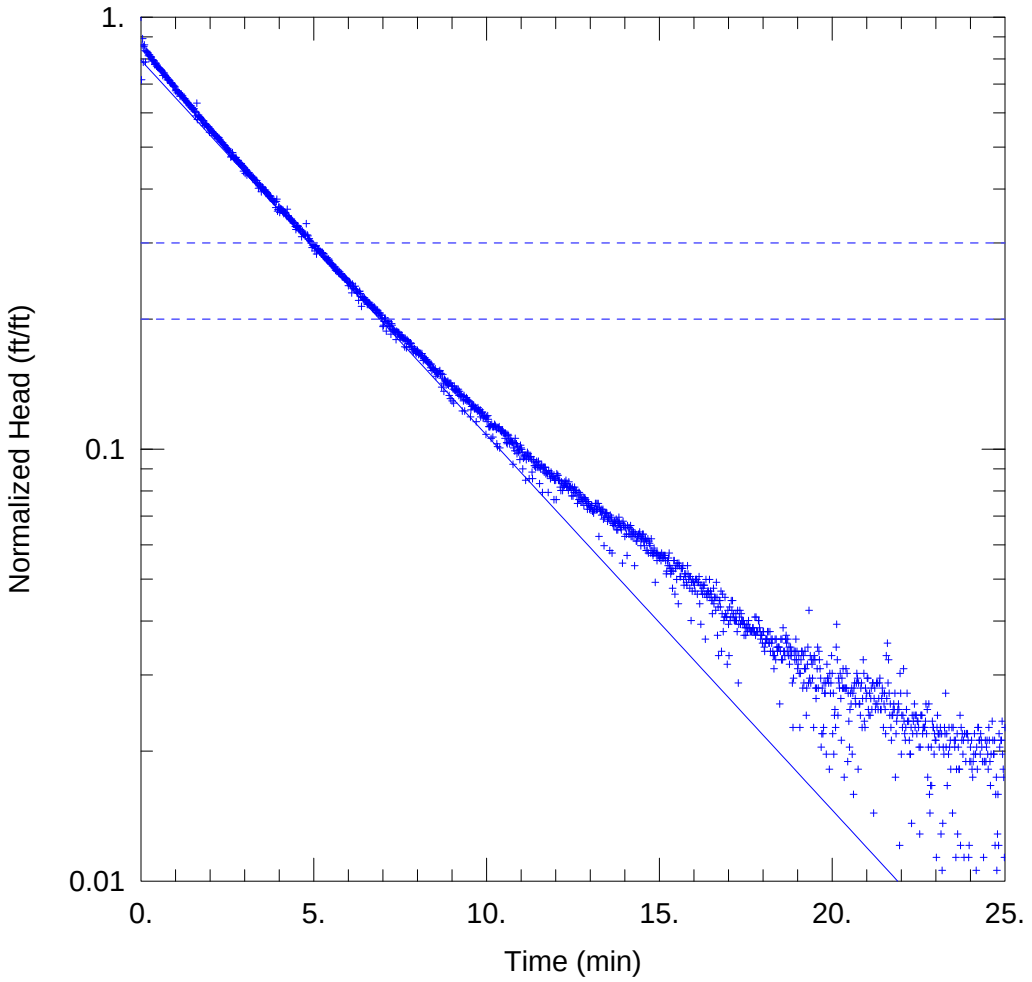
Saturated Thickness: 65.36 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug B Rising Head)

Initial Displacement: 0.961 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5533 ft/day
y0 = 0.801 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-6_SlugCFallingHead.aqt
Date: 02/19/13 Time: 12:59:34

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

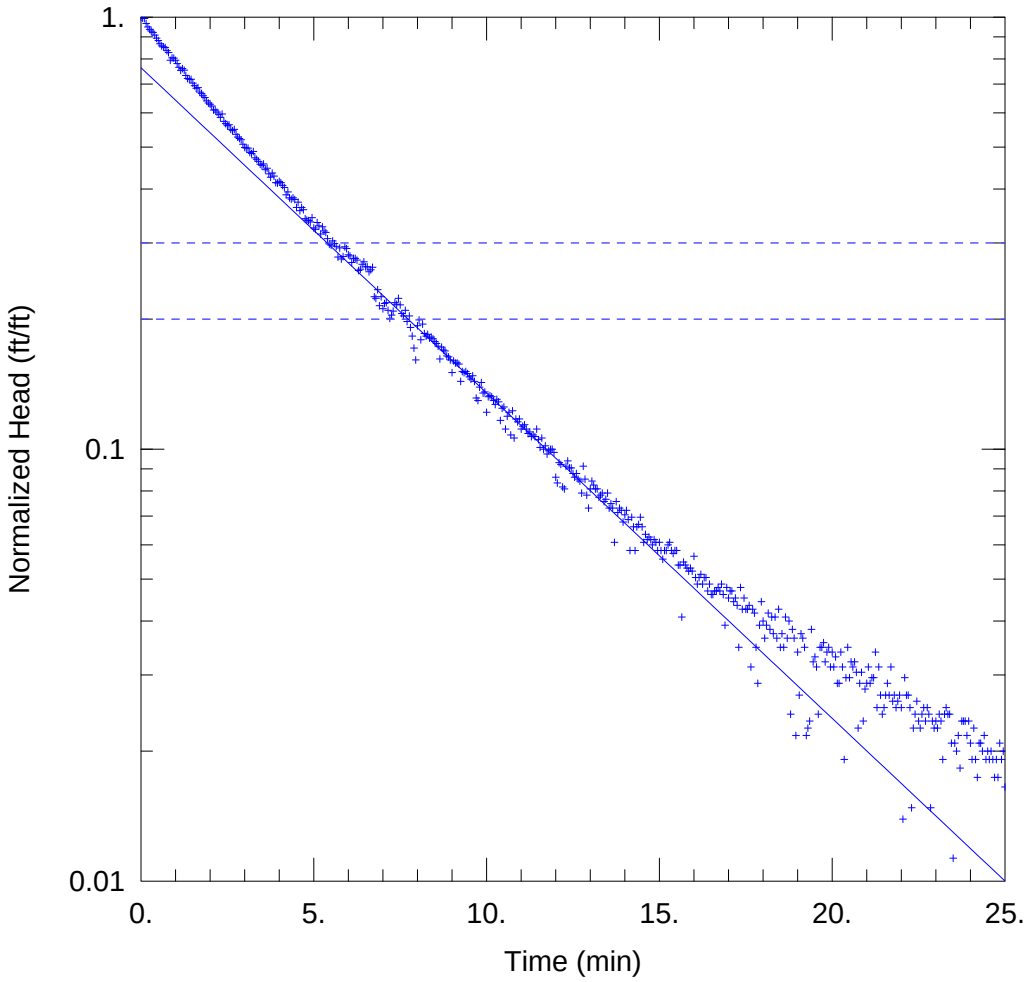
Saturated Thickness: 65.36 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug C Falling Head)

Initial Displacement: 1.322 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5305 ft/day
y0 = 1.05 ft



EF-6 SLUG C RISING HEAD

Data Set: S:\...\EF-6_SlugCRisingHead.aqt
Date: 02/19/13 Time: 12:59:30

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-6
Test Date: 27 Aug 2012

AQUIFER DATA

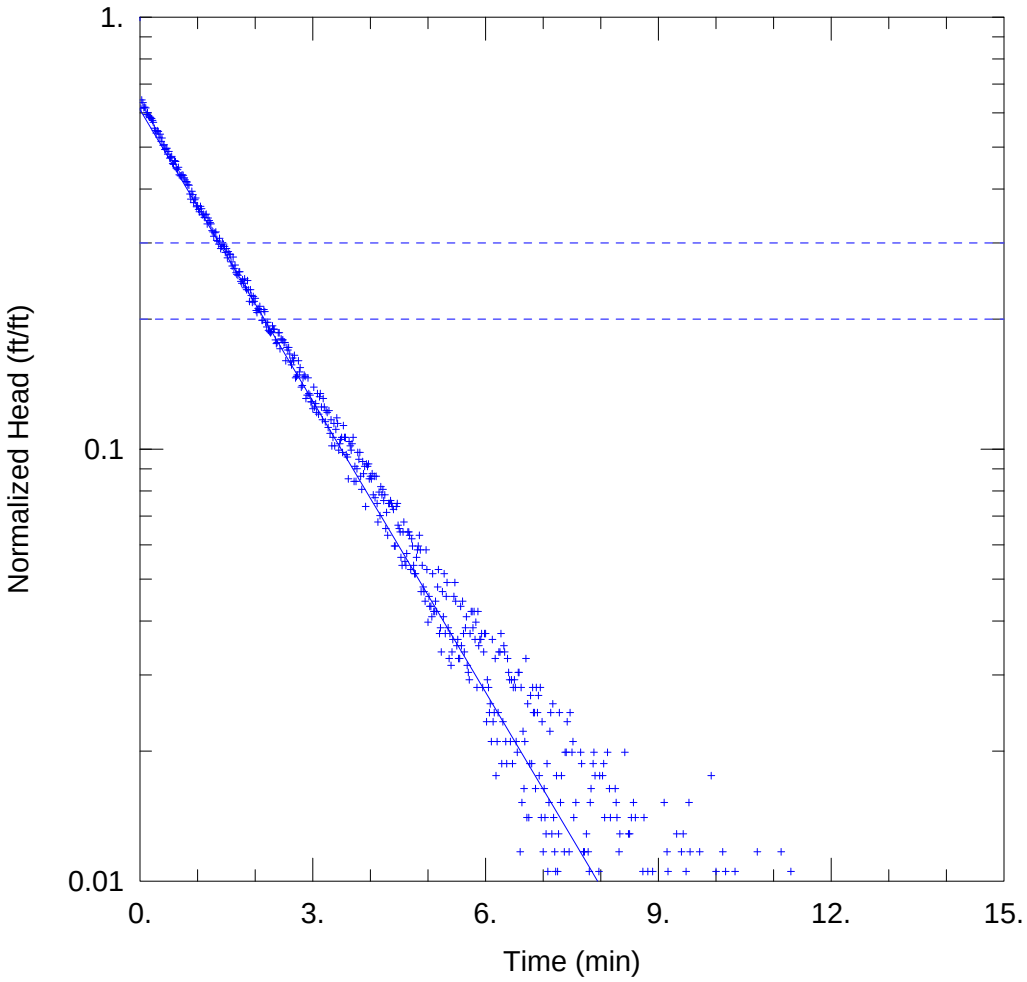
Saturated Thickness: 65.36 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-6 Slug C Rising Head)

Initial Displacement: 1.15 ft
Total Well Penetration Depth: 65.36 ft
Casing Radius: 0.167 ft
Static Water Column Height: 65.36 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4604 ft/day
y0 = 0.8781 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:03:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

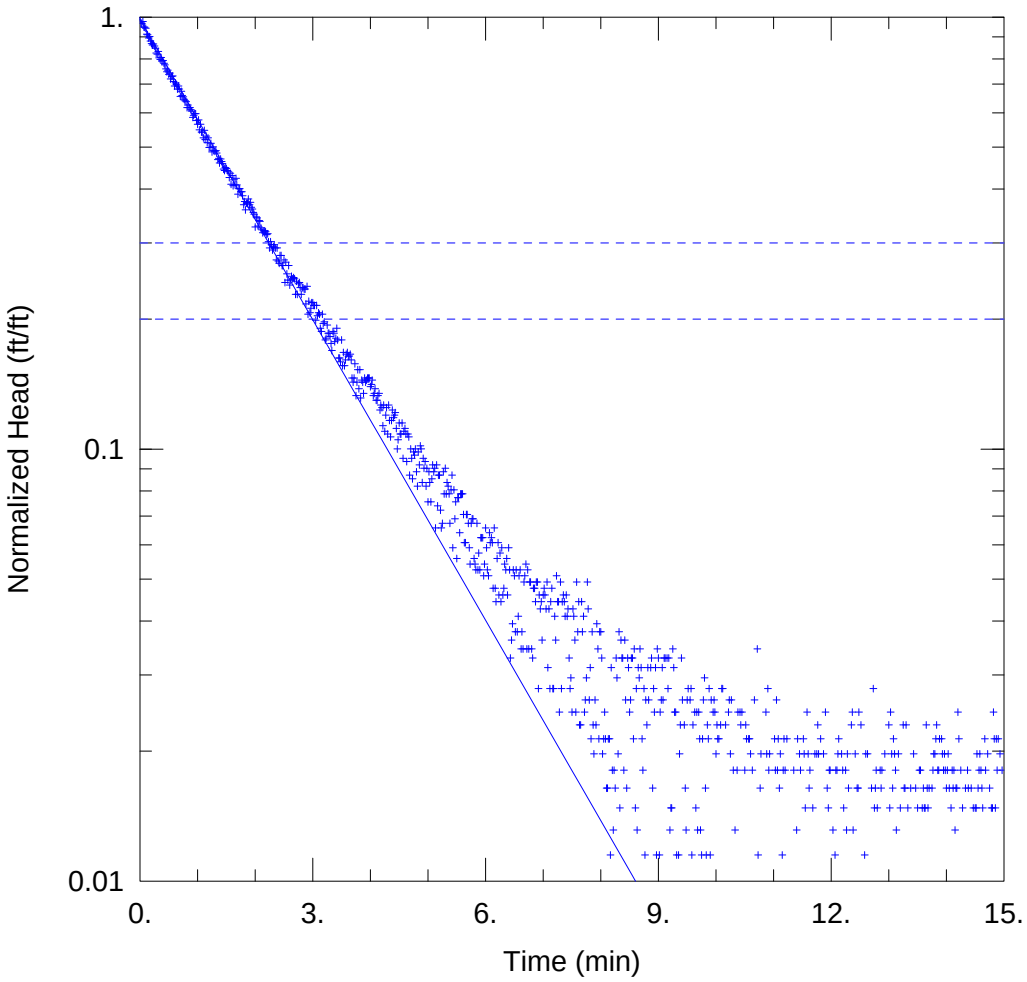
Saturated Thickness: 121. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug A Falling Head)

Initial Displacement: 0.855 ft Static Water Column Height: 169. ft
Total Well Penetration Depth: 121. ft Screen Length: 30. ft
Casing Radius: 0.167 ft Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 1.503 ft/day y0 = 0.5219 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:03:31

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

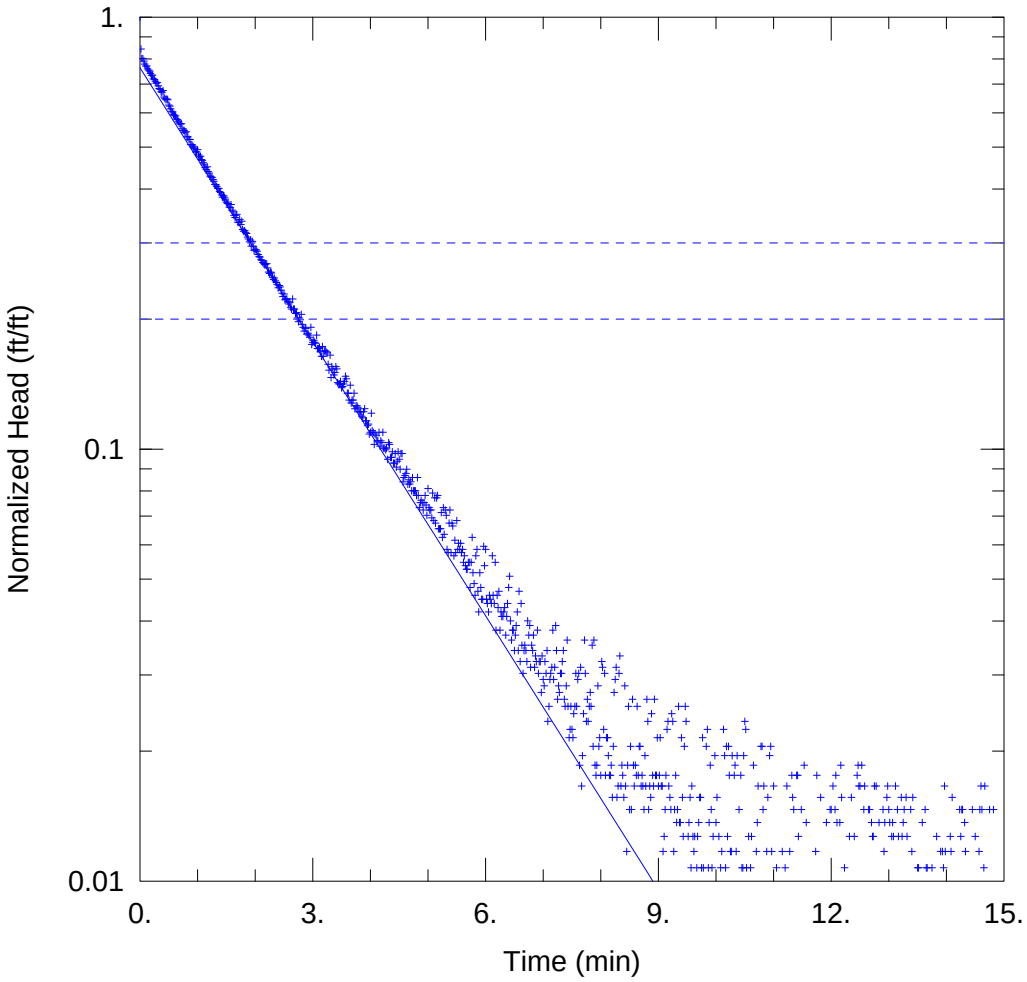
Saturated Thickness: 121. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug A Rising Head)

Initial Displacement: 0.609 ft
Total Well Penetration Depth: 121. ft
Casing Radius: 0.167 ft
Static Water Column Height: 169. ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.551 ft/day
y0 = 0.6025 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:03:14

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

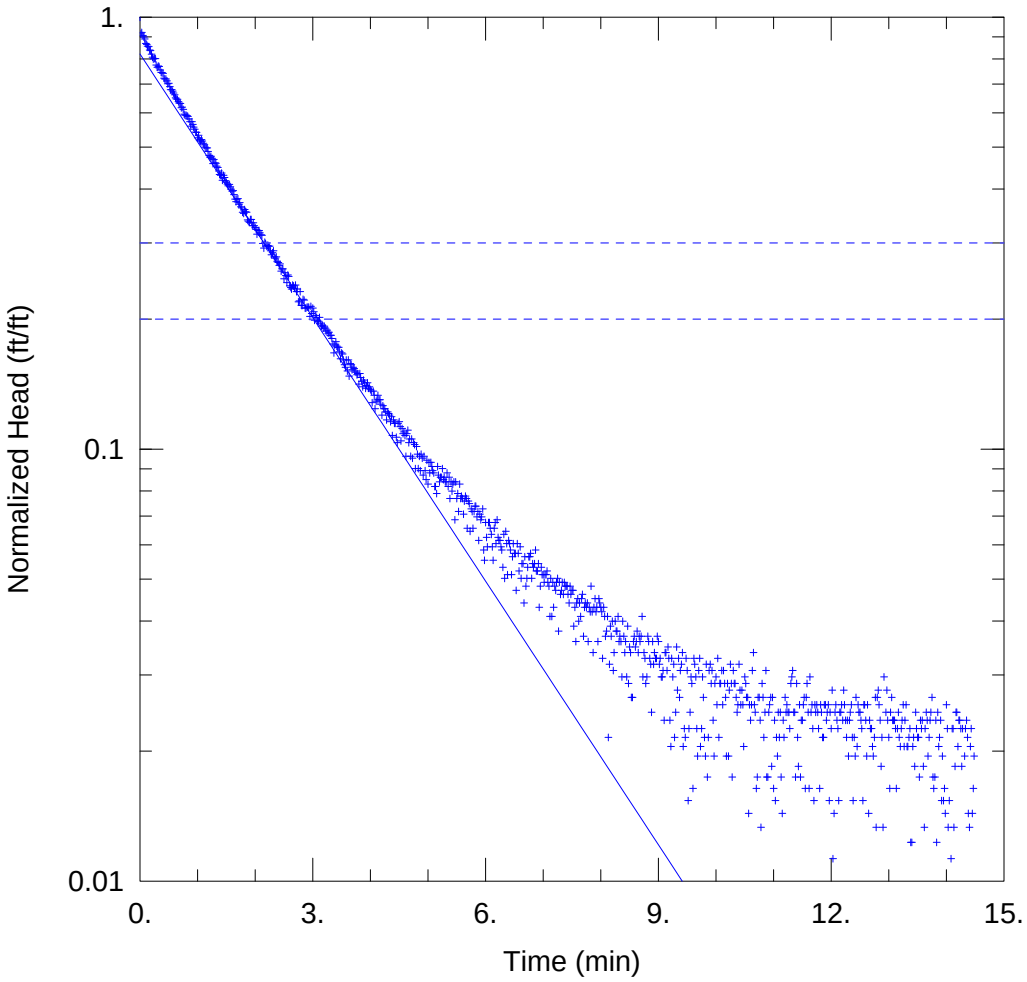
Saturated Thickness: 121. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug B Falling Head)

Initial Displacement: 1.024 ft
Total Well Penetration Depth: 121. ft
Casing Radius: 0.167 ft
Static Water Column Height: 169. ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.414 ft/day
y0 = 0.7817 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:03:11

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

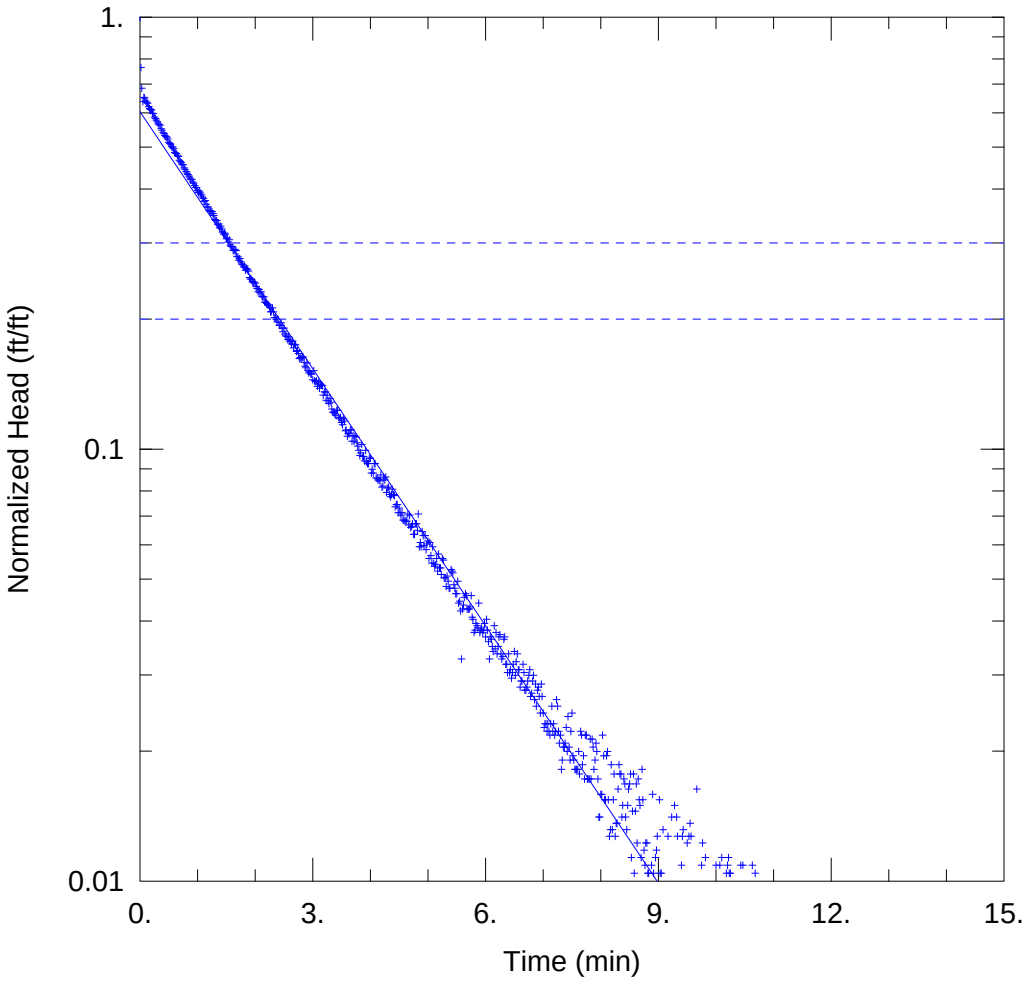
Saturated Thickness: 121. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug B Rising Head)

Initial Displacement: 0.976 ft
Total Well Penetration Depth: 121. ft
Casing Radius: 0.167 ft
Static Water Column Height: 169. ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.36 ft/day
y0 = 0.8017 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:03:08

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

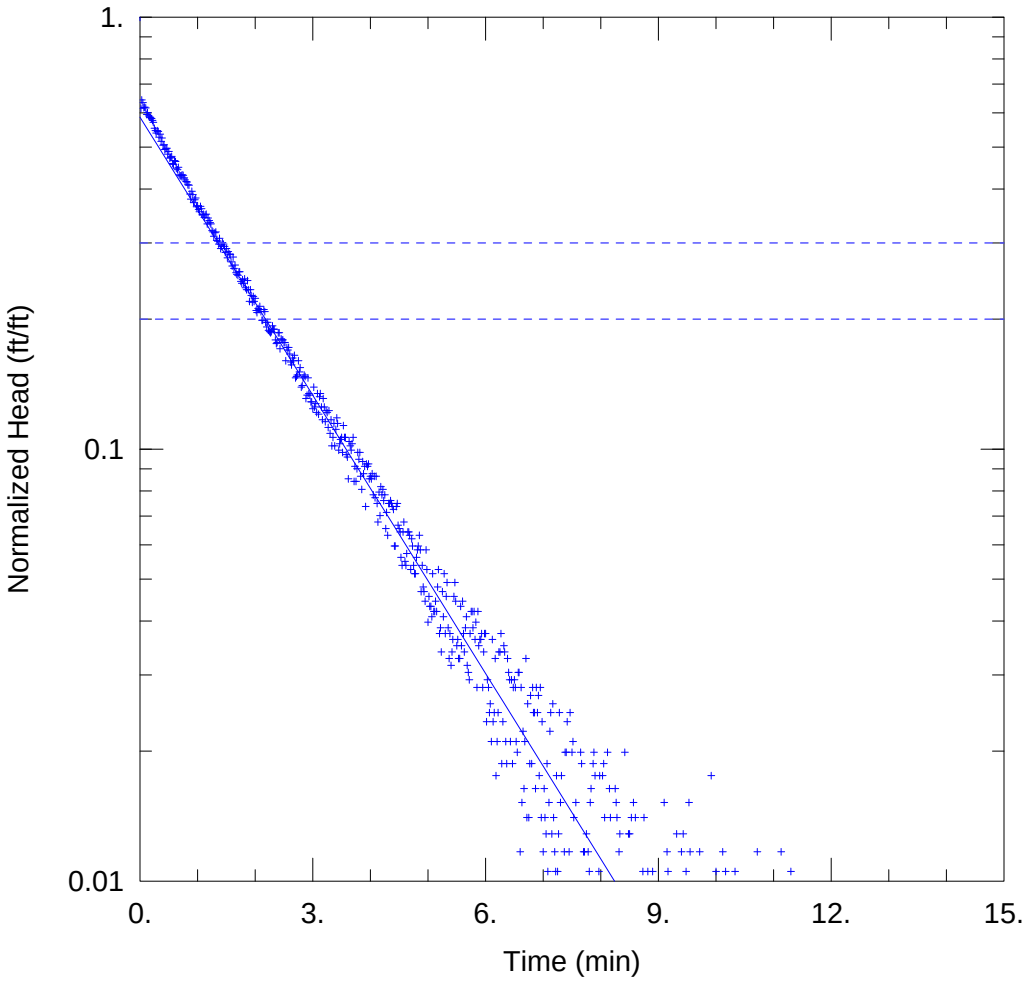
Saturated Thickness: 121. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug D Falling Head)

Initial Displacement: 2.204 ft
Total Well Penetration Depth: 121. ft
Casing Radius: 0.167 ft
Static Water Column Height: 169. ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.326 ft/day
y0 = 1.331 ft



WELL TEST ANALYSIS

Data Set: S:\...\EF-8_SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:03:04

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: EF-8
Test Date: 27 Aug 2012

AQUIFER DATA

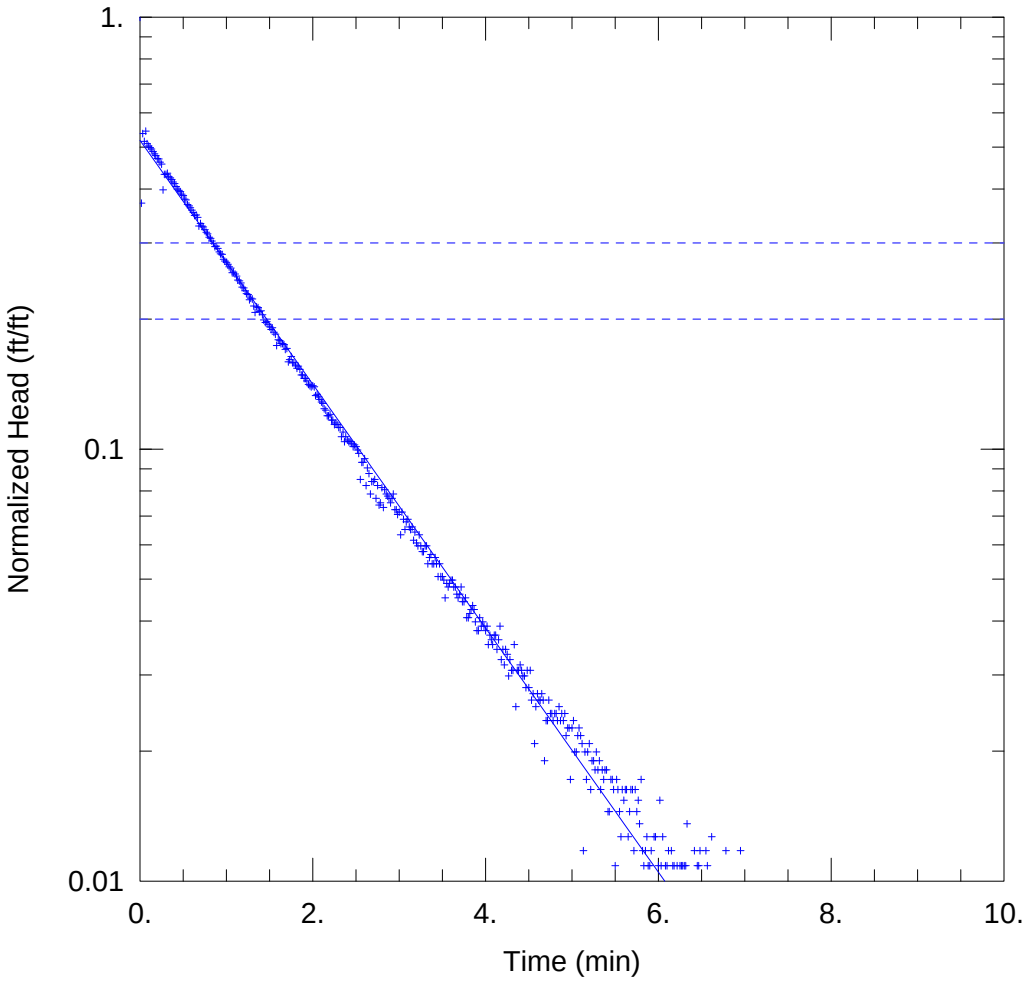
Saturated Thickness: 121. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EF-8 Slug A Falling Head)

Initial Displacement: 0.855 ft
Total Well Penetration Depth: 121. ft
Casing Radius: 0.167 ft
Static Water Column Height: 169. ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.435 ft/day
y0 = 0.5017 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:04:20

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

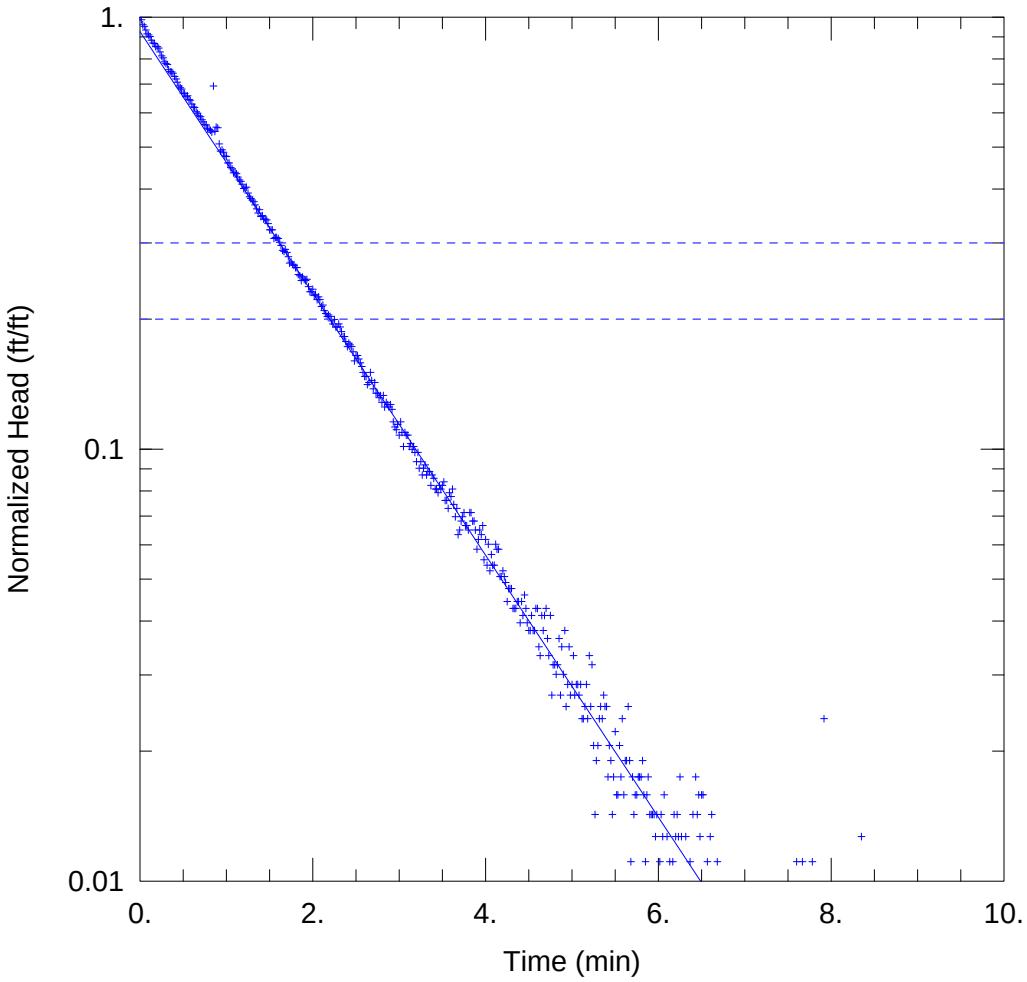
Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (H-63 Slug B Falling Head)

Initial Displacement: 1.105 ft Static Water Column Height: 36.55 ft
Total Well Penetration Depth: 36.55 ft Screen Length: 30. ft
Casing Radius: 0.167 ft Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.566 ft/day y0 = 0.5728 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:04:18

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

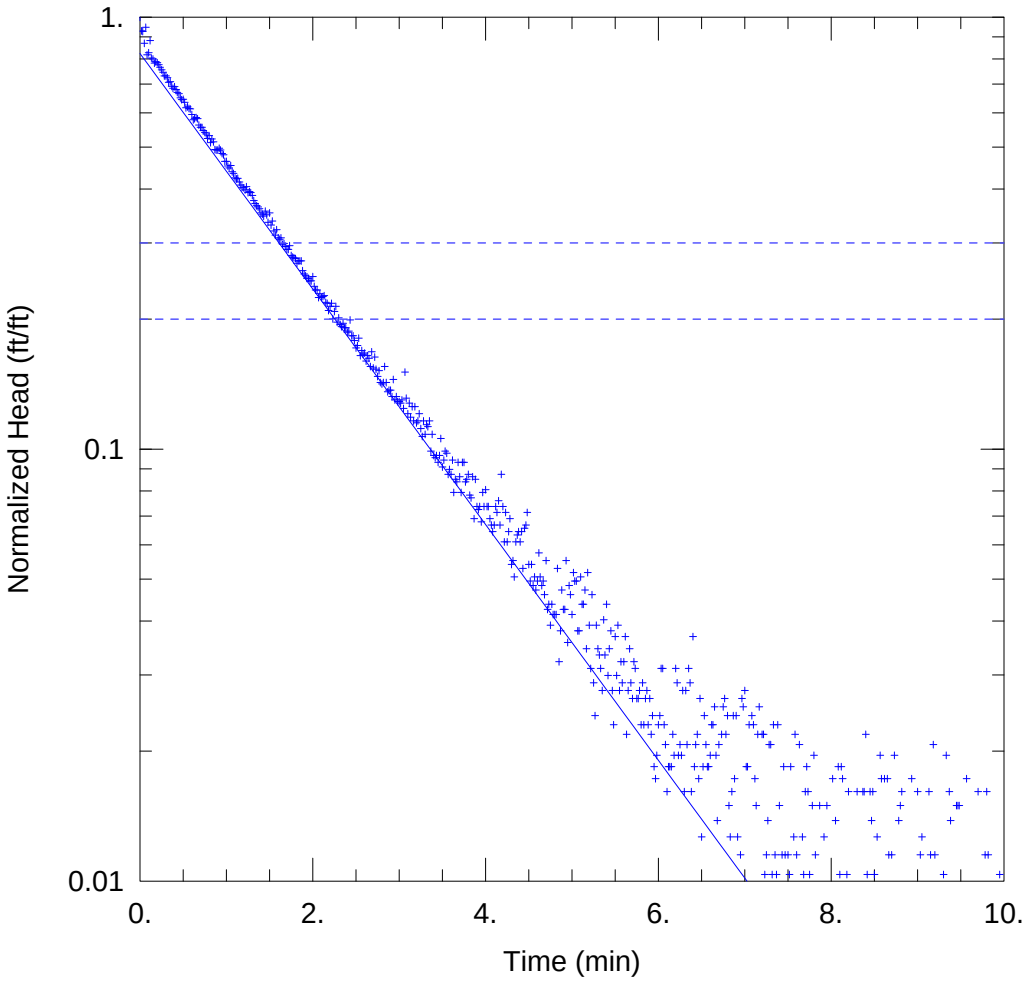
Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (H-63 Slug B Rising Headd)

Initial Displacement: 0.631 ft
Total Well Penetration Depth: 36.55 ft
Casing Radius: 0.167 ft
Static Water Column Height: 36.55 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.681 ft/day
y0 = 0.5841 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:04:13

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

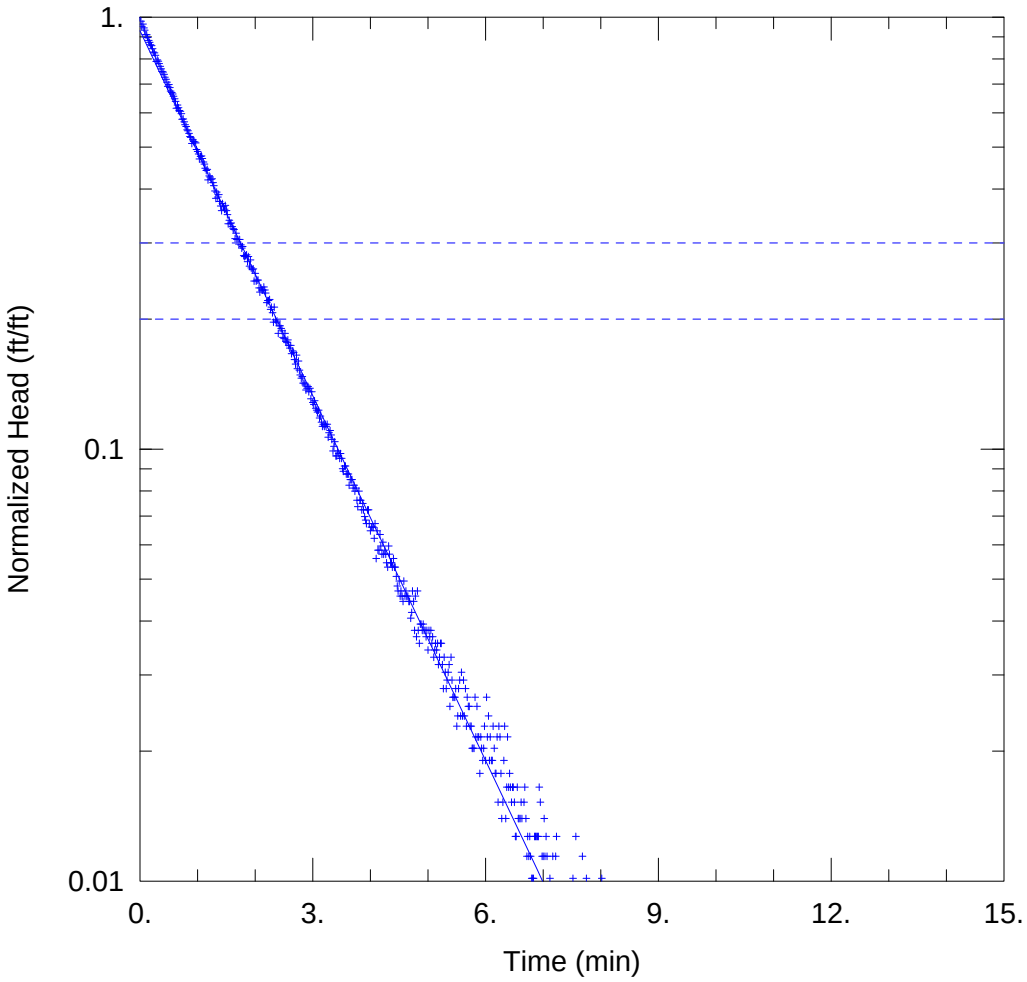
Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (H-63 Slug C Falling Head)

Initial Displacement: 0.869 ft
Total Well Penetration Depth: 36.55 ft
Casing Radius: 0.167 ft
Static Water Column Height: 36.55 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.513 ft/day
y0 = 0.7161 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:04:09

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

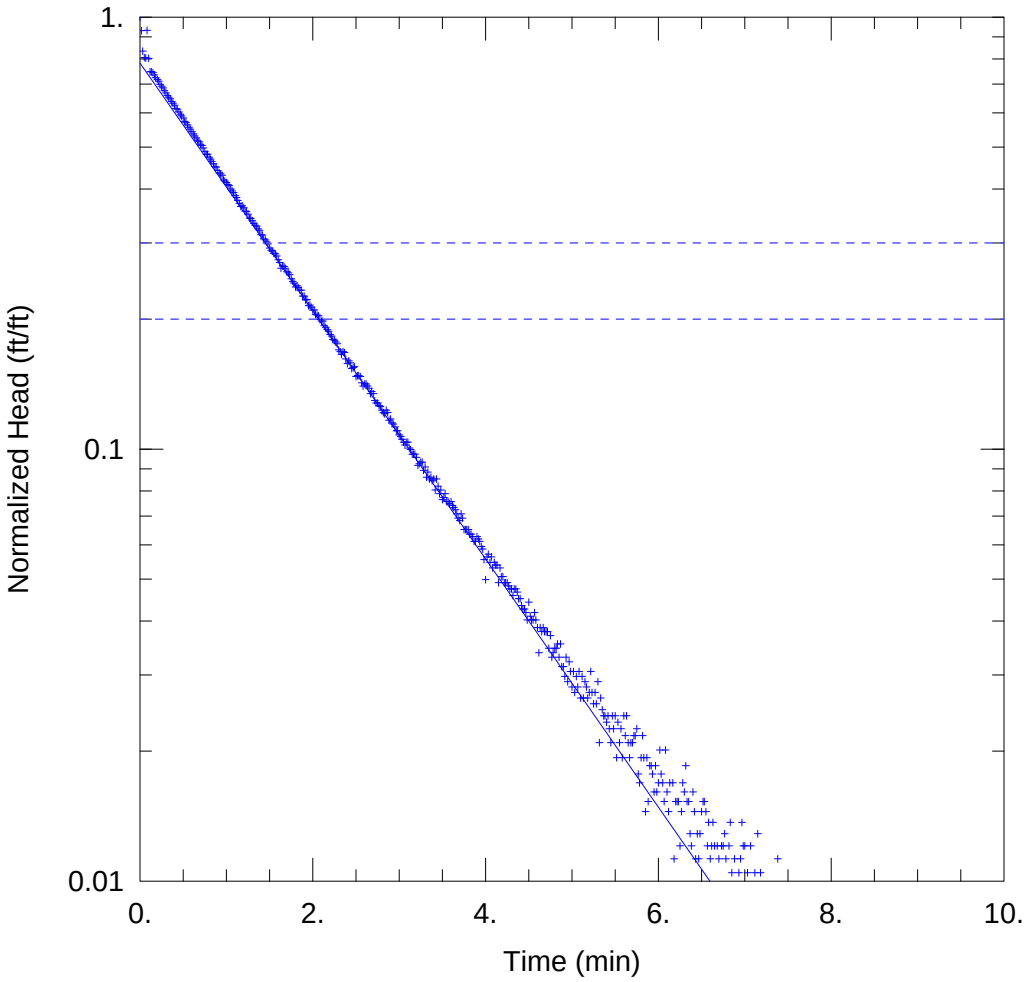
Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (H-63 Slug C Rising Head)

Initial Displacement: 0.788 ft
Total Well Penetration Depth: 36.55 ft
Casing Radius: 0.167 ft
Static Water Column Height: 36.55 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.562 ft/day
y0 = 0.7324 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:04:06

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

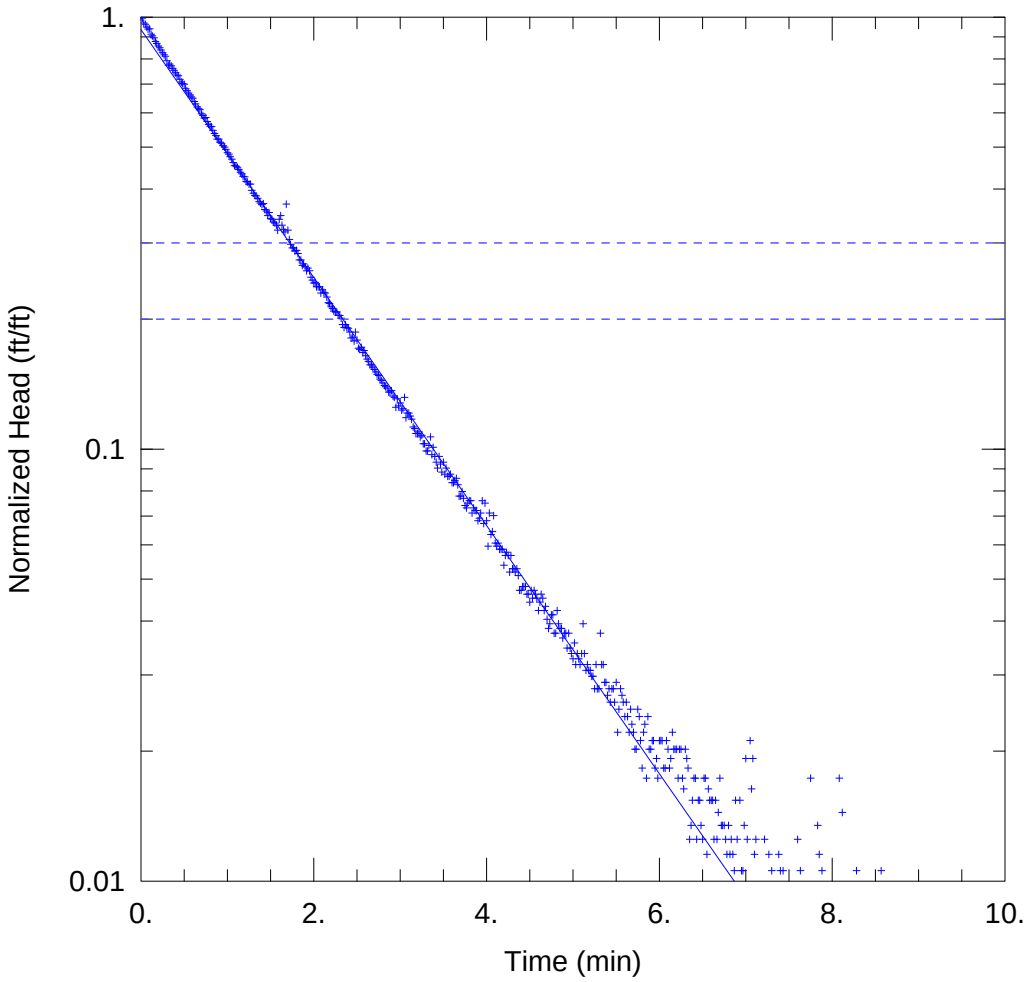
WELL DATA (H-63 Slug D Falling Head)

Initial Displacement: 1.243 ft
Total Well Penetration Depth: 36.55 ft
Casing Radius: 0.167 ft
Static Water Column Height: 36.55 ft
Screen Length: 30. ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.593 ft/day y0 = 0.973 ft



WELL TEST ANALYSIS

Data Set: S:\...\H-63_SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:04:01

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: H-63
Test Date: 26 Aug 2012

AQUIFER DATA

Saturated Thickness: 36.55 ft Anisotropy Ratio (Kz/Kr): 1.

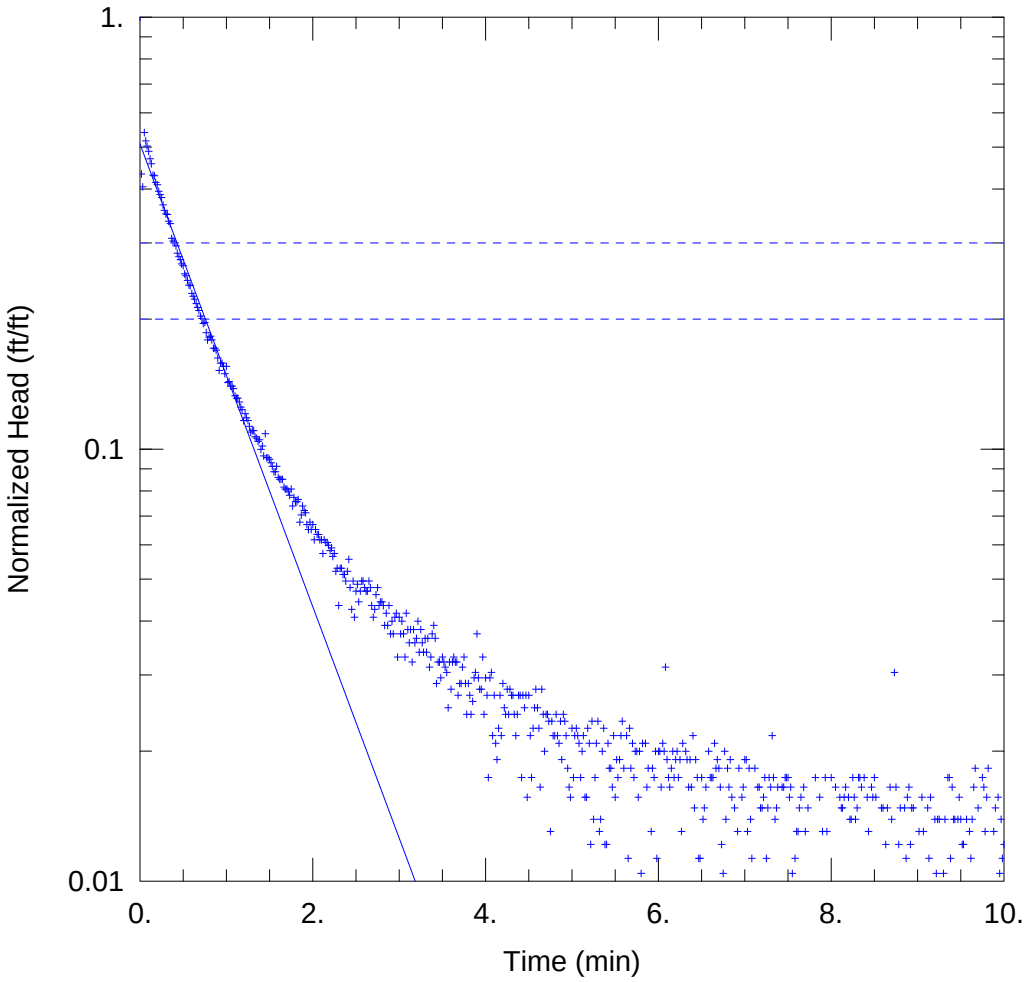
WELL DATA (H-63 Slug D Rising Head)

Initial Displacement: 1.04 ft
Static Water Column Height: 36.55 ft
Total Well Penetration Depth: 36.55 ft
Screen Length: 30. ft
Casing Radius: 0.167 ft
Well Radius: 0.3281 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.593 ft/day
y0 = 0.973 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:05:16

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

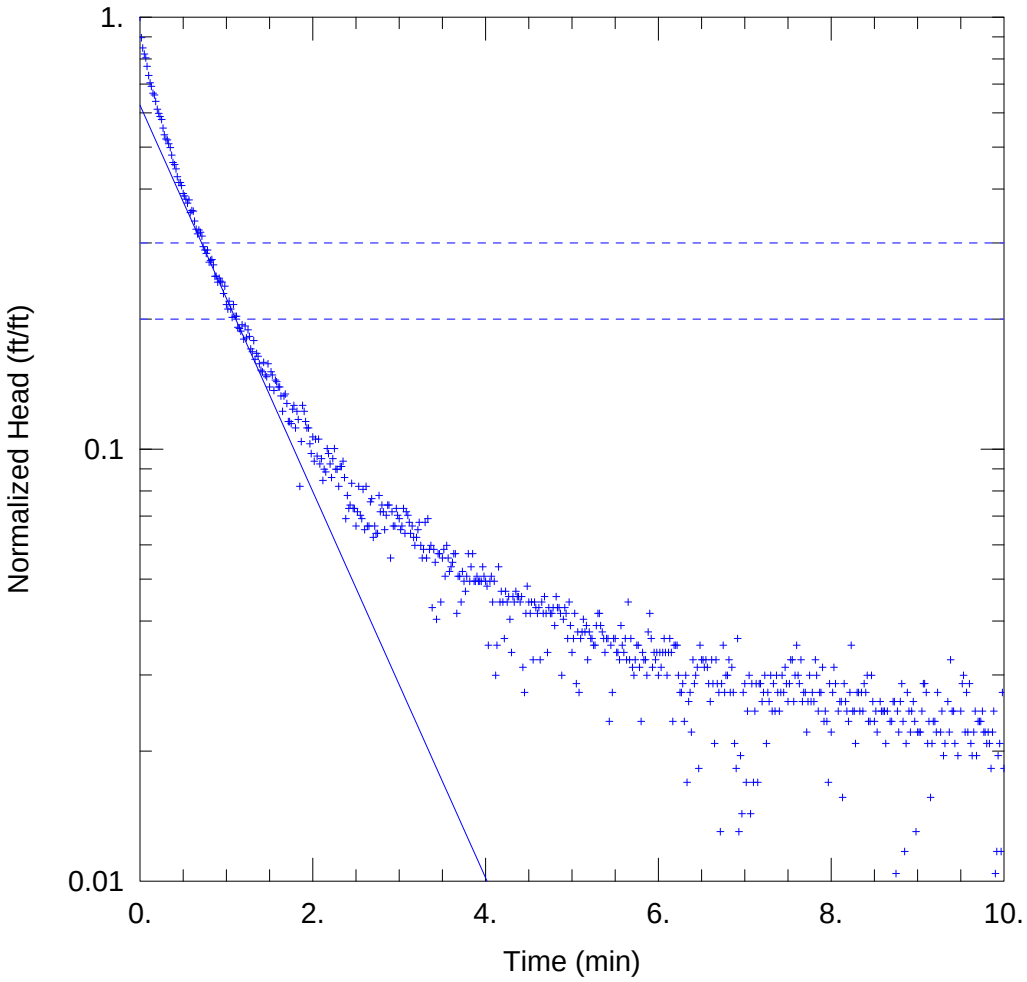
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug B Falling Head)

Initial Displacement: 1.151 ft
Total Well Penetration Depth: 88.02 ft
Casing Radius: 0.159 ft
Static Water Column Height: 88.02 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.095 ft/day
y0 = 0.5853 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:05:13

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

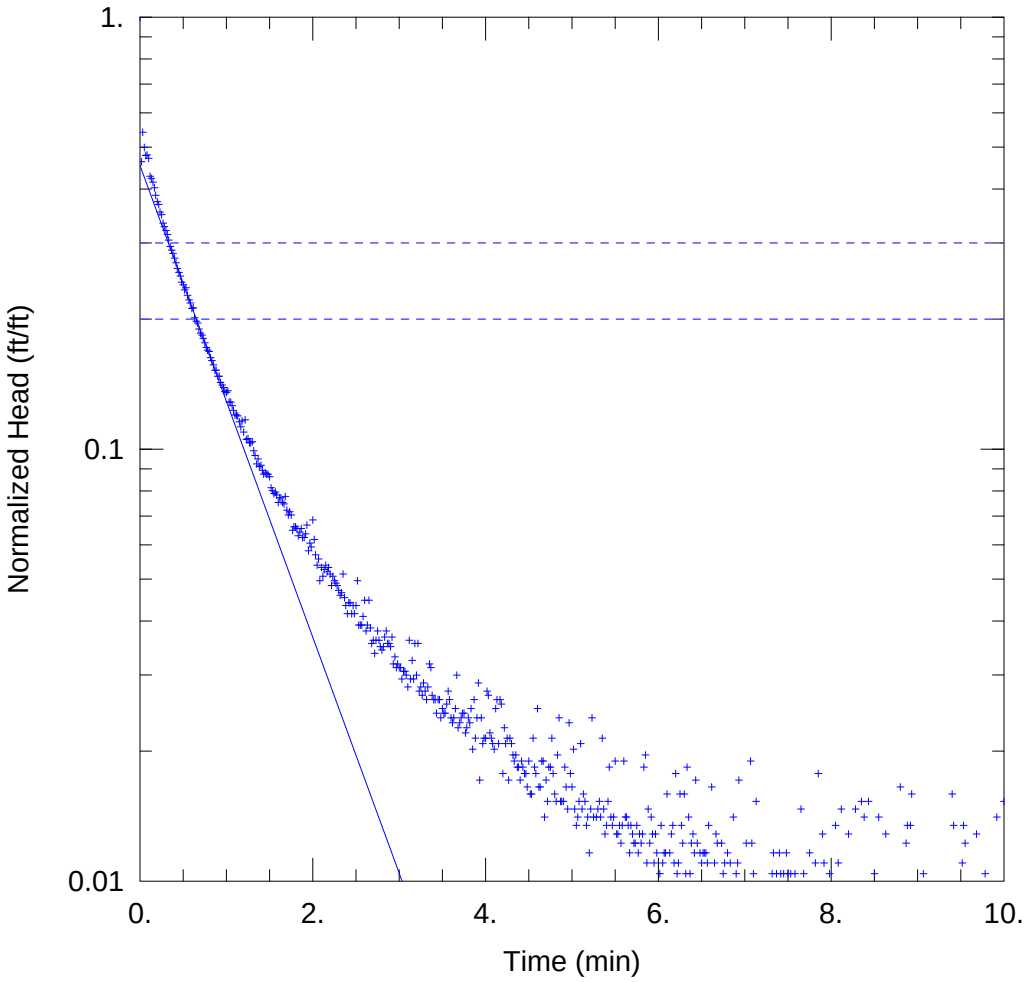
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug B Rising Head)

Initial Displacement: 0.768 ft Static Water Column Height: 88.02 ft
Total Well Penetration Depth: 88.02 ft Screen Length: 30. ft
Casing Radius: 0.159 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 2.584 ft/day y0 = 0.4802 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:05:09

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

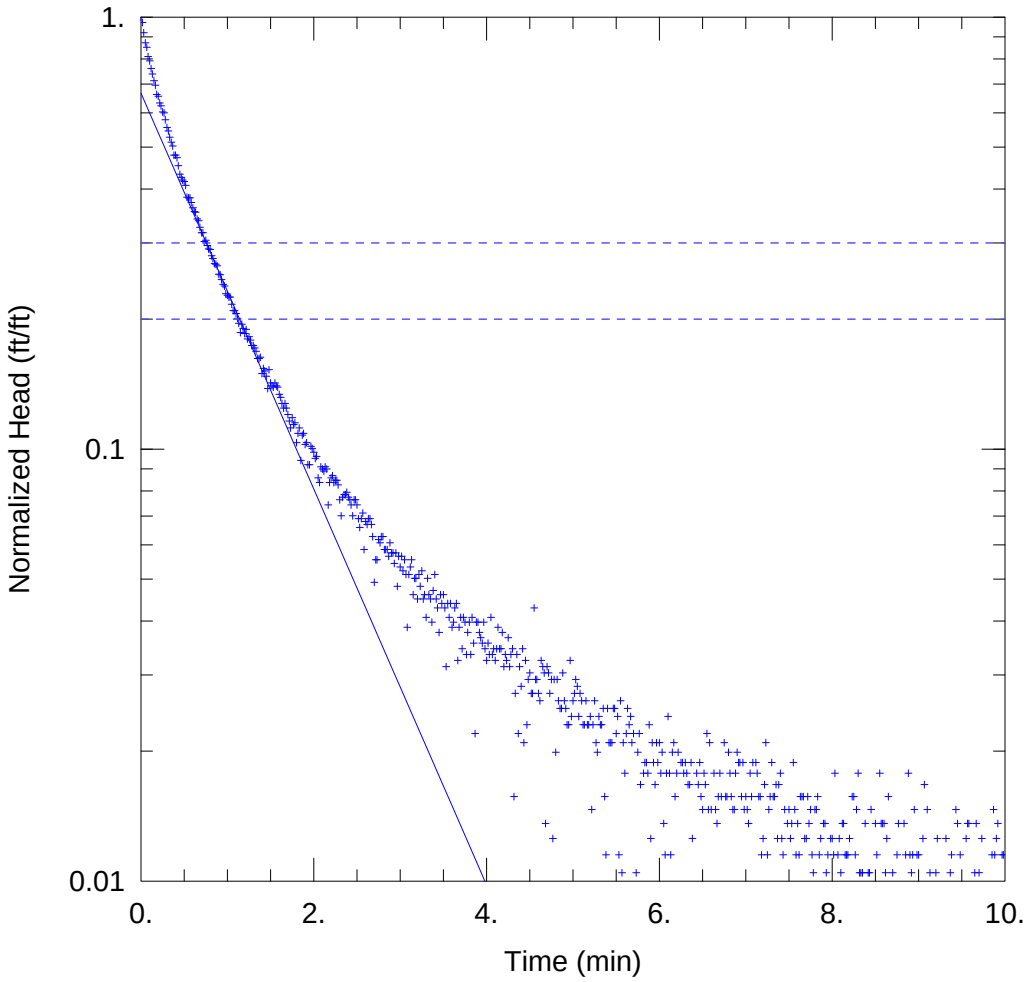
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug C Rising Head)

Initial Displacement: 1.634 ft
Total Well Penetration Depth: 88.02 ft
Casing Radius: 0.159 ft
Static Water Column Height: 88.02 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.155 ft/day
y0 = 0.7409 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:05:06

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

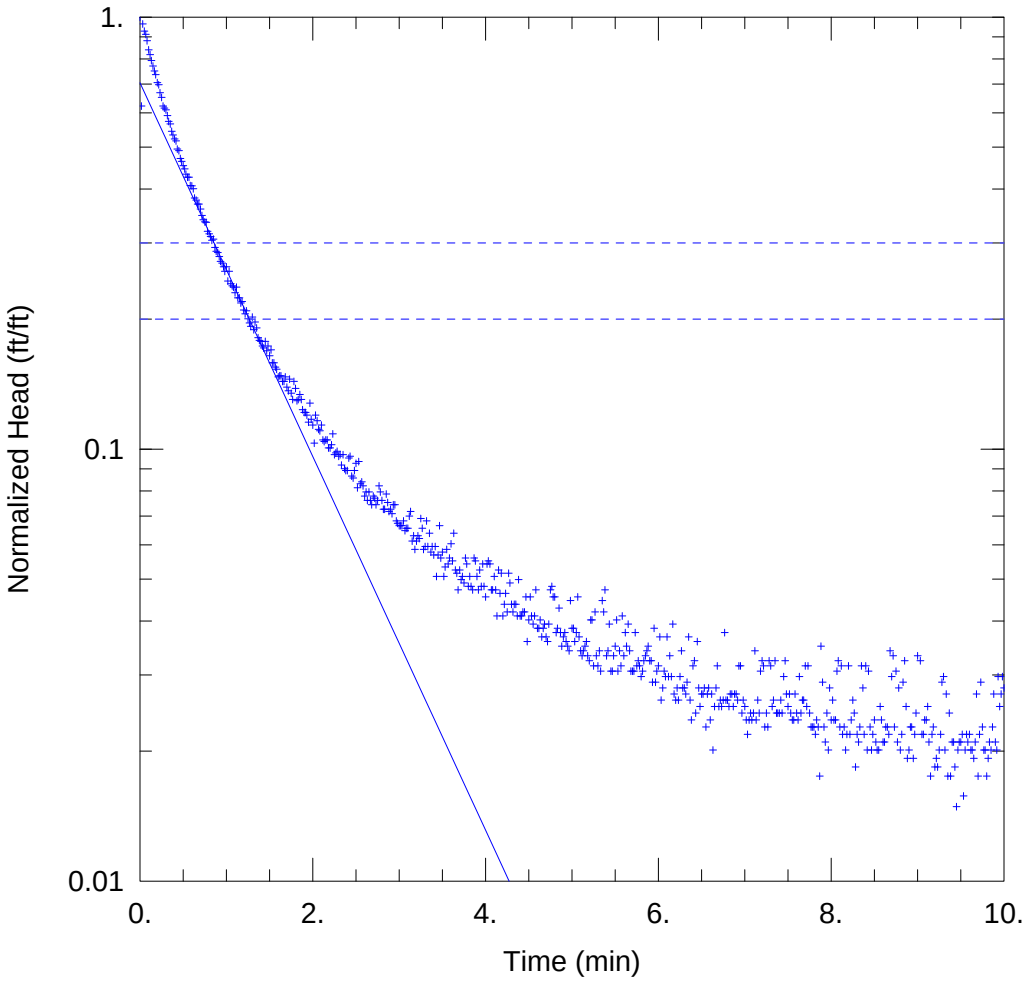
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug C Rising Head)

Initial Displacement: 0.956 ft
Total Well Penetration Depth: 88.02 ft
Casing Radius: 0.159 ft
Static Water Column Height: 88.02 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.648 ft/day
y0 = 0.6372 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:05:03

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

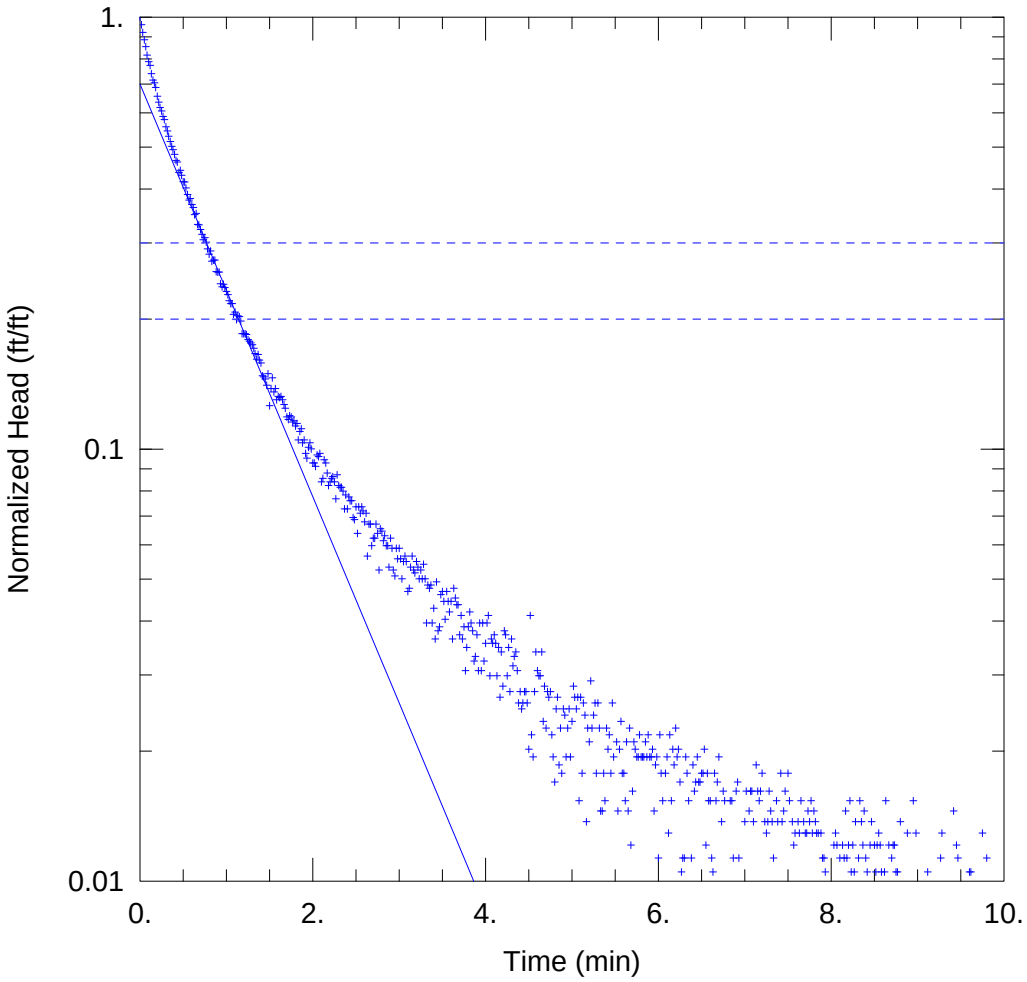
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug D Falling Head)

Initial Displacement: 1.143 ft
Total Well Penetration Depth: 88.02 ft
Casing Radius: 0.159 ft
Static Water Column Height: 88.02 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.499 ft/day
y0 = 0.8054 ft



WELL TEST ANALYSIS

Data Set: S:\...\LW-1_SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:04:39

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: LW-1
Test Date: 27 Aug 2012

AQUIFER DATA

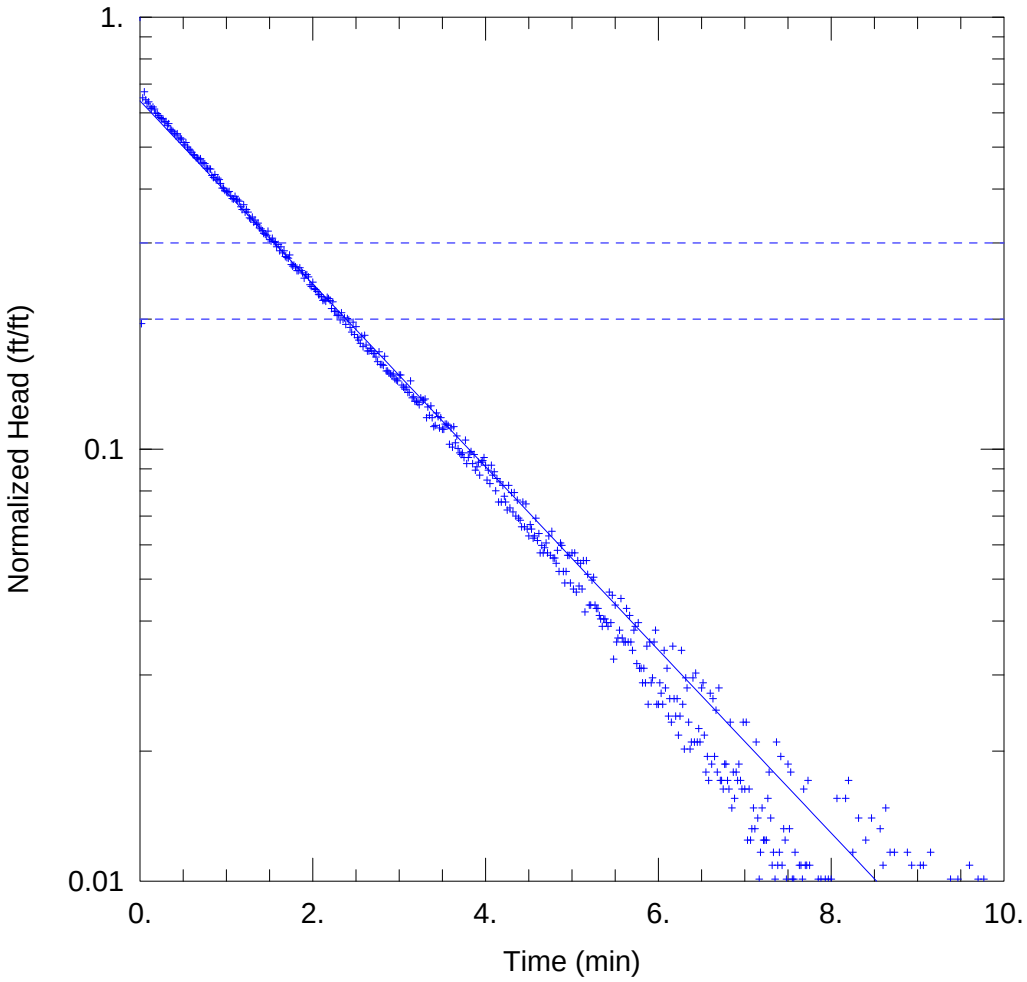
Saturated Thickness: 88.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (LW-1 Slug D Rising Head)

Initial Displacement: 1.238 ft
Total Well Penetration Depth: 88.02 ft
Casing Radius: 0.159 ft
Static Water Column Height: 88.02 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.76 ft/day
y0 = 0.8664 ft



ML-1 SLUG B FALLING HEAD

Data Set: S:\...\ML-1SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:05:53

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

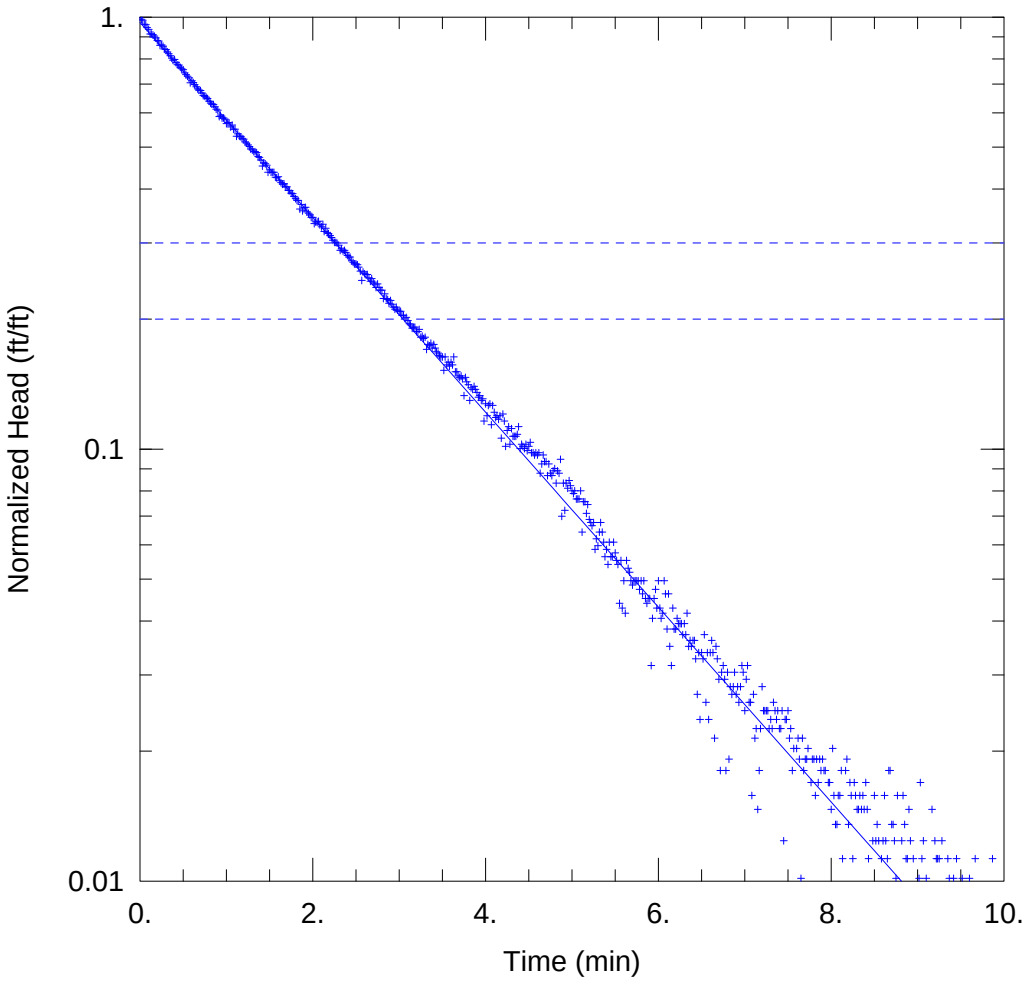
Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (ML-1)

Initial Displacement: 1.286 ft Static Water Column Height: 129.1 ft
Total Well Penetration Depth: 76.05 ft Screen Length: 19. ft
Casing Radius: 0.167 ft Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.701 ft/day y0 = 0.8229 ft



ML-1 SLUG B RISING HEAD

Data Set: S:\...\ML-1SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:05:50

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

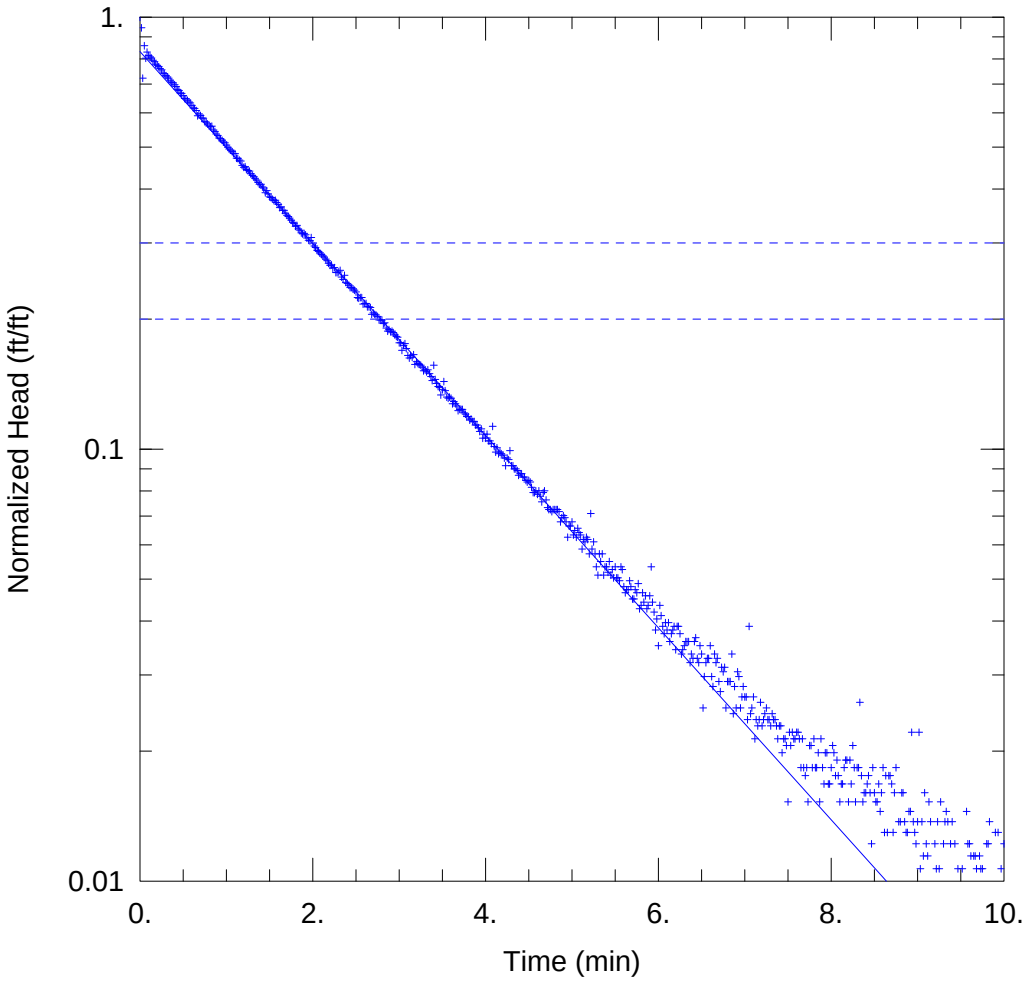
Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (ML-1)

Initial Displacement: 0.887 ft
Total Well Penetration Depth: 76.05 ft
Casing Radius: 0.167 ft
Static Water Column Height: 129.1 ft
Screen Length: 19. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.811 ft/day
y0 = 0.8617 ft



ML-1 SLUG C FALLING HEAD

Data Set: S:\...\ML-1SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:05:44

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

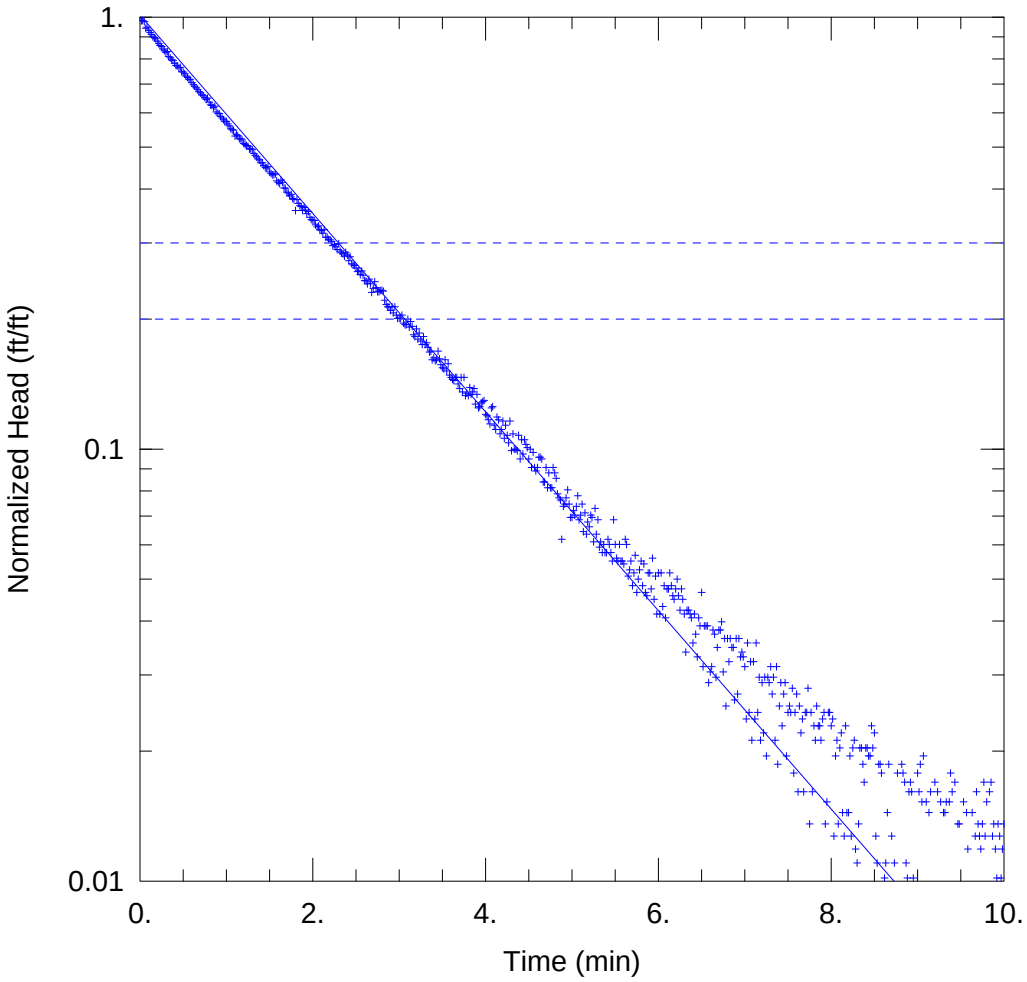
Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (ML-1)

Initial Displacement: 1.311 ft
Total Well Penetration Depth: 76.05 ft
Casing Radius: 0.167 ft
Static Water Column Height: 129.1 ft
Screen Length: 19. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.785 ft/day
y0 = 1.091 ft



ML-1 SLUG C RISING HEAD

Data Set: S:\...\ML-1SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:05:40

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

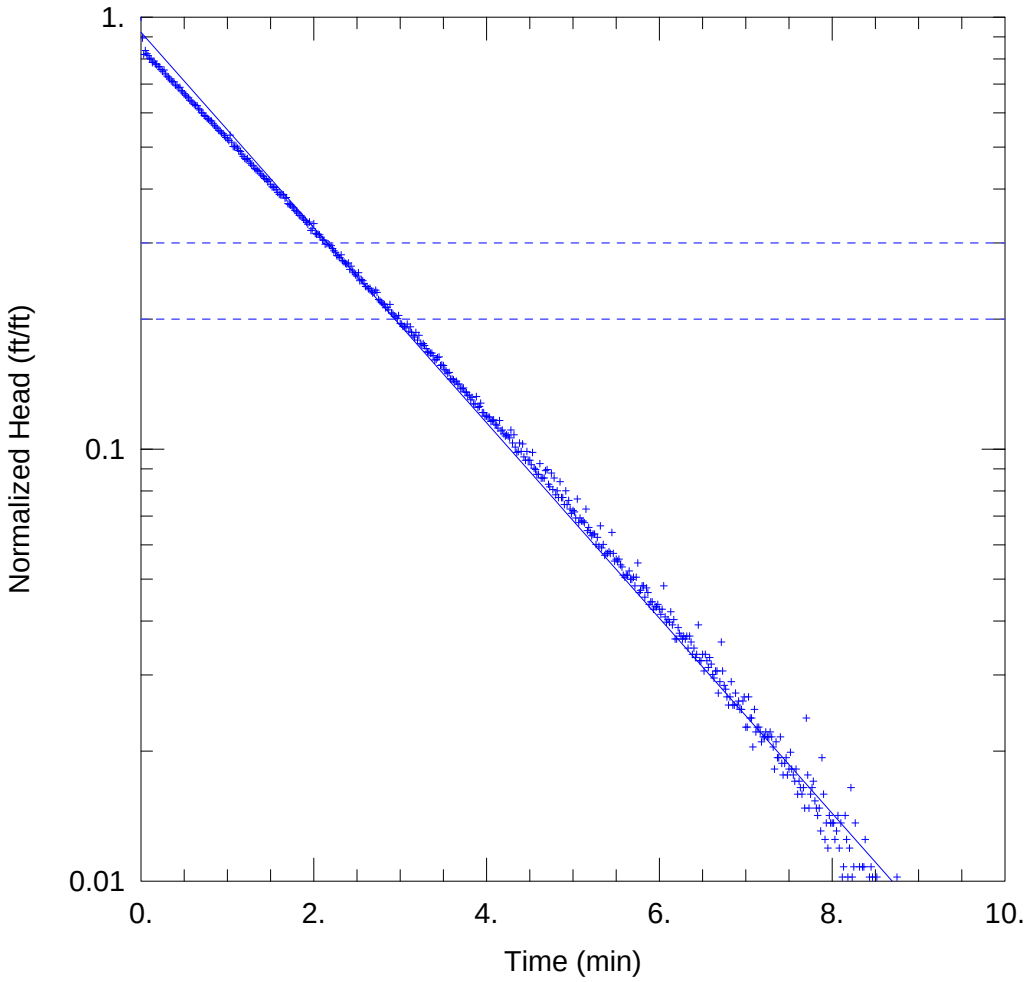
Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (ML-1)

Initial Displacement: 1.18 ft
Total Well Penetration Depth: 76.05 ft
Casing Radius: 0.167 ft
Static Water Column Height: 129.1 ft
Screen Length: 19. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.844 ft/day
y0 = 1.193 ft



ML-1 SLUG D FALLING HEAD

Data Set: S:\...\ML-1SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:05:38

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

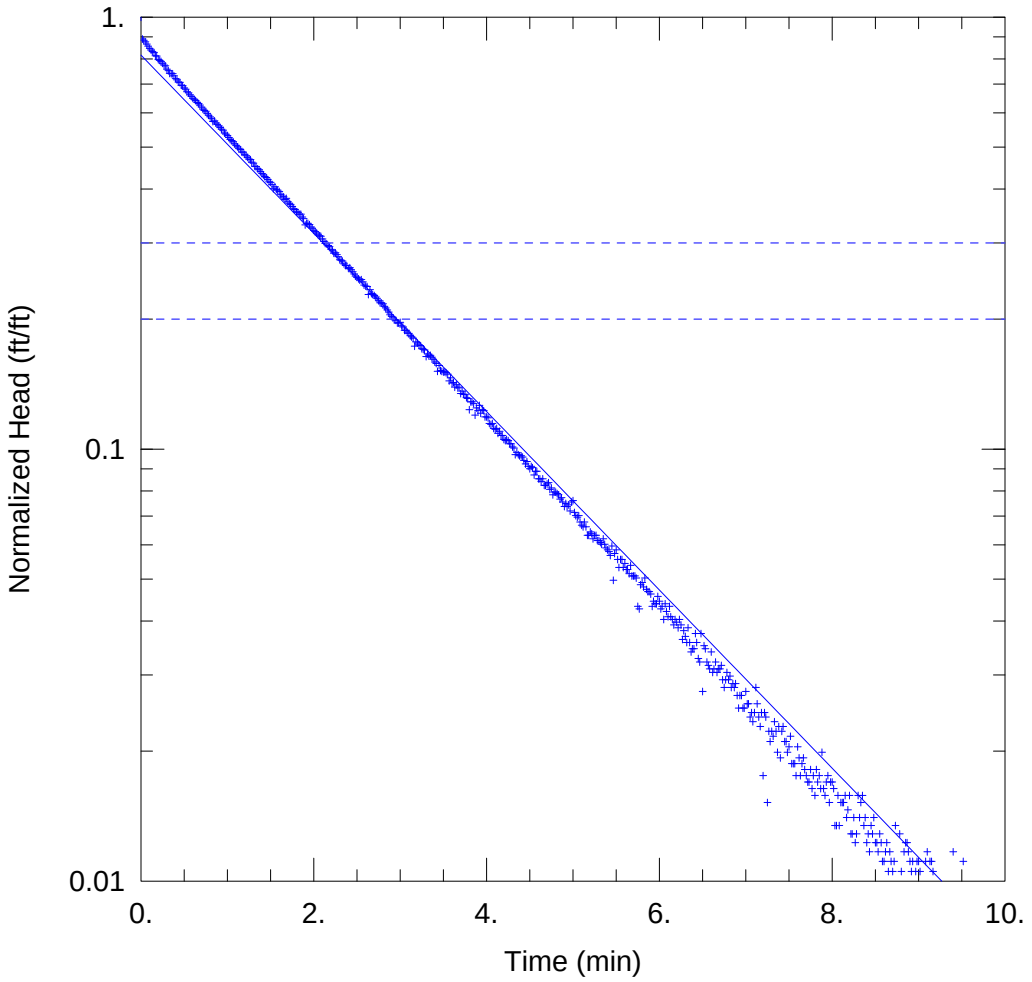
WELL DATA (ML-1)

Initial Displacement: 1.761 ft Static Water Column Height: 129.1 ft
Total Well Penetration Depth: 76.05 ft Screen Length: 19. ft
Casing Radius: 0.167 ft Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.815 ft/day y0 = 1.624 ft



ML-1 SLUG D RISING HEAD

Data Set: S:\...\ML-1SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:05:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

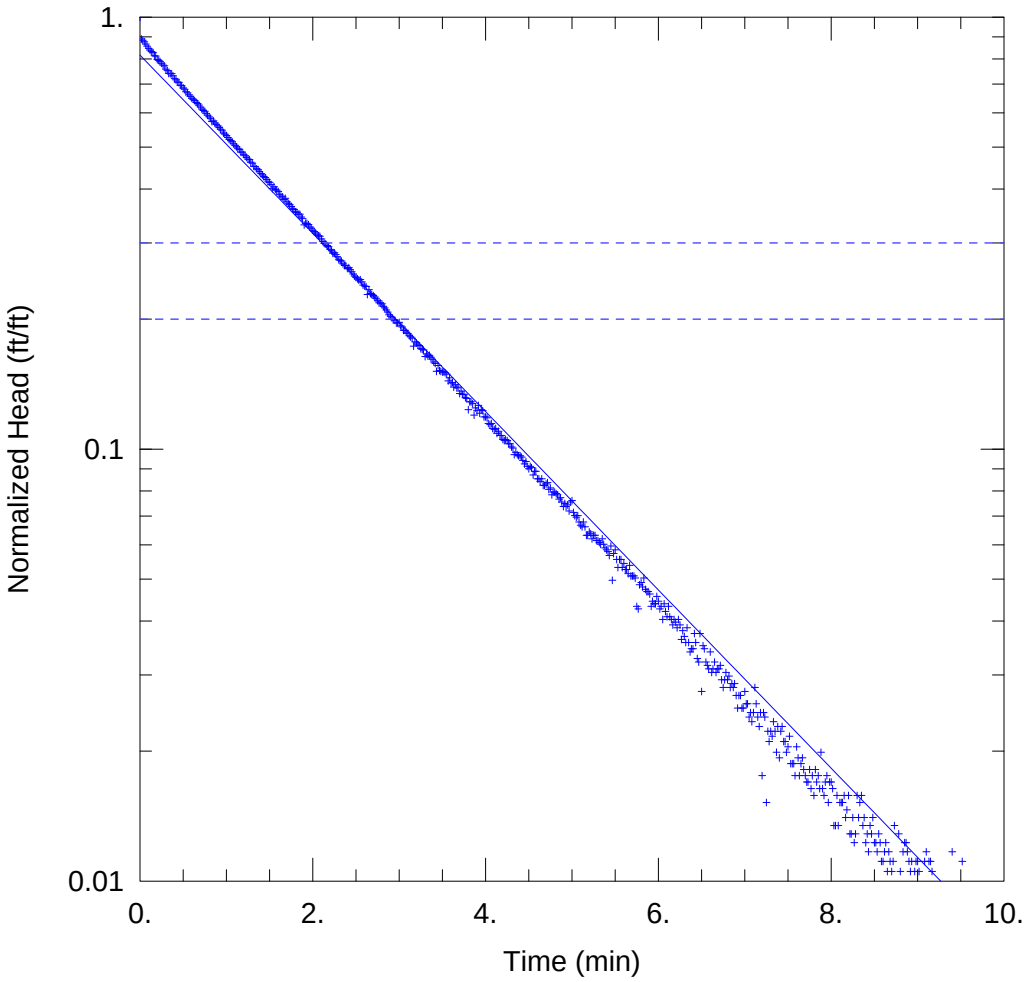
Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (ML-1)

Initial Displacement: 1.71 ft Static Water Column Height: 129.1 ft
Total Well Penetration Depth: 76.05 ft Screen Length: 19. ft
Casing Radius: 0.167 ft Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.657 ft/day y0 = 1.396 ft



ML-1 SLUG D RISING HEAD

Data Set: S:\...\ML-1SlugDRisngHead.aqt
Date: 02/19/13 Time: 13:05:32

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: ML-1
Test Date: 26 Aug 2012

AQUIFER DATA

Saturated Thickness: 115.4 ft Anisotropy Ratio (Kz/Kr): 1.

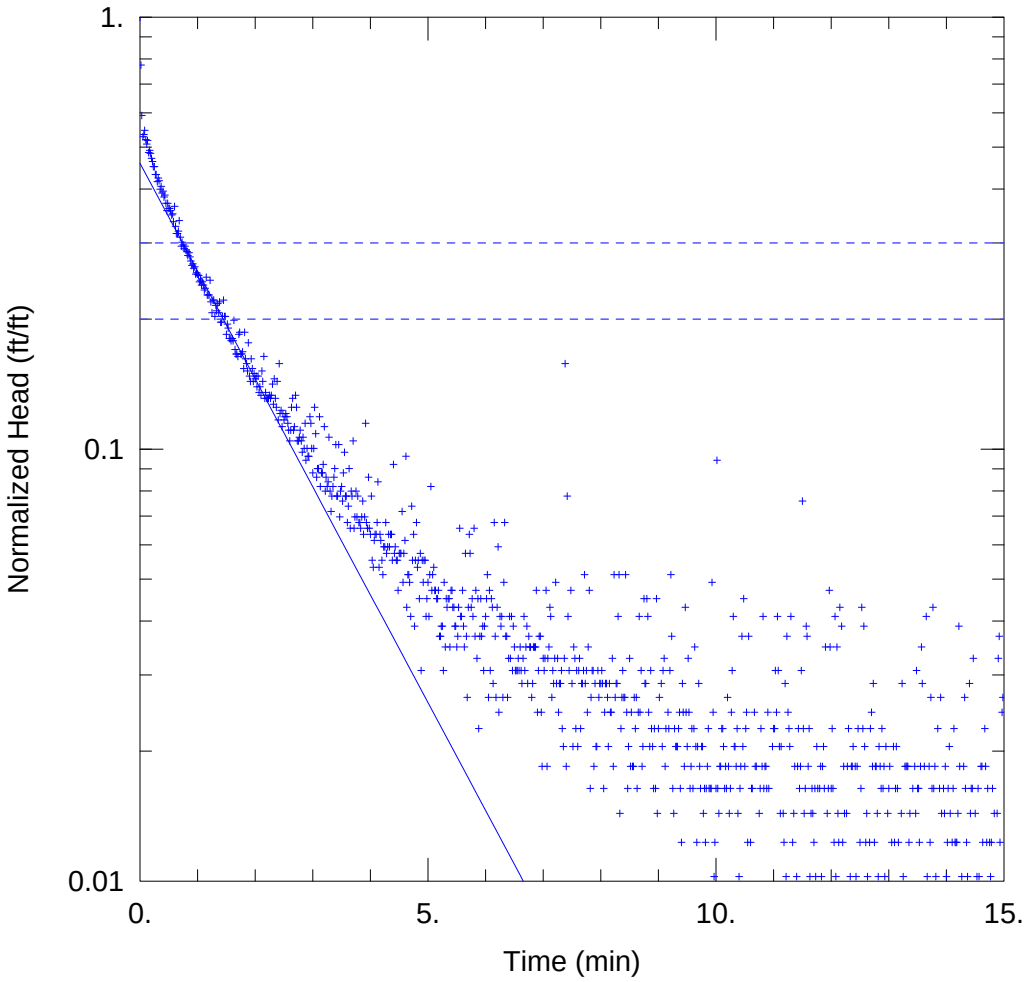
WELL DATA (ML-1)

Initial Displacement: 1.71 ft Static Water Column Height: 129.1 ft
Total Well Penetration Depth: 76.05 ft Screen Length: 19. ft
Casing Radius: 0.167 ft Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.657 ft/day y0 = 1.396 ft



MW-100 SLUG B FALLING HEAD

Data Set: S:\...\MW-100_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:07:38

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

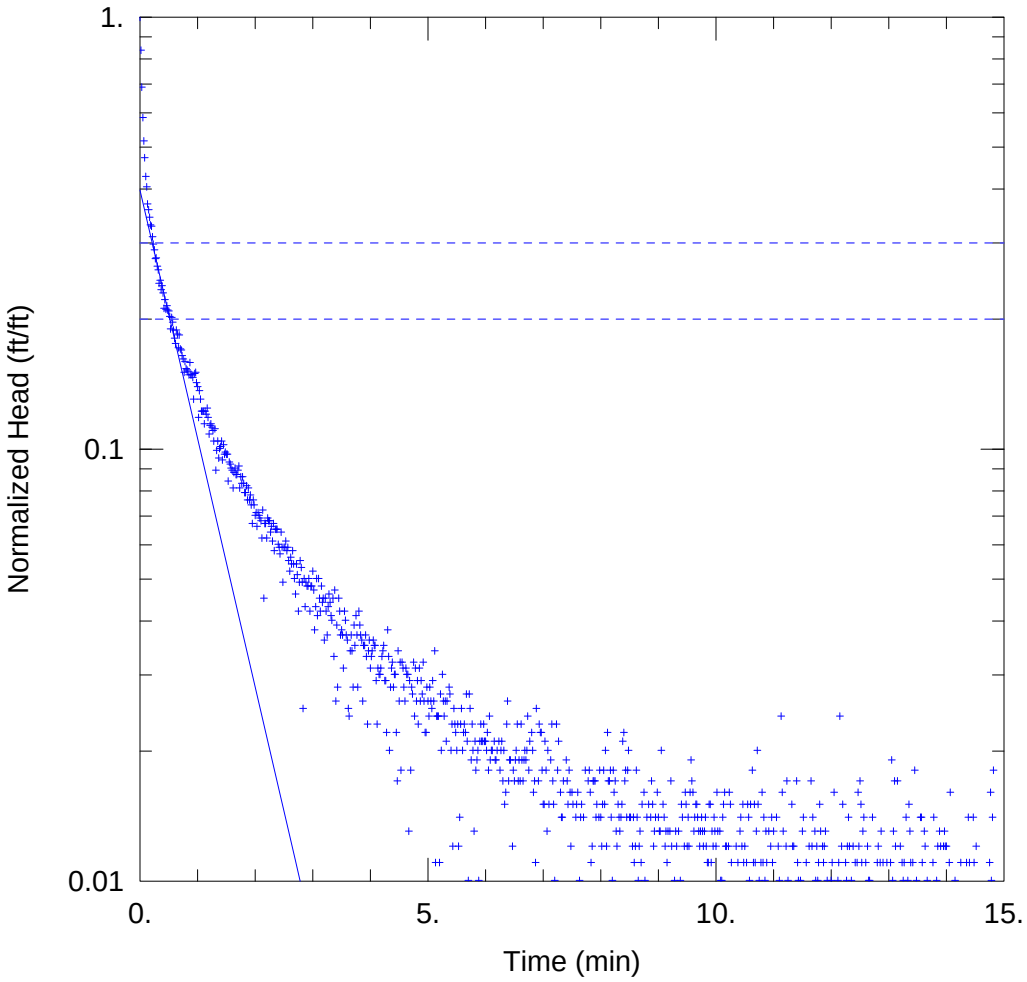
Saturated Thickness: 57.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-100)

Initial Displacement: 0.488 ft
Total Well Penetration Depth: 57.23 ft
Casing Radius: 0.167 ft
Static Water Column Height: 57.23 ft
Screen Length: 57.23 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.806 ft/day
y0 = 0.224 ft



MW-100 SLUG B RISING HEAD

Data Set: S:\...\MW-100_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:07:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

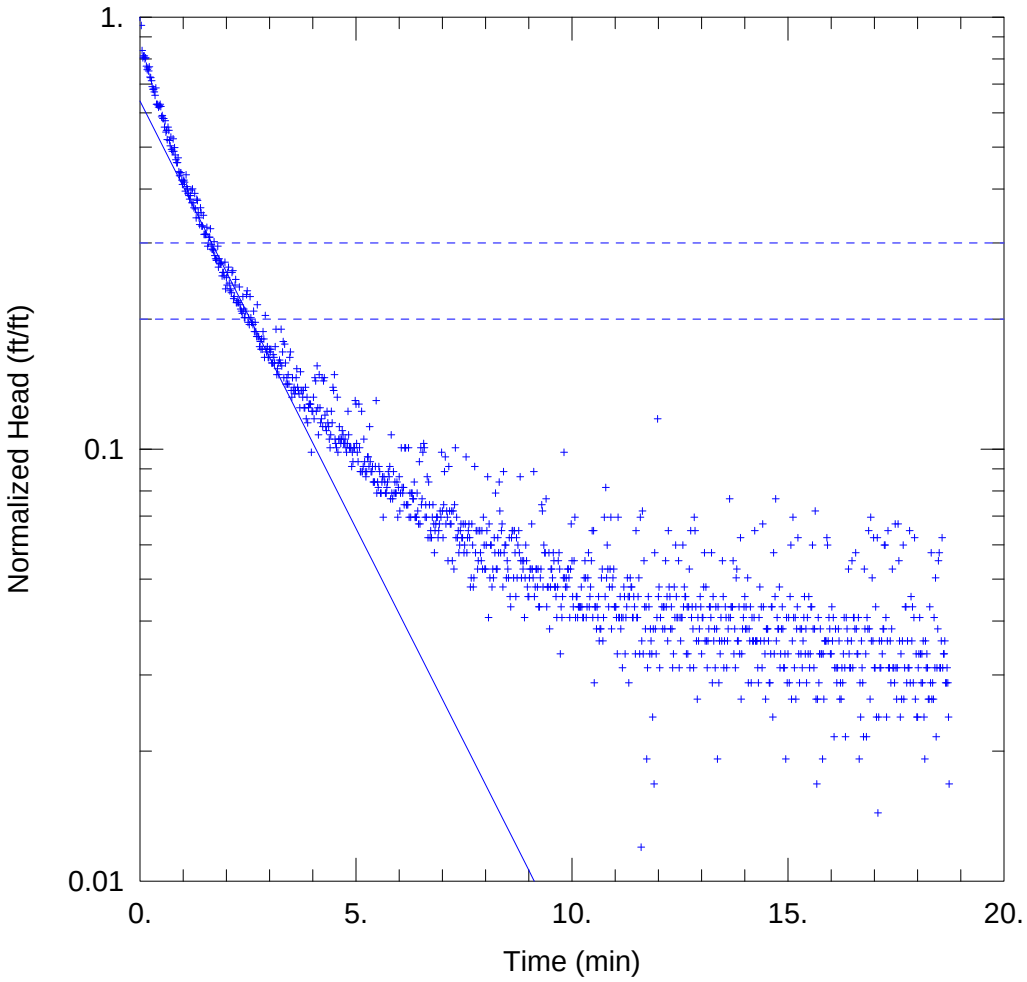
Saturated Thickness: 57.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-100)

Initial Displacement: 0.996 ft
Total Well Penetration Depth: 57.23 ft
Casing Radius: 0.167 ft
Static Water Column Height: 57.23 ft
Screen Length: 57.23 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.856 ft/day
y0 = 0.396 ft



MW-100 SLUG C FALLING HEAD

Data Set: S:\...\MW-100_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:07:32

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

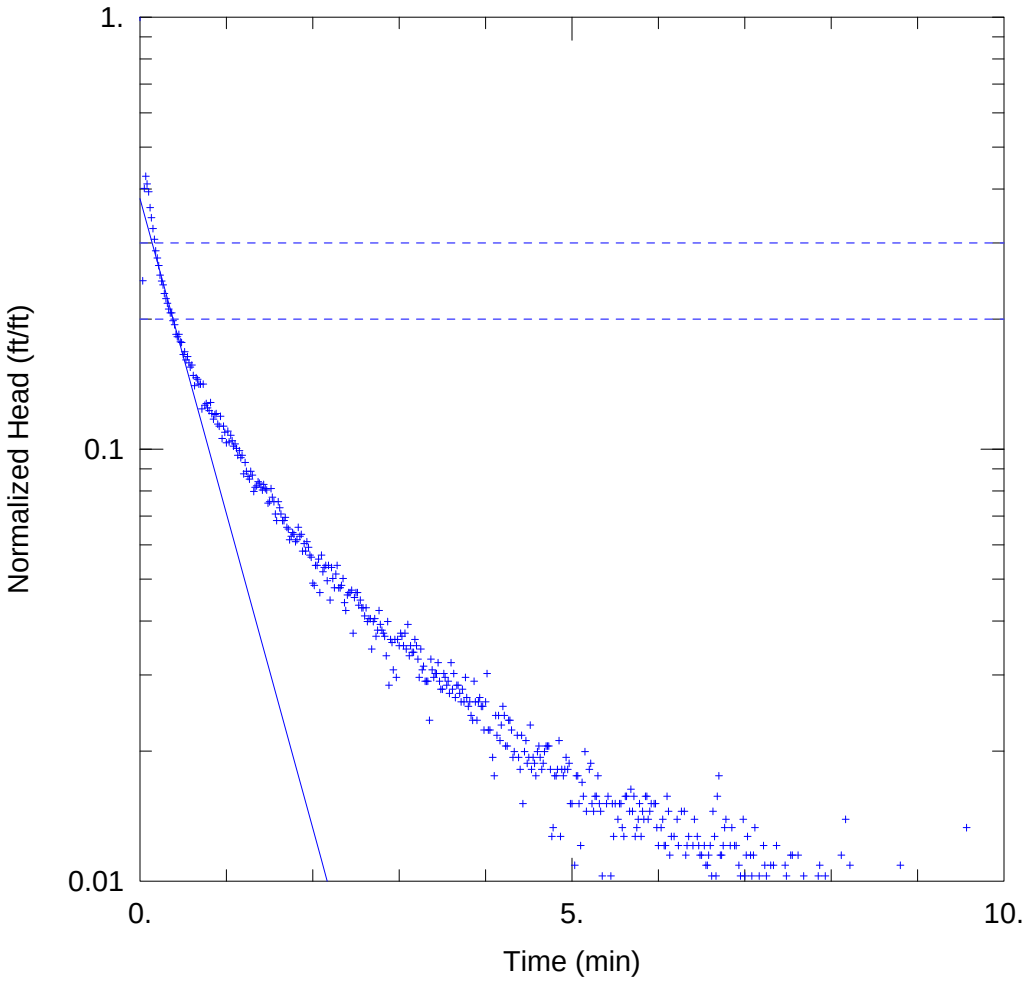
Saturated Thickness: 57.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-100)

Initial Displacement: 0.417 ft
Total Well Penetration Depth: 57.23 ft
Casing Radius: 0.167 ft
Static Water Column Height: 57.23 ft
Screen Length: 57.23 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
K = 0.6385 ft/day
Solution Method: Bouwer-Rice
y0 = 0.2666 ft



MW-100 SLUG C RISING HEAD

Data Set: S:\...\MW-100_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:07:29

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

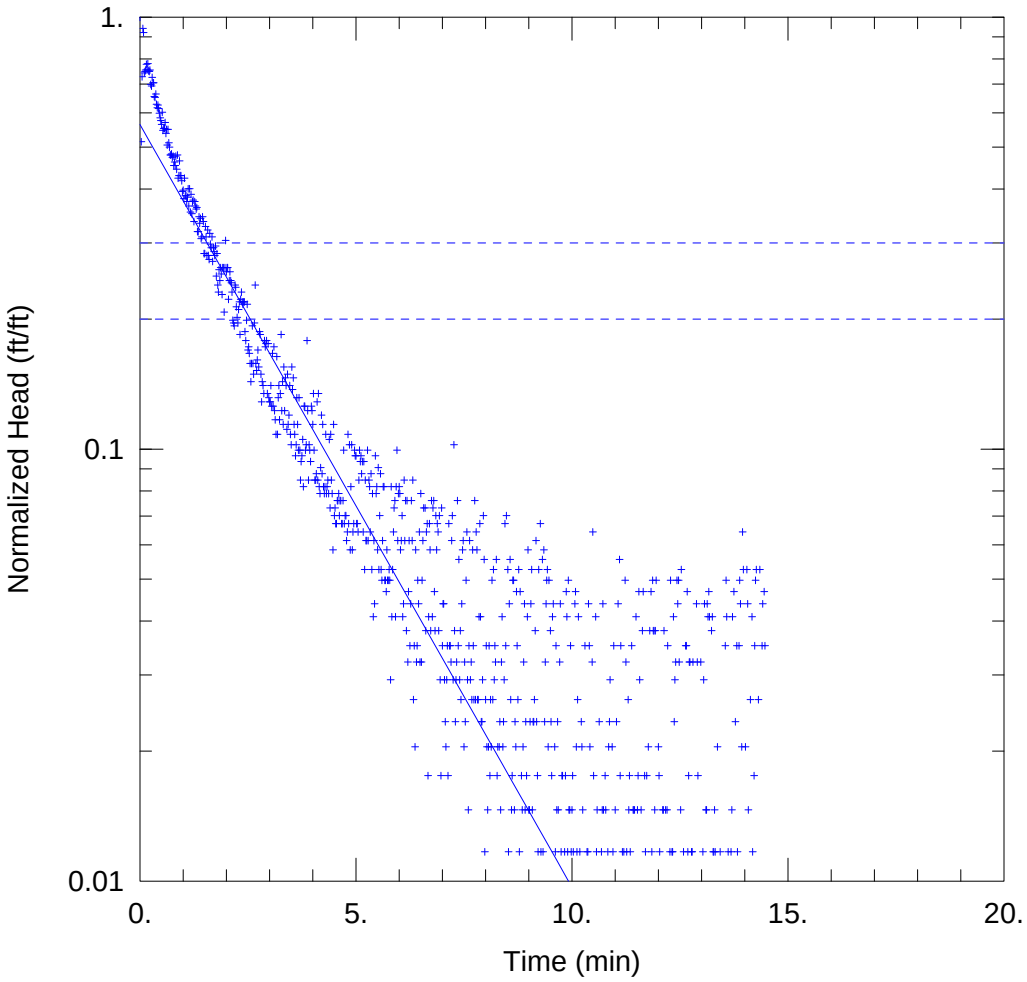
Saturated Thickness: 57.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-100)

Initial Displacement: 1.654 ft
Total Well Penetration Depth: 57.23 ft
Casing Radius: 0.167 ft
Static Water Column Height: 57.23 ft
Screen Length: 57.23 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.352 ft/day
y0 = 0.6285 ft



MW-100 SLUG F FALLING HEAD

Data Set: S:\...\MW-100_SlugFFallingHead.aqt
Date: 02/19/13 Time: 13:07:26

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

Saturated Thickness: 57.23 ft Anisotropy Ratio (Kz/Kr): 1.

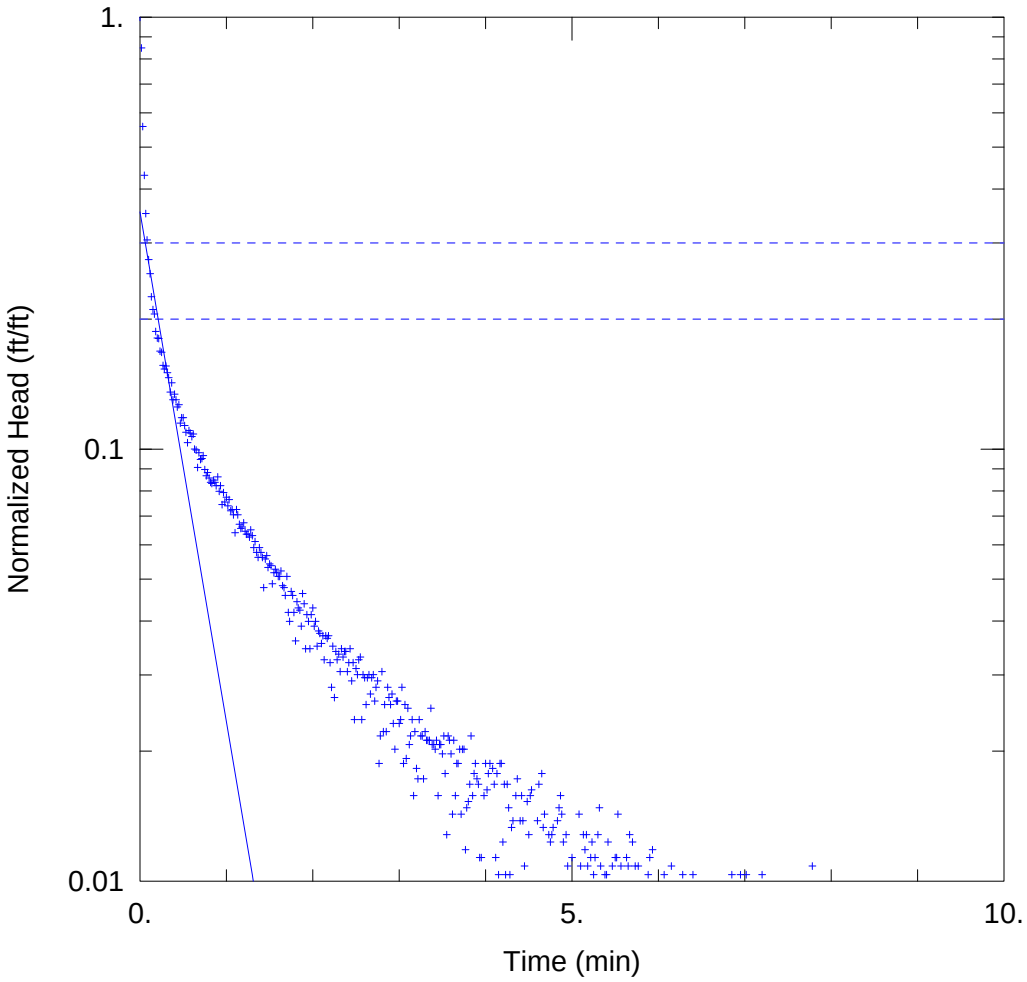
WELL DATA (MW-100)

Initial Displacement: 0.342 ft
Total Well Penetration Depth: 57.23 ft
Casing Radius: 0.167 ft
Static Water Column Height: 57.23 ft
Screen Length: 57.23 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.5697 ft/day
y0 = 0.1929 ft



MW-100 SLUG F RISING HEAD

Data Set: S:\...\MW-100_SlugFRisingHead.aqt
Date: 02/19/13 Time: 13:07:22

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-100
Test Date: 3 Nov 2012

AQUIFER DATA

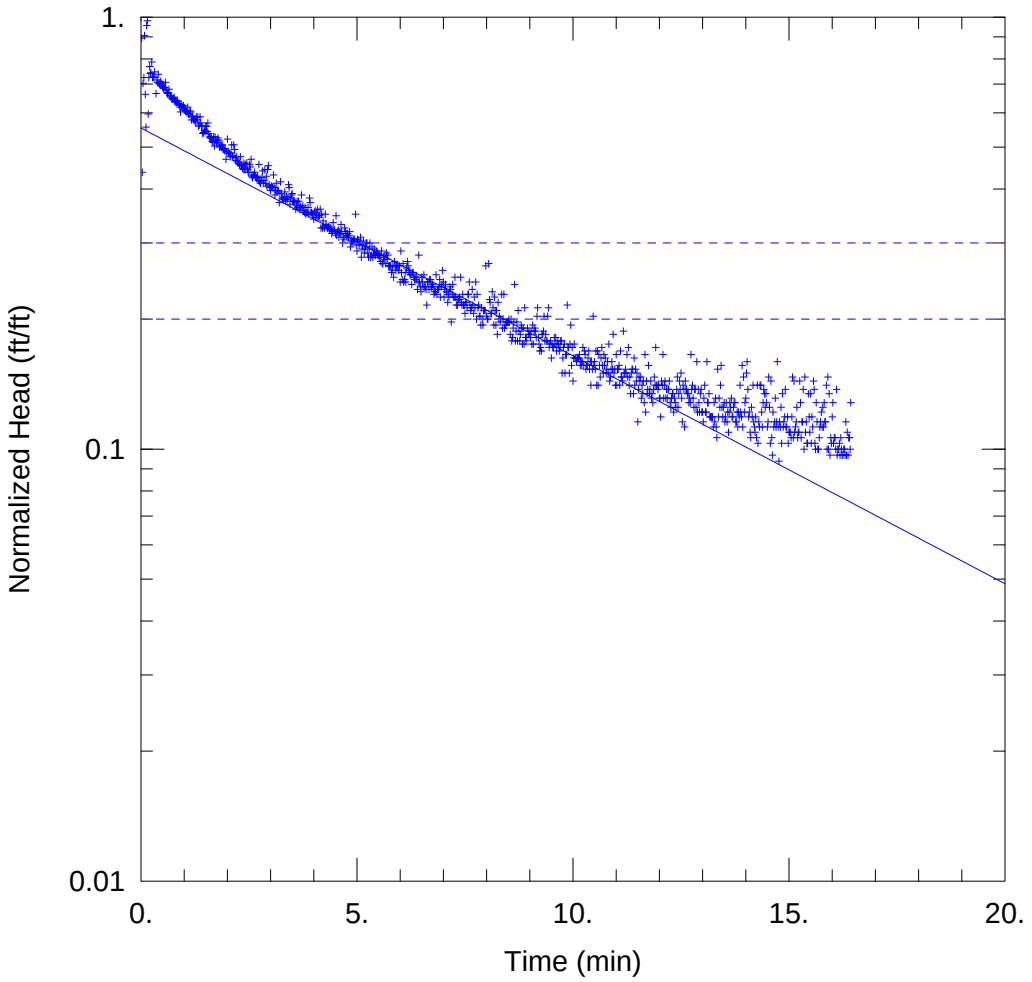
Saturated Thickness: 57.23 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-100)

Initial Displacement: 2.029 ft Static Water Column Height: 57.23 ft
Total Well Penetration Depth: 57.23 ft Screen Length: 57.23 ft
Casing Radius: 0.167 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 3.81 ft/day y0 = 0.7185 ft



MW-101 SLUG A FALLING HEAD

Data Set: S:\...\MW-101_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:08:10

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-101
Test Date: 4 Nov 2012

AQUIFER DATA

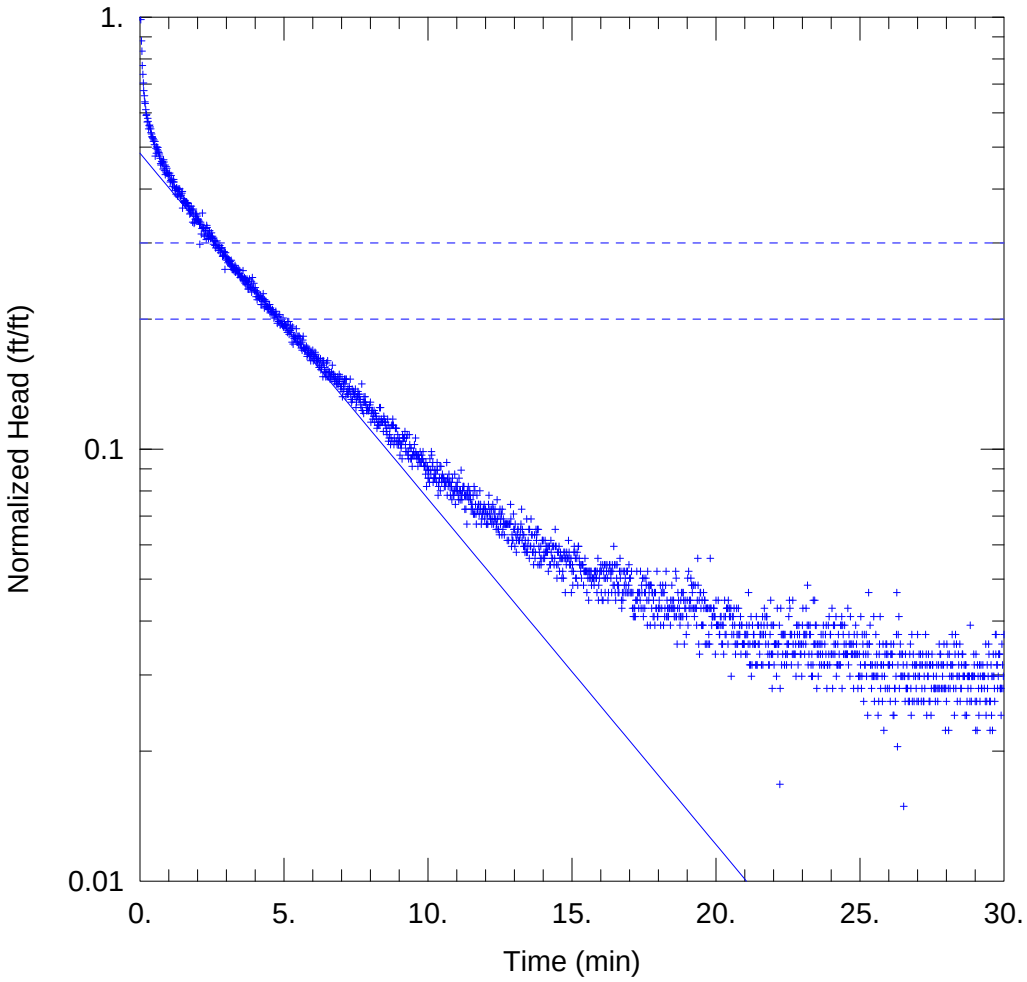
Saturated Thickness: 9.765 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-101)

Initial Displacement: 0.32 ft
Total Well Penetration Depth: 9.765 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.765 ft
Screen Length: 9.765 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
K = 0.637 ft/day
Solution Method: Bouwer-Rice
y0 = 0.1772 ft



MW-101 SLUG A RISING HEAD

Data Set: S:\...\MW-101_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:08:07

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-101
Test Date: 4 Nov 2012

AQUIFER DATA

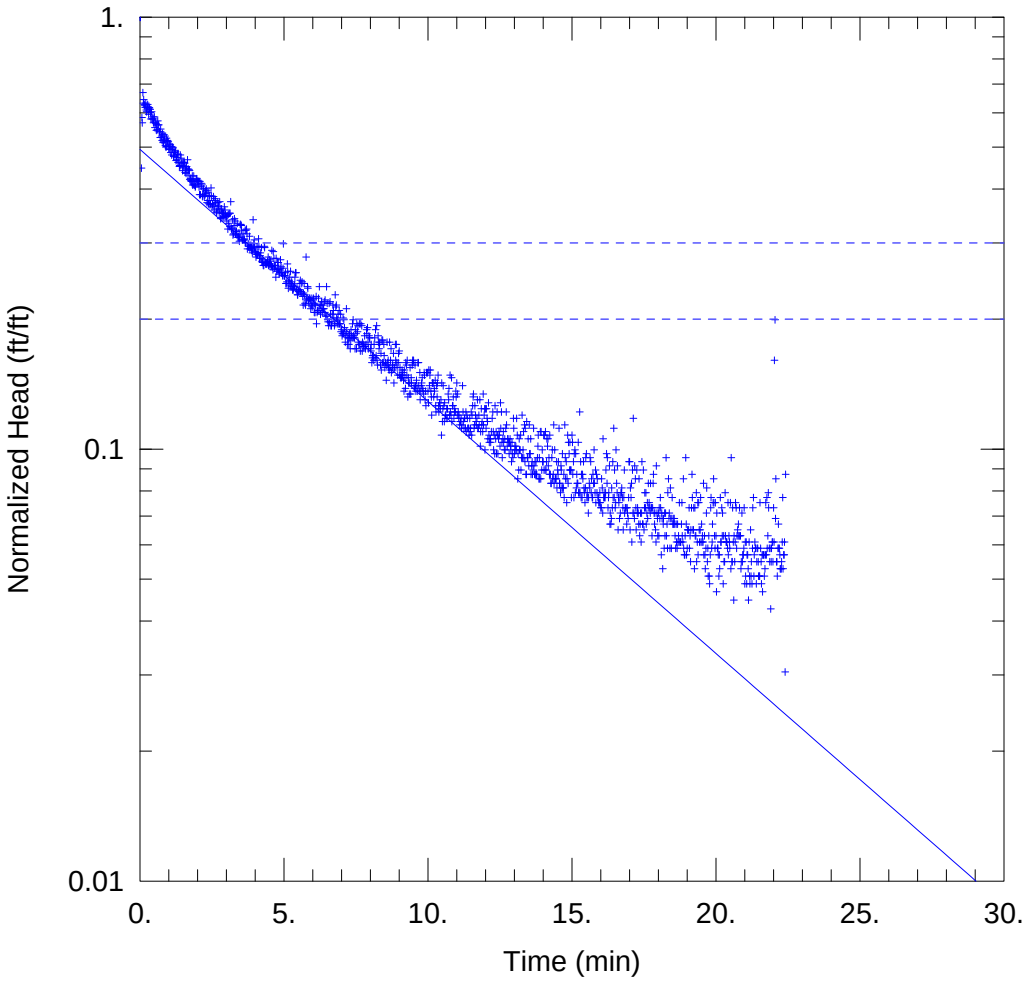
Saturated Thickness: 9.765 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-101)

Initial Displacement: 0.537 ft
Total Well Penetration Depth: 9.765 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.765 ft
Screen Length: 9.765 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.9664 ft/day
y0 = 0.26 ft



MW-101 SLUG G FALLING HEAD

Data Set: S:\...\MW-101_SlugGFallingHead.aqt
Date: 02/19/13 Time: 13:08:03

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-101
Test Date: 4 Nov 2012

AQUIFER DATA

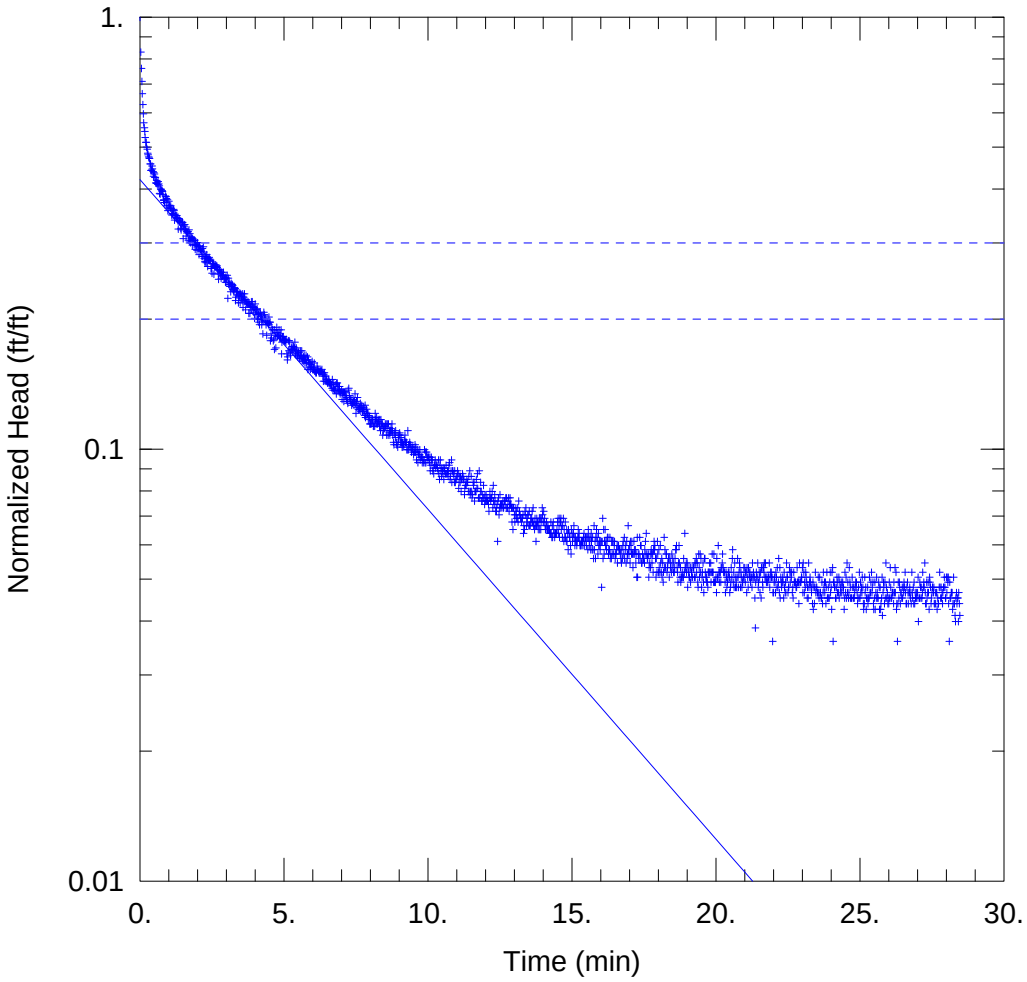
Saturated Thickness: 9.765 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-101)

Initial Displacement: 0.492 ft
Total Well Penetration Depth: 9.765 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.765 ft
Screen Length: 9.765 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7047 ft/day
y0 = 0.2431 ft



MW-101 SLUG G RISING HEAD

Data Set: S:\...\MW-101_SlugGRisingHead.aqt
Date: 02/19/13 Time: 13:07:59

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-101
Test Date: 4 Nov 2012

AQUIFER DATA

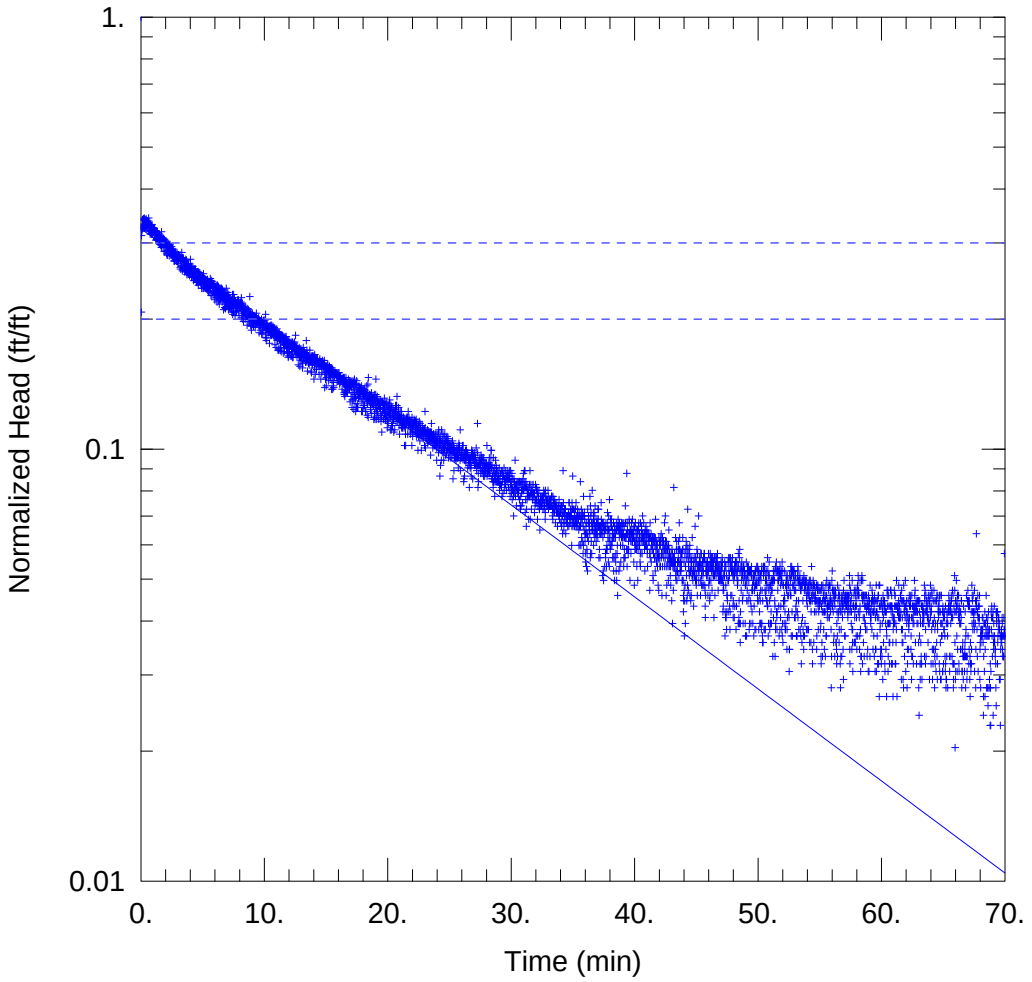
Saturated Thickness: 9.765 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-101)

Initial Displacement: 0.752 ft
Total Well Penetration Depth: 9.765 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.765 ft
Screen Length: 9.765 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.9221 ft/day
y0 = 0.3164 ft



MW-102 SLUG A FALLING HEAD

Data Set: S:\...\MW-102_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:08:40

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102
Test Date: 3 Nov 2012

AQUIFER DATA

Saturated Thickness: 9.233 ft Anisotropy Ratio (Kz/Kr): 1.

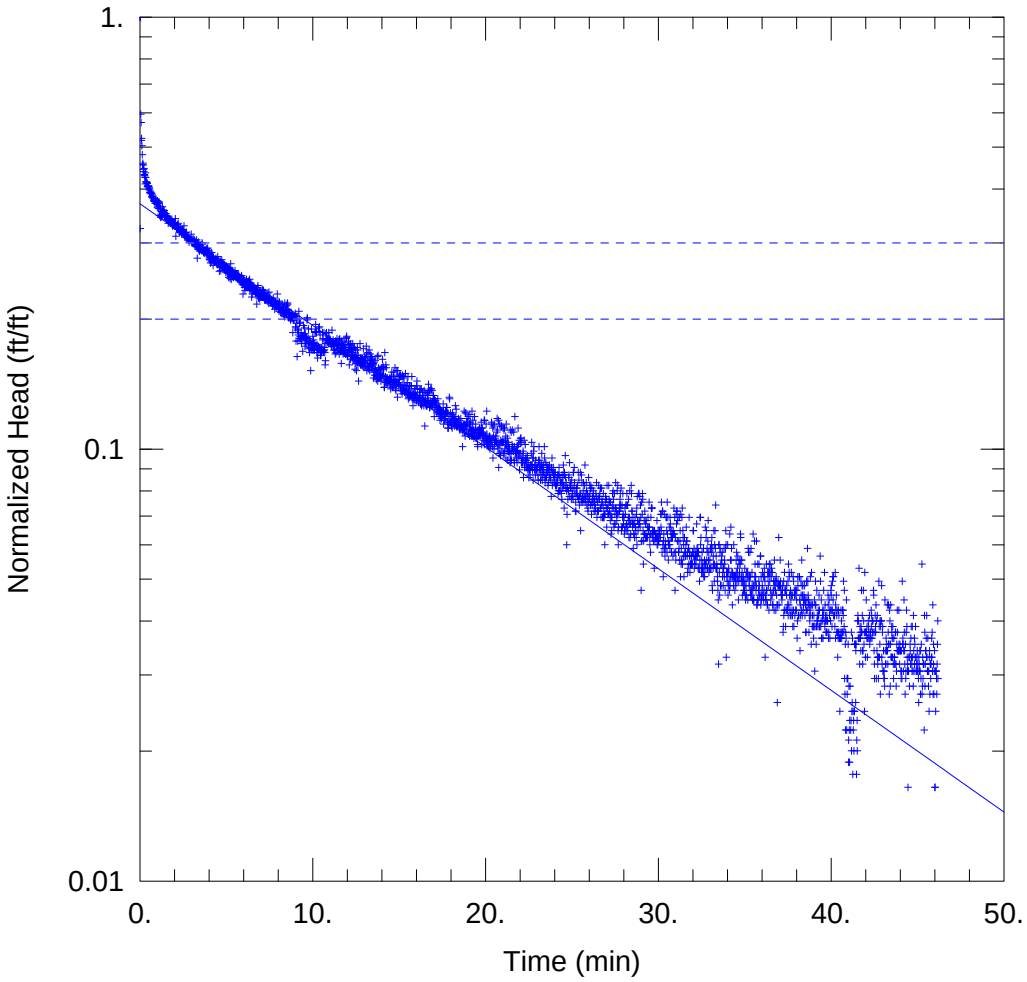
WELL DATA (MW-102)

Initial Displacement: 0.785 ft
Total Well Penetration Depth: 9.233 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.233 ft
Screen Length: 9.233 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.2671 ft/day
y0 = 0.2541 ft



MW-102 SLUG A RISING HEAD

Data Set: S:\...\MW-102_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:08:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102
Test Date: 3 Nov 2012

AQUIFER DATA

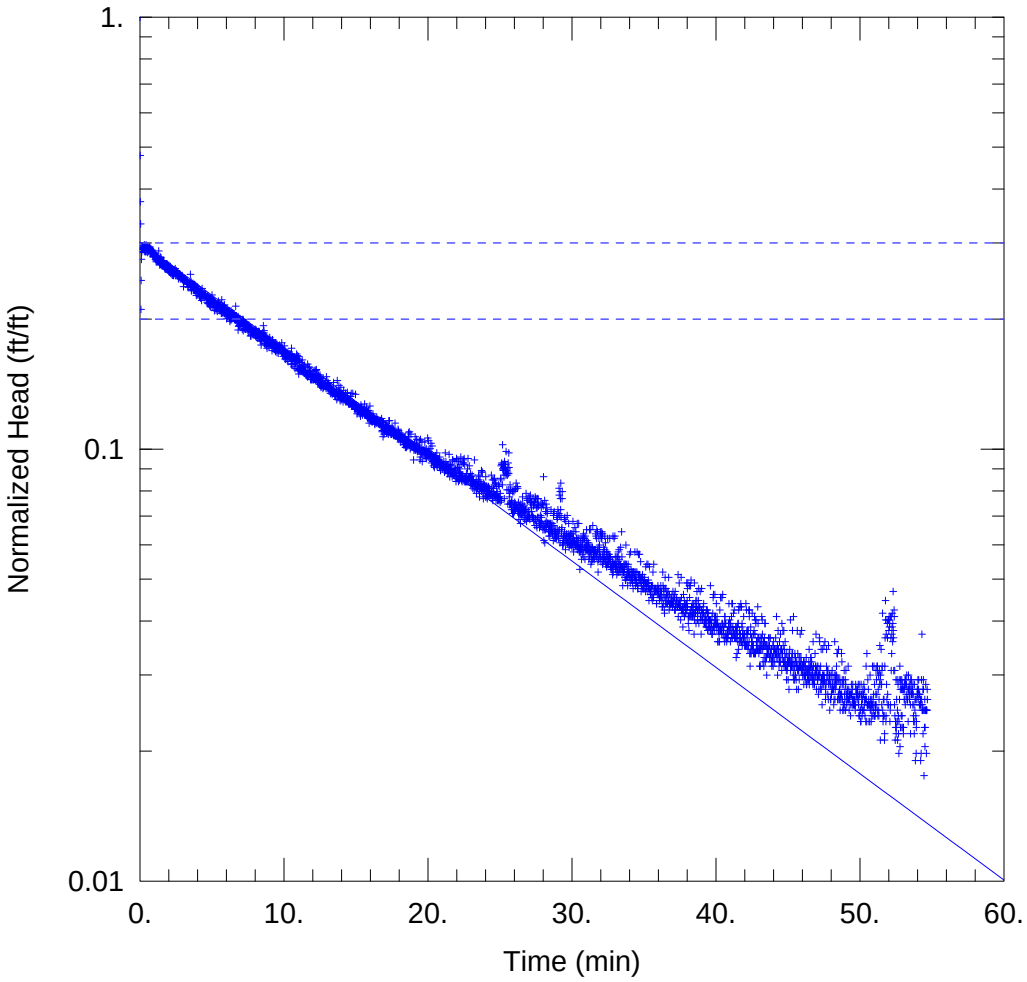
Saturated Thickness: 9.233 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102)

Initial Displacement: 0.849 ft
Total Well Penetration Depth: 9.233 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.233 ft
Screen Length: 9.233 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3529 ft/day
y0 = 0.3139 ft



MW-102 SLUG F FALLING HEAD

Data Set: S:\...\MW-102_SlugFFallingHead.aqt
Date: 02/19/13 Time: 13:08:32

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102
Test Date: 3 Nov 2012

AQUIFER DATA

Saturated Thickness: 9.233 ft Anisotropy Ratio (Kz/Kr): 1.

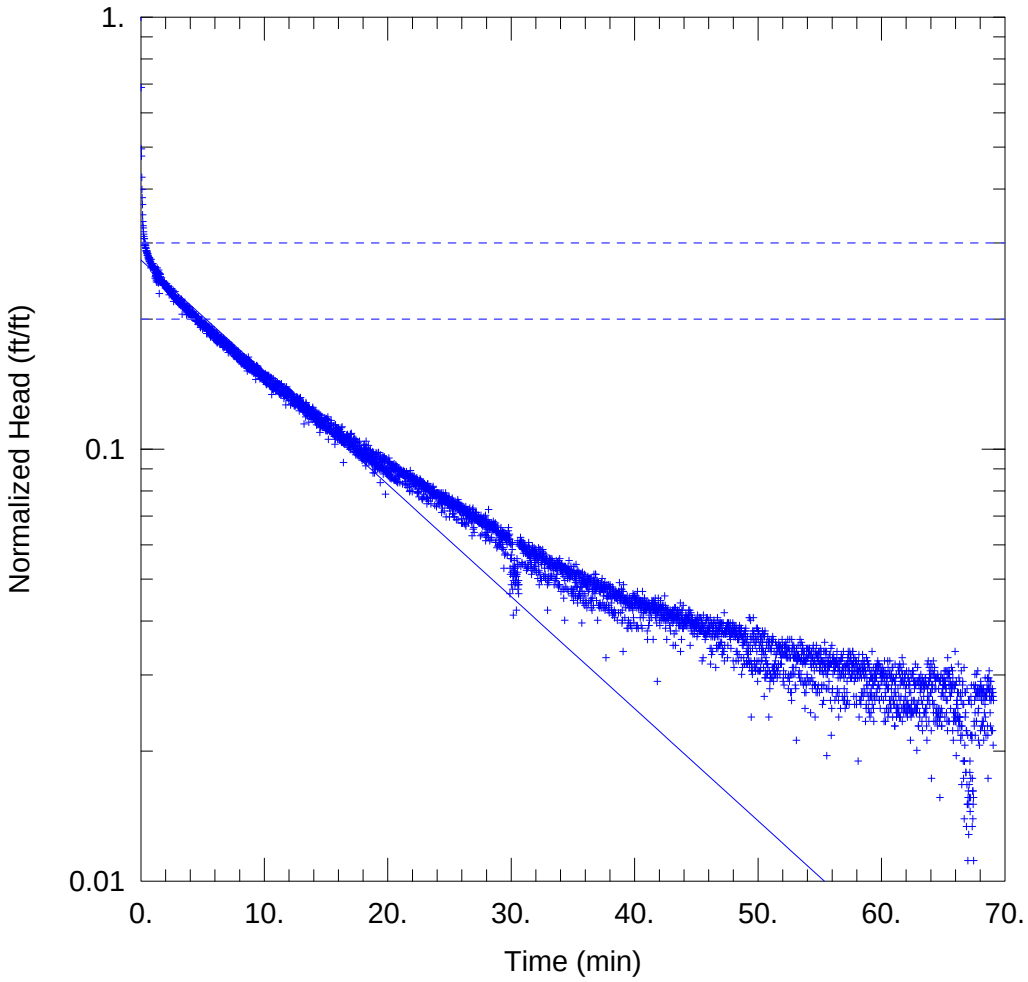
WELL DATA (MW-102)

Initial Displacement: 1.367 ft
Total Well Penetration Depth: 9.233 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.233 ft
Screen Length: 9.233 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.3085 ft/day
y0 = 0.412 ft



MW-102 SLUG F RISING HEAD

Data Set: S:\...\MW-102_SlugFRisingHead.aqt
Date: 02/19/13 Time: 13:08:27

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102
Test Date: 3 Nov 2012

AQUIFER DATA

Saturated Thickness: 9.233 ft Anisotropy Ratio (Kz/Kr): 1.

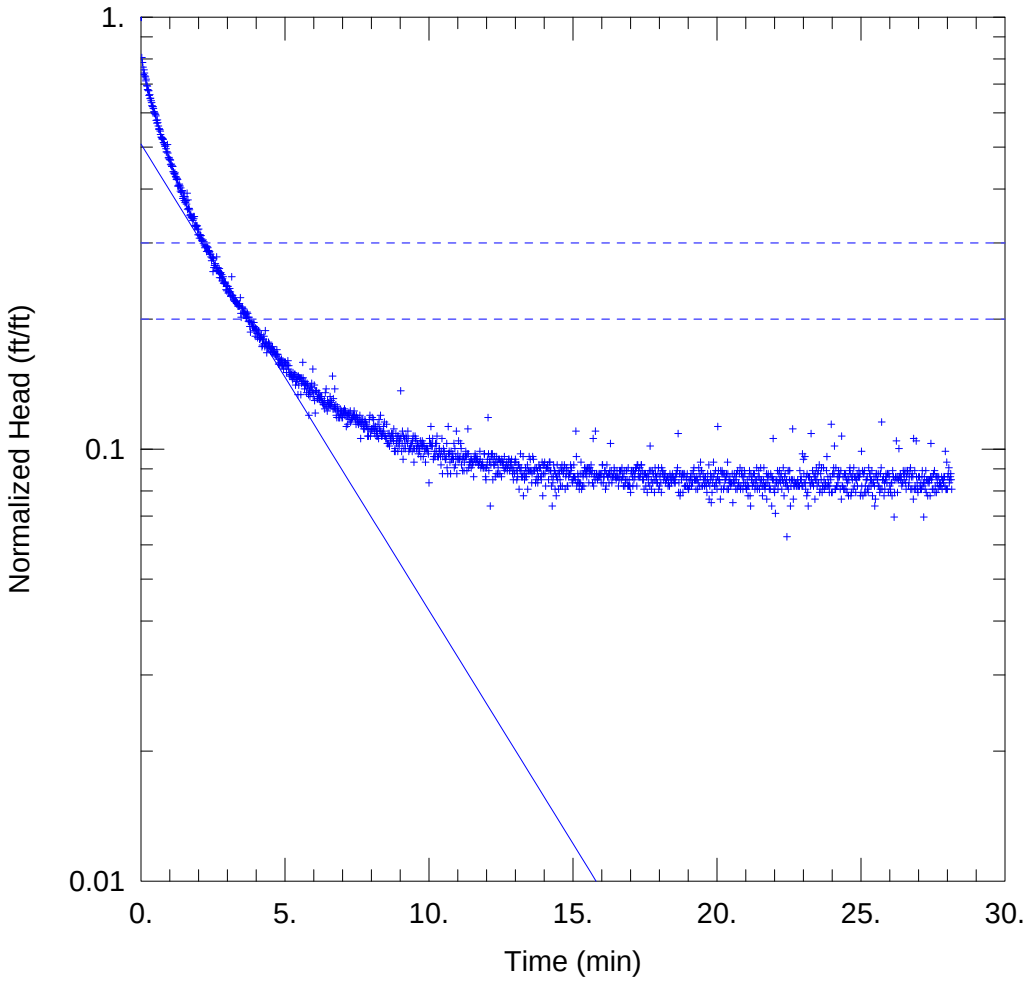
WELL DATA (MW-102)

Initial Displacement: 1.793 ft Static Water Column Height: 9.233 ft
Total Well Penetration Depth: 9.233 ft Screen Length: 9.233 ft
Casing Radius: 0.167 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.3254 ft/day y0 = 0.491 ft



MW-102DB SLUG A FALLING HEAD

Data Set: S:\...\MW-102DB_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:09:25

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

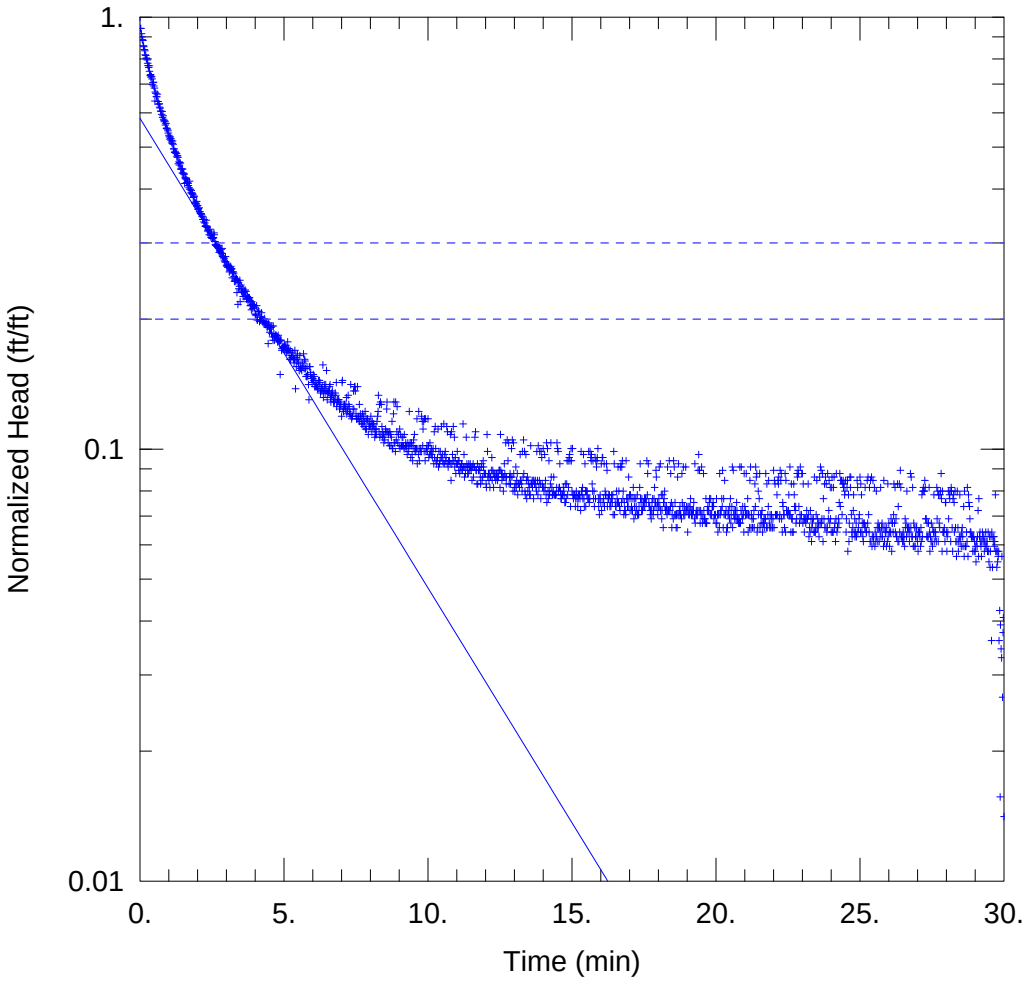
Saturated Thickness: 50.28 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 0.718 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6221 ft/day
y0 = 0.365 ft



MW-102DB SLUG A RISING HEAD

Data Set: S:\...\MW-102DB_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:09:22

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

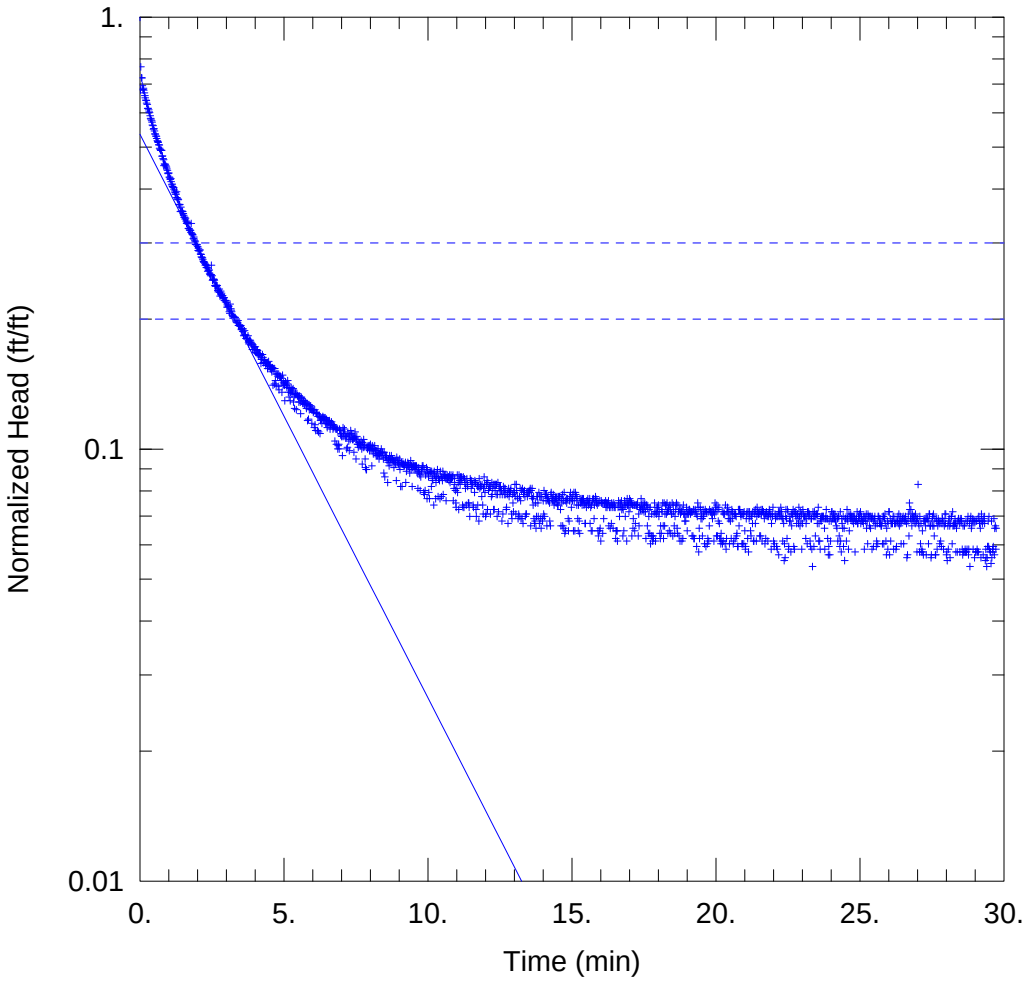
Saturated Thickness: 50.28 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 0.638 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6265 ft/day
y0 = 0.3721 ft



MW-102DB SLUG B FALLING HEAD

Data Set: S:\...\MW-102DB_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:09:18

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

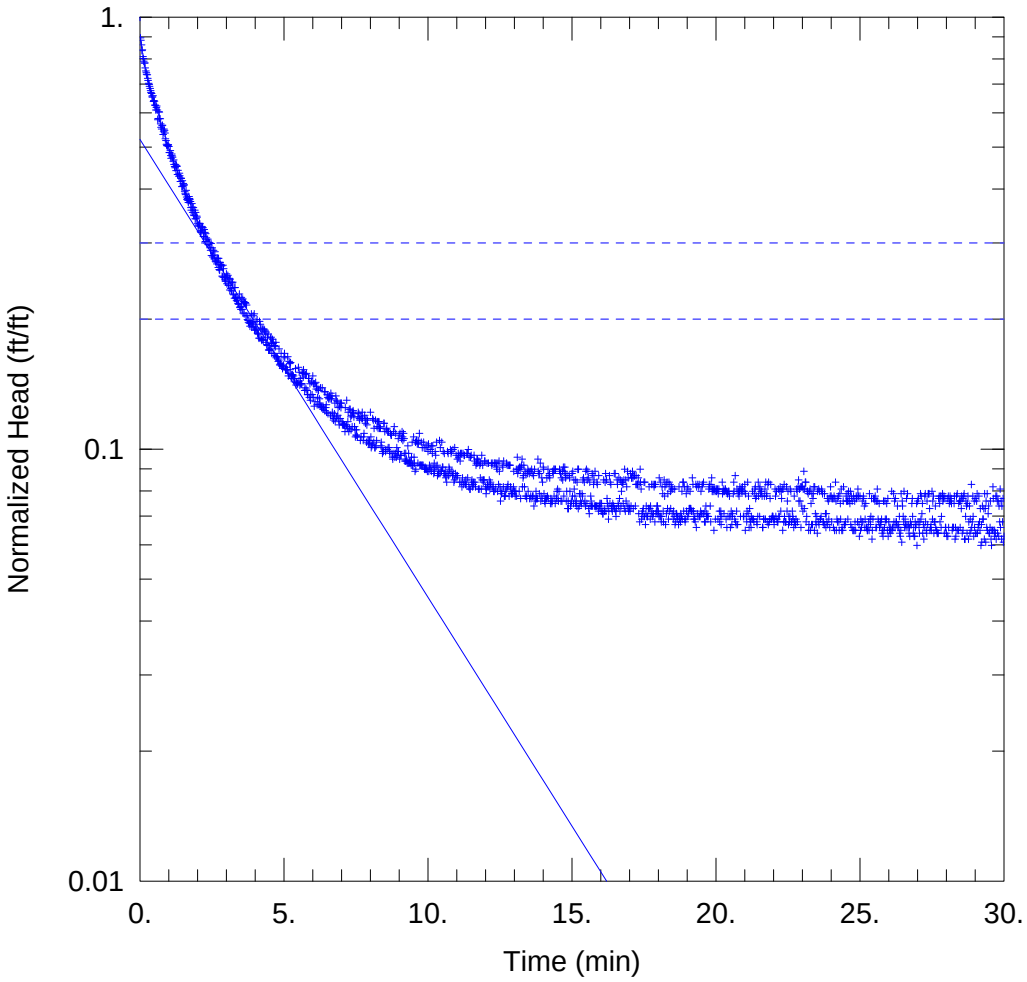
Saturated Thickness: 50.28 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 1.159 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7518 ft/day
y0 = 0.6204 ft



MW-102DB SLUG B RISING HEAD

Data Set: S:\...\MW-102DB_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:56:54

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

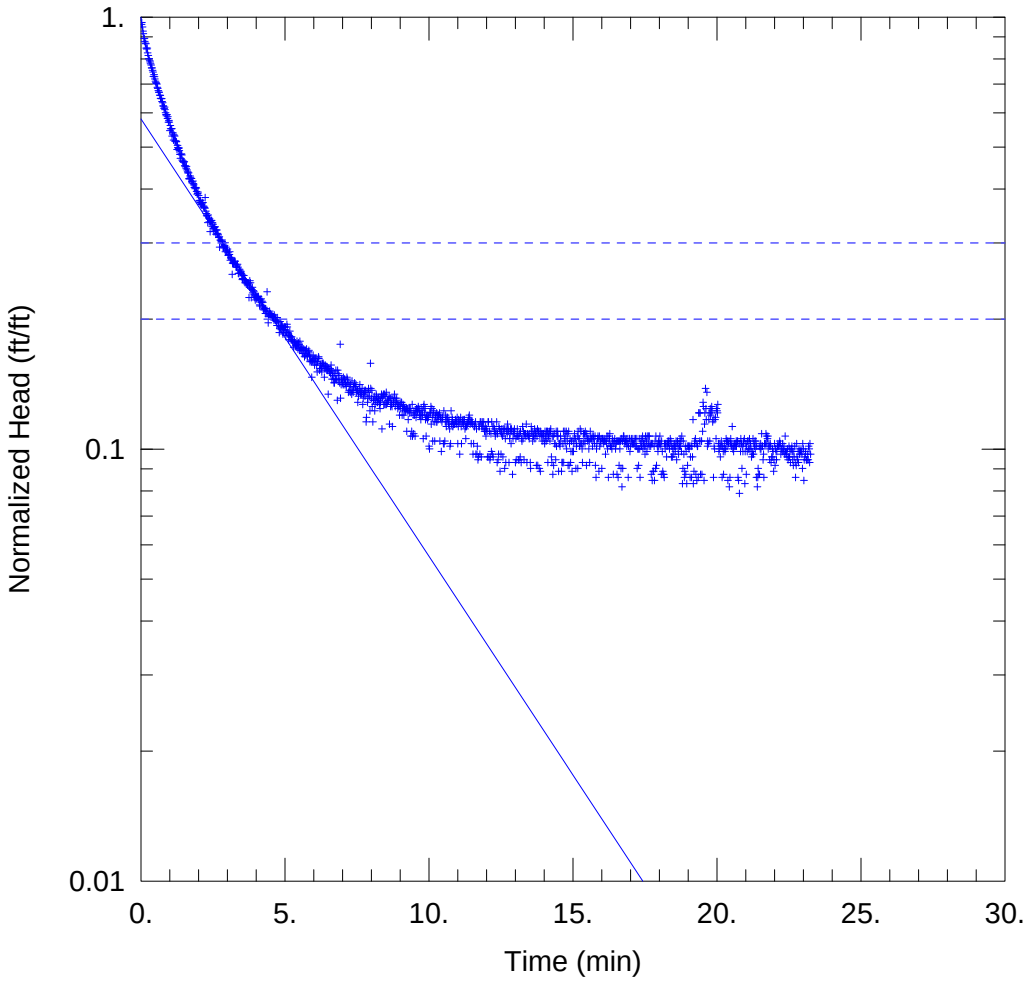
Saturated Thickness: 50.28 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 1.002 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6107 ft/day
y0 = 0.522 ft



MW-102DB SLUG G FALLING HEAD

Data Set: S:\...\MW-102DB_SlugGFallingHead.aqt
Date: 02/19/13 Time: 13:56:46

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

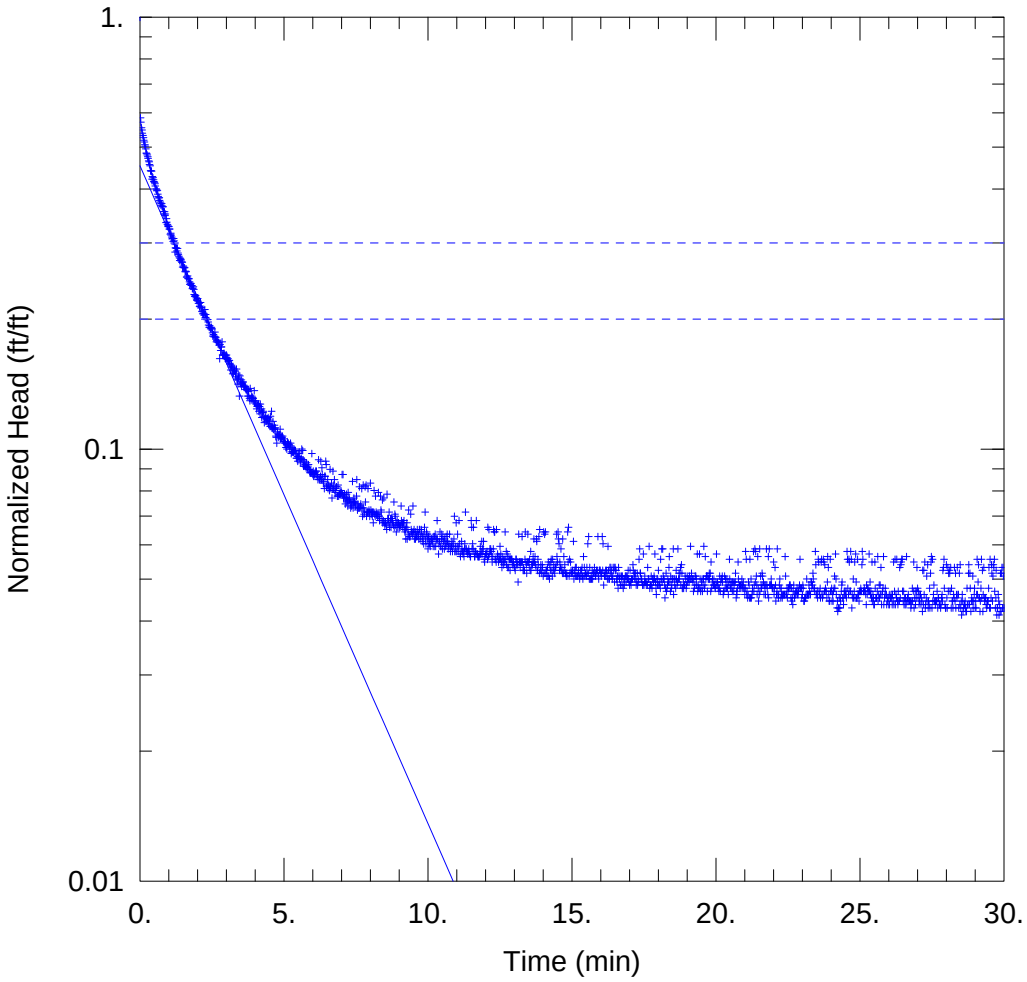
Saturated Thickness: 50.28 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 0.709 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5835 ft/day
y0 = 0.4122 ft



MW-102DB SLUG G RISING HEAD

Data Set: S:\...\MW-102DB_SlugGRisingHead.aqt
Date: 02/19/13 Time: 13:09:04

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-102DB
Test Date: 3 Nov 2012

AQUIFER DATA

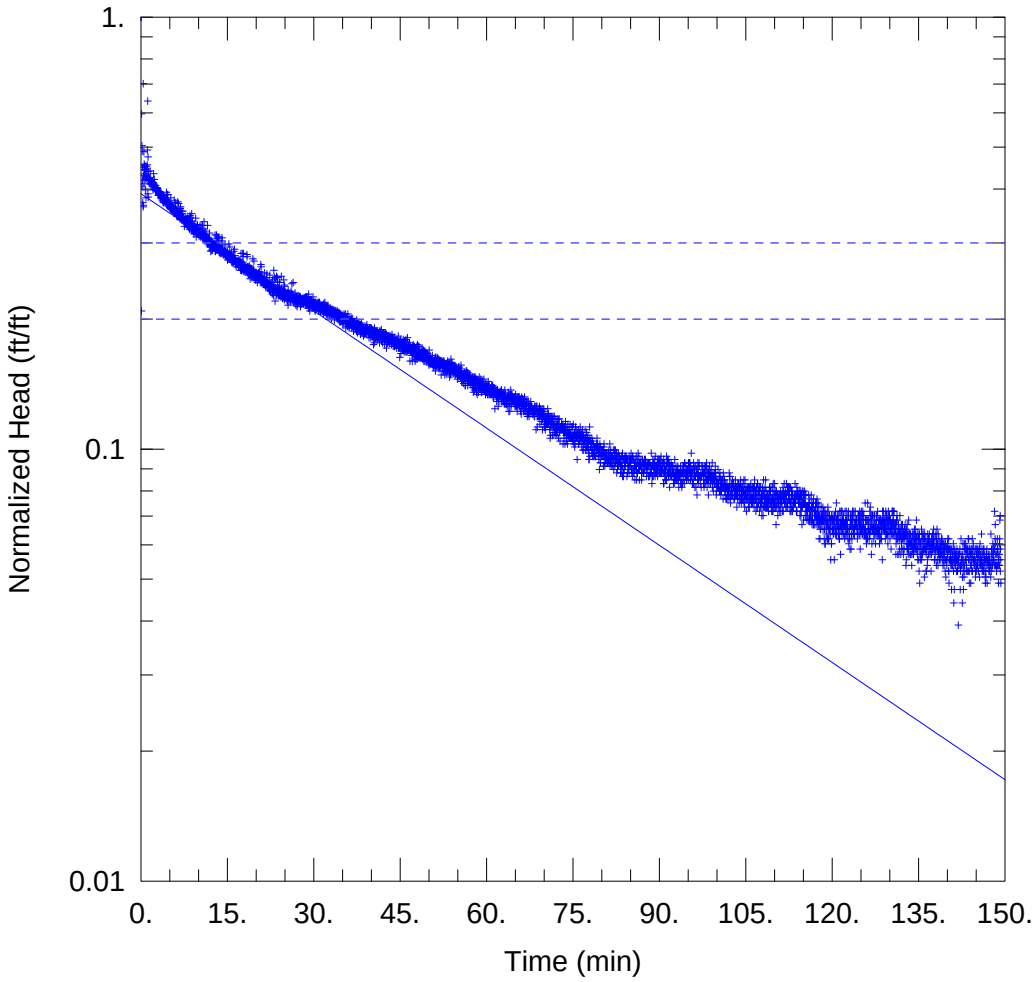
Saturated Thickness: 50.28 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-102DB)

Initial Displacement: 1.259 ft
Total Well Penetration Depth: 49.88 ft
Casing Radius: 0.167 ft
Static Water Column Height: 50.28 ft
Screen Length: 30. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.8773 ft/day
y0 = 0.5698 ft



MW-103 SLUG A FALLING HEAD

Data Set: S:\...\MW-103_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:10:00

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-103
Test Date: 4 Nov 2012

AQUIFER DATA

Saturated Thickness: 27.75 ft Anisotropy Ratio (Kz/Kr): 1.

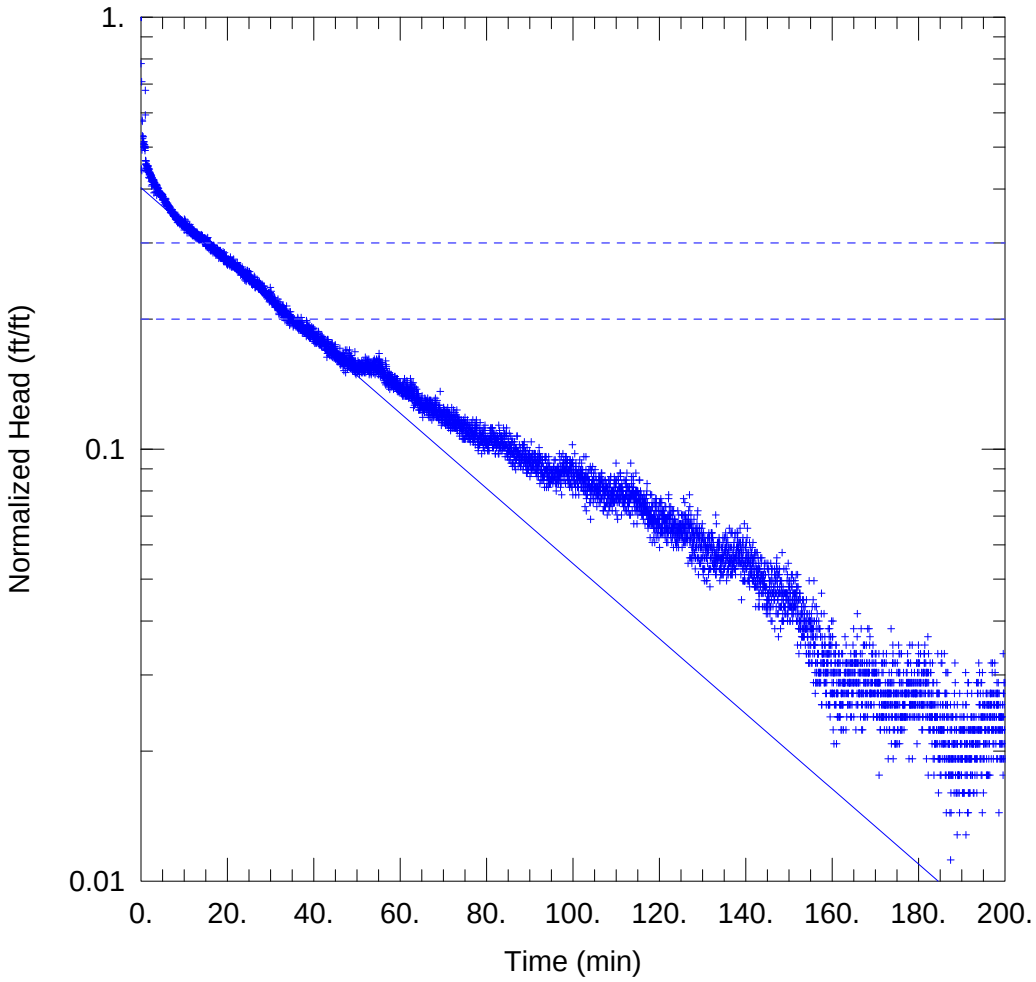
WELL DATA (MW-103)

Initial Displacement: 0.613 ft
Total Well Penetration Depth: 27.75 ft
Casing Radius: 0.167 ft
Static Water Column Height: 27.75 ft
Screen Length: 27.75 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.05122 ft/day
y0 = 0.2392 ft



MW-103 SLUG A RISING HEAD

Data Set: S:\...\MW-103_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:09:56

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-103
Test Date: 4 Nov 2012

AQUIFER DATA

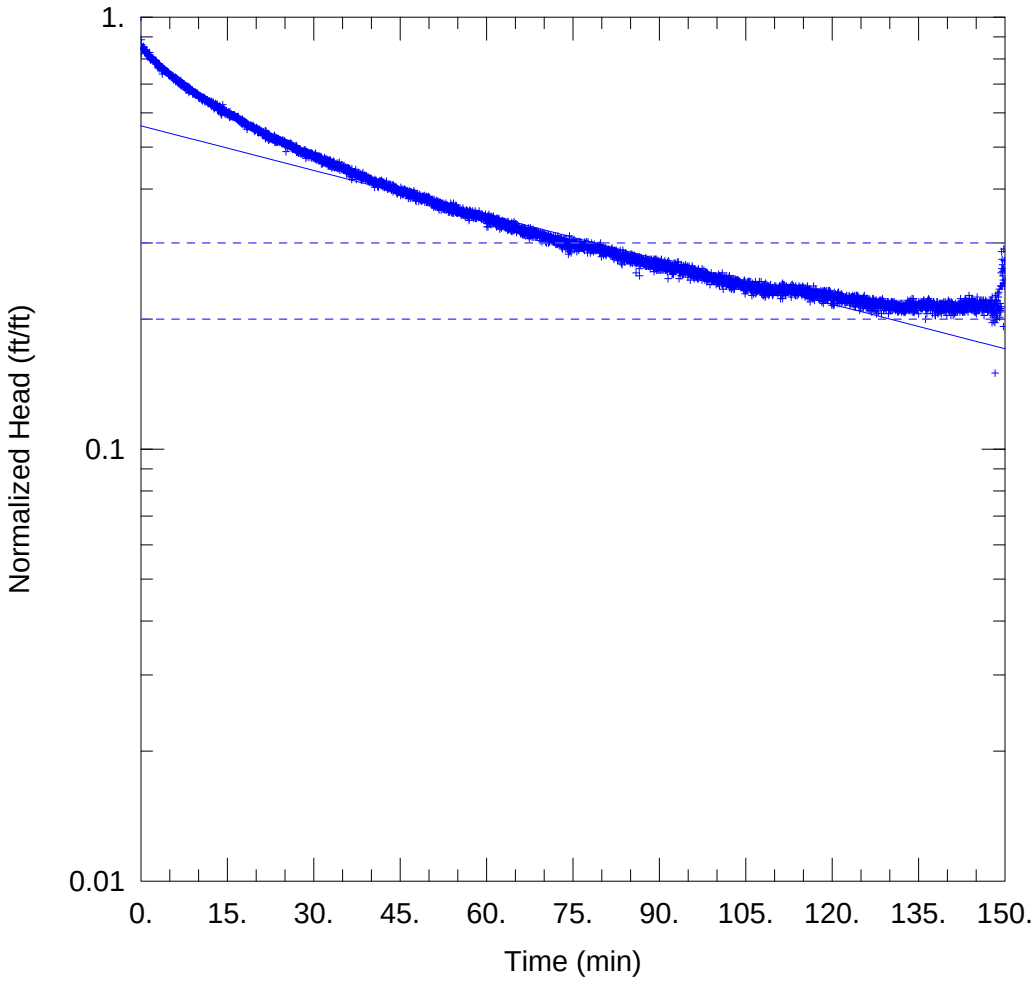
Saturated Thickness: 27.75 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-103)

Initial Displacement: 0.625 ft
Total Well Penetration Depth: 27.75 ft
Casing Radius: 0.167 ft
Static Water Column Height: 27.75 ft
Screen Length: 27.75 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04926 ft/day
y0 = 0.2516 ft



MW-103 SLUG F FALLING HEAD

Data Set: S:\...\MW-103_SlugFFallingHead.aqt
Date: 02/19/13 Time: 13:09:51

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-103
Test Date: 4 Nov 2012

AQUIFER DATA

Saturated Thickness: 27.75 ft Anisotropy Ratio (Kz/Kr): 1.

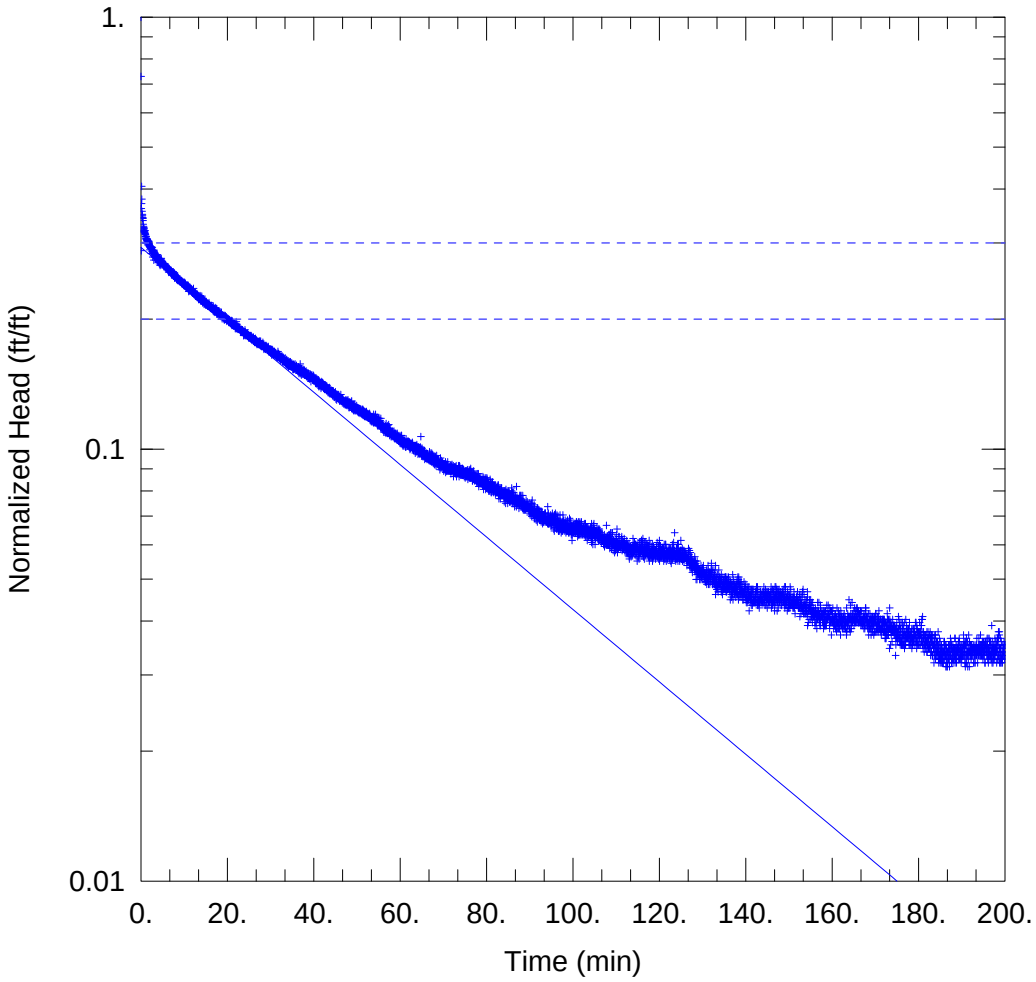
WELL DATA (MW-103)

Initial Displacement: 0.52 ft Static Water Column Height: 27.75 ft
Total Well Penetration Depth: 27.75 ft Screen Length: 27.75 ft
Casing Radius: 0.167 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.01949 ft/day y0 = 0.2913 ft



MW-103 SLUG F RISING HEAD

Data Set: S:\...\MW-103_SlugFRisingHead.aqt
Date: 02/19/13 Time: 13:09:47

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-103
Test Date: 4 Nov 2012

AQUIFER DATA

Saturated Thickness: 27.75 ft Anisotropy Ratio (Kz/Kr): 1.

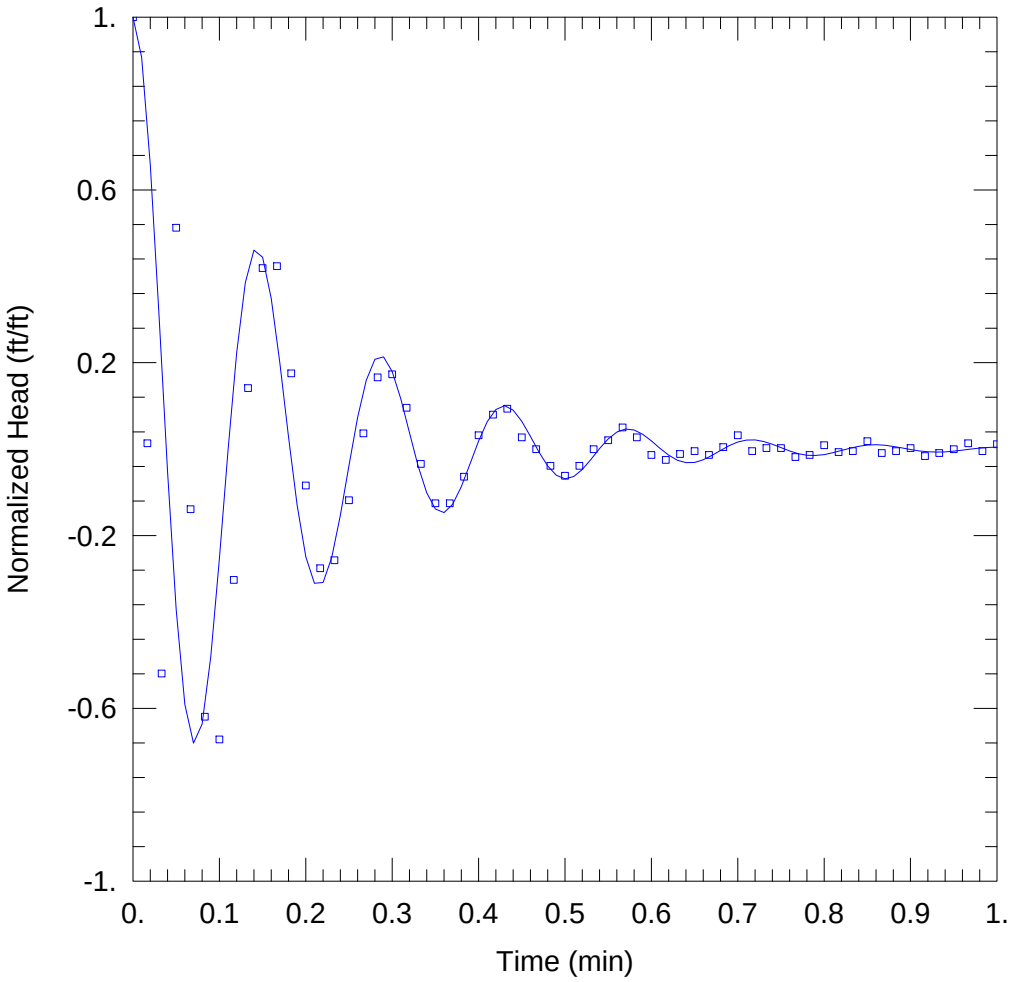
WELL DATA (MW-103)

Initial Displacement: 1.562 ft Static Water Column Height: 27.75 ft
Total Well Penetration Depth: 27.75 ft Screen Length: 27.75 ft
Casing Radius: 0.167 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04746 ft/day y0 = 0.4576 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugAFallingHead_SGI.aqt
Date: 02/19/13 Time: 11:24:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

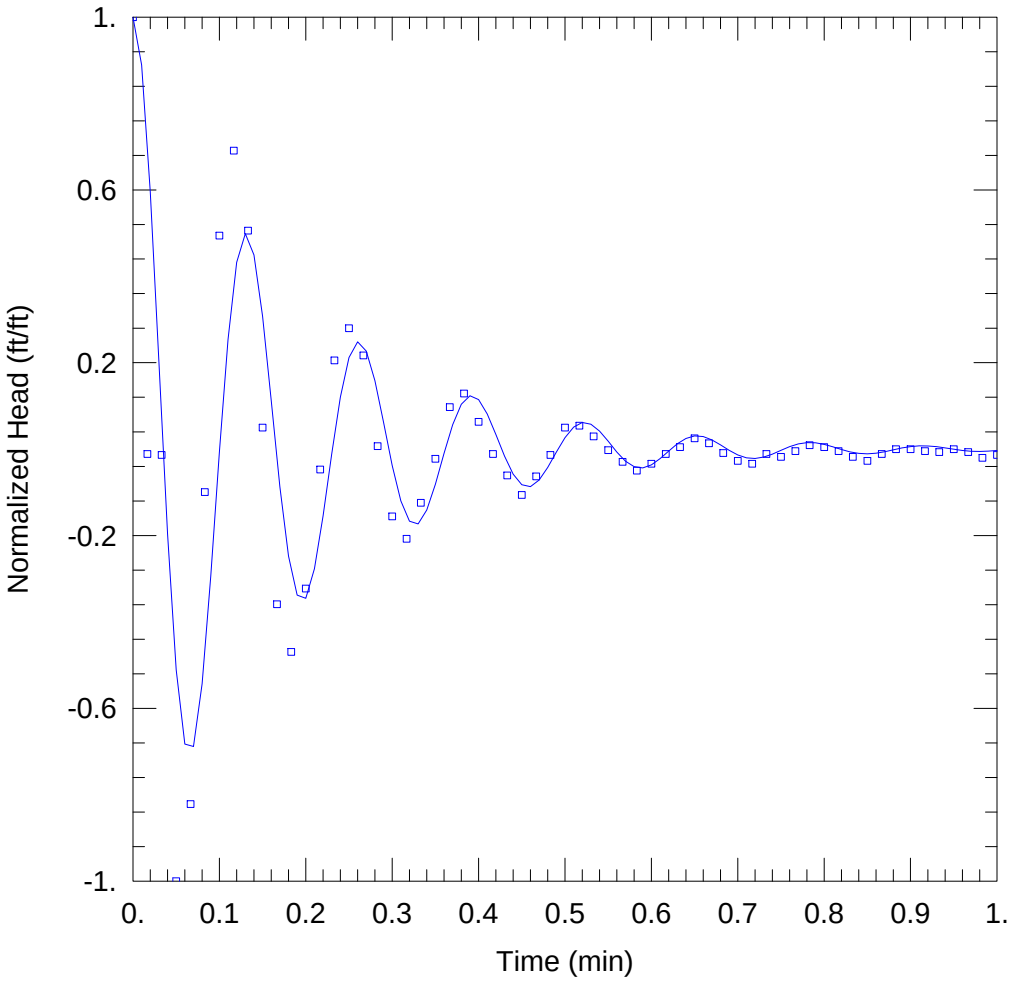
Saturated Thickness: 113.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug A Falling Head)

Initial Displacement: 0.439 ft
Total Well Penetration Depth: 110.7 ft
Casing Radius: 0.167 ft
Static Water Column Height: 113.5 ft
Screen Length: 76.2 ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 210.8 ft/day
Le = 59.23 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugARisingHead_SGI.aqt
Date: 02/19/13 Time: 11:22:57

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

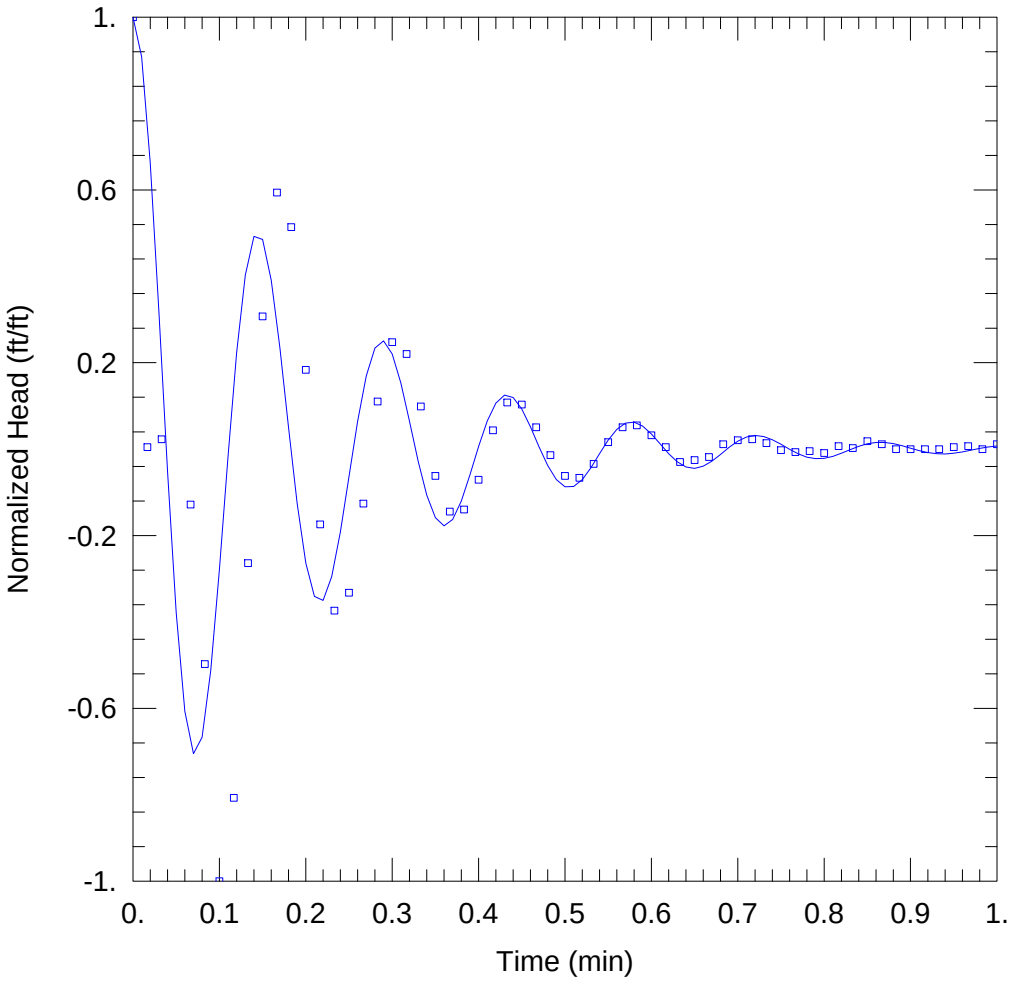
Saturated Thickness: 113.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug A Rising Head)

Initial Displacement: 0.443 ft
Total Well Penetration Depth: 110.7 ft
Casing Radius: 0.167 ft
Static Water Column Height: 113.5 ft
Screen Length: 76.2 ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 253.5 ft/day
Le = 49.42 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugB1FalllingHeadSGI.aqt
Date: 02/19/13 Time: 11:21:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

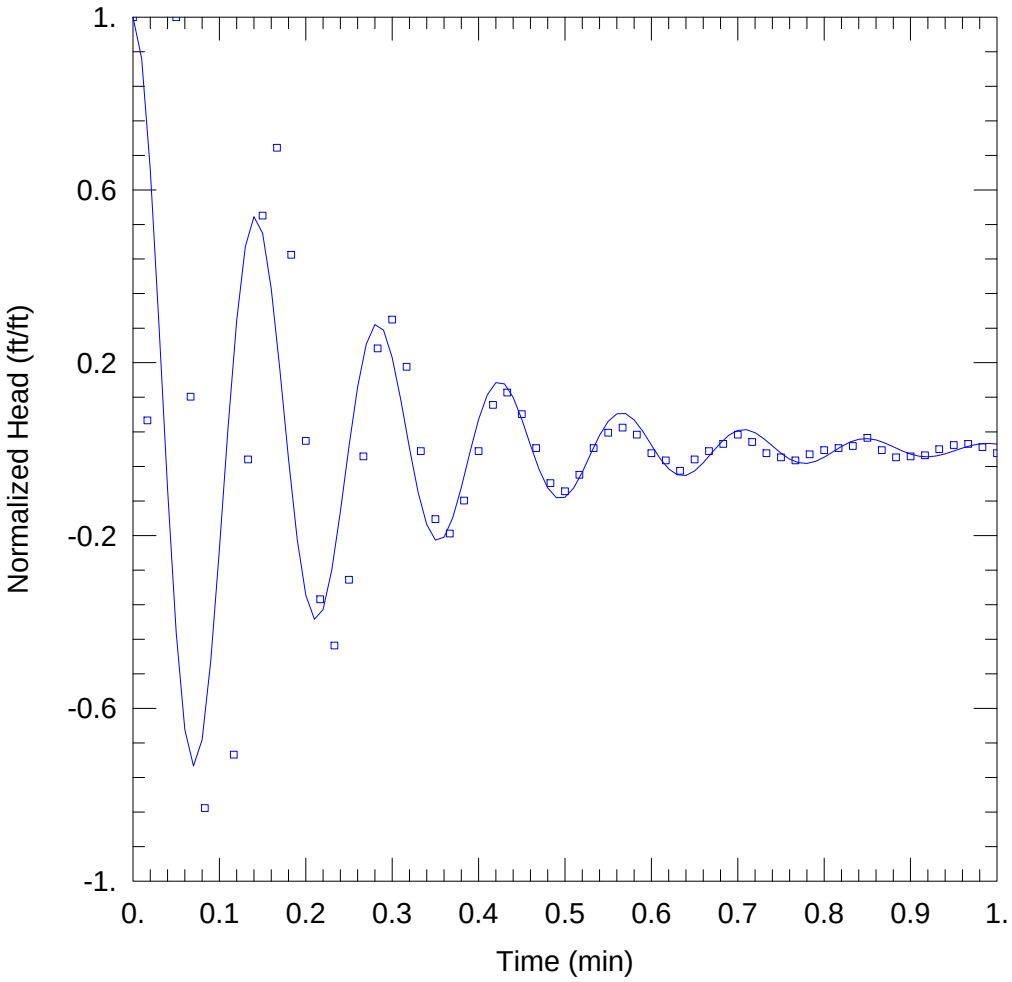
Saturated Thickness: 113.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug B1 Falling Head)

Initial Displacement: 0.436 ft
Total Well Penetration Depth: 110.7 ft
Casing Radius: 0.167 ft
Static Water Column Height: 113.5 ft
Screen Length: 76.2 ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 231.1 ft/day
Le = 60.27 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugB1RisingHead_SGI.aqt
Date: 02/19/13 Time: 11:19:04

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

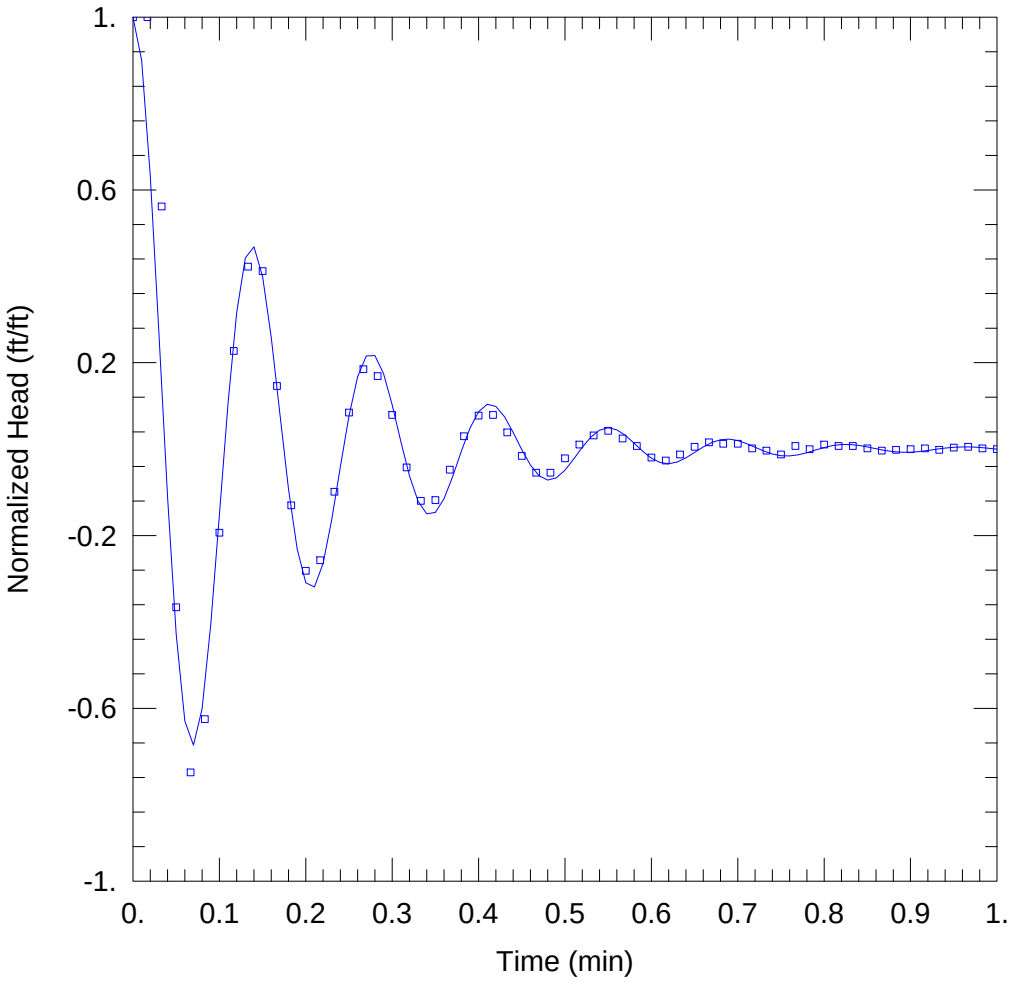
Saturated Thickness: 113.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug B1 Rising Head)

Initial Displacement: 0.42 ft
Total Well Penetration Depth: 110.7 ft
Casing Radius: 0.167 ft
Static Water Column Height: 113.5 ft
Screen Length: 76.2 ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 262.8 ft/day
Le = 58.05 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugB2FallingHead_SGI.aqt
Date: 02/19/13 Time: 11:13:53

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

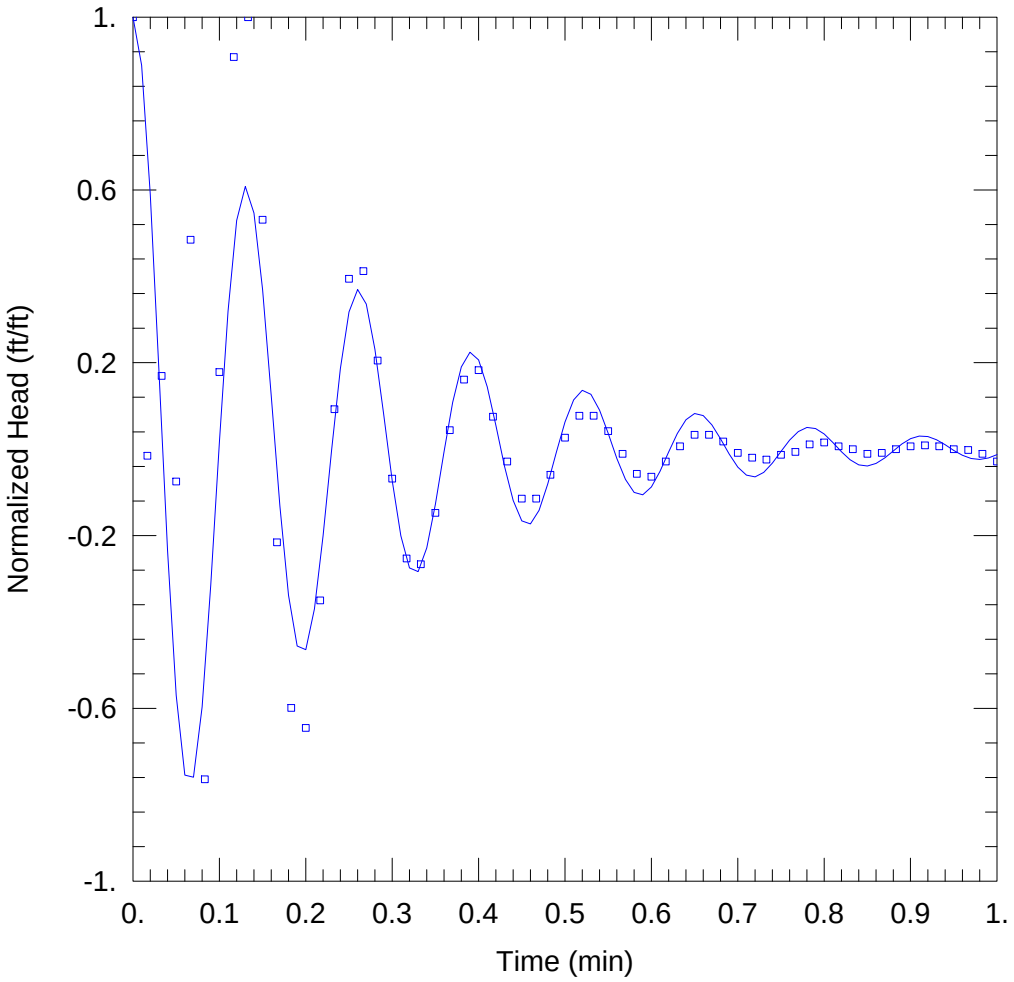
Saturated Thickness: 113.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug B2 Falling Head)

Initial Displacement: 0.568 ft
Total Well Penetration Depth: 106.2 ft
Casing Radius: 0.167 ft
Static Water Column Height: 113.5 ft
Screen Length: 30. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 499. ft/day
Le = 54.73 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-13_SlugB2RisingHead_SGI.aqt
Date: 02/19/13 Time: 11:18:24

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-13
Test Date: 26 Aug 2012

AQUIFER DATA

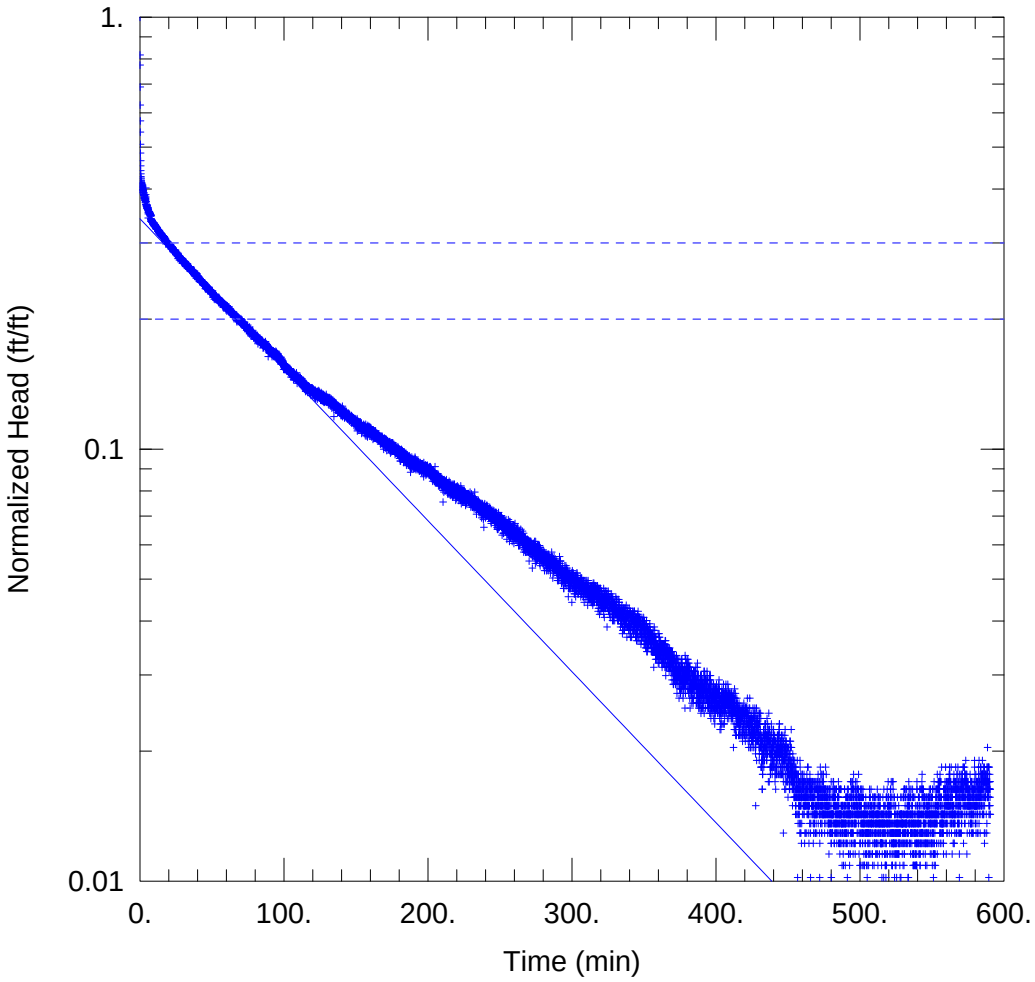
Saturated Thickness: 113.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13 Slug B2 Rising Head)

Initial Displacement: 0.454 ft Static Water Column Height: 113.5 ft
Total Well Penetration Depth: 64.47 ft Screen Length: 30. ft
Casing Radius: 0.167 ft Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar
K = 702.1 ft/day Le = 49.64 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-5_SlugDFalling Head.aqt
Date: 02/19/13 Time: 13:06:55

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-5
Test Date: 27 Aug 2012

AQUIFER DATA

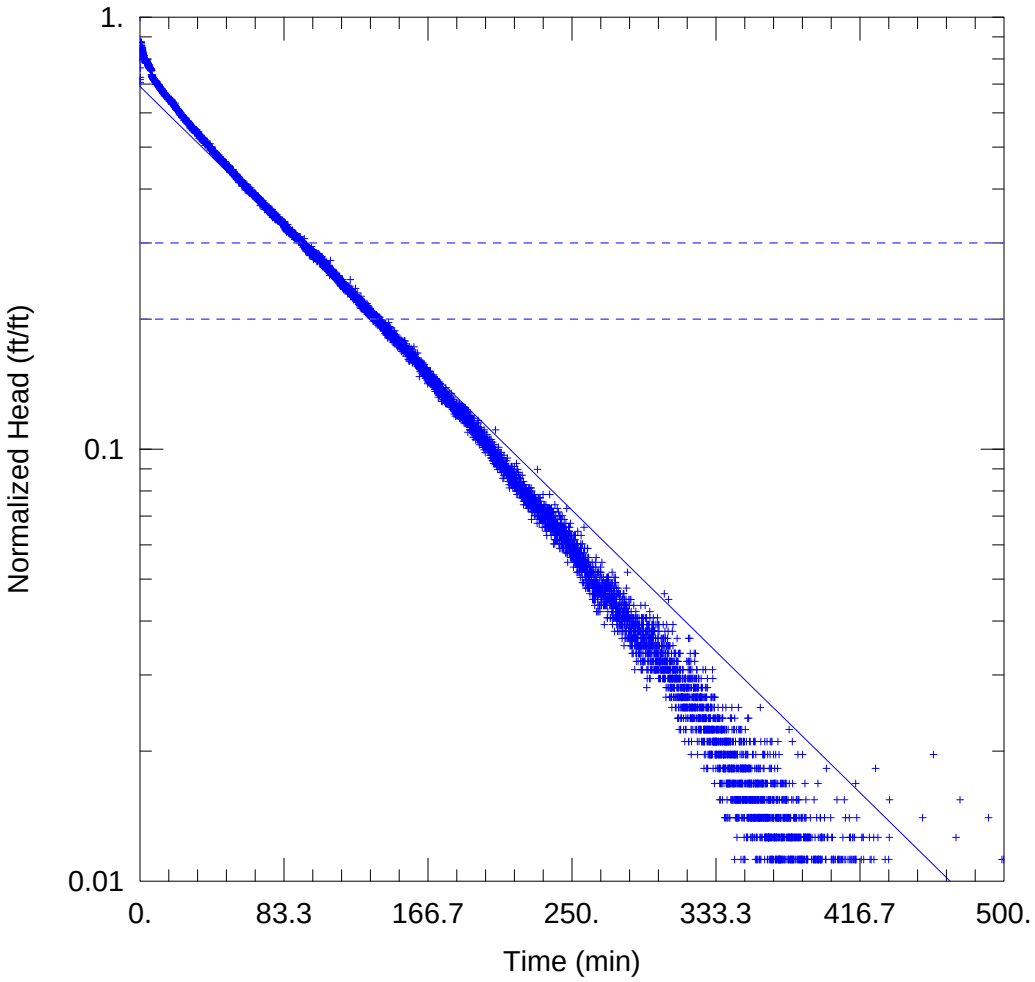
Saturated Thickness: 42.35 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5 Slug D Falling Head)

Initial Displacement: 1.471 ft
Total Well Penetration Depth: 42.35 ft
Casing Radius: 0.167 ft
Static Water Column Height: 42.35 ft
Screen Length: 30. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0199 ft/day
y0 = 0.5023 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-5_SlugDRising Head.aqt
Date: 02/19/13 Time: 13:06:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-5
Test Date: 27 Aug 2012

AQUIFER DATA

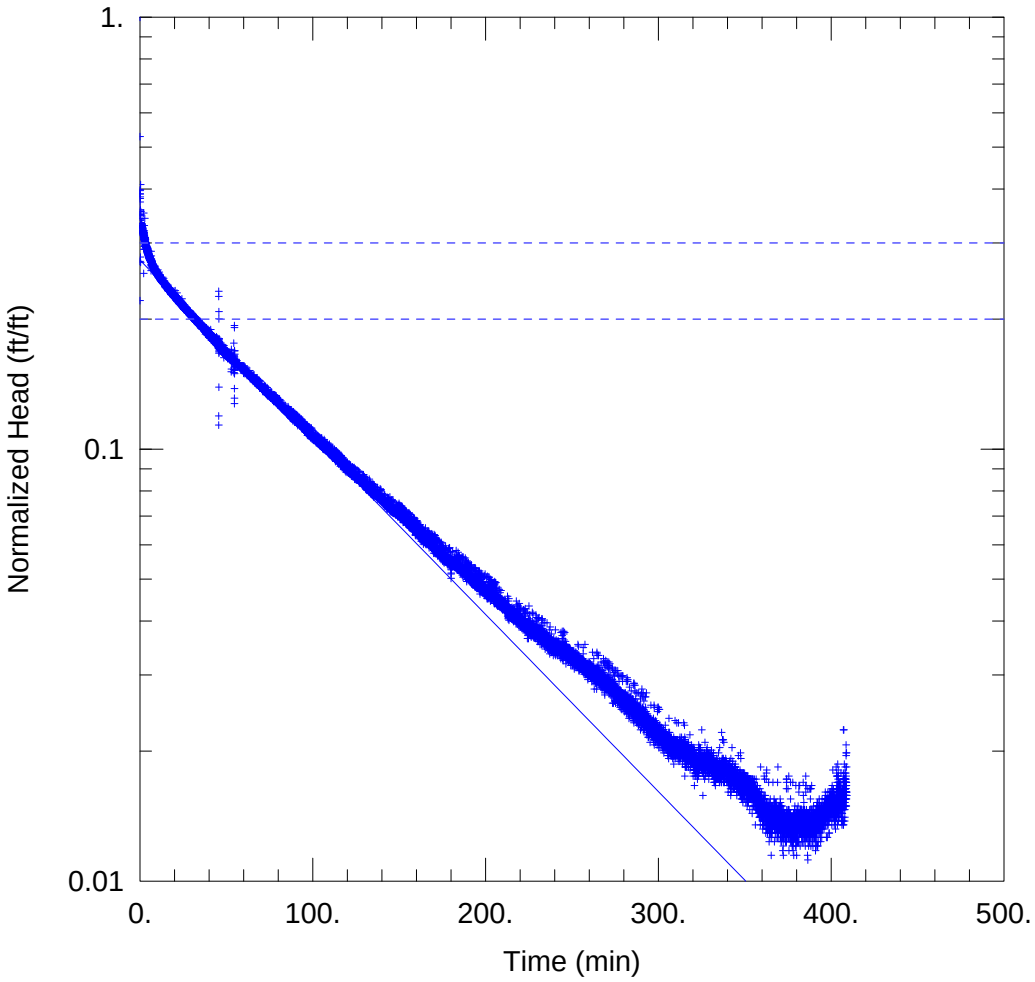
Saturated Thickness: 42.35 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5 Slug D Rising Head)

Initial Displacement: 0.713 ft
Total Well Penetration Depth: 42.35 ft
Casing Radius: 0.167 ft
Static Water Column Height: 42.35 ft
Screen Length: 30. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02234 ft/day
y0 = 0.4928 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-5_SlugEFallingHead.aqt
Date: 02/19/13 Time: 13:06:29

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-5
Test Date: 27 Aug 2012

AQUIFER DATA

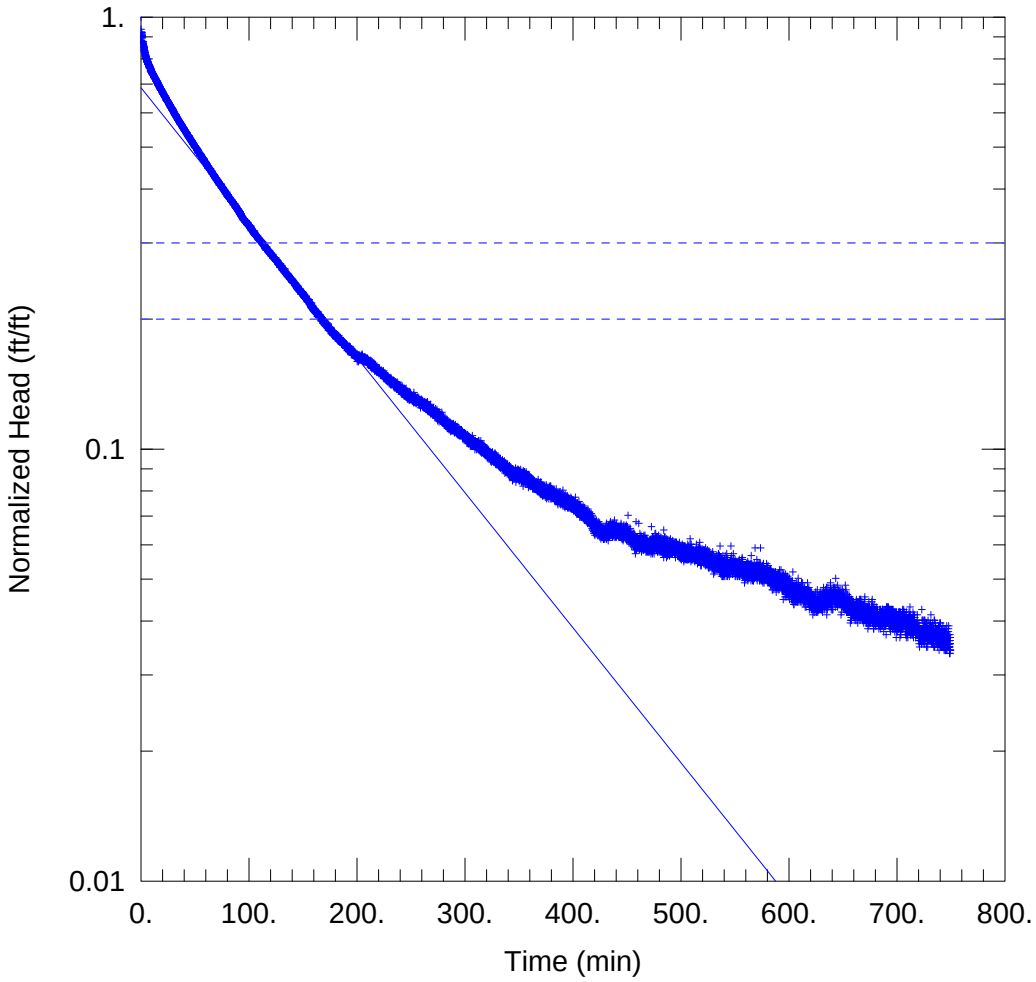
Saturated Thickness: 42.35 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5 Slug E Falling Head)

Initial Displacement: 3.484 ft
Total Well Penetration Depth: 42.35 ft
Casing Radius: 0.167 ft
Static Water Column Height: 42.35 ft
Screen Length: 30. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02335 ft/day
y0 = 0.9541 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-5_SlugERisingHead.aqt
Date: 02/19/13 Time: 13:06:19

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: MW-5
Test Date: 27 Aug 2012

AQUIFER DATA

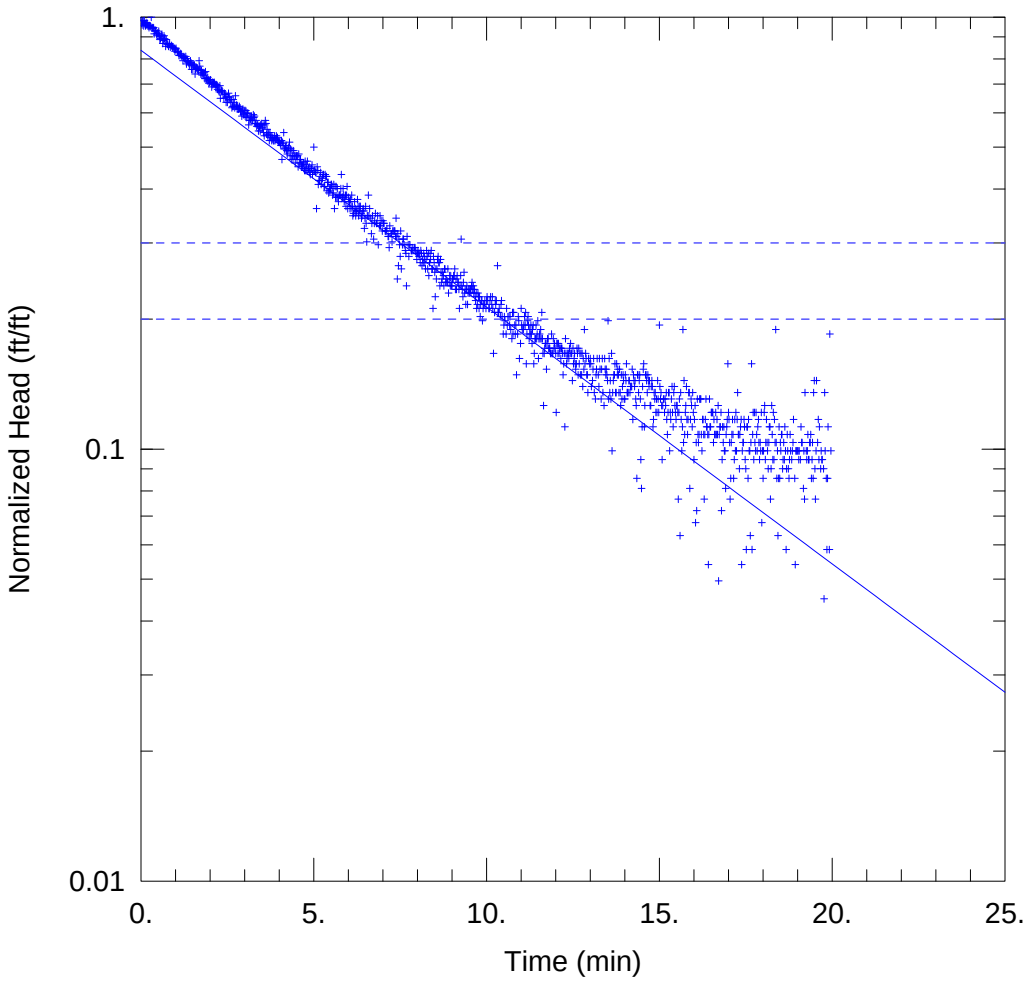
Saturated Thickness: 42.35 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5 Slug E Rising Head)

Initial Displacement: 1.693 ft
Total Well Penetration Depth: 42.35 ft
Casing Radius: 0.167 ft
Static Water Column Height: 42.35 ft
Screen Length: 30. ft
Well Radius: 0.328 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0178 ft/day
y0 = 1.162 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:10:39

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

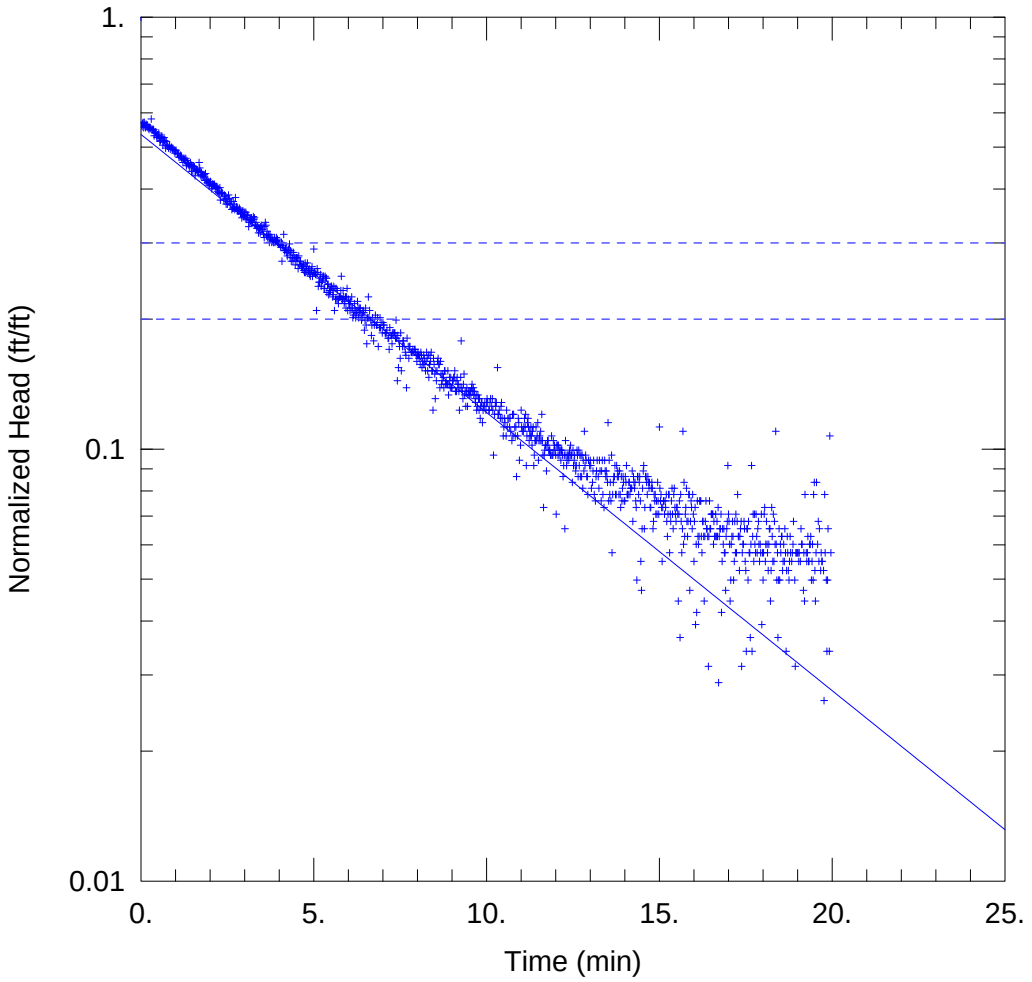
WELL DATA (OW-UT9 Slug B Falling Head)

Initial Displacement: 0.222 ft
Static Water Column Height: 16.54 ft
Total Well Penetration Depth: 16.54 ft
Screen Length: 16.54 ft
Casing Radius: 0.25 ft
Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.049 ft/day
y0 = 0.186 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:10:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

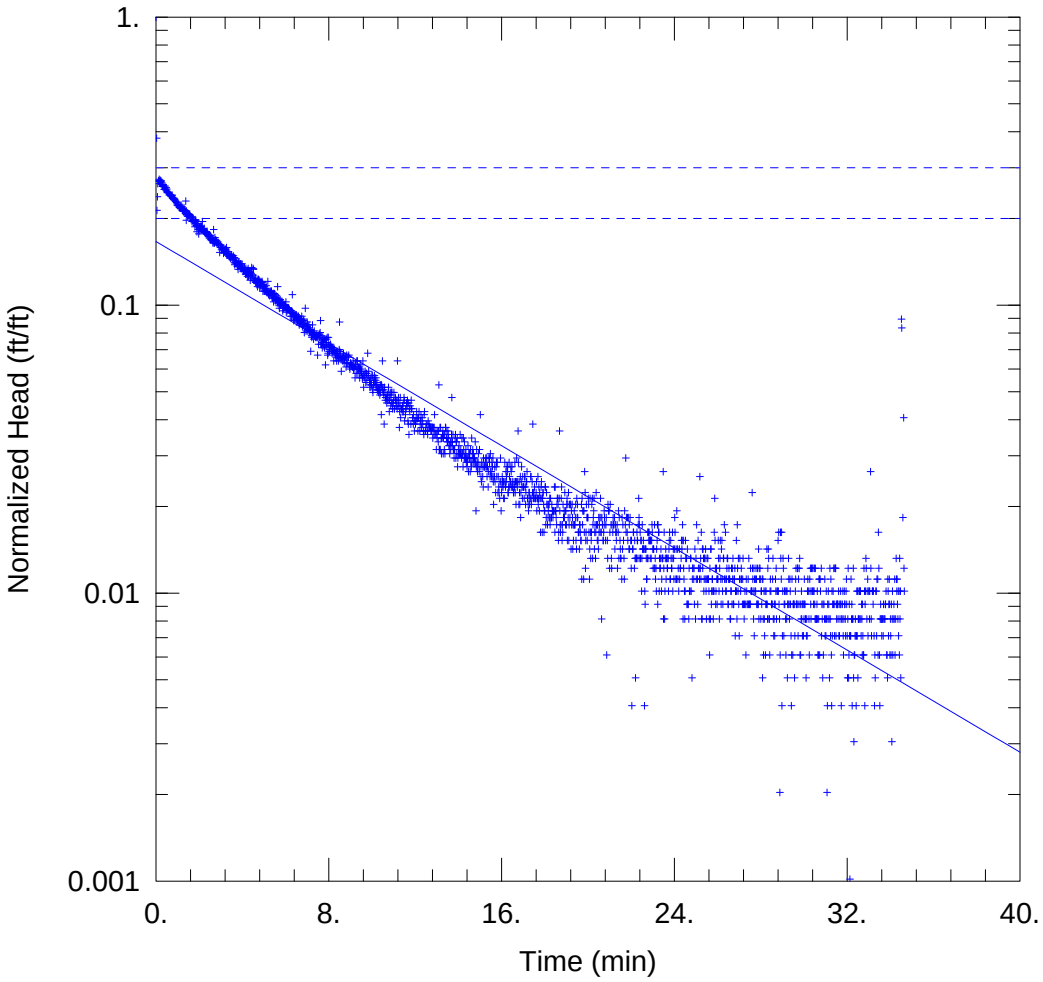
Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-UT9 Slug B Rising Head)

Initial Displacement: 0.382 ft Static Water Column Height: 16.54 ft
Total Well Penetration Depth: 16.54 ft Screen Length: 16.54 ft
Casing Radius: 0.25 ft Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.136 ft/day y0 = 0.2044 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:10:32

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

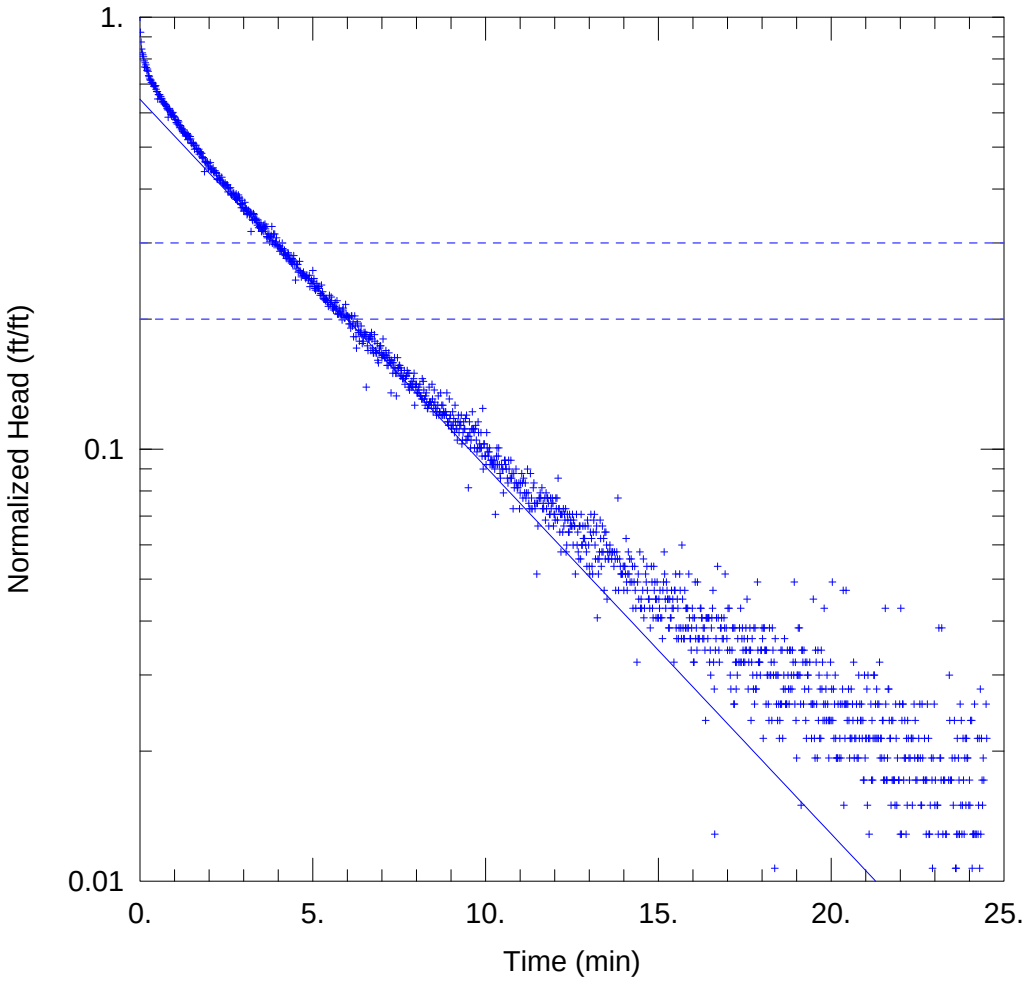
WELL DATA (OW-UT9 Slug C Falling Head)

Initial Displacement: 0.984 ft
Total Well Penetration Depth: 16.54 ft
Casing Radius: 0.25 ft
Static Water Column Height: 16.54 ft
Screen Length: 16.54 ft
Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.782 ft/day
y0 = 0.1637 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:10:29

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

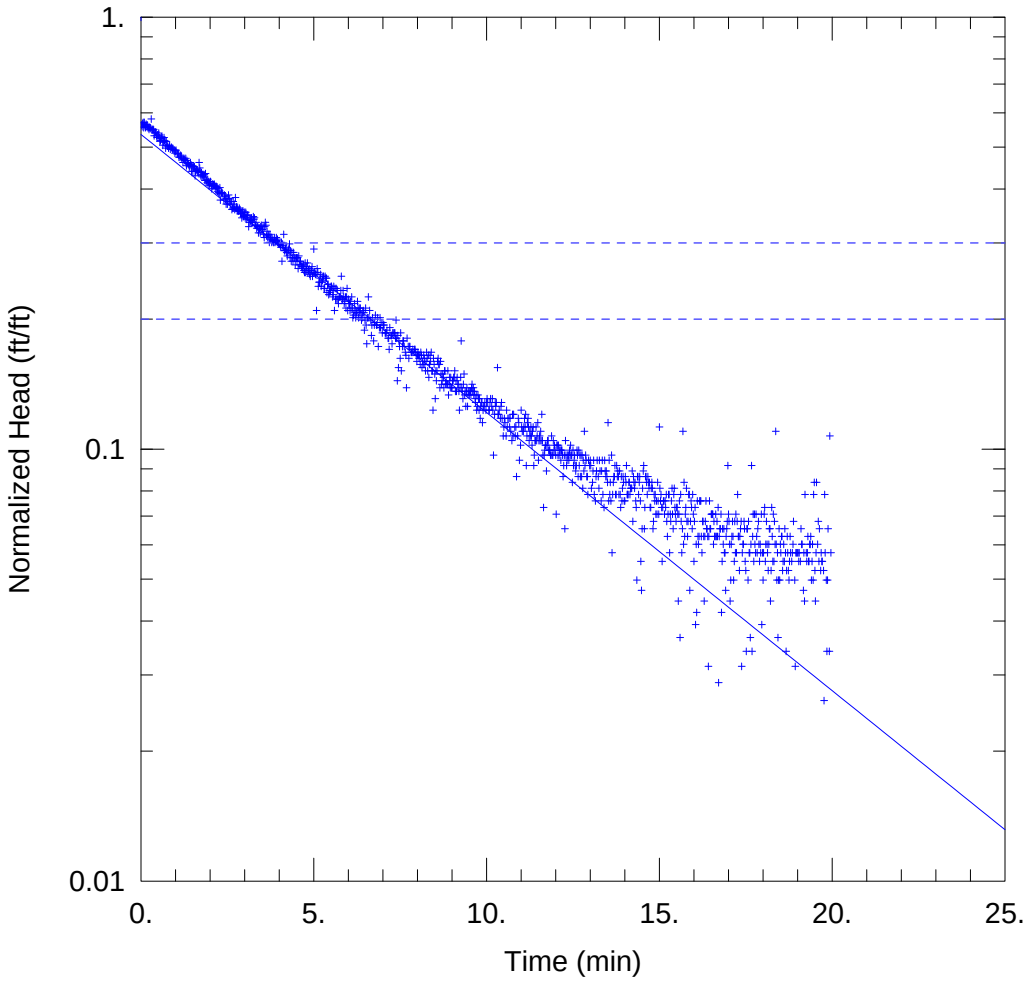
Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-UT9 Slug C Rising Head)

Initial Displacement: 0.467 ft Static Water Column Height: 16.54 ft
Total Well Penetration Depth: 16.54 ft Screen Length: 16.54 ft
Casing Radius: 0.25 ft Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.5 ft/day y0 = 0.3013 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:10:26

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

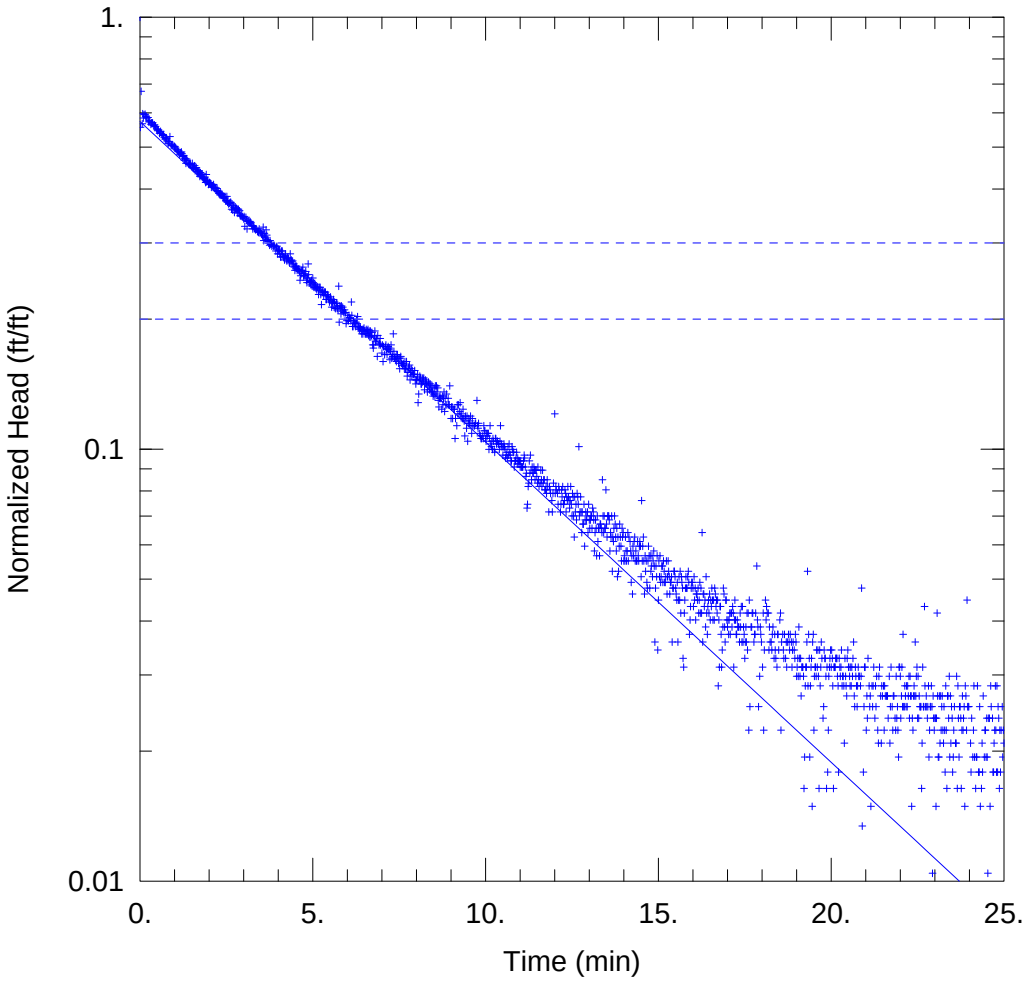
Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-UT9 Slug B Rising Head)

Initial Displacement: 0.382 ft
Total Well Penetration Depth: 16.54 ft
Casing Radius: 0.25 ft
Static Water Column Height: 16.54 ft
Screen Length: 16.54 ft
Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.136 ft/day
y0 = 0.2044 ft



WELL TEST ANALYSIS

Data Set: S:\...\OW-UT9_SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:10:22

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: OW-UT9
Test Date: 29 Aug 2012

AQUIFER DATA

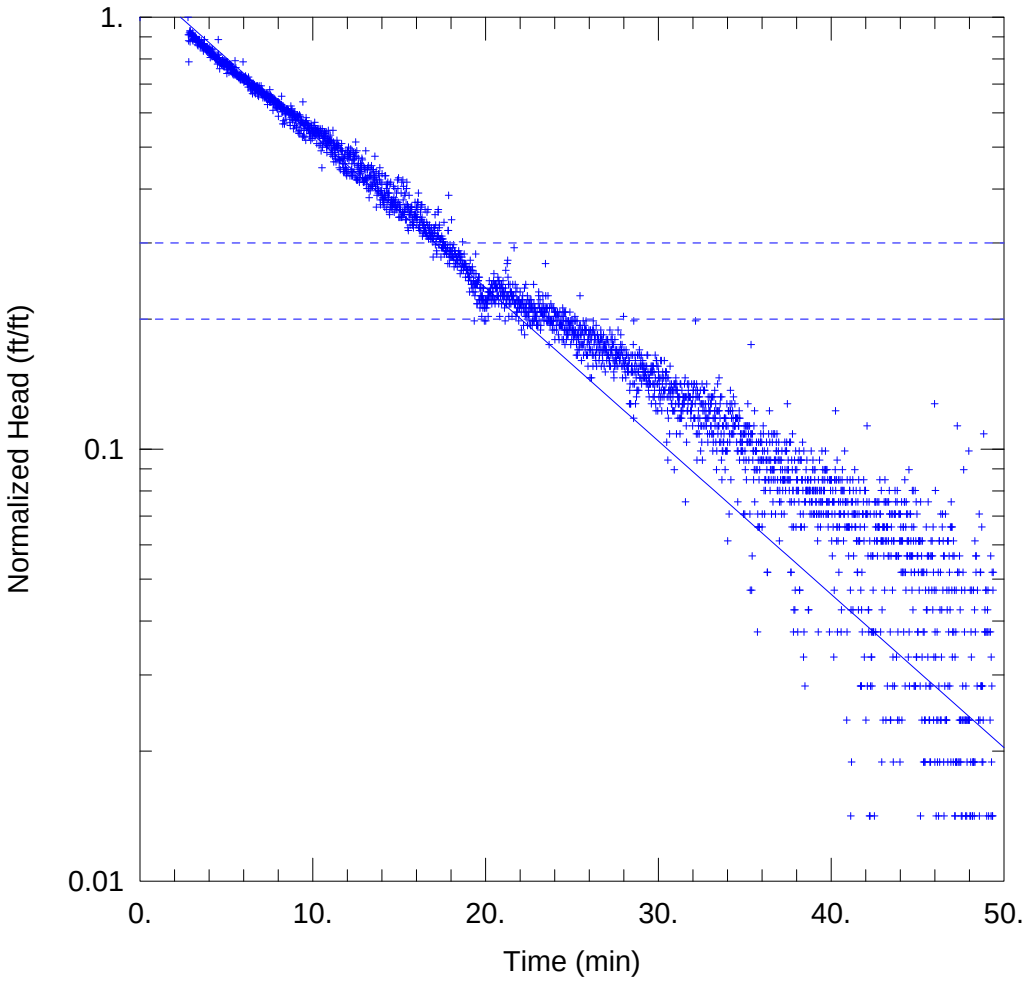
Saturated Thickness: 16.54 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-UT9 Slug D Rising Head)

Initial Displacement: 0.671 ft Static Water Column Height: 16.54 ft
Total Well Penetration Depth: 16.54 ft Screen Length: 16.54 ft
Casing Radius: 0.25 ft Well Radius: 0.4115 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.308 ft/day y0 = 0.3846 ft



RL-1 SLUG A

Data Set: S:\...\RL-1_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:11:12

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-1
Test Date: 28 Aug 2012

AQUIFER DATA

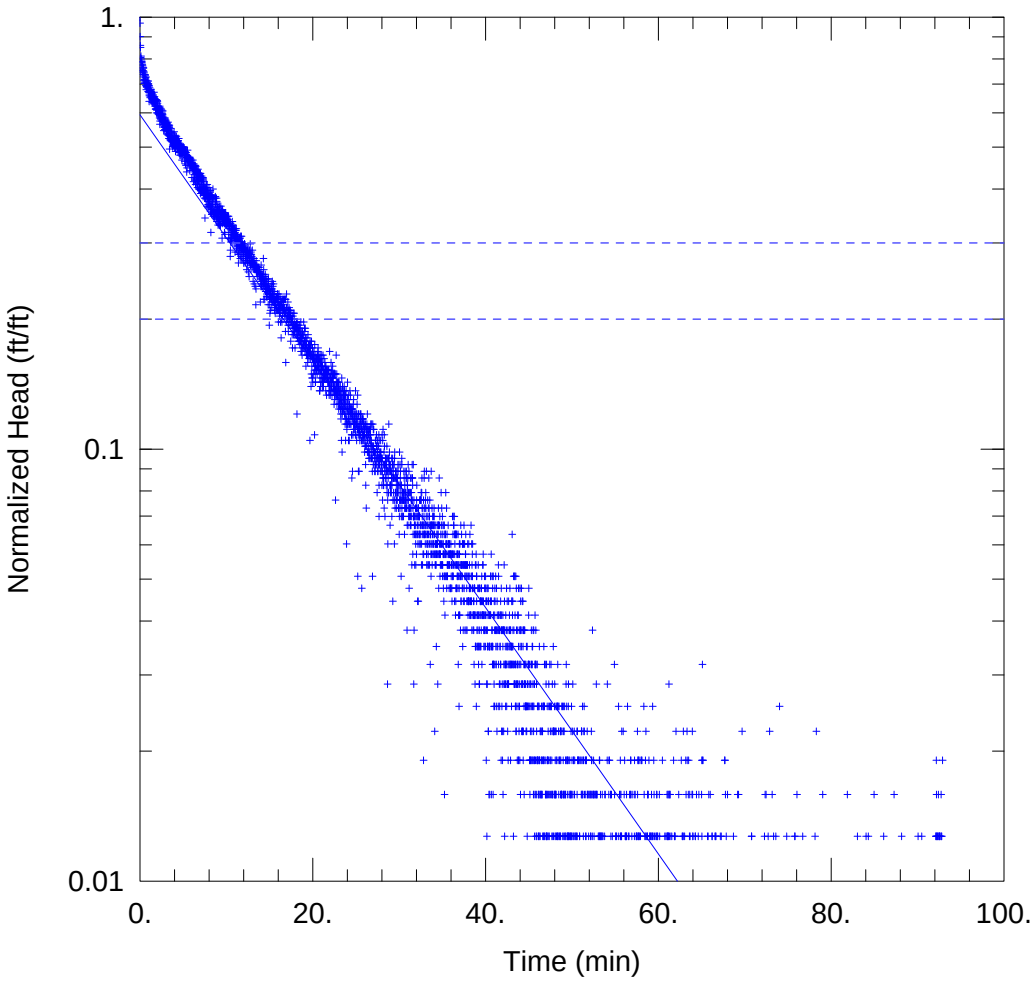
Saturated Thickness: 8.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-1 Slug A)

Initial Displacement: 0.212 ft
Total Well Penetration Depth: 8.8 ft
Casing Radius: 0.208 ft
Static Water Column Height: 8.8 ft
Screen Length: 8.8 ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6889 ft/day
y0 = 0.2565 ft



RL-1 SLUG A

Data Set: S:\...\RL-1_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:11:09

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-1
Test Date: 28 Aug 2012

AQUIFER DATA

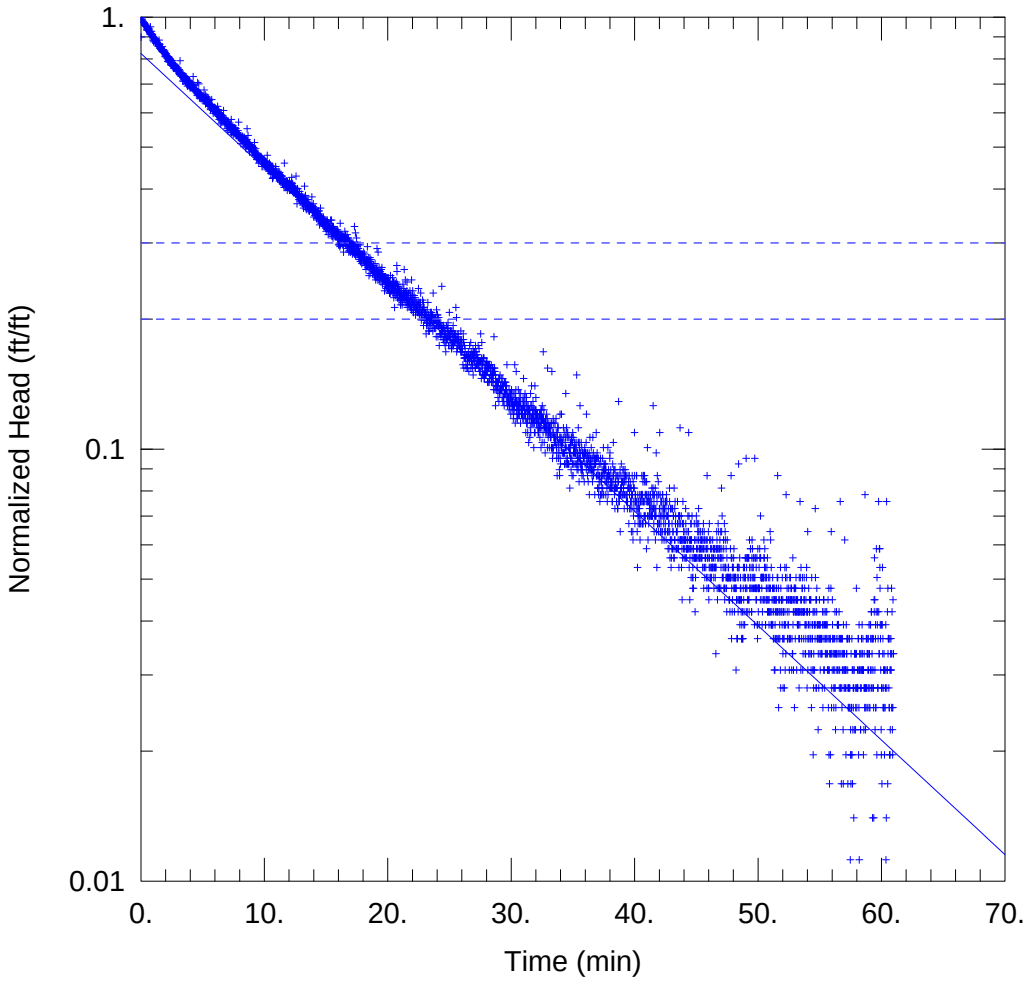
Saturated Thickness: 8.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-1 Slug A)

Initial Displacement: 0.315 ft
Total Well Penetration Depth: 8.8 ft
Casing Radius: 0.208 ft
Static Water Column Height: 8.8 ft
Screen Length: 8.8 ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5538 ft/day
y0 = 0.1871 ft



RL-1 SLUG B

Data Set: S:\...\RL-1_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:11:06

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-1
Test Date: 28 Aug 2012

AQUIFER DATA

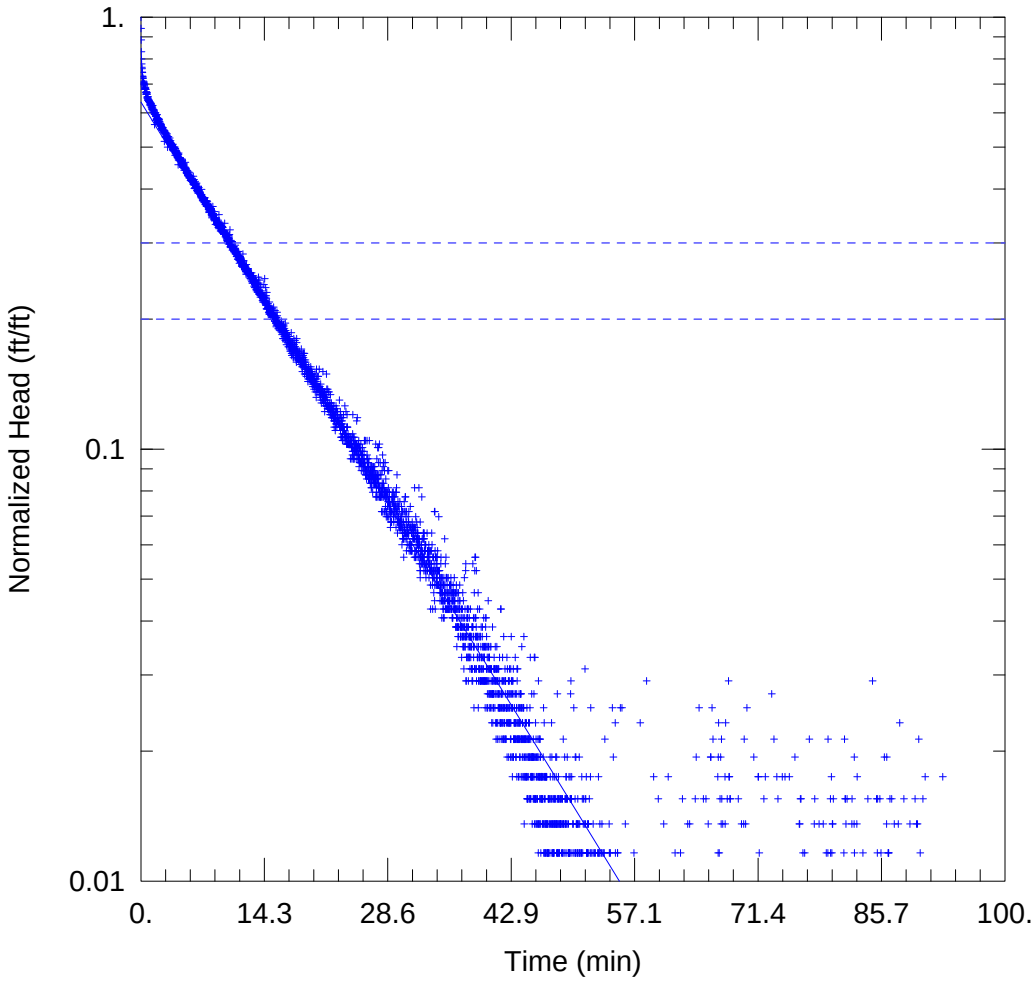
Saturated Thickness: 8.8 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-1 Slug B)

Initial Displacement: 0.357 ft
Total Well Penetration Depth: 8.8 ft
Casing Radius: 0.208 ft
Static Water Column Height: 8.8 ft
Screen Length: 8.8 ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5145 ft/day
y0 = 0.2941 ft



RL-1 SLUG B

Data Set: S:\...\RL-1_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:11:03

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-1
Test Date: 28 Aug 2012

AQUIFER DATA

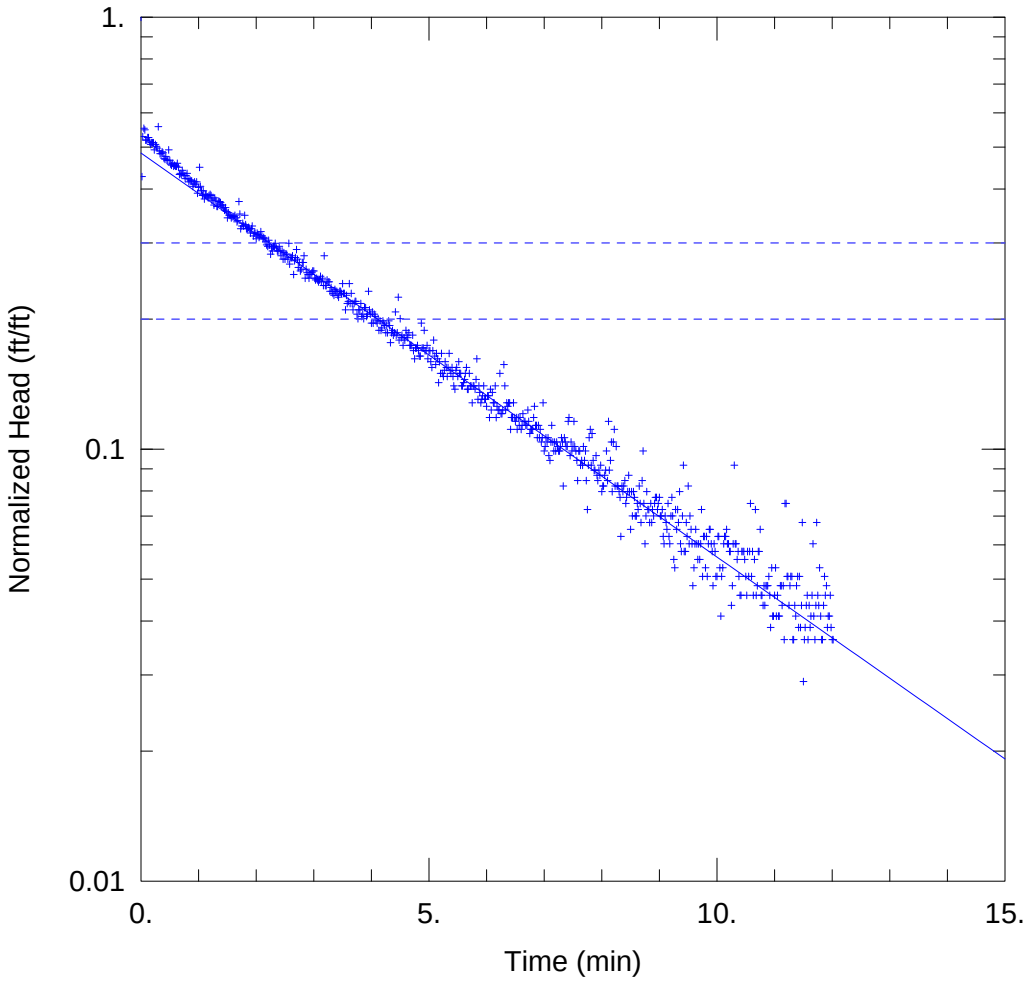
Saturated Thickness: 8.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-1 Slug B)

Initial Displacement: 0.516 ft
Total Well Penetration Depth: 8.8 ft
Casing Radius: 0.208 ft
Static Water Column Height: 8.8 ft
Screen Length: 8.8 ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6324 ft/day
y0 = 0.3279 ft



RL-3 SLUG A FALLING HEAD

Data Set: S:\...\RL-3_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:11:46

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

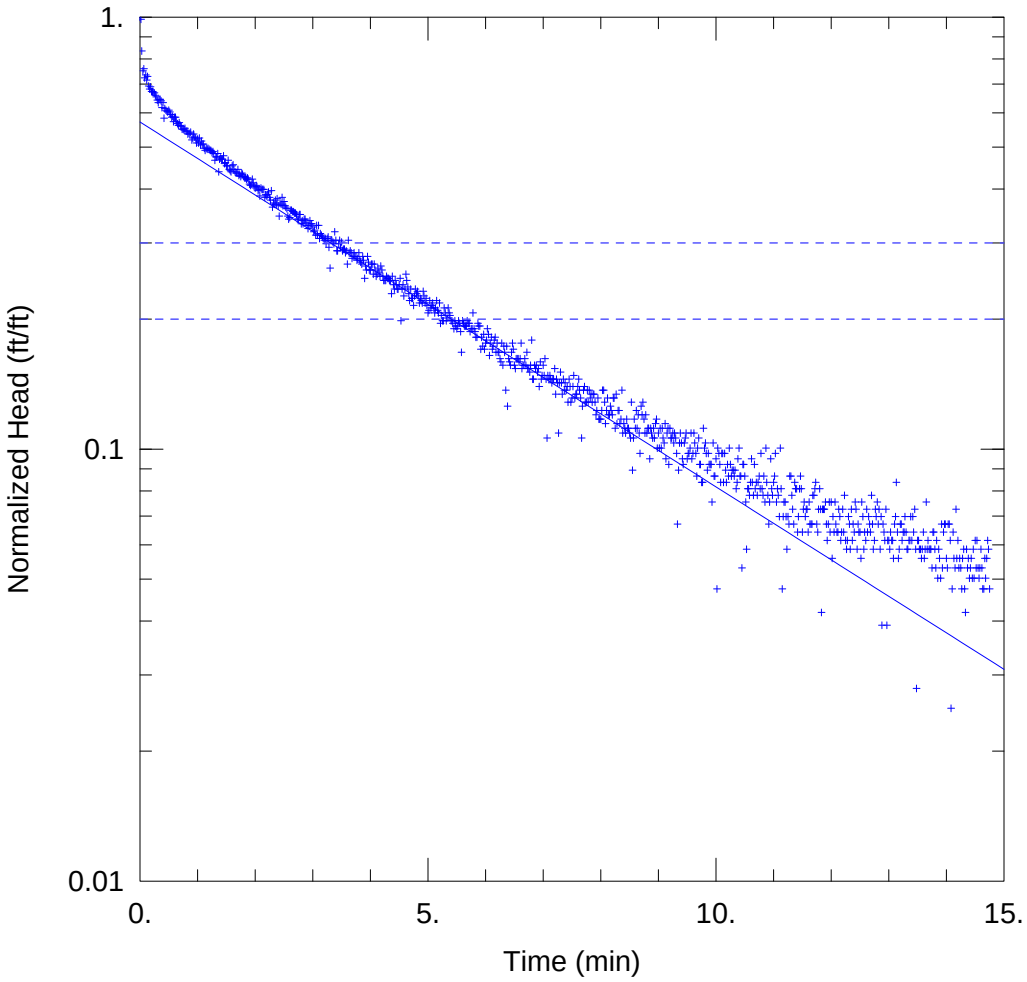
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.414 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.267 ft/day
y0 = 0.2006 ft



RL-3 SLUG A RISING HEAD

Data Set: S:\...\RL-3_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:11:43

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

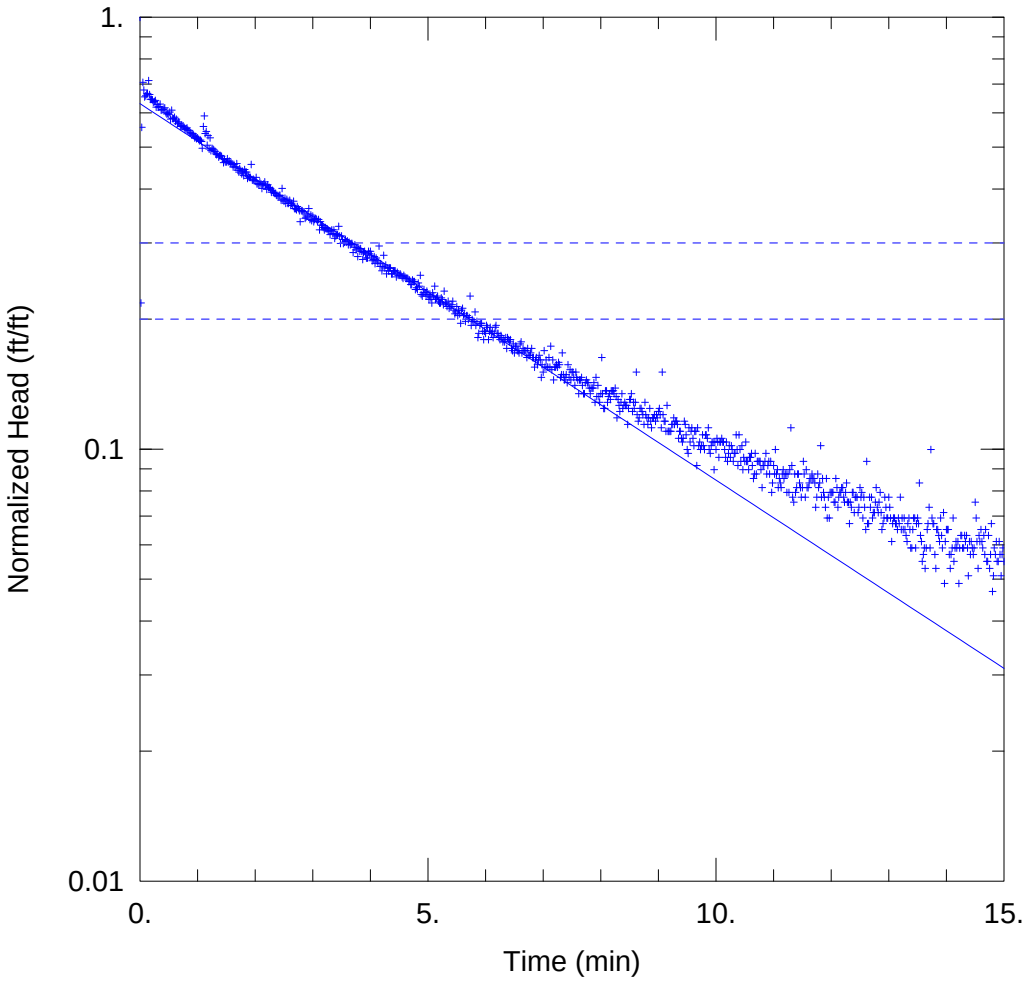
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.358 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.145 ft/day
y0 = 0.2047 ft



RL-3 SLUG B FALLING HEAD

Data Set: S:\...\RL-3_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:11:40

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

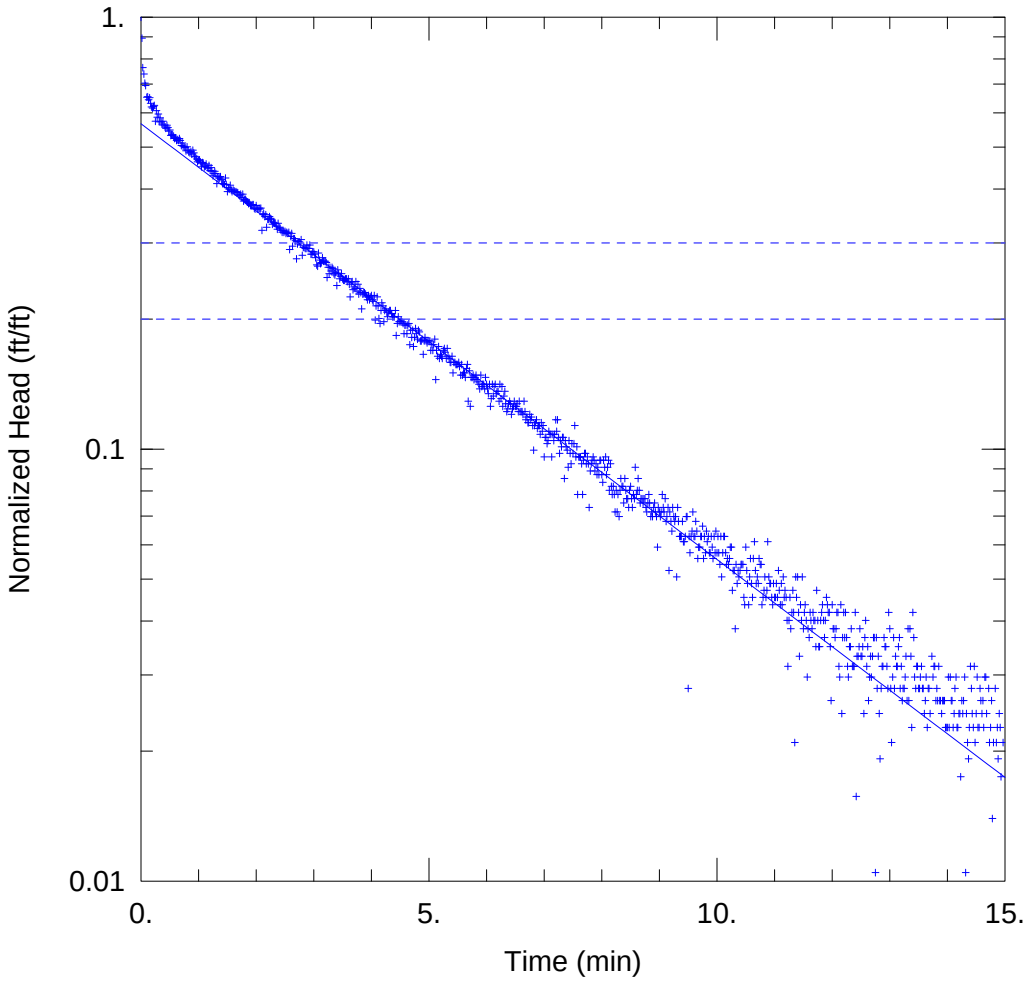
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.491 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.181 ft/day
y0 = 0.3096 ft



RL-3 SLUG B RISING HEAD

Data Set: S:\...\RL-3_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:11:37

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

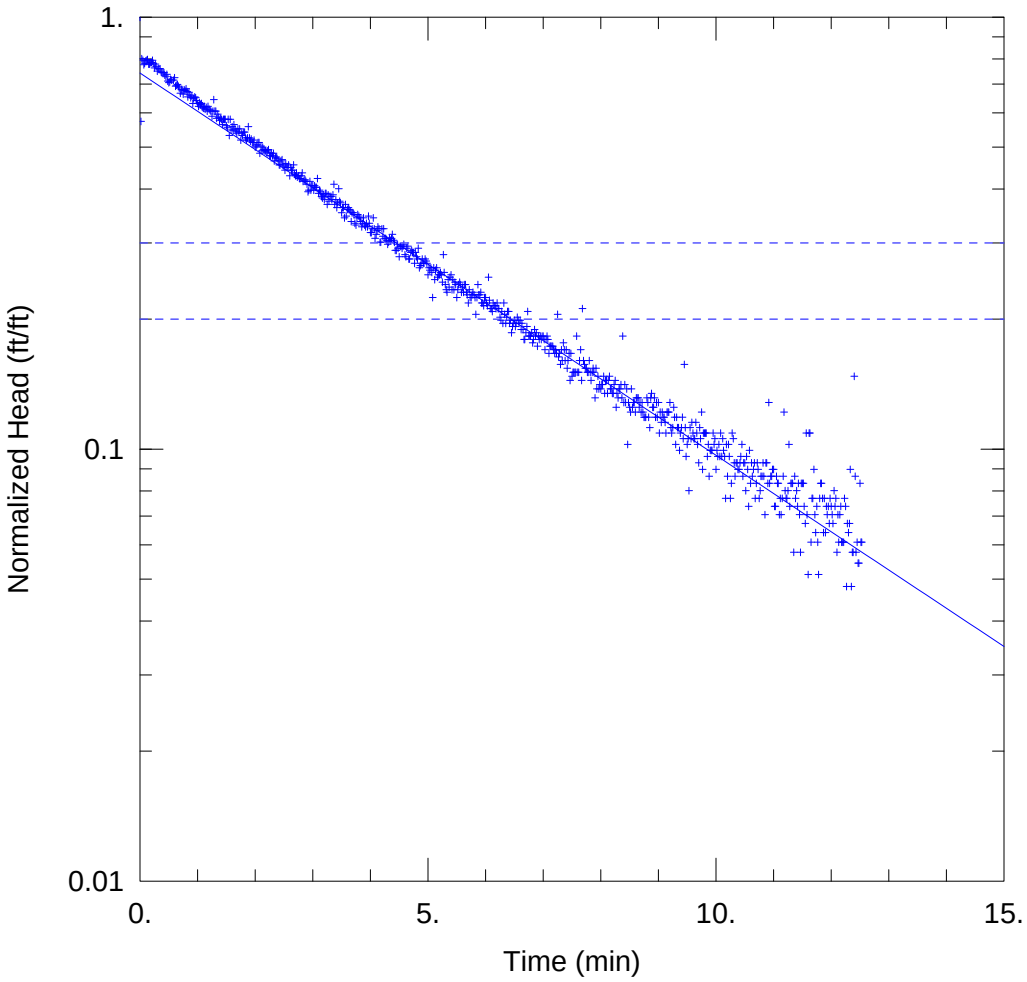
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.573 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.367 ft/day
y0 = 0.3246 ft



RL-3 SLUG G FALLING HEAD

Data Set: S:\...\RL-3_SlugGFallingHead.aqt
Date: 02/19/13 Time: 13:11:34

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

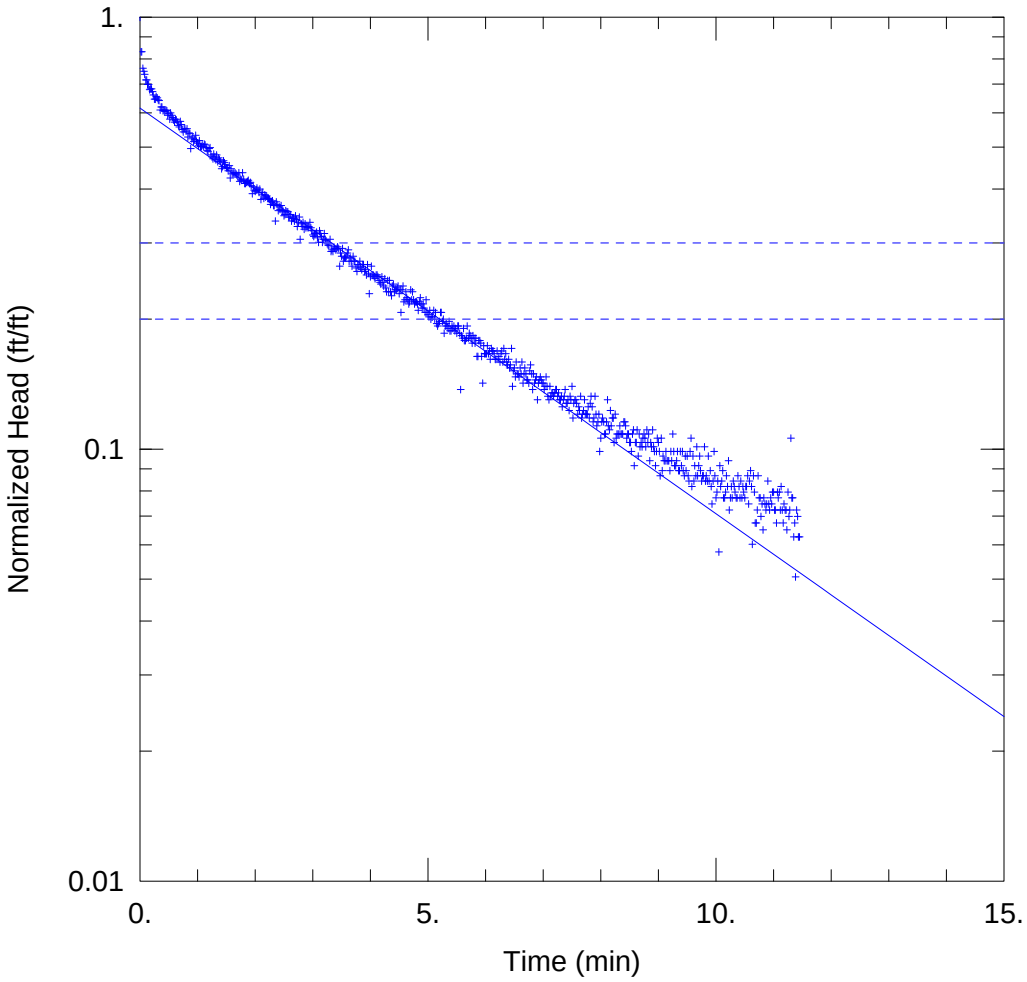
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.312 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.199 ft/day
y0 = 0.2316 ft



RL-3 SLUG G RISING HEAD

Data Set: S:\...\RL-3_SlugGRisingHead.aqt
Date: 02/19/13 Time: 13:11:30

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-3
Test Date: 2 Nov 2012

AQUIFER DATA

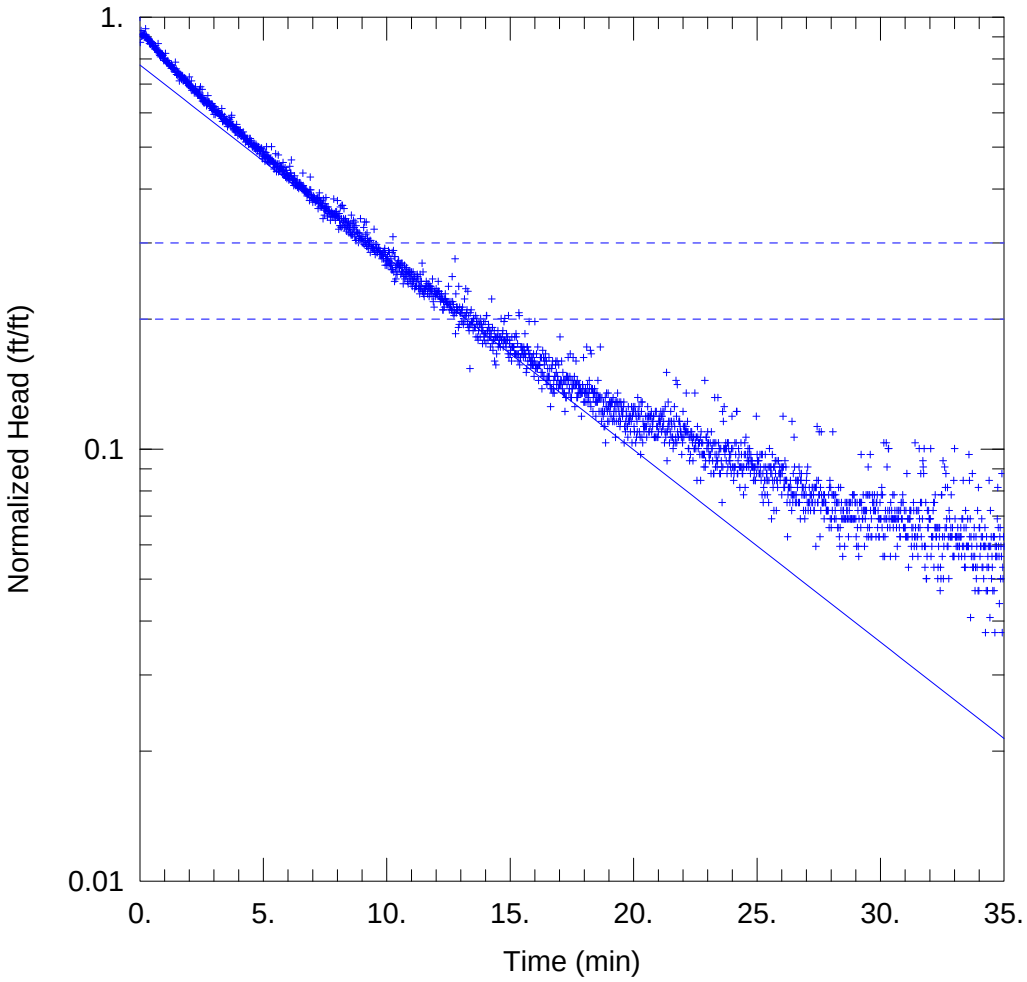
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-3)

Initial Displacement: 0.415 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.208 ft
Static Water Column Height: 15. ft
Screen Length: 15. ft
Well Radius: 0.365 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.273 ft/day
y0 = 0.2556 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:12:18

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

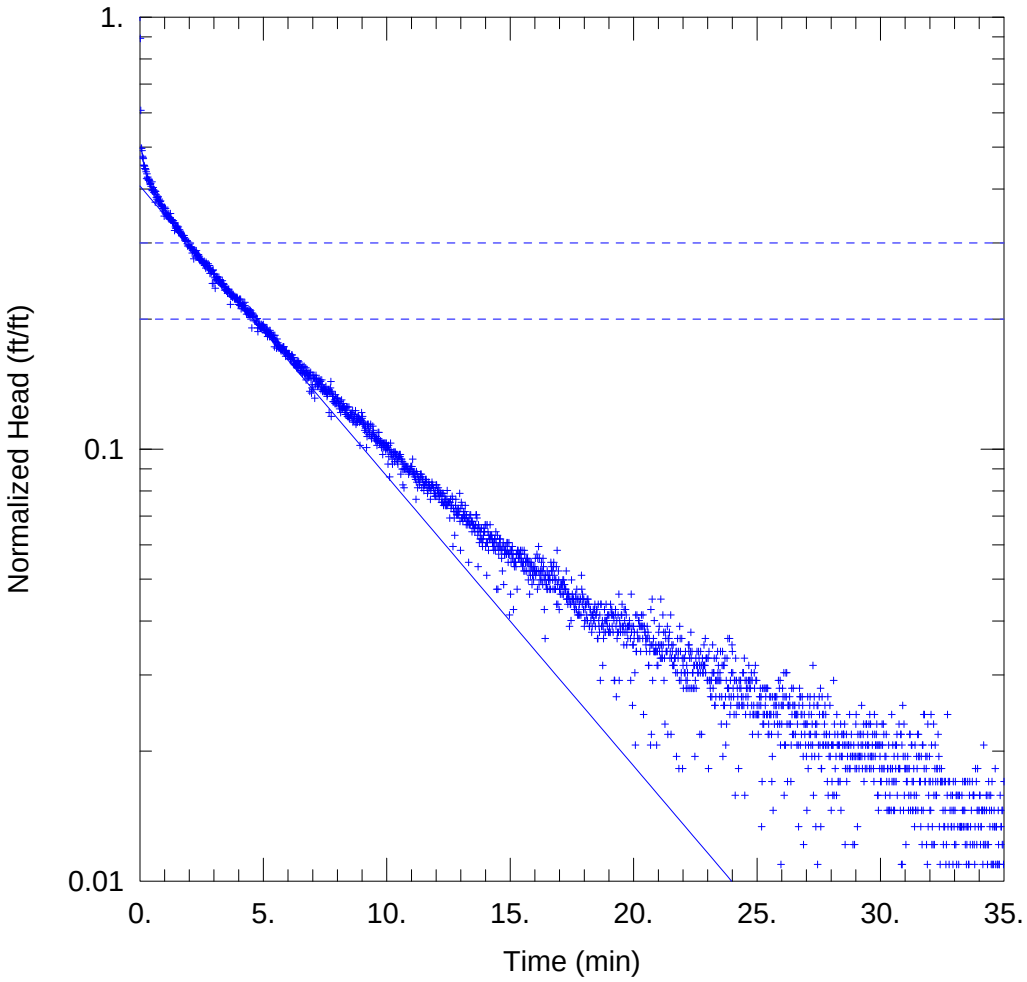
Saturated Thickness: 21.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-4 Slug B Falling Head)

Initial Displacement: 0.319 ft Static Water Column Height: 21.9 ft
Total Well Penetration Depth: 21.9 ft Screen Length: 21.9 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.4594 ft/day y0 = 0.2471 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:12:15

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

Saturated Thickness: 21.9 ft Anisotropy Ratio (Kz/Kr): 1.

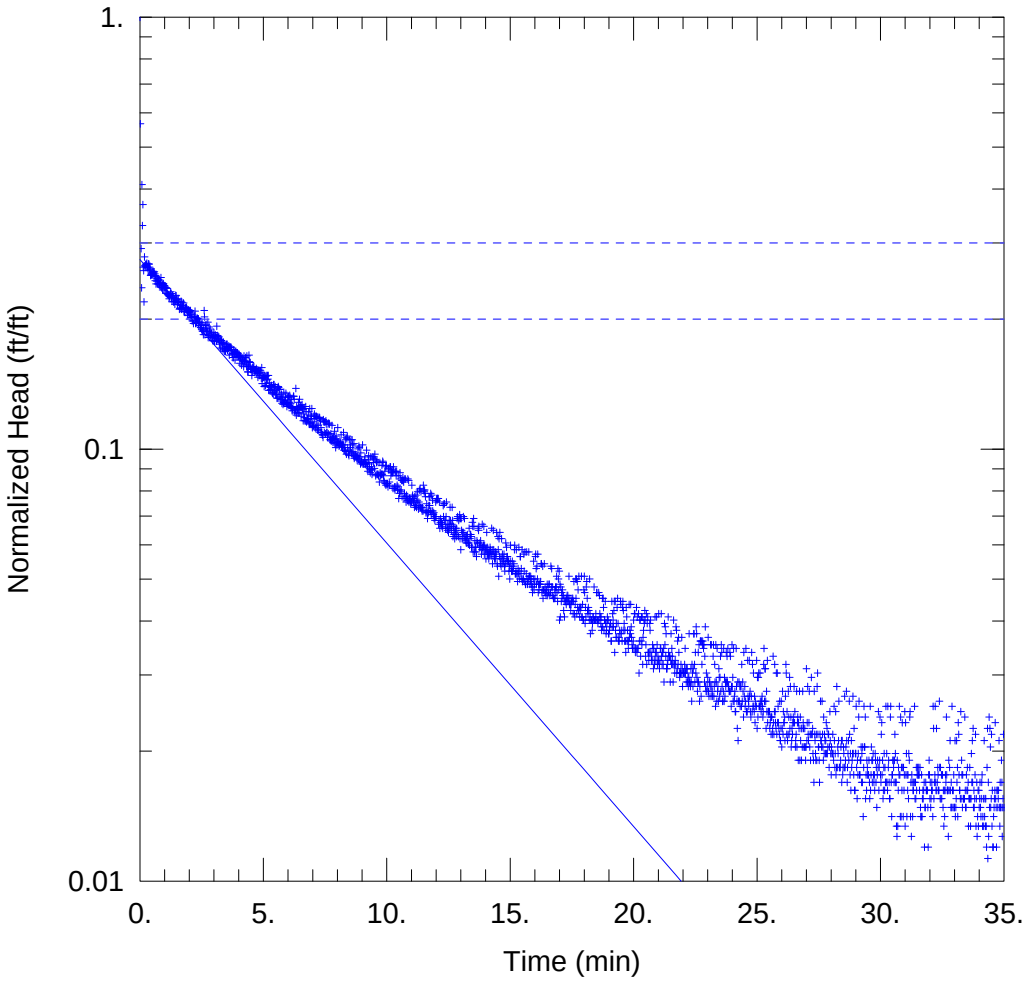
WELL DATA (RL-4 Slug B Rising Head)

Initial Displacement: 0.823 ft Static Water Column Height: 21.9 ft
Total Well Penetration Depth: 21.9 ft Screen Length: 21.9 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.6925 ft/day y0 = 0.3344 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:12:12

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

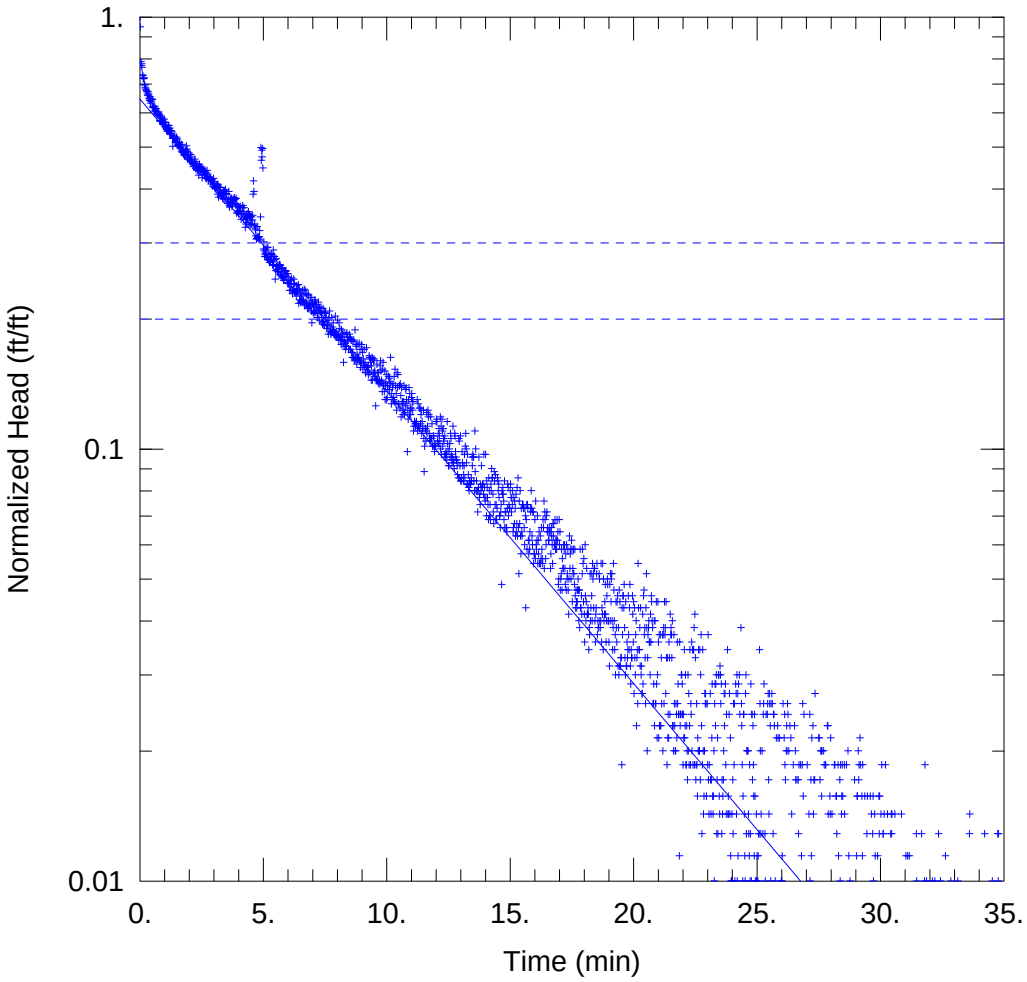
Saturated Thickness: 21.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-4 Slug C Falling Head)

Initial Displacement: 1.418 ft
Total Well Penetration Depth: 21.9 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 21.9 ft
Screen Length: 21.9 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6769 ft/day
y0 = 0.3894 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:12:09

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

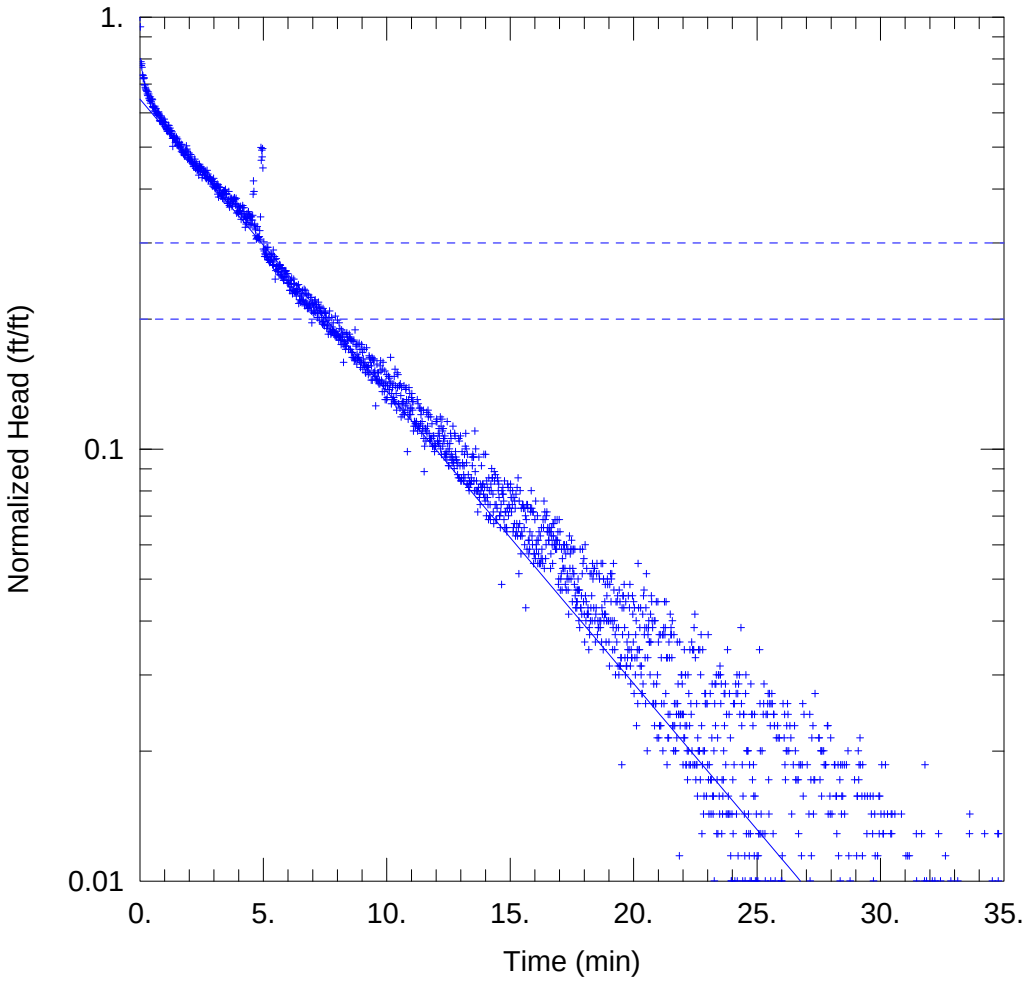
Saturated Thickness: 21.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-4 Slug C Rising Head)

Initial Displacement: 0.699 ft
Total Well Penetration Depth: 21.9 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 21.9 ft
Screen Length: 21.9 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.6979 ft/day
y0 = 0.4516 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:12:06

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

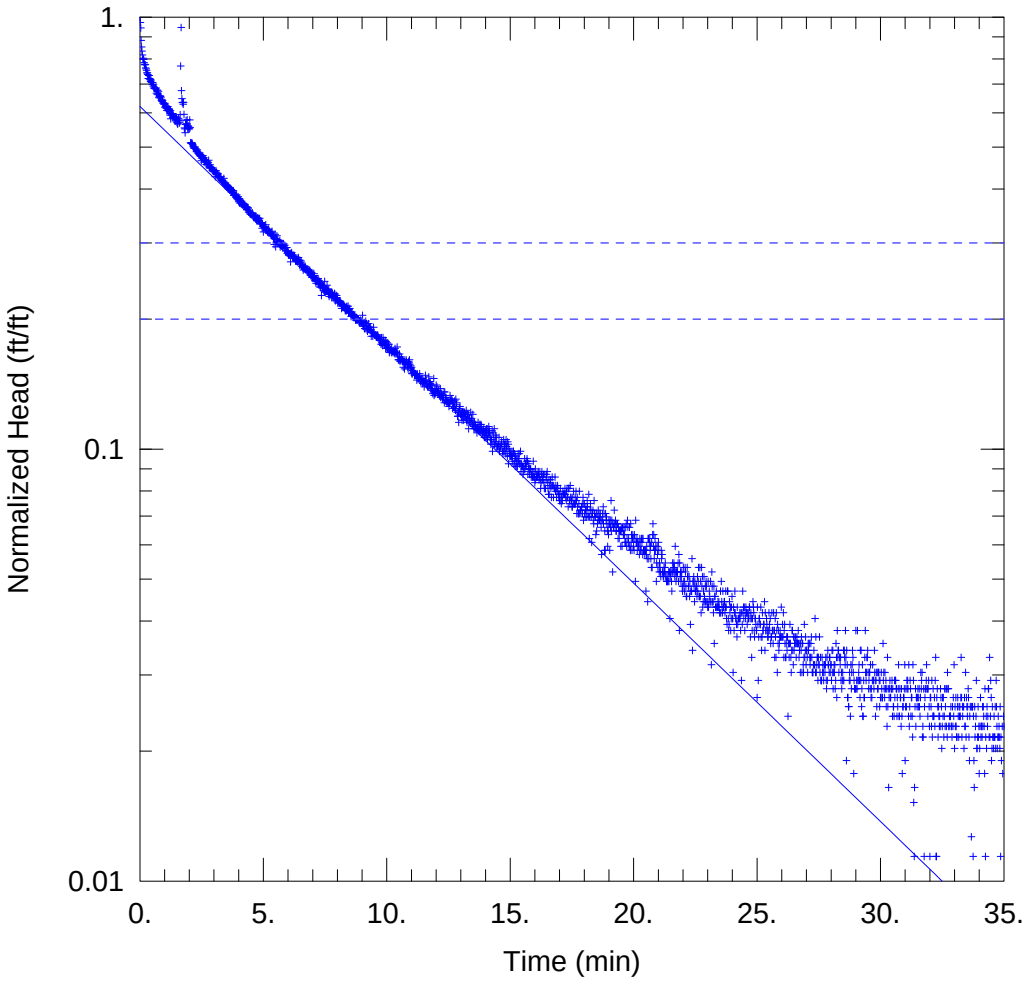
Saturated Thickness: 21.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-4 Slug C Rising Head)

Initial Displacement: 0.699 ft Static Water Column Height: 21.9 ft
Total Well Penetration Depth: 21.9 ft Screen Length: 21.9 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.6979 ft/day y0 = 0.4516 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-4_SlugDRisingHead.aqt
Date: 02/19/13 Time: 13:12:03

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-4
Test Date: 26 Aug 2012

AQUIFER DATA

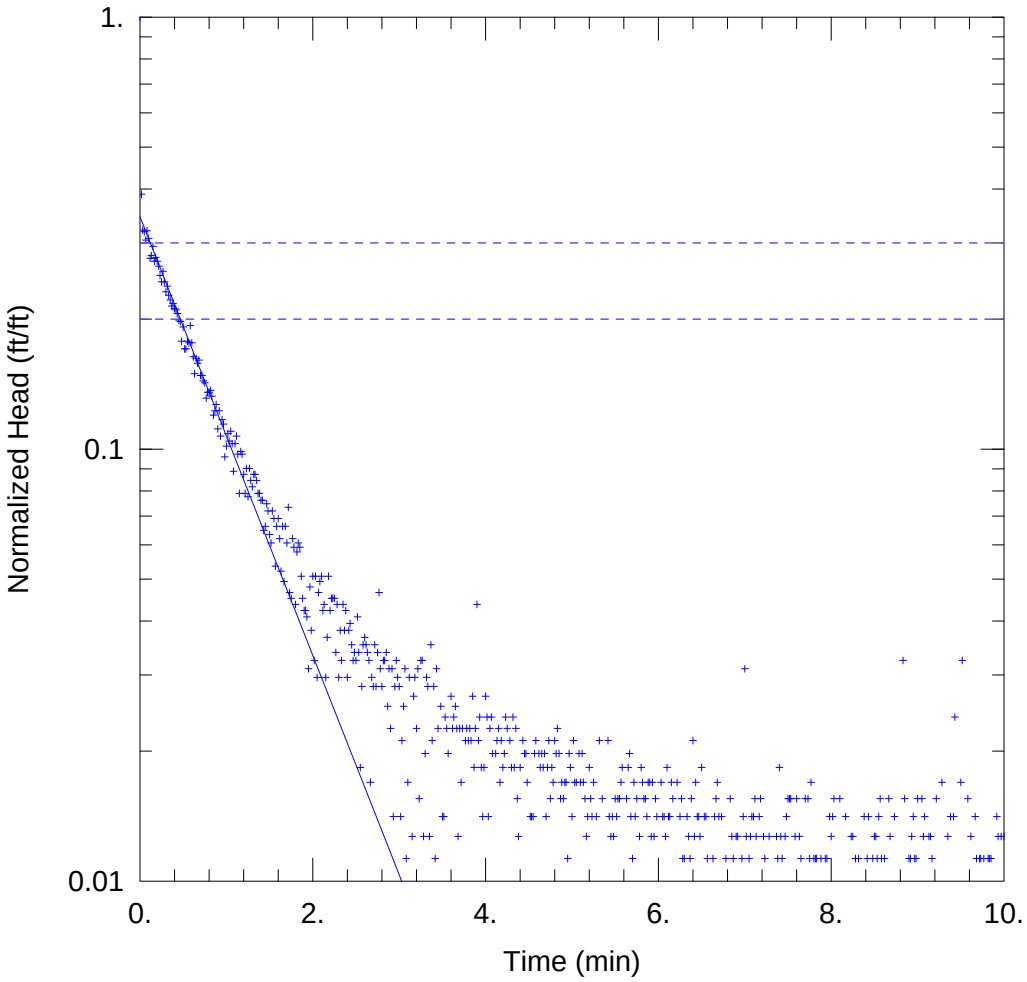
Saturated Thickness: 21.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-4 Slug D Rising Head)

Initial Displacement: 0.789 ft
Total Well Penetration Depth: 21.9 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 21.9 ft
Screen Length: 21.9 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5693 ft/day
y0 = 0.4902 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:18:44

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

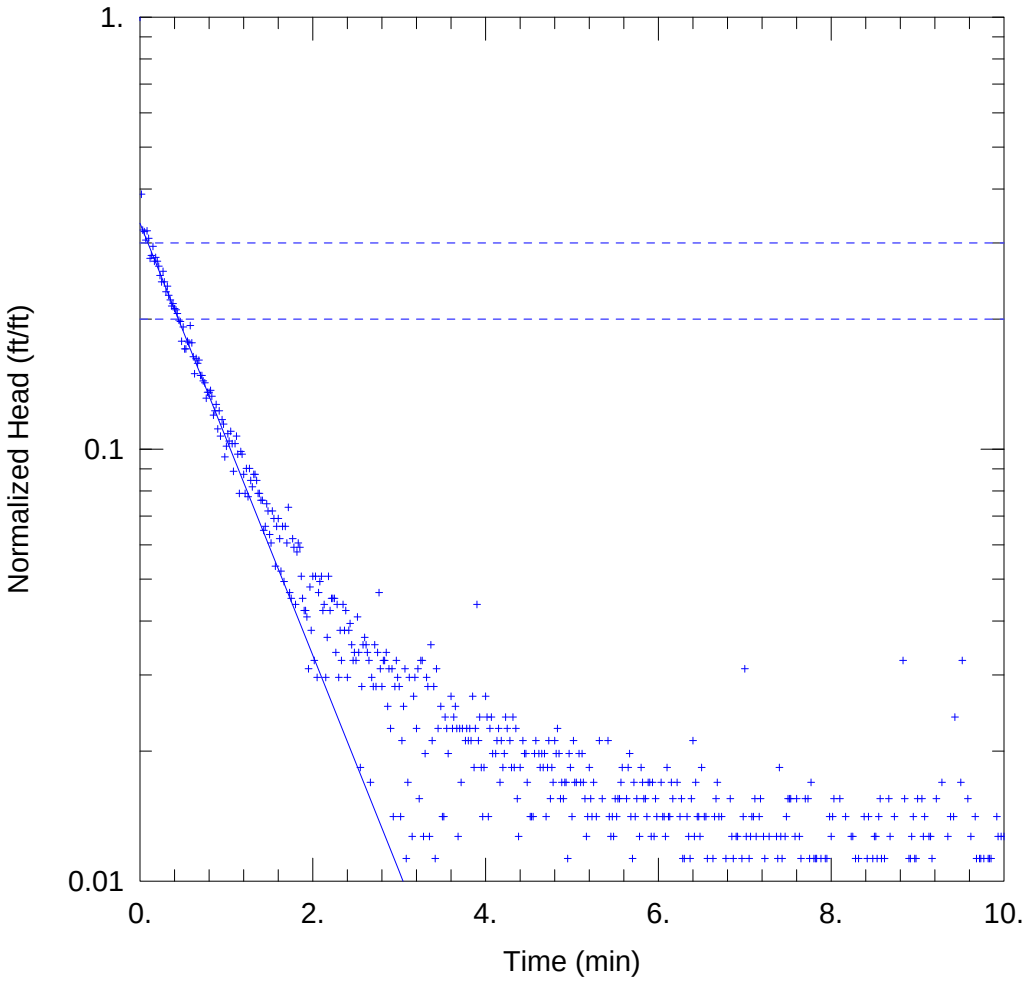
Saturated Thickness: 19.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug B Falling Head)

Initial Displacement: 0.709 ft
Total Well Penetration Depth: 19.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 19.4 ft
Screen Length: 19.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.731 ft/day
y0 = 0.2448 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugBFallingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:13:13

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

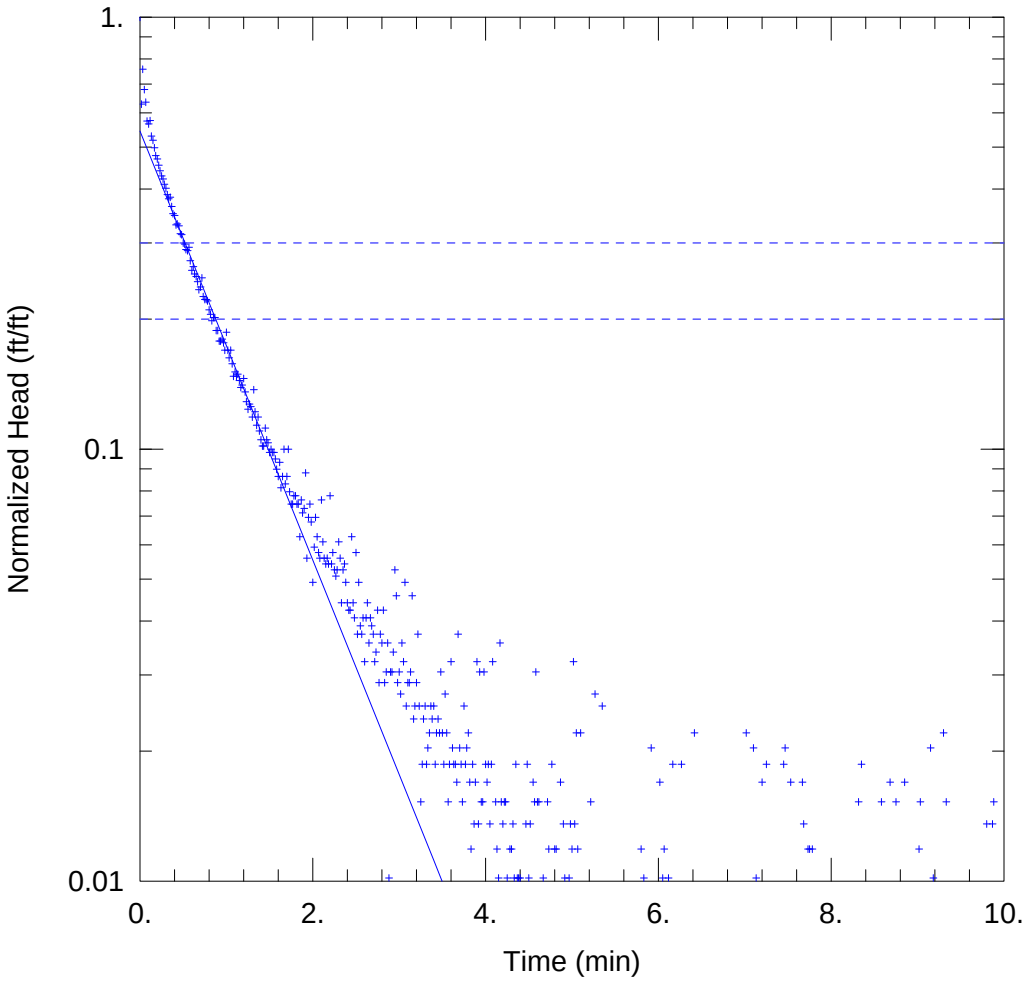
Saturated Thickness: 36.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug B Falling Head)

Initial Displacement: 0.709 ft
Total Well Penetration Depth: 36.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 36.4 ft
Screen Length: 36.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.501 ft/day
y0 = 0.2364 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:18:41

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

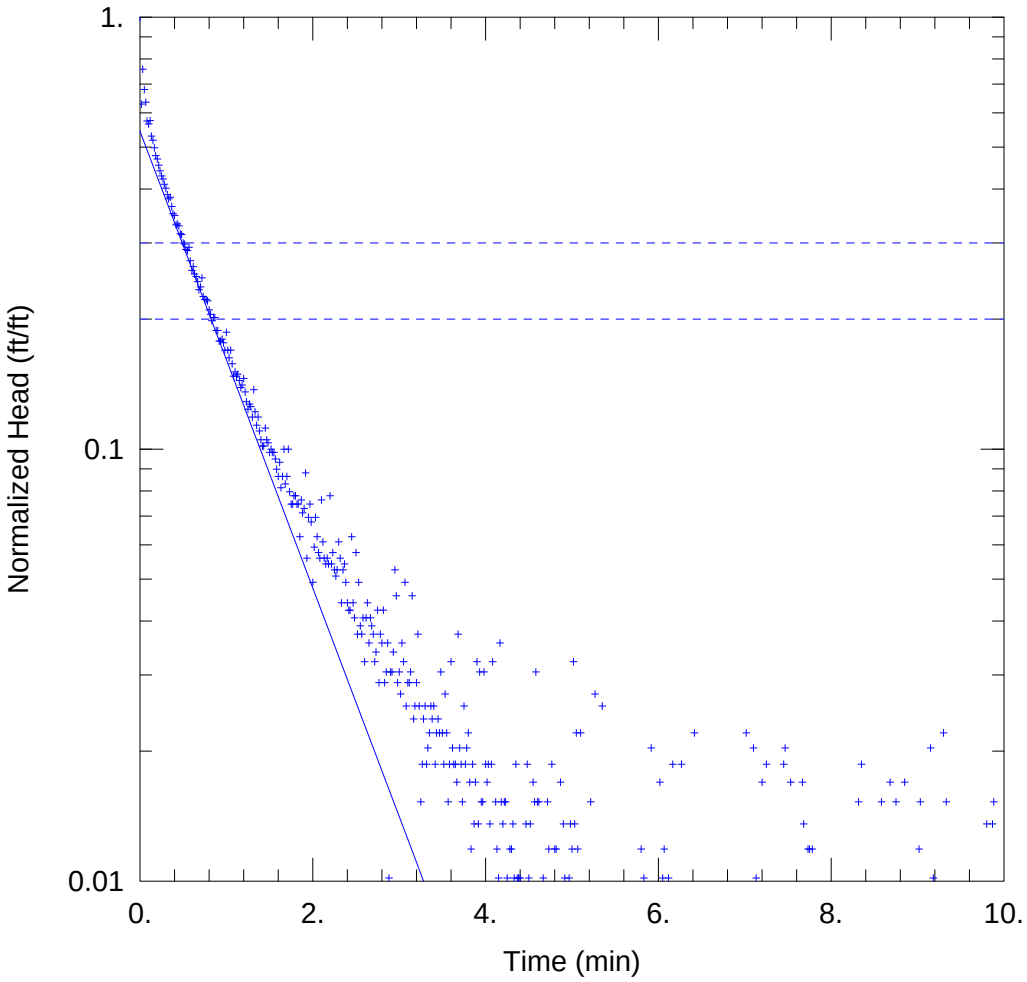
Saturated Thickness: 19.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug B Rising Head)

Initial Displacement: 0.59 ft
Static Water Column Height: 19.4 ft
Total Well Penetration Depth: 19.4 ft
Screen Length: 19.4 ft
Casing Radius: 0.2083 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.603 ft/day
y0 = 0.3212 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugBRisingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:13:09

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

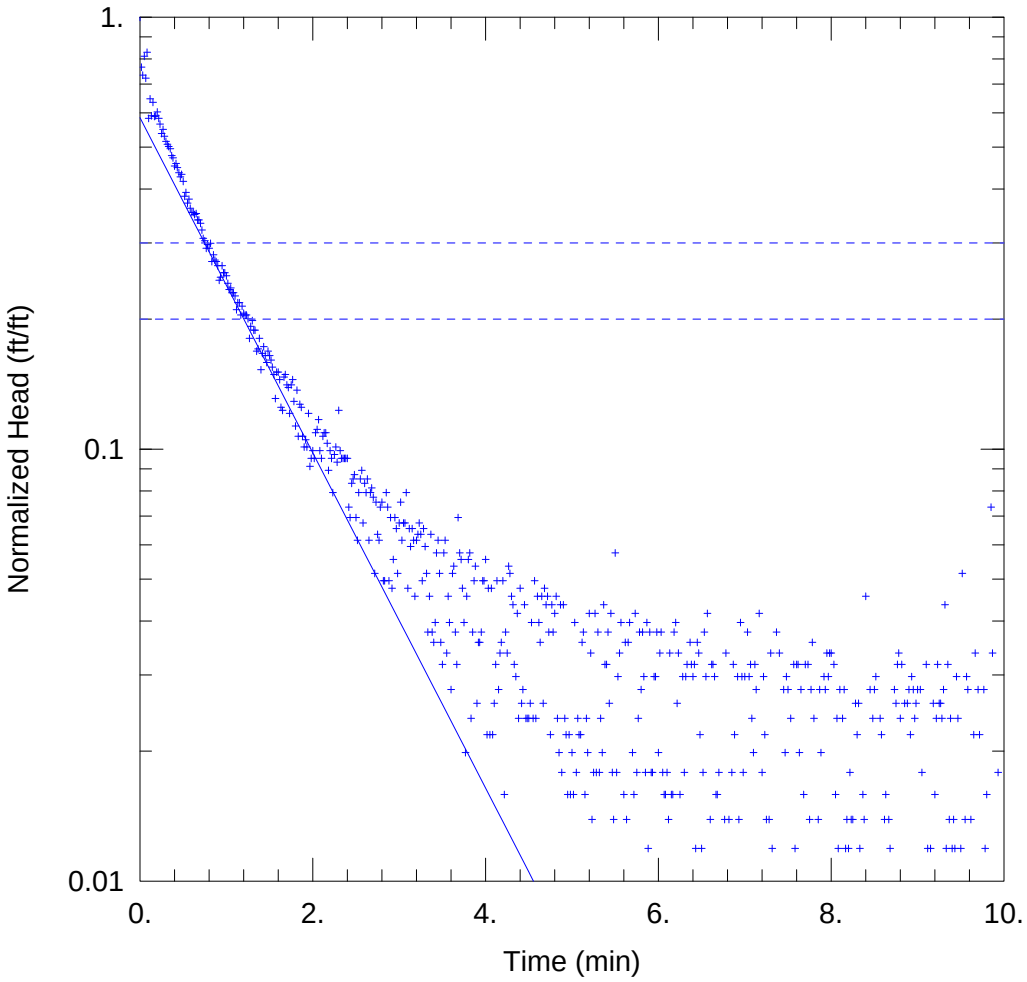
Saturated Thickness: 36.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug B Rising Head)

Initial Displacement: 0.59 ft
Static Water Column Height: 36.4 ft
Total Well Penetration Depth: 36.4 ft
Screen Length: 36.4 ft
Casing Radius: 0.2083 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.701 ft/day
y0 = 0.321 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:18:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

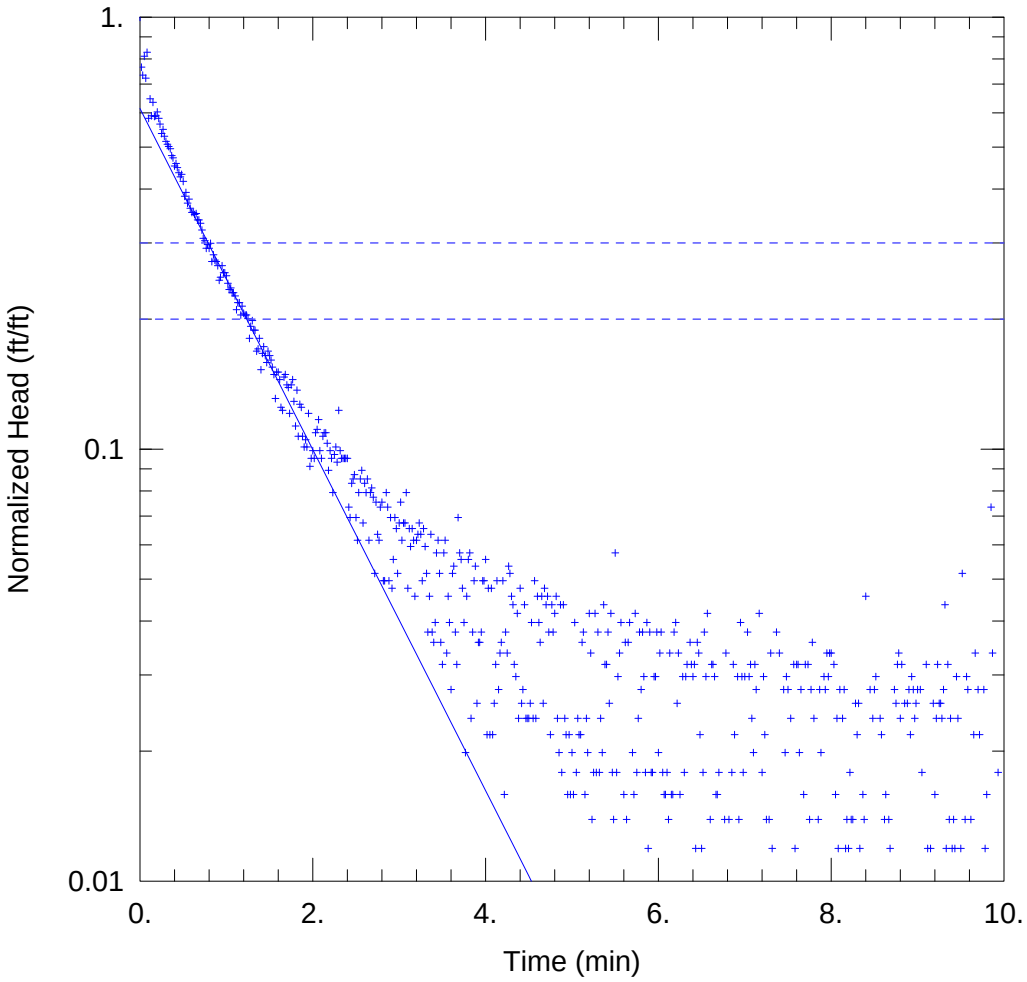
Saturated Thickness: 19.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug C Falling Head)

Initial Displacement: 0.504 ft
Total Well Penetration Depth: 19.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 19.4 ft
Screen Length: 19.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.379 ft/day
y0 = 0.2949 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugCFallingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:13:06

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

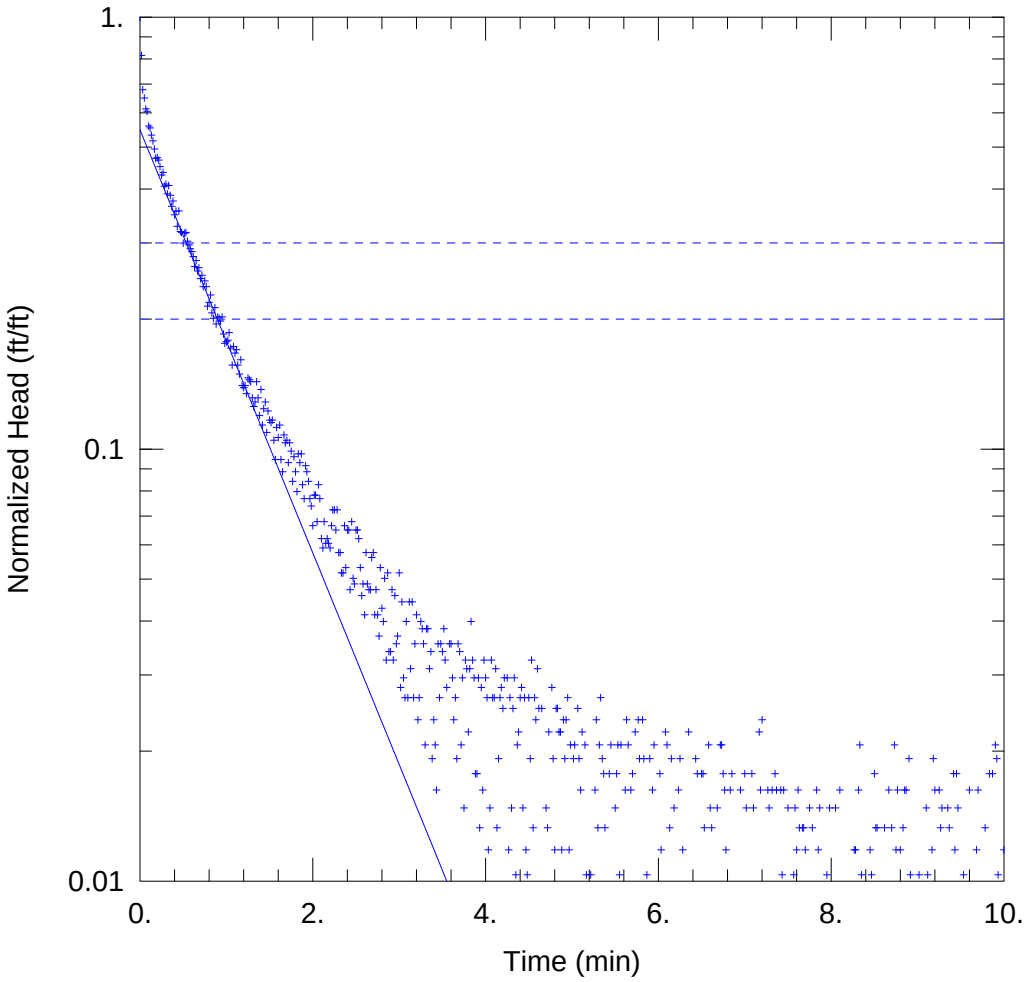
Saturated Thickness: 36.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug C Falling Head)

Initial Displacement: 0.504 ft
Total Well Penetration Depth: 36.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 36.4 ft
Screen Length: 36.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.763 ft/day
y0 = 0.3095 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:18:34

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

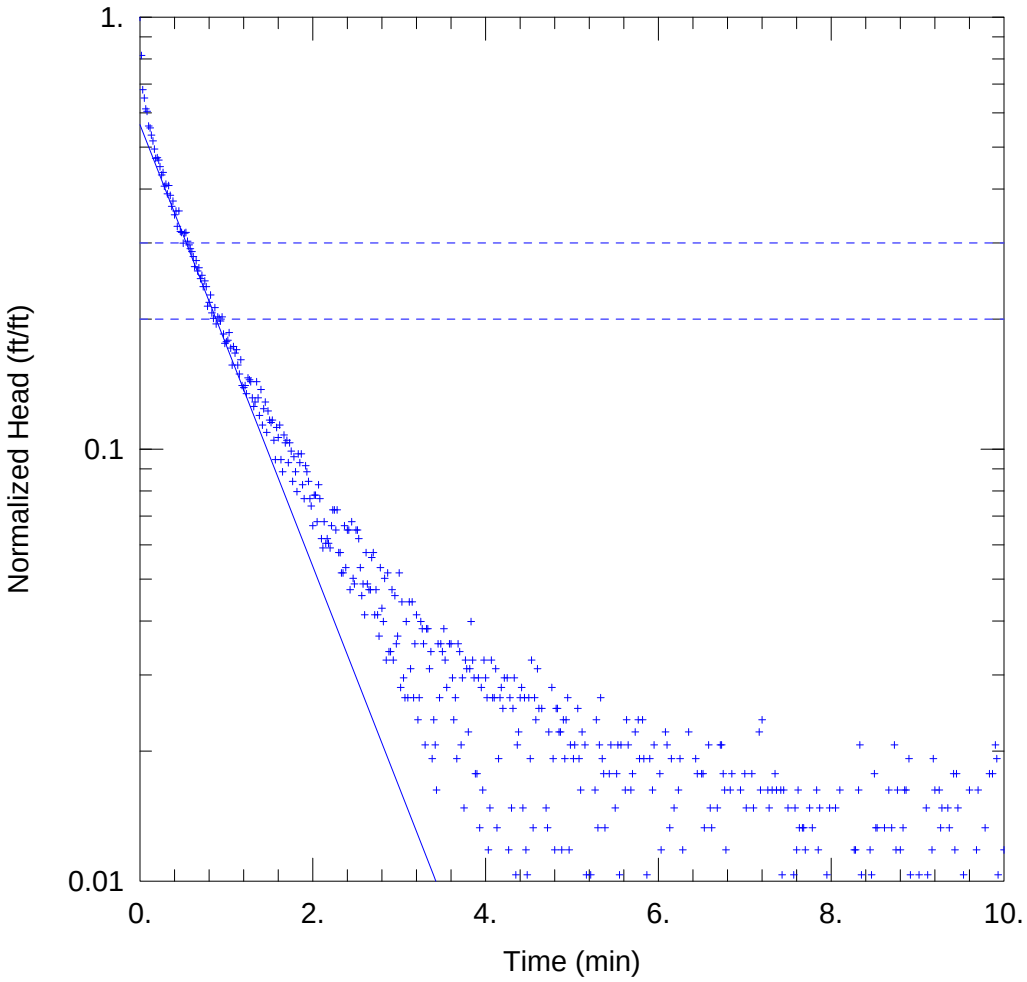
Saturated Thickness: 19.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug C Rising Head)

Initial Displacement: 0.677 ft Static Water Column Height: 19.4 ft
Total Well Penetration Depth: 19.4 ft Screen Length: 19.4 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 5.528 ft/day y0 = 0.3714 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugCRisingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:13:04

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

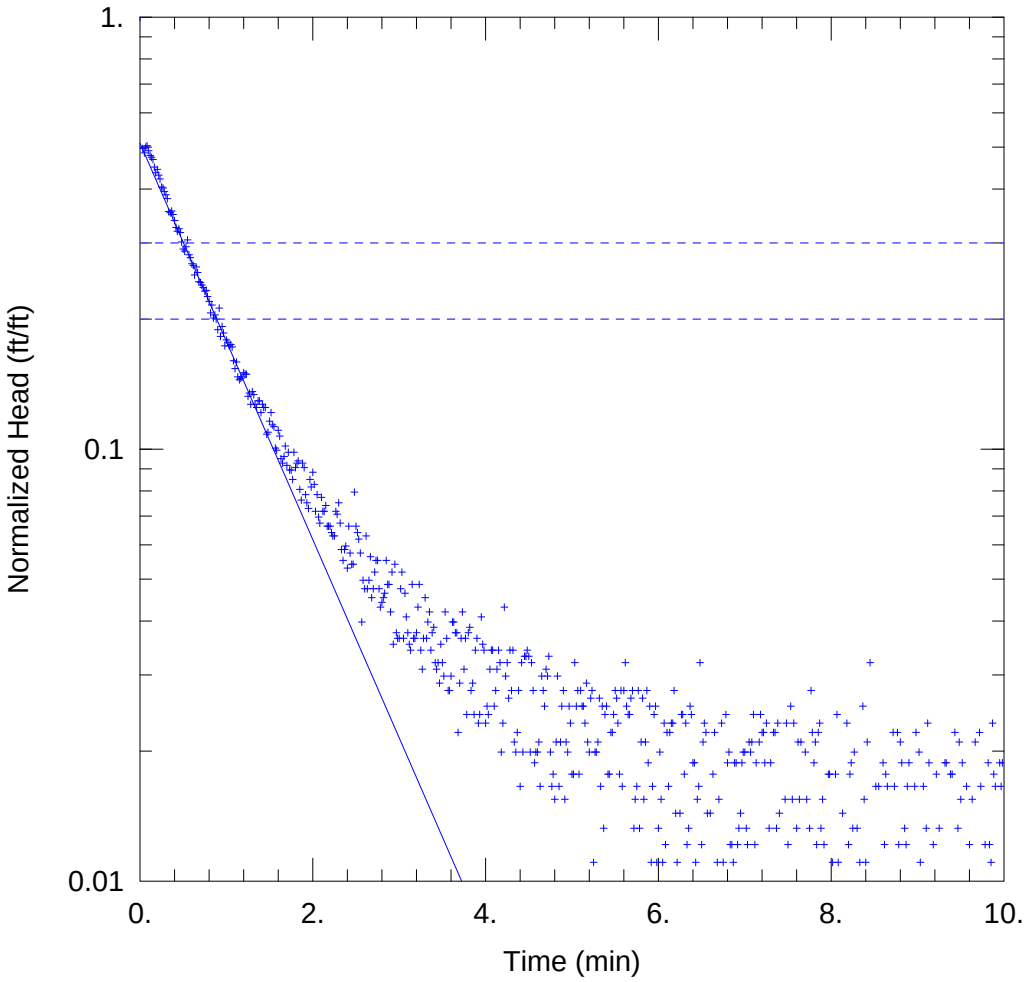
Saturated Thickness: 36.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug C Rising Head)

Initial Displacement: 0.677 ft Static Water Column Height: 36.4 ft
Total Well Penetration Depth: 36.4 ft Screen Length: 36.4 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 3.579 ft/day y0 = 0.3815 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugDFallingHead.aqt
Date: 02/19/13 Time: 13:18:30

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

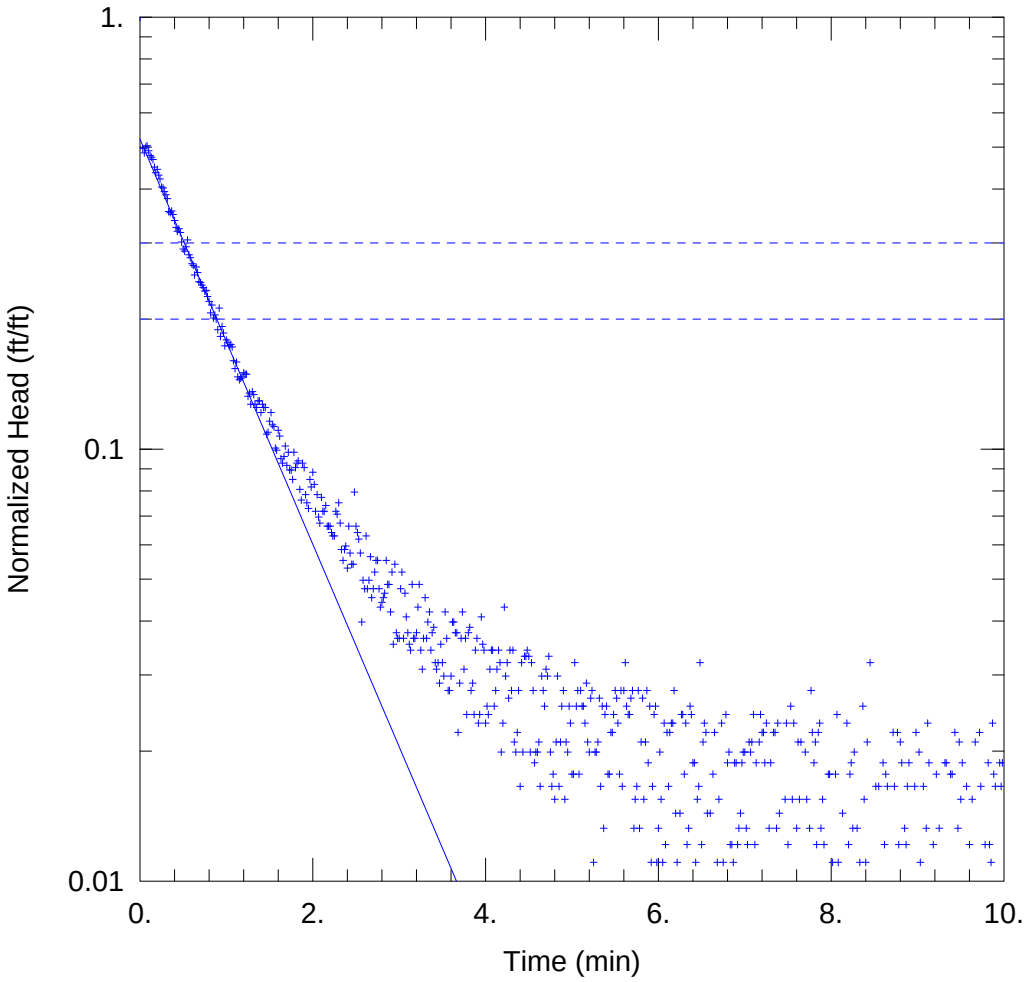
Saturated Thickness: 19.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug D Falling Head)

Initial Displacement: 0.905 ft
Static Water Column Height: 19.4 ft
Total Well Penetration Depth: 19.4 ft
Screen Length: 19.4 ft
Casing Radius: 0.2083 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.18 ft/day
y0 = 0.4624 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugDFallingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:13:01

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

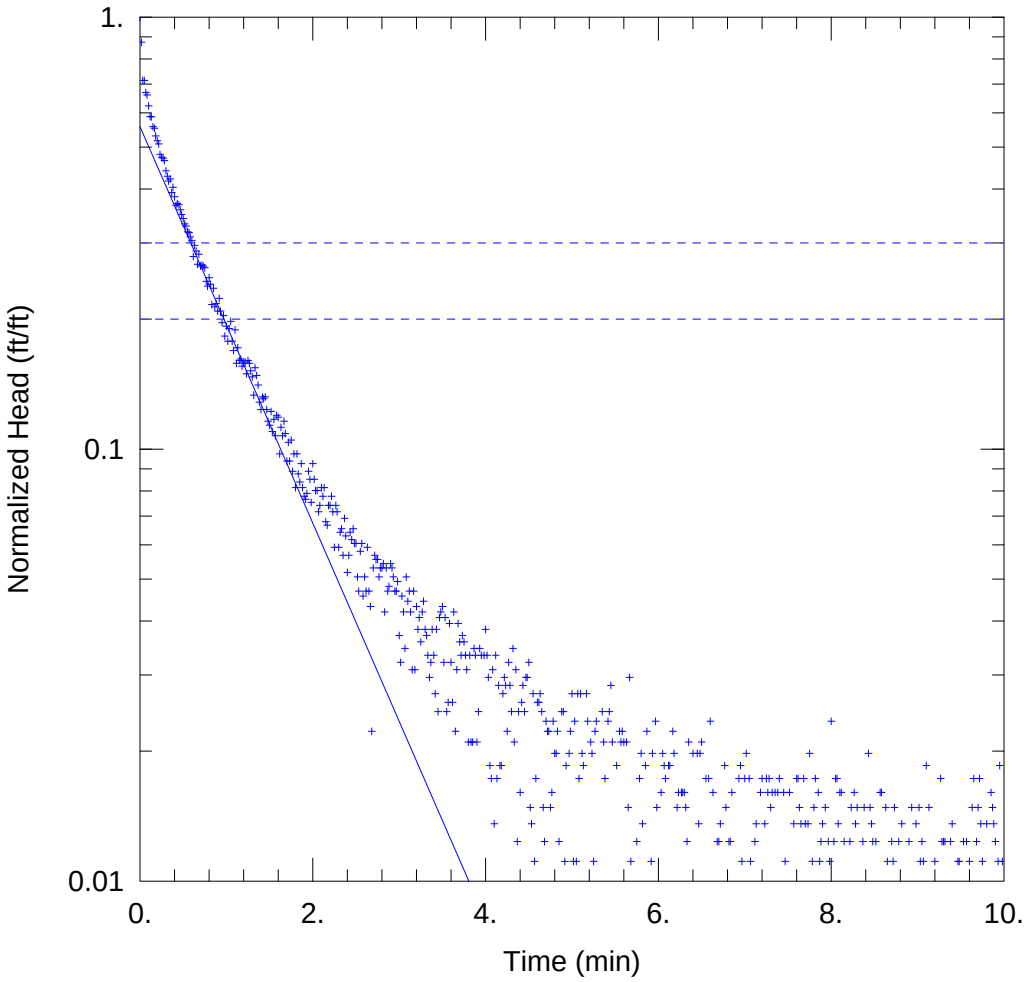
Saturated Thickness: 36.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug D Falling Head)

Initial Displacement: 0.905 ft
Total Well Penetration Depth: 36.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 36.4 ft
Screen Length: 36.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.282 ft/day
y0 = 0.4722 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-5_SlugDRisingHead36FtScreen.aqt
Date: 02/19/13 Time: 13:12:56

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-5
Test Date: 25 Aug 2012

AQUIFER DATA

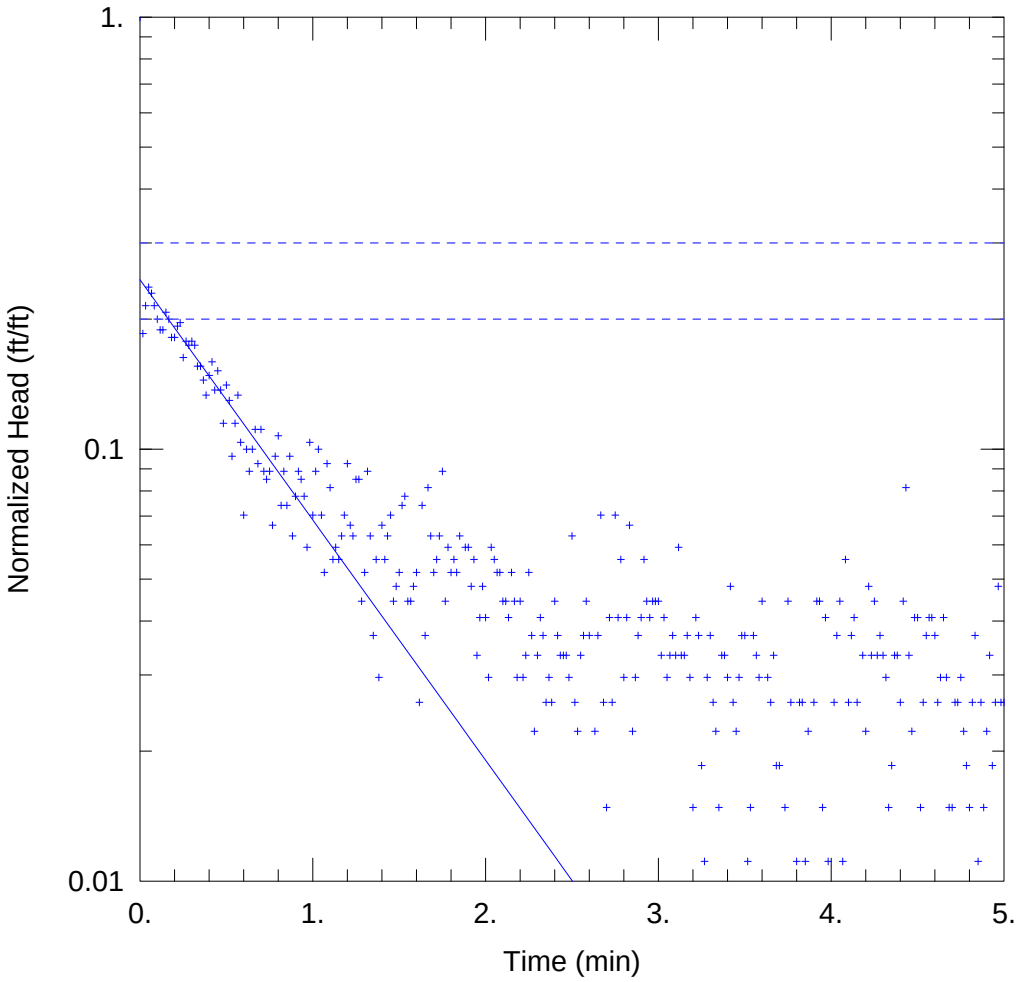
Saturated Thickness: 36.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-5 Slug D Rising Head)

Initial Displacement: 0.81 ft
Total Well Penetration Depth: 36.4 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 36.4 ft
Screen Length: 36.4 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.213 ft/day
y0 = 0.4519 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-6_SlugAFallingHead.aqt
Date: 02/19/13 Time: 13:14:11

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-6
Test Date: 25 Aug 2012

AQUIFER DATA

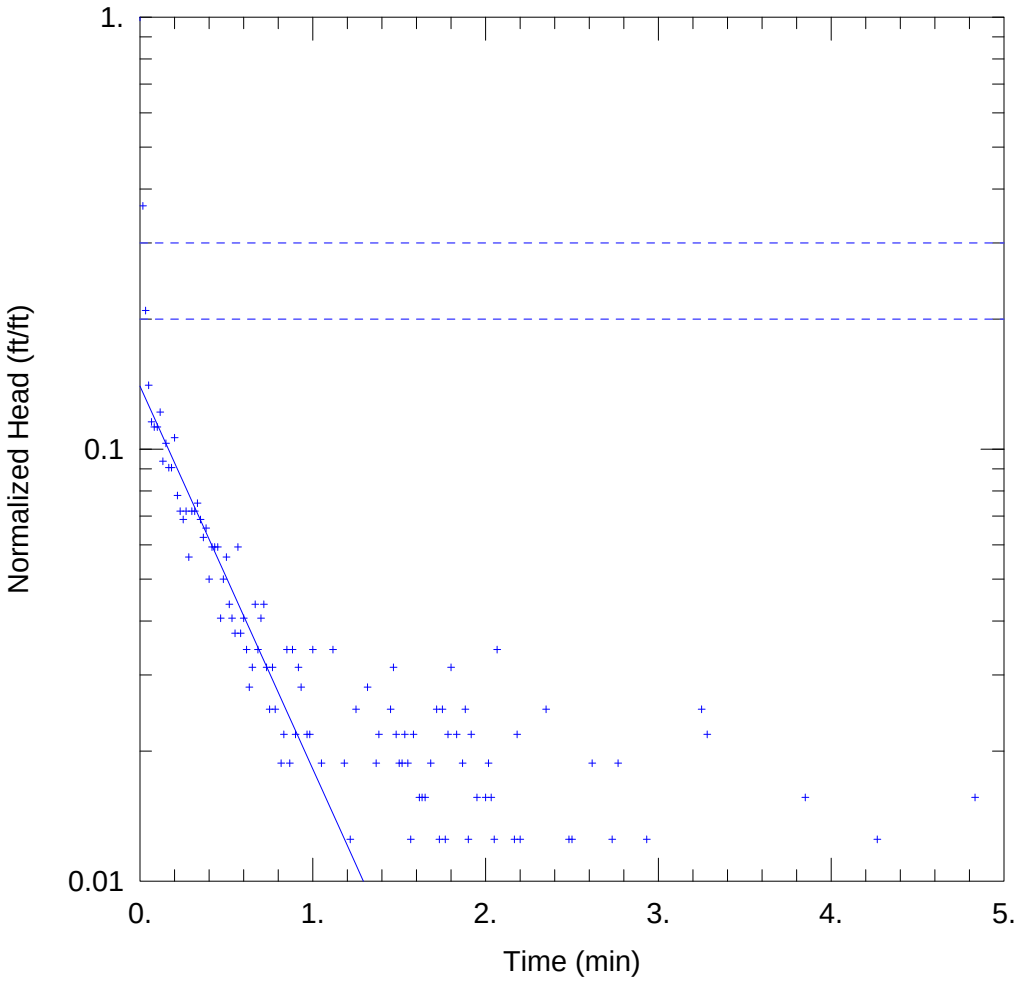
Saturated Thickness: 6.03 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-6 Slug A Falling Head)

Initial Displacement: 0.27 ft
Total Well Penetration Depth: 6.03 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 6.03 ft
Screen Length: 6.03 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 13.65 ft/day
y0 = 0.06657 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-6_SlugARisingHead.aqt
Date: 02/19/13 Time: 13:13:44

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-6
Test Date: 25 Aug 2012

AQUIFER DATA

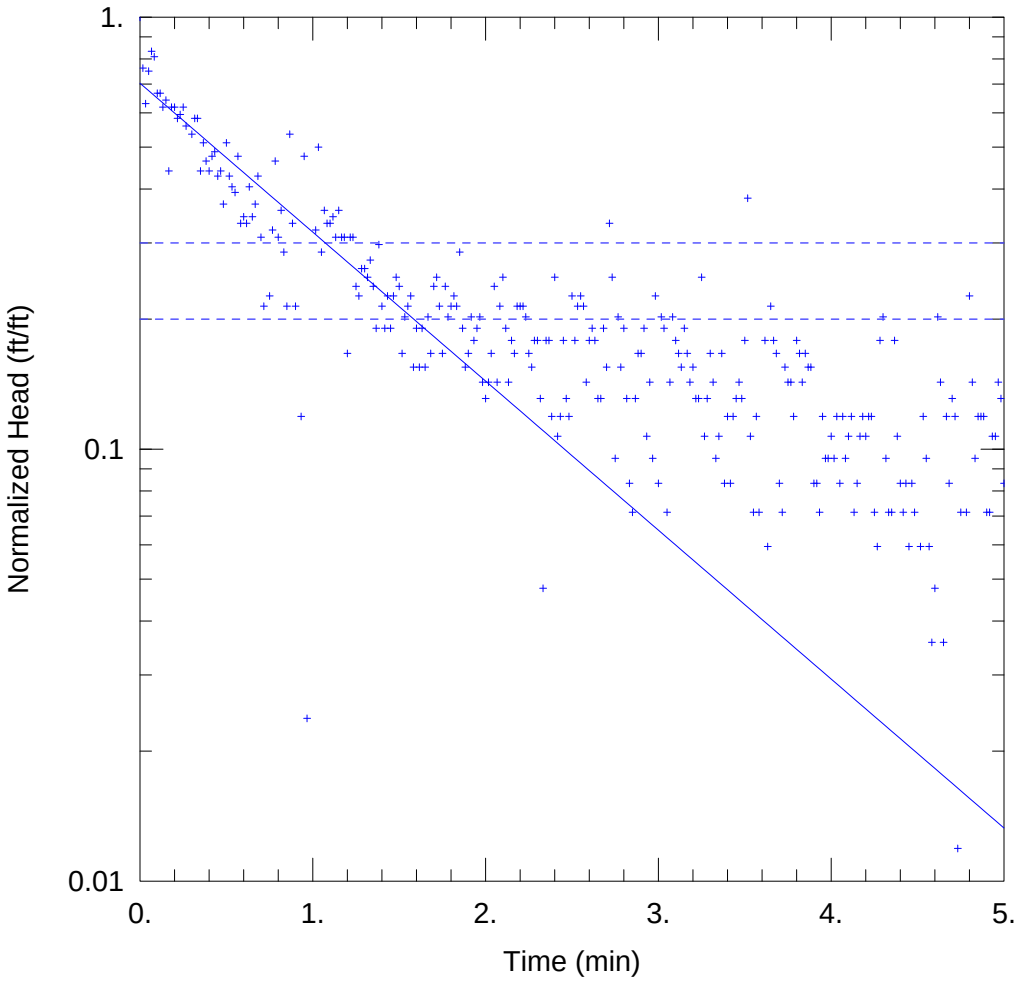
Saturated Thickness: 6.03 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-6 Slug A Rising Head)

Initial Displacement: 0.32 ft
Total Well Penetration Depth: 6.03 ft
Casing Radius: 0.2083 ft
Static Water Column Height: 6.03 ft
Screen Length: 6.03 ft
Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 21.76 ft/day
y0 = 0.04476 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-6_SlugBFallingHead.aqt
Date: 02/19/13 Time: 13:13:38

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-6
Test Date: 25 Aug 2012

AQUIFER DATA

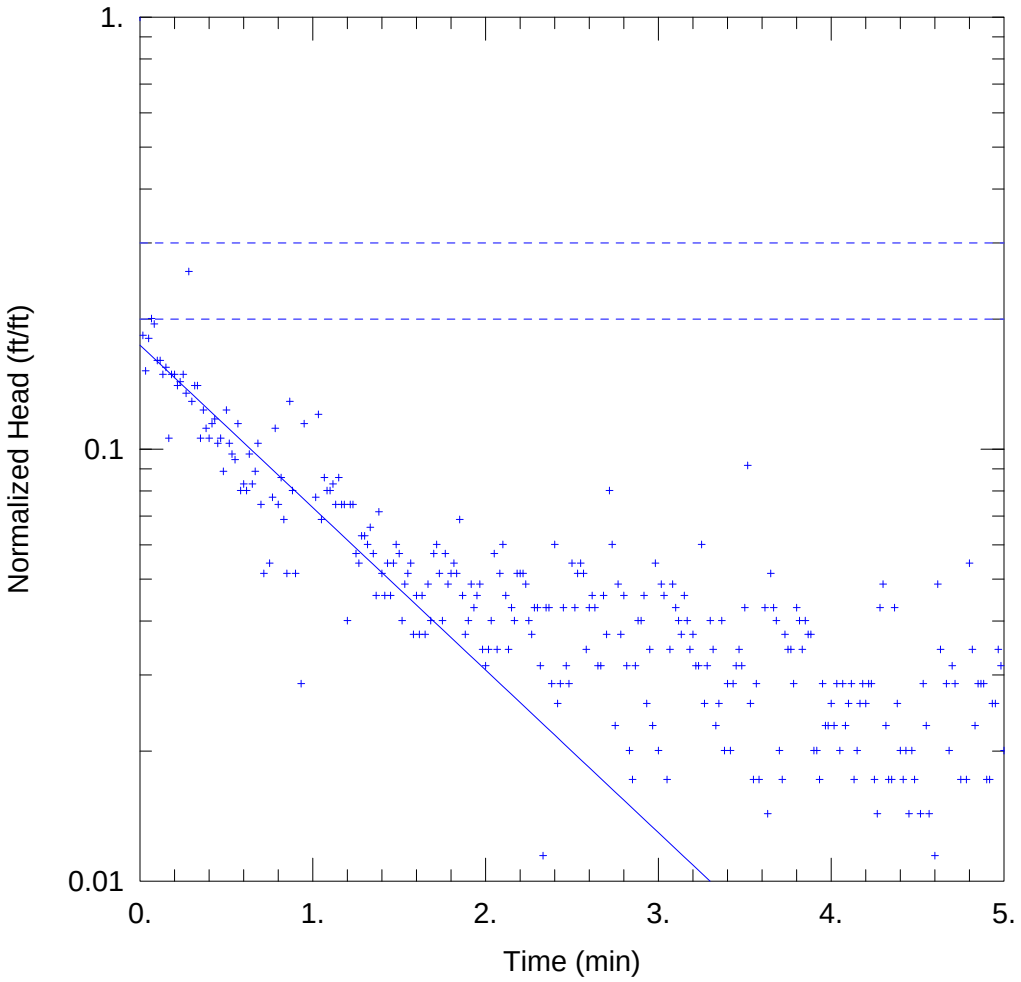
Saturated Thickness: 6.03 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-6 Slug B Falling Head)

Initial Displacement: 0.084 ft Static Water Column Height: 6.03 ft
Total Well Penetration Depth: 6.03 ft Screen Length: 6.03 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 8.465 ft/day y0 = 0.05905 ft



WELL TEST ANALYSIS

Data Set: S:\...\RL-6_SlugBRisingHead.aqt
Date: 02/19/13 Time: 13:13:35

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: RL-6
Test Date: 25 Aug 2012

AQUIFER DATA

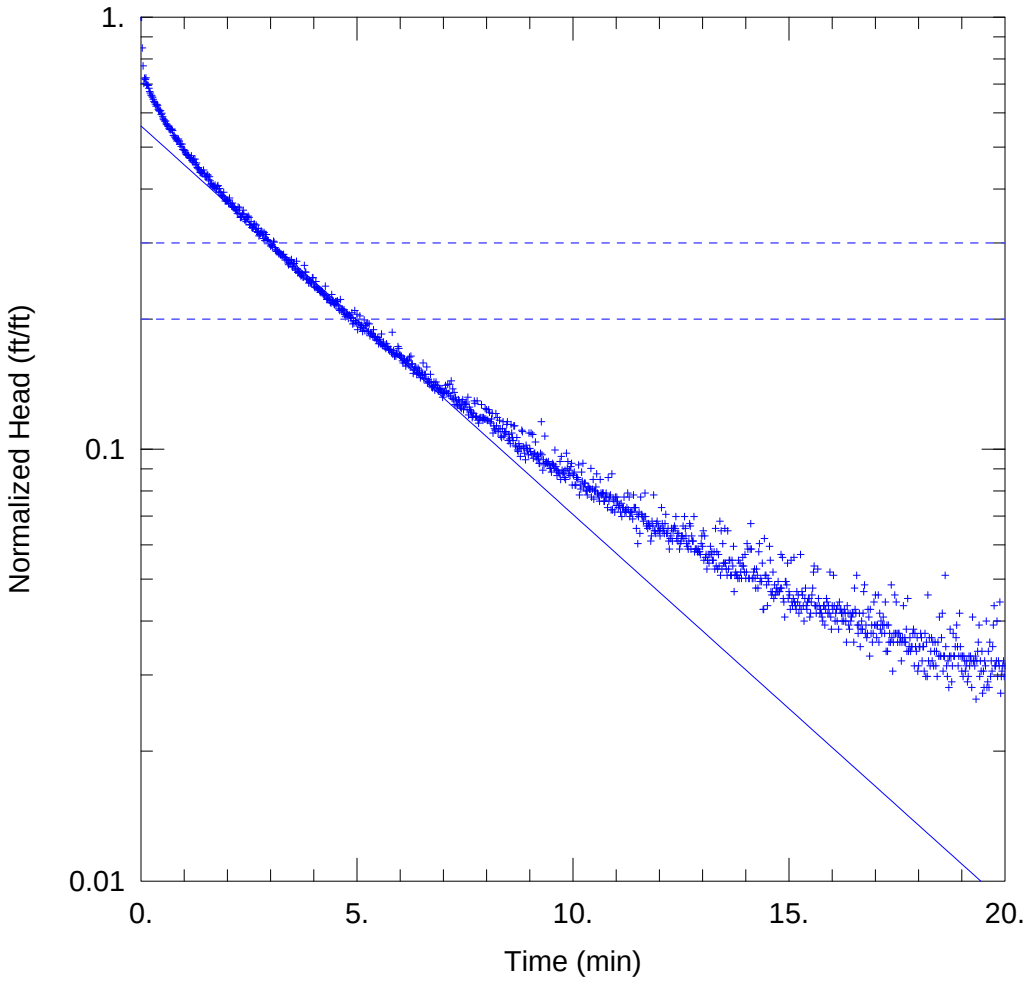
Saturated Thickness: 6.03 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RL-6 Slug B Rising Head)

Initial Displacement: 0.349 ft Static Water Column Height: 6.03 ft
Total Well Penetration Depth: 6.03 ft Screen Length: 6.03 ft
Casing Radius: 0.2083 ft Well Radius: 0.3646 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 9.233 ft/day y0 = 0.06074 ft



UW-1 SLUG C&G FALLING HEAD

Data Set: S:\...\UW-1_SlugC&GFallingHead.aqt
Date: 02/19/13 Time: 13:15:25

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

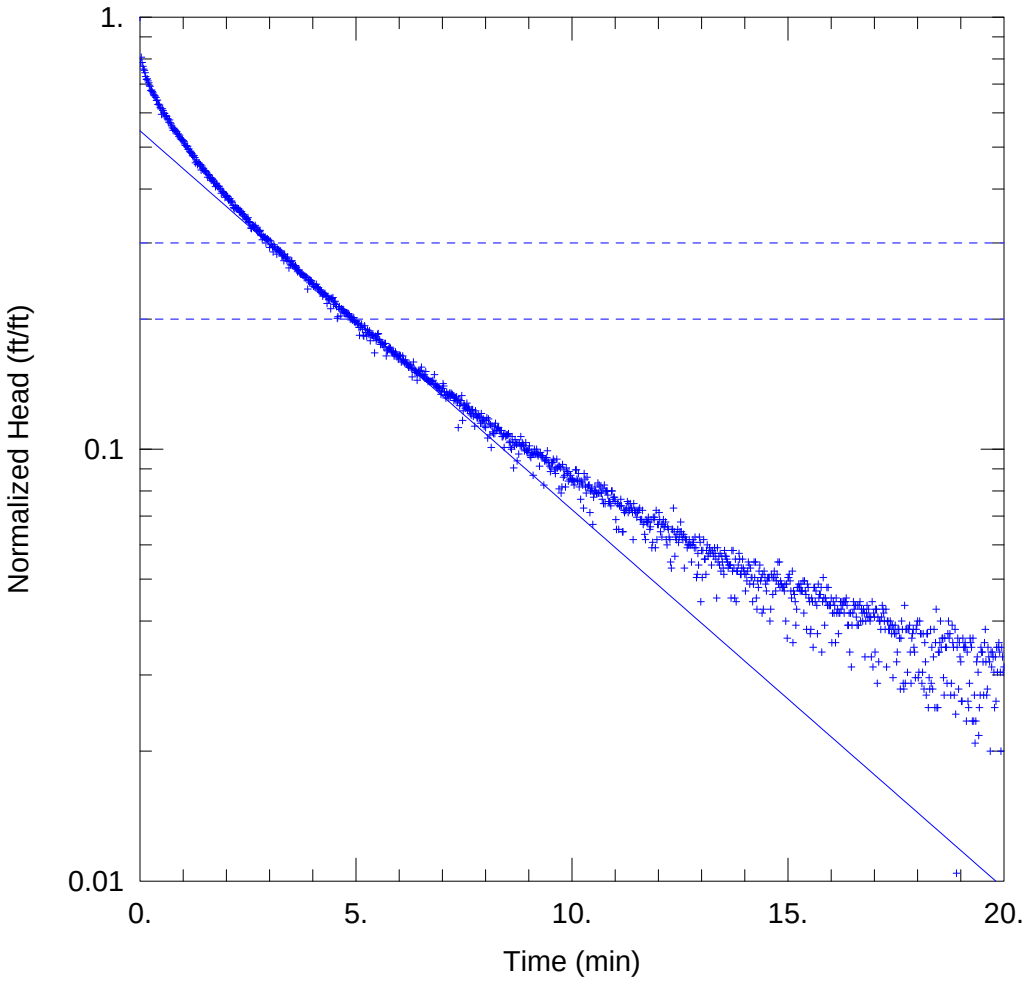
Saturated Thickness: 34.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 1.175 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4291 ft/day
y0 = 0.6578 ft



UW-1 SLUG C&G RISING HEAD

Data Set: S:\...\UW-1_SlugC&GRisingHead.aqt
Date: 02/19/13 Time: 13:15:15

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

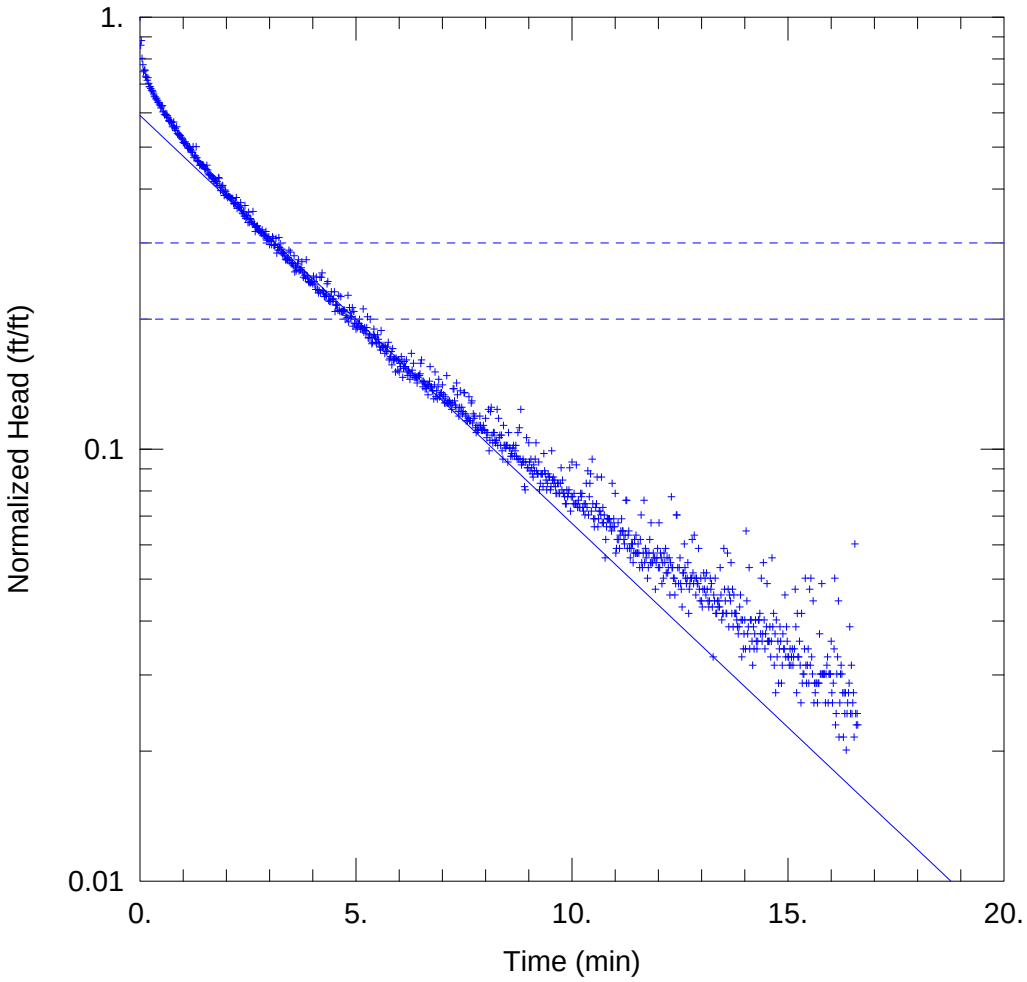
Saturated Thickness: 34.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 1.15 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4184 ft/day
y0 = 0.6273 ft



UW-1 SLUG C FALLING HEAD

Data Set: S:\...\UW-1_SlugCFallingHead.aqt
Date: 02/19/13 Time: 13:15:05

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

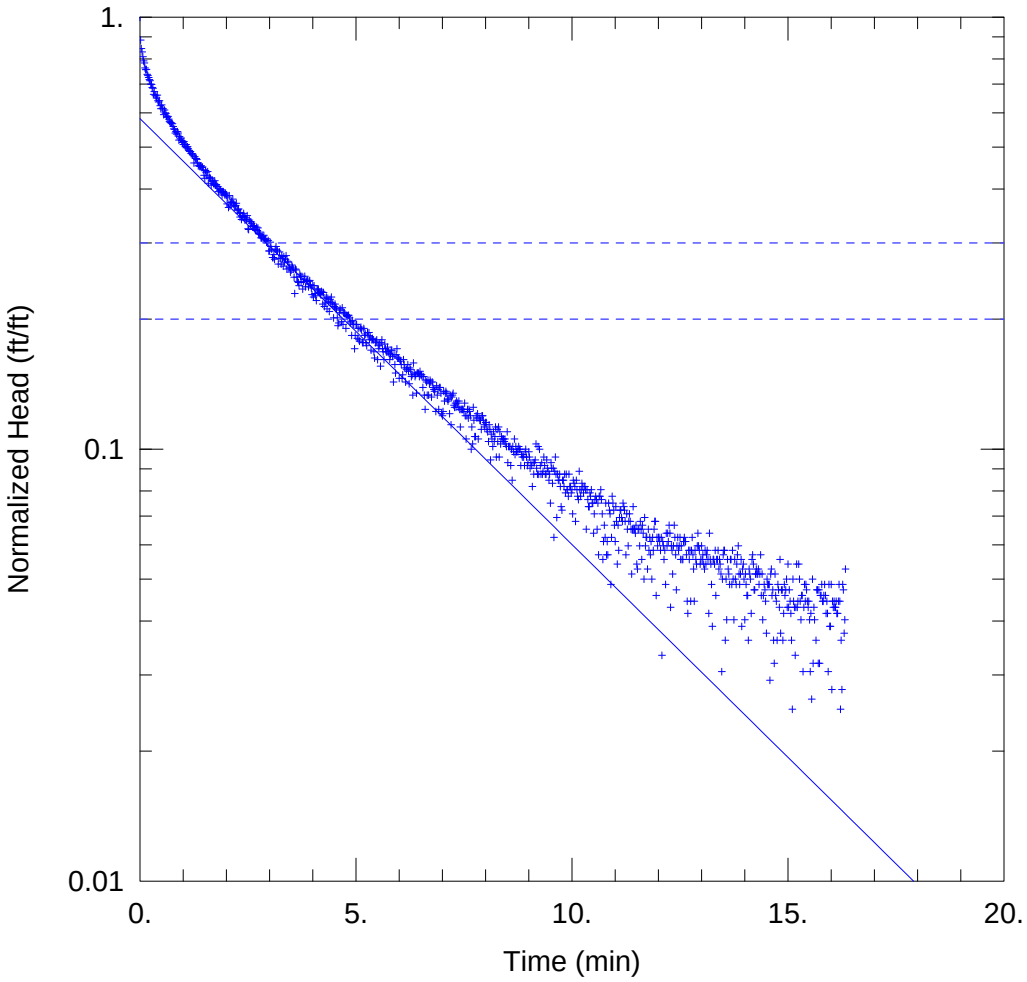
Saturated Thickness: 34.64 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 0.696 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4506 ft/day
y0 = 0.4121 ft



UW-1 SLUG C RISING HEAD

Data Set: S:\...\UW-1_SlugCRisingHead.aqt
Date: 02/19/13 Time: 13:14:44

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

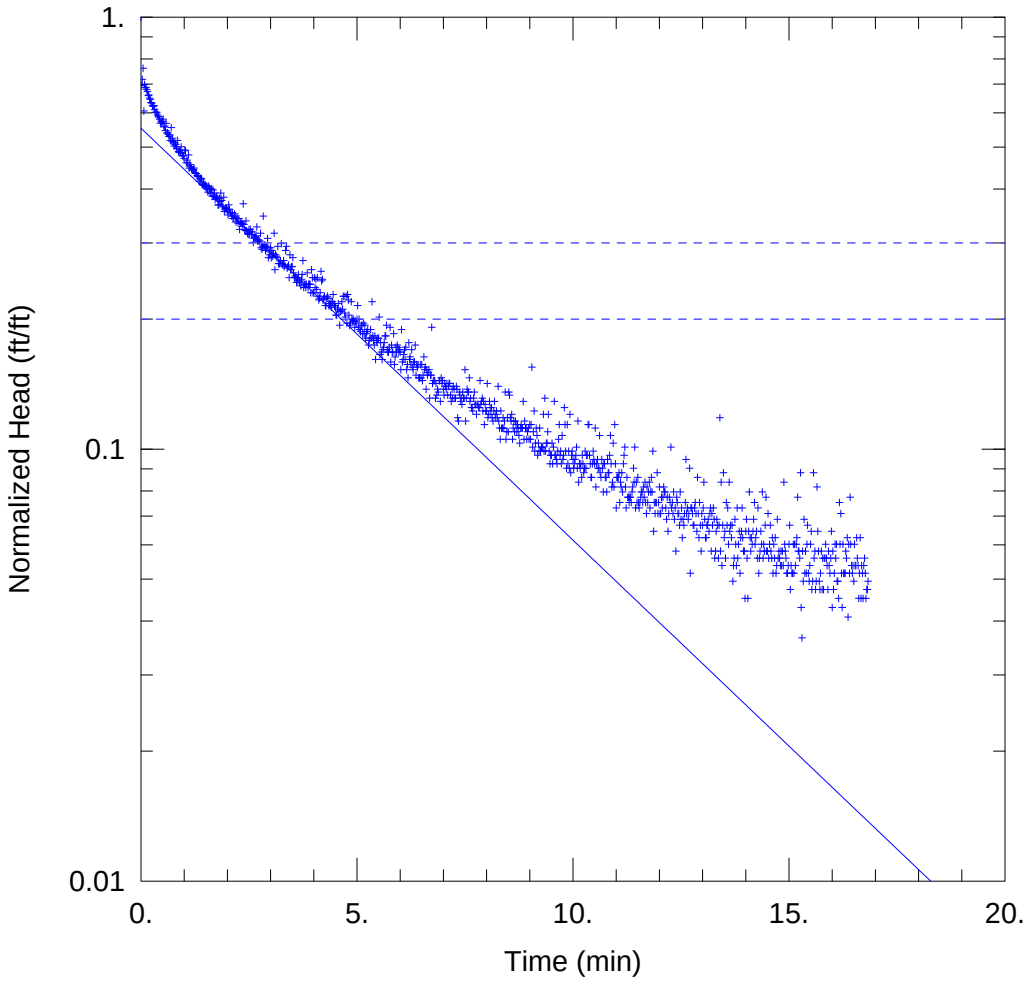
Saturated Thickness: 34.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 0.72 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4704 ft/day
y0 = 0.4191 ft



UW-1 SLUG G FALLING HEAD

Data Set: S:\...\UW-1_SlugGFallingHead.aqt
Date: 02/19/13 Time: 13:14:41

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

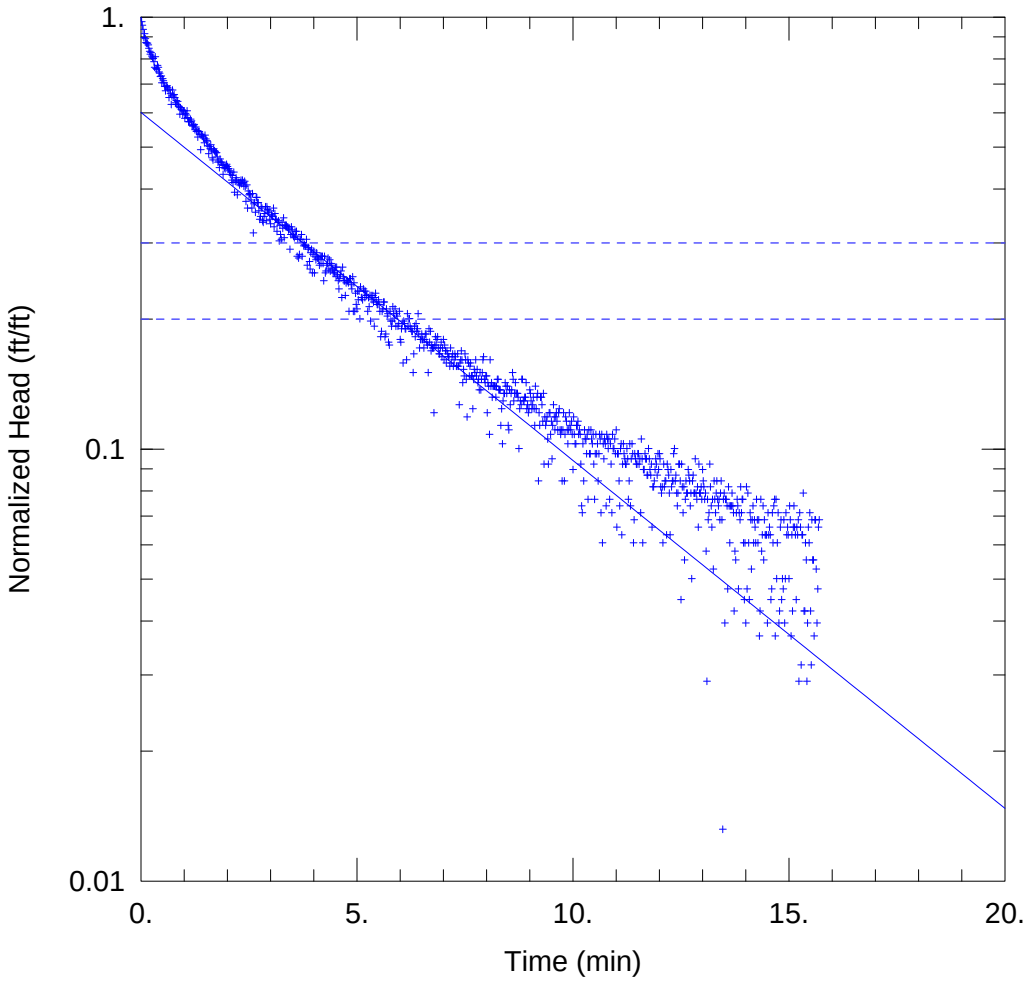
Saturated Thickness: 34.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 0.465 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.455 ft/day
y0 = 0.2572 ft



UW-1 SLUG G RISING HEAD

Data Set: S:\...\UW-1_SlugGRisingHead.aqt
Date: 02/19/13 Time: 13:14:36

PROJECT INFORMATION

Company: Rio Algom
Project: 1350.14
Location: Lisbon
Test Well: UW-1
Test Date: 4 Nov 2012

AQUIFER DATA

Saturated Thickness: 34.64 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (UW-1)

Initial Displacement: 0.379 ft
Total Well Penetration Depth: 34.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 34.64 ft
Screen Length: 34.64 ft
Well Radius: 0.333 ft

SOLUTION

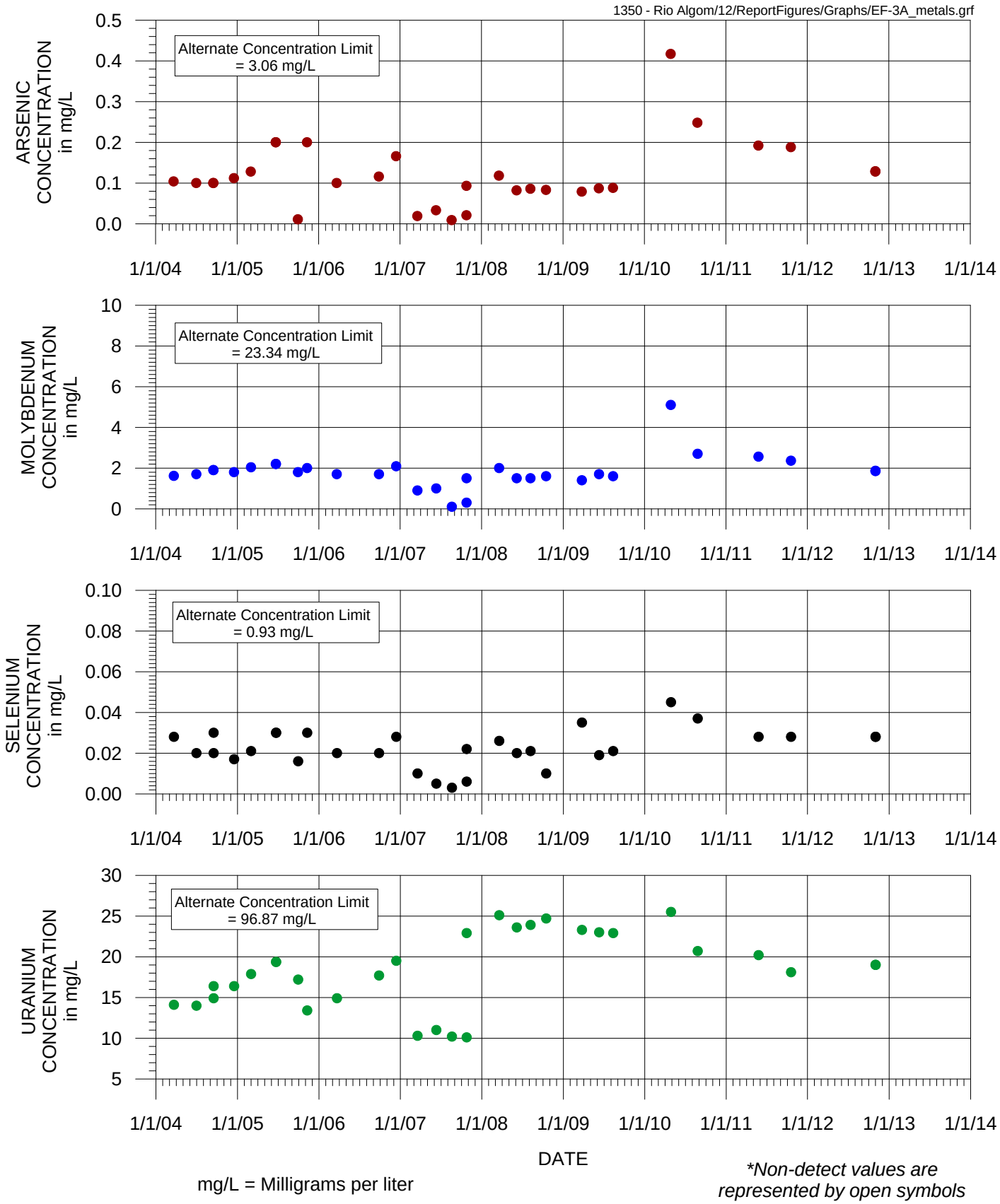
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3844 ft/day
y0 = 0.228 ft

MONTGOMERY & ASSOCIATES

APPENDIX E

TIME SERIES WATER QUALITY GRAPHS

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

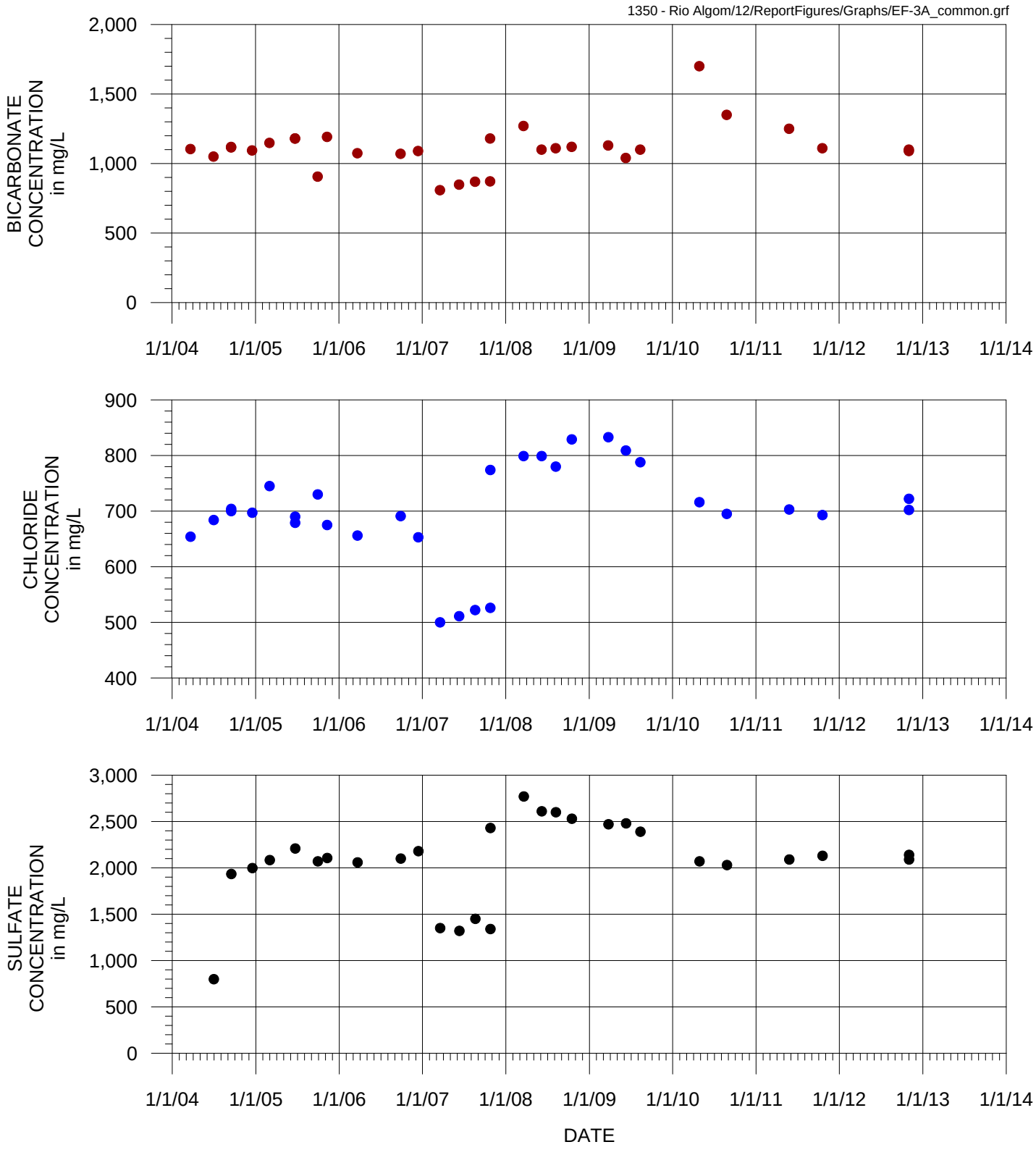


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-1. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR POINT OF COMPLIANCE WELL EF-3A RIO ALGOM MINING LLC, LISBON FACILITY

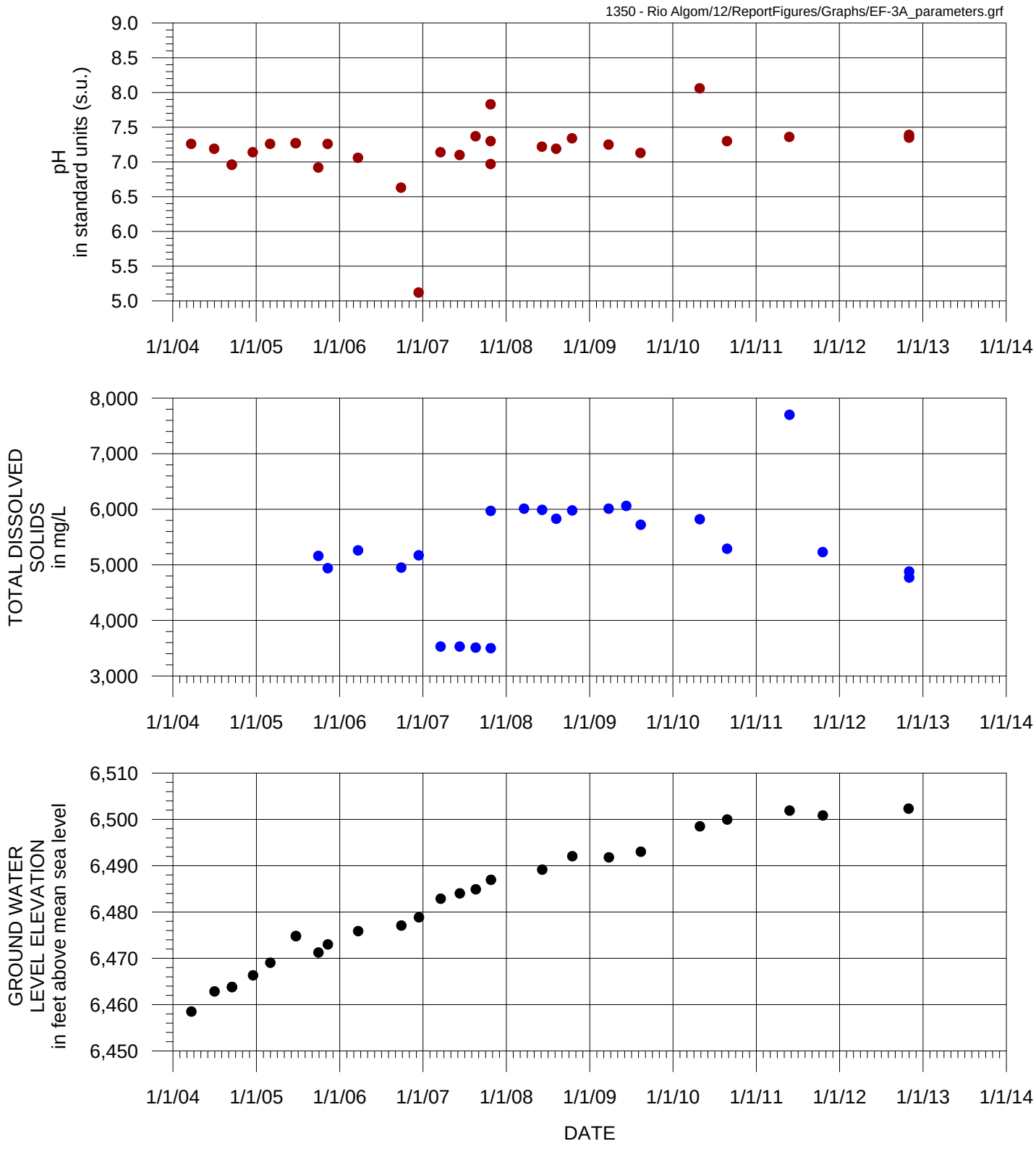
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-2. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR POINT OF COMPLIANCE WELL EF-3A RIO ALGOM MINING LLC, LISBON FACILITY

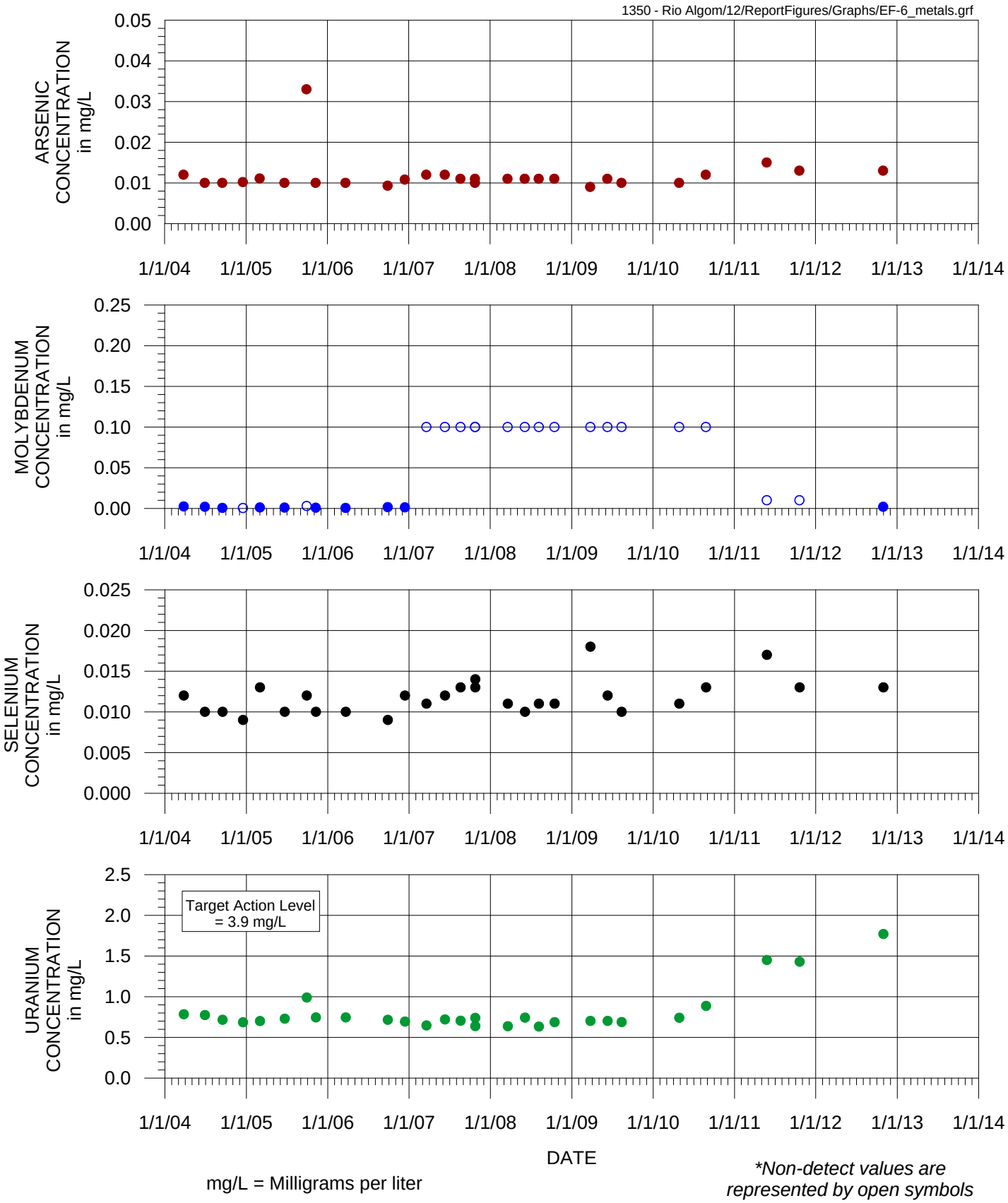
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-3. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR POINT OF COMPLIANCE WELL EF-3A RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

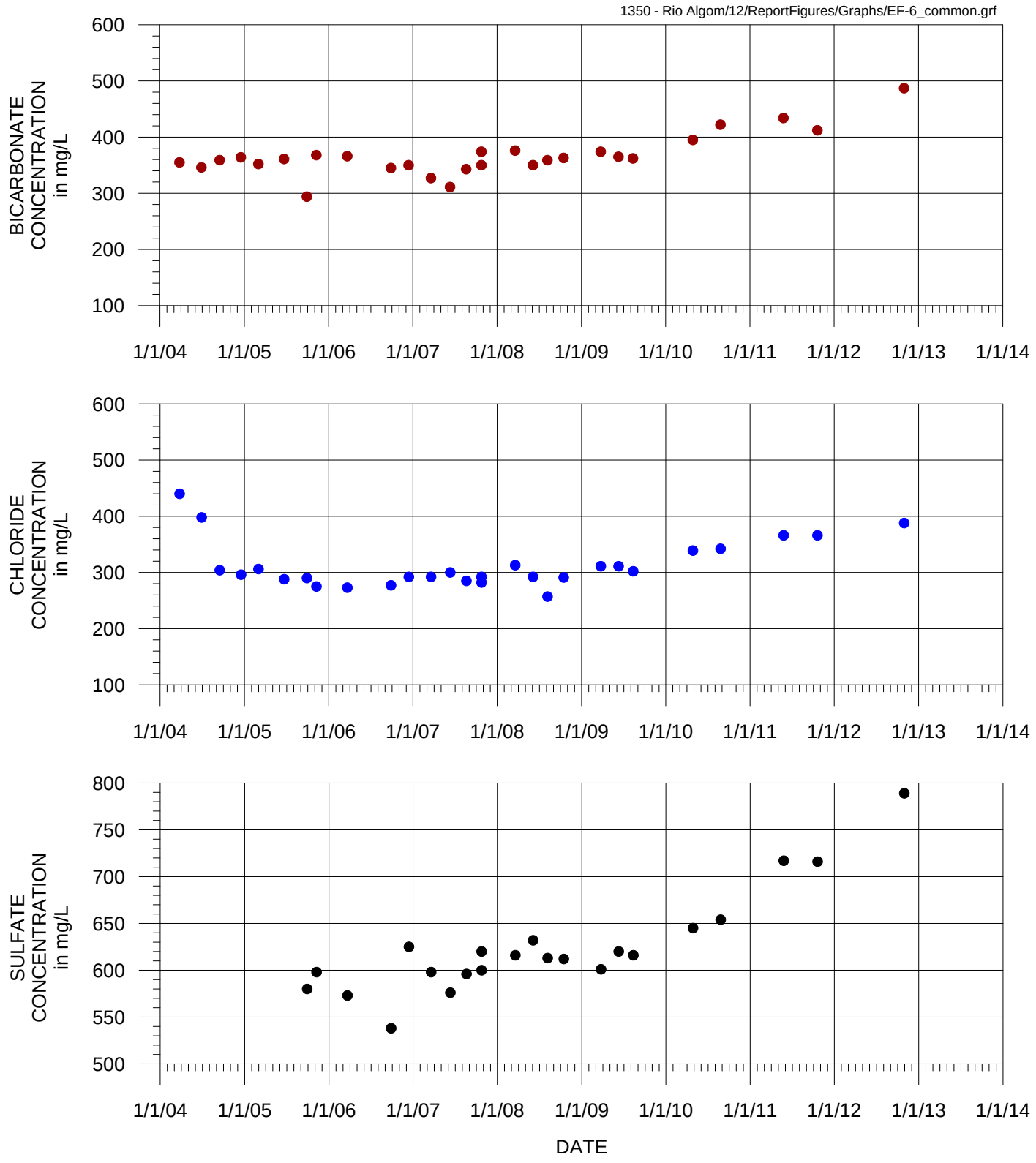


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-4. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL EF-6
RIO ALGOM MINING LLC, LISBON FACILITY

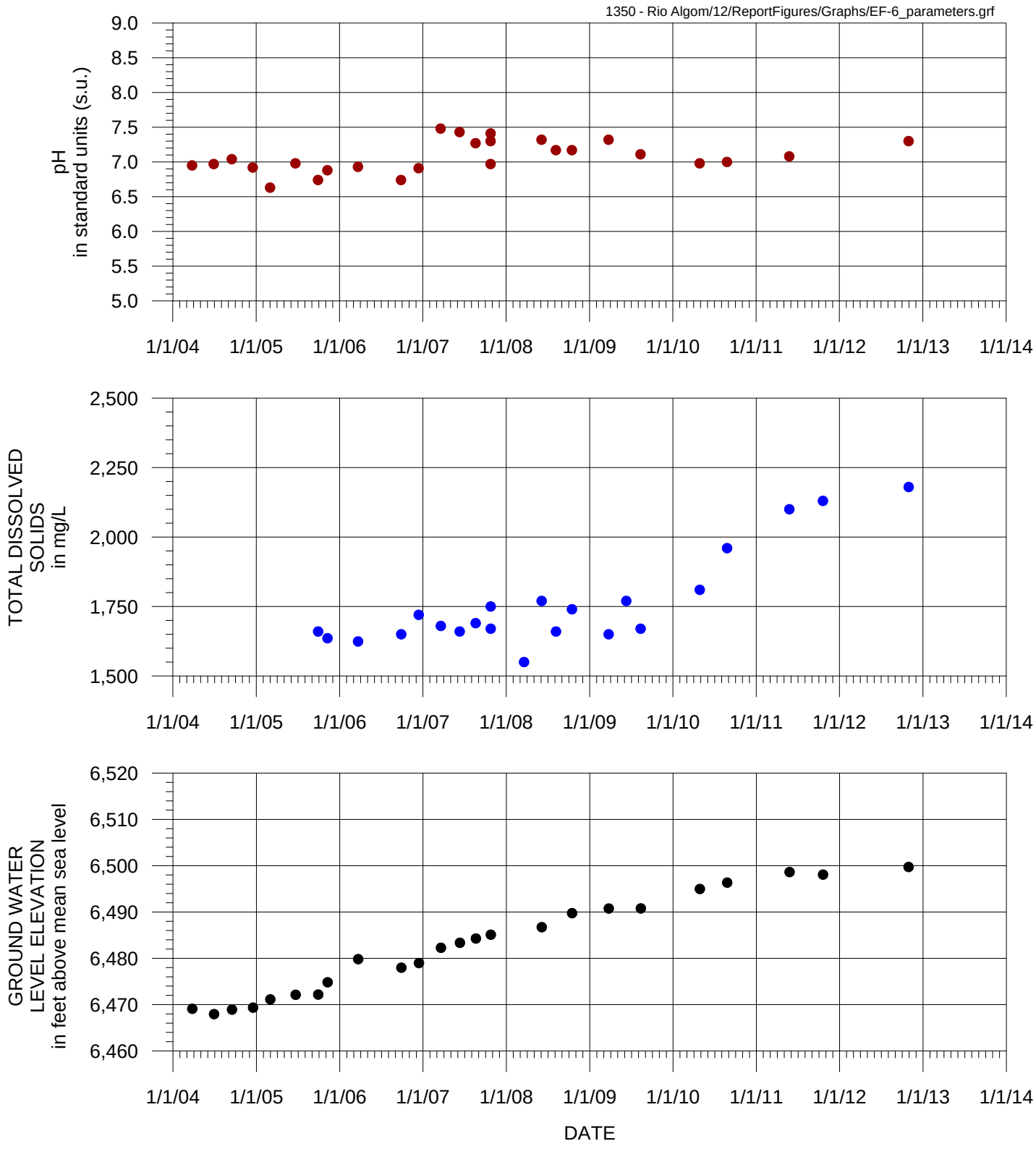
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-5. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL EF-6 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-6. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL EF-6 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

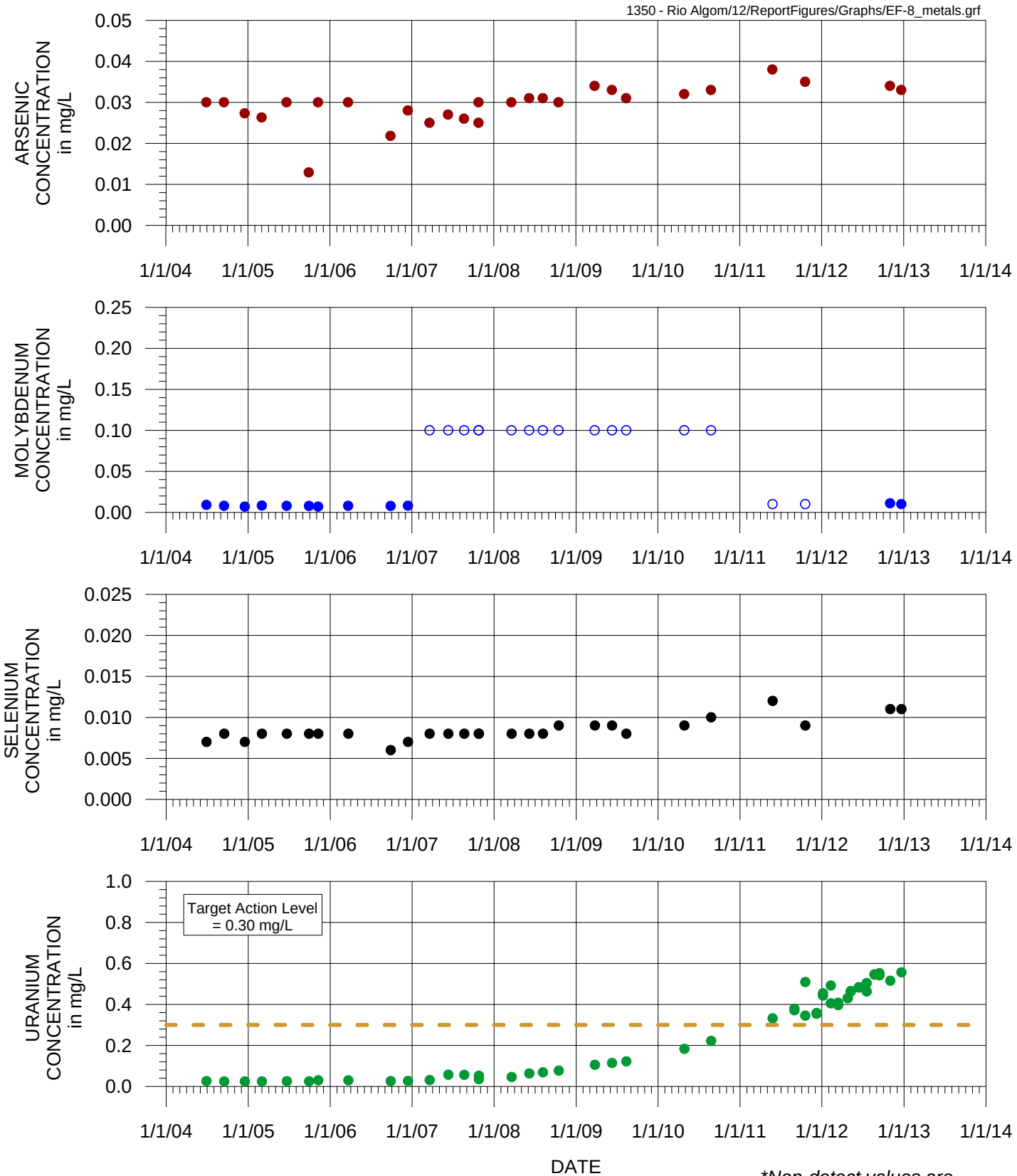
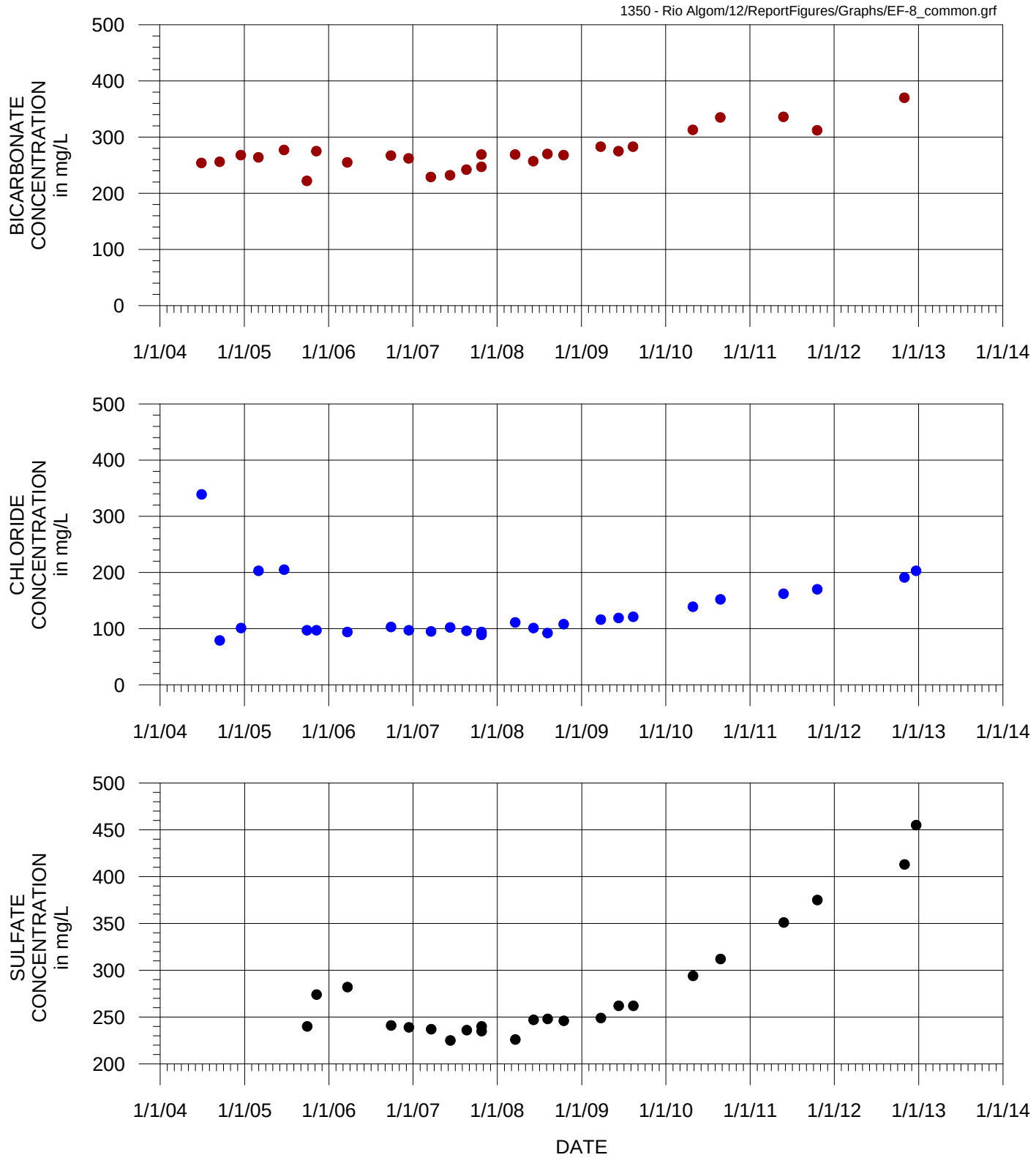


FIGURE E-7. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL EF-8
RIO ALGOM MINING LLC, LISBON FACILITY

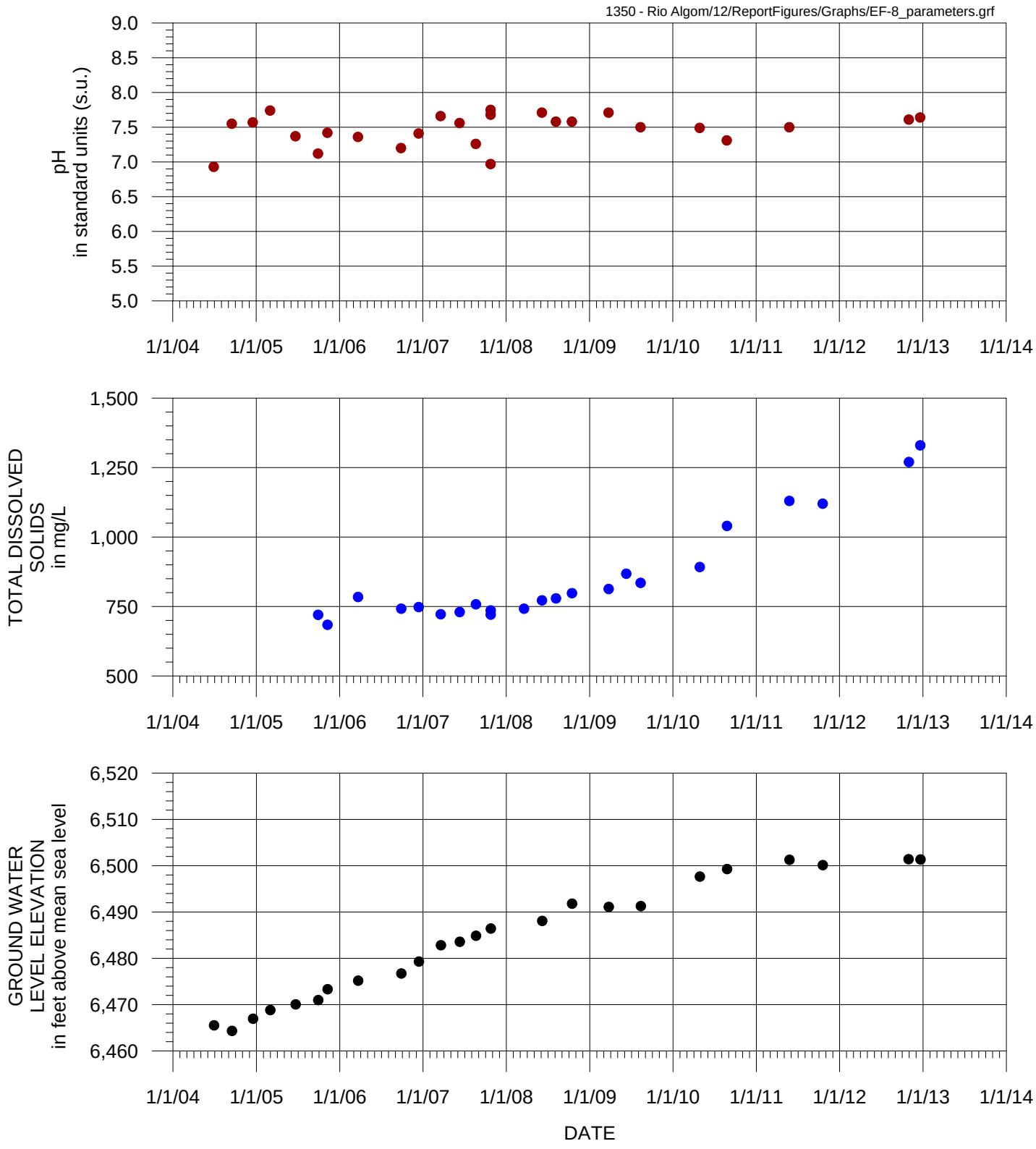
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-8. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL EF-8 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-9. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL EF-8 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

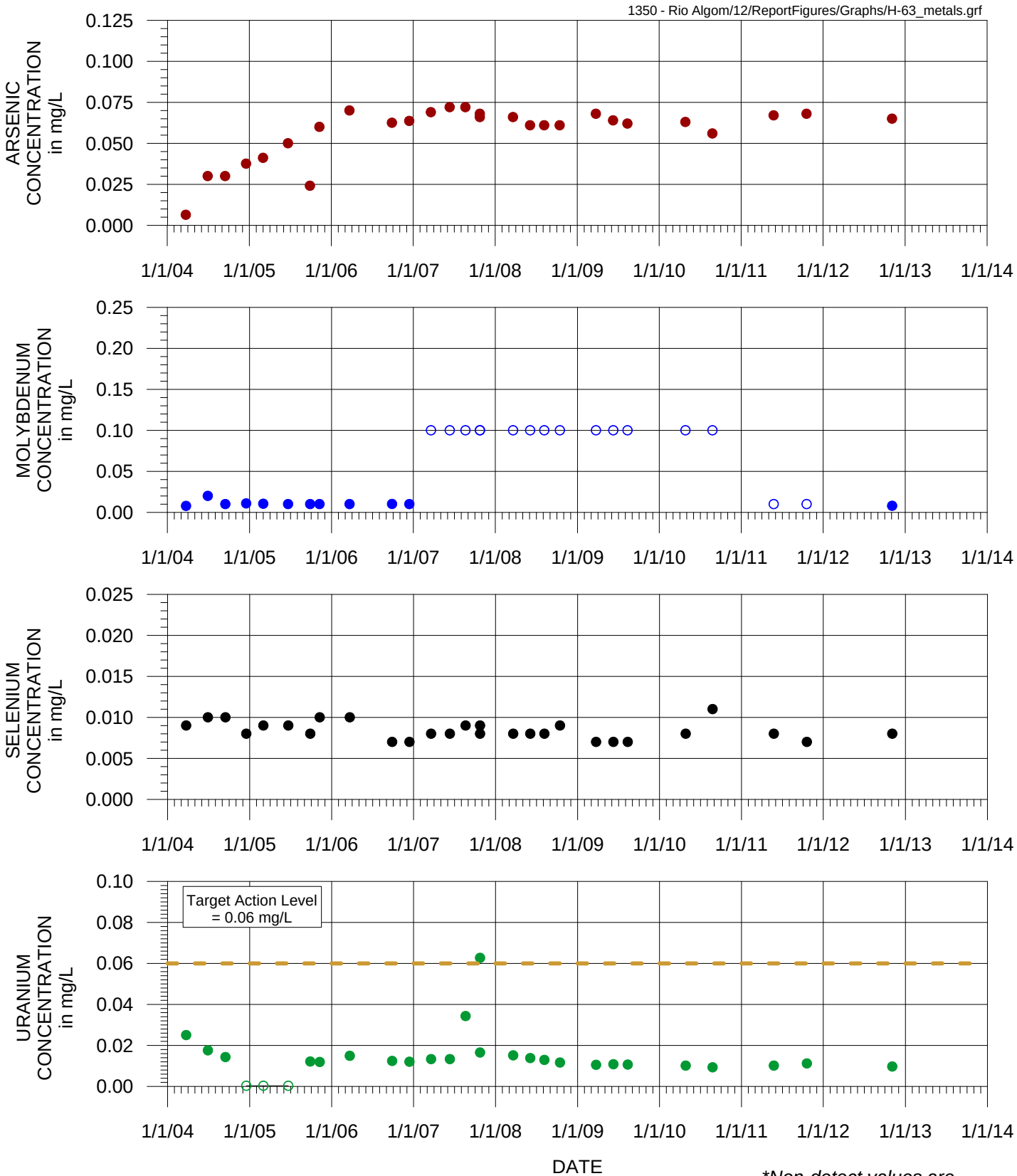
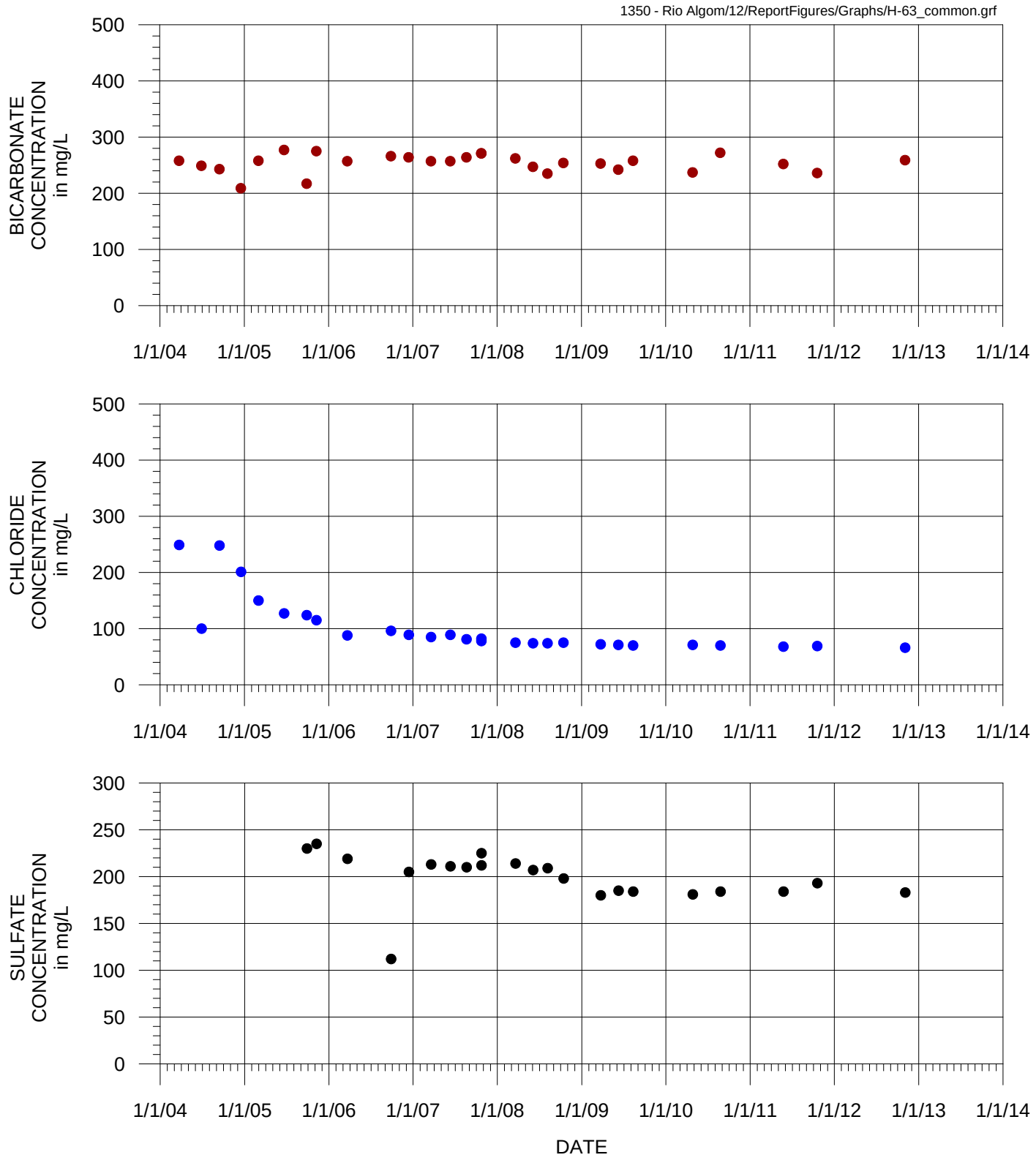


FIGURE E-10. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL H-63
RIO ALGOM MINING LLC, LISBON FACILITY

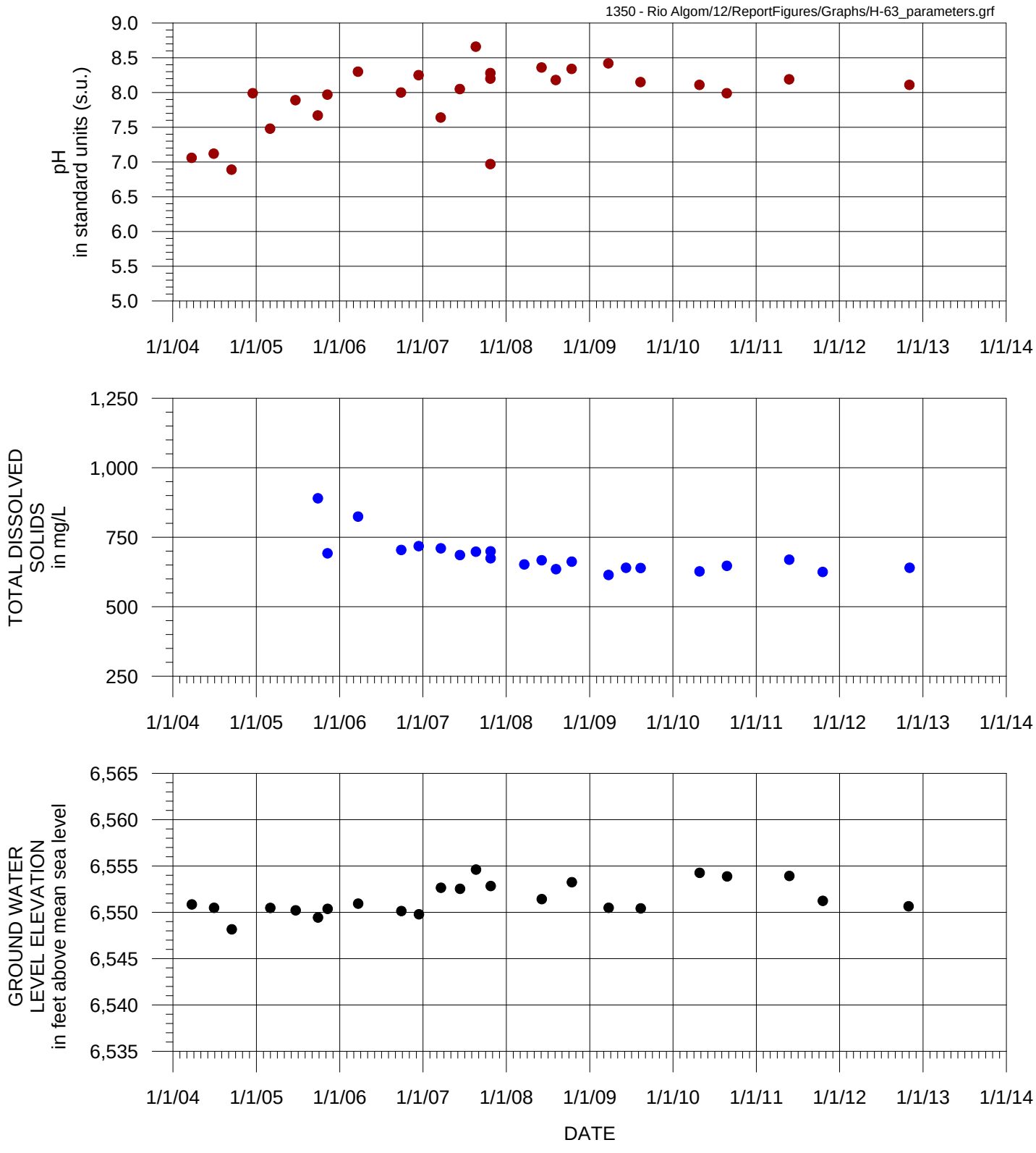
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-11. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL H-63 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-12. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL H-63 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

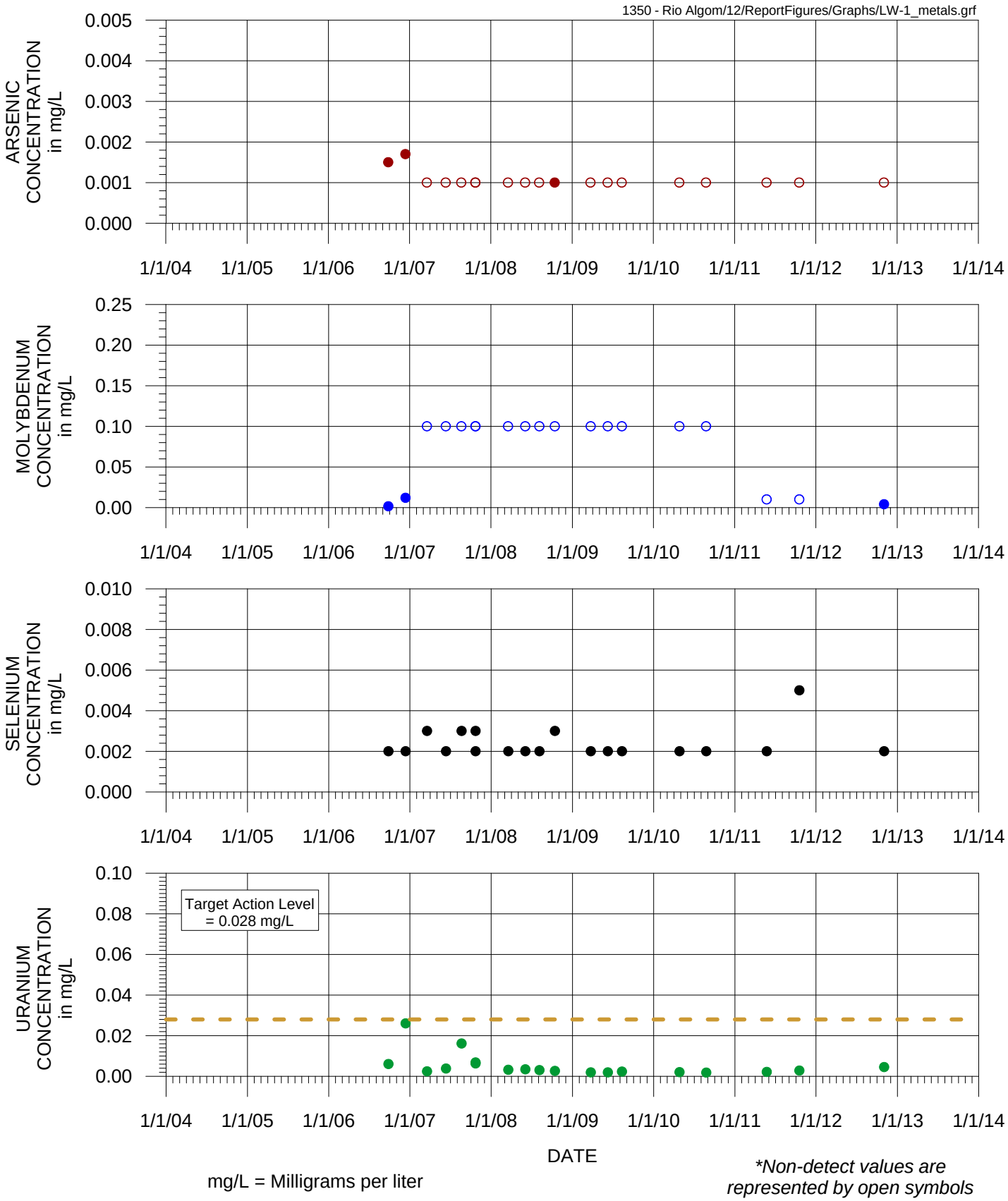
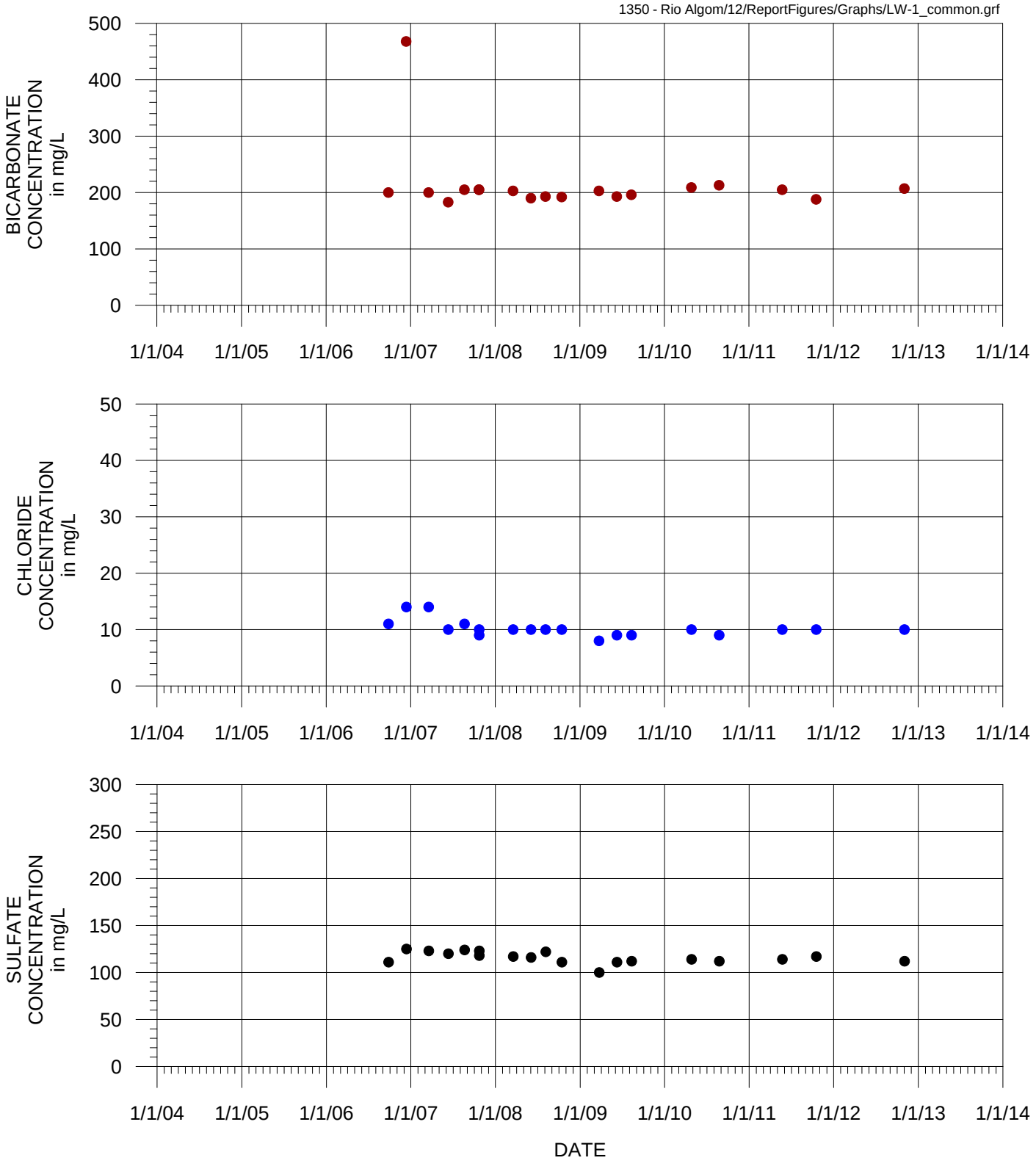


FIGURE E-13. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL LW-1
RIO ALGOM MINING LLC, LISBON FACILITY

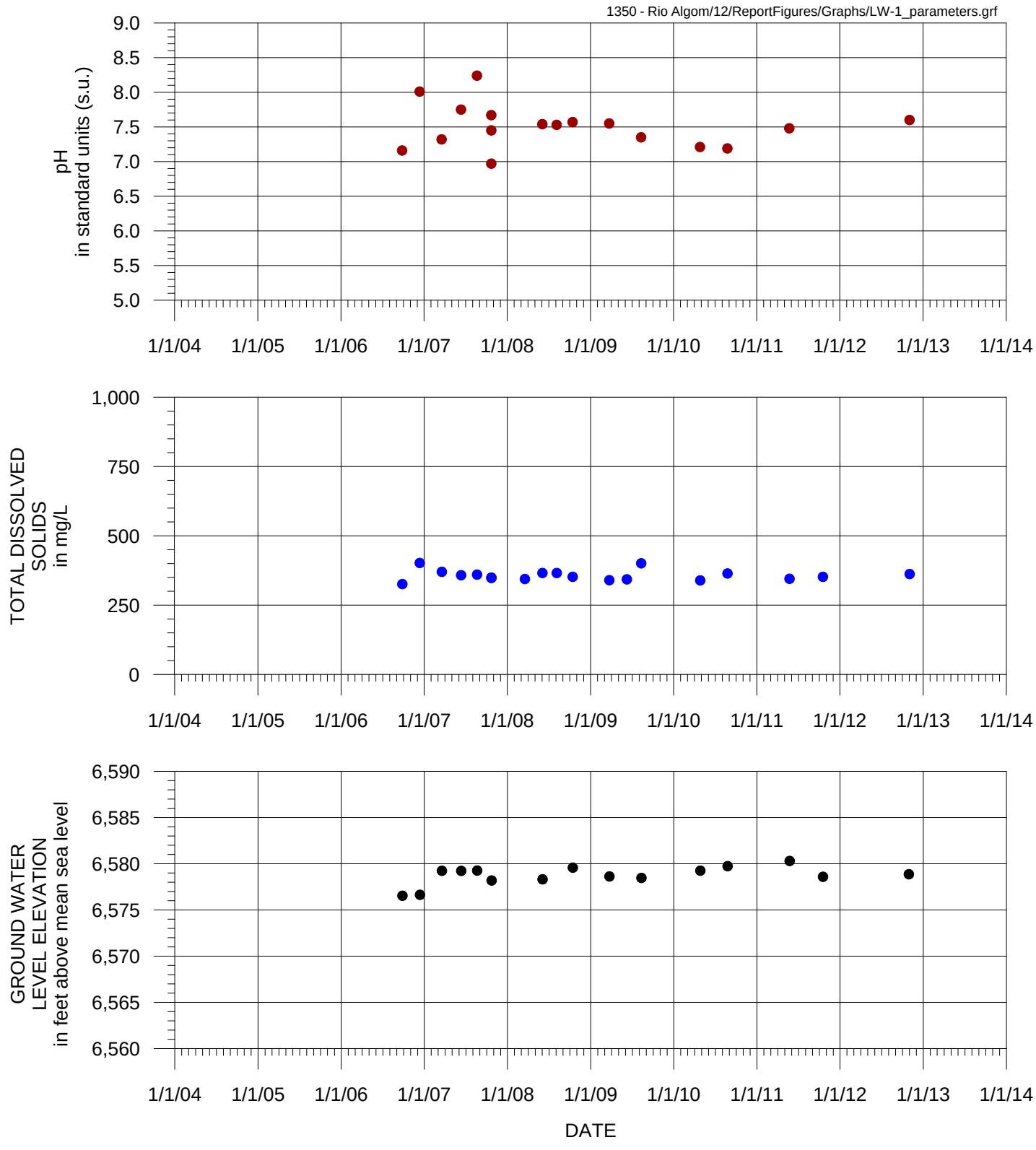
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-14. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL LW-1 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-15. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL LW-1 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

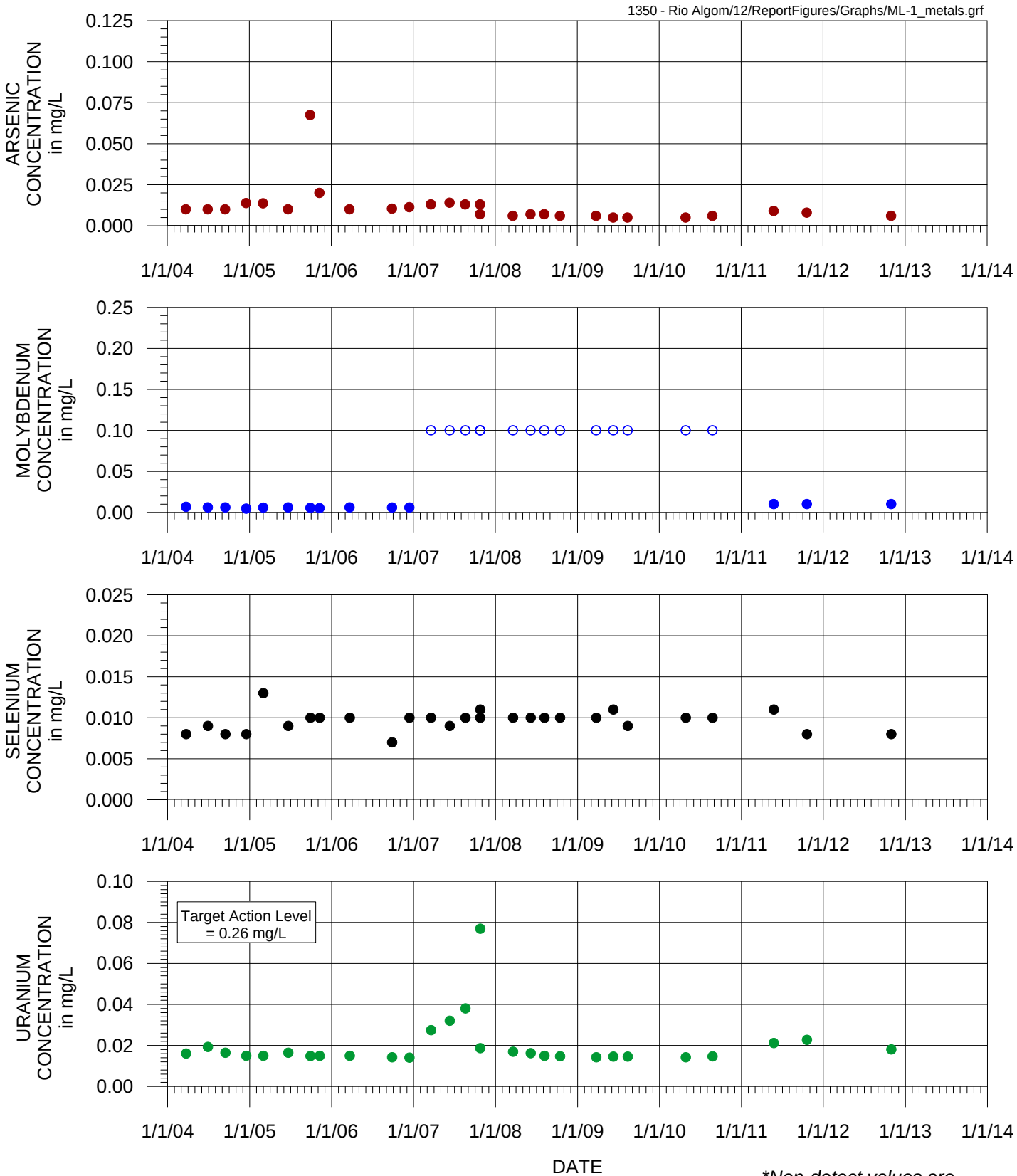
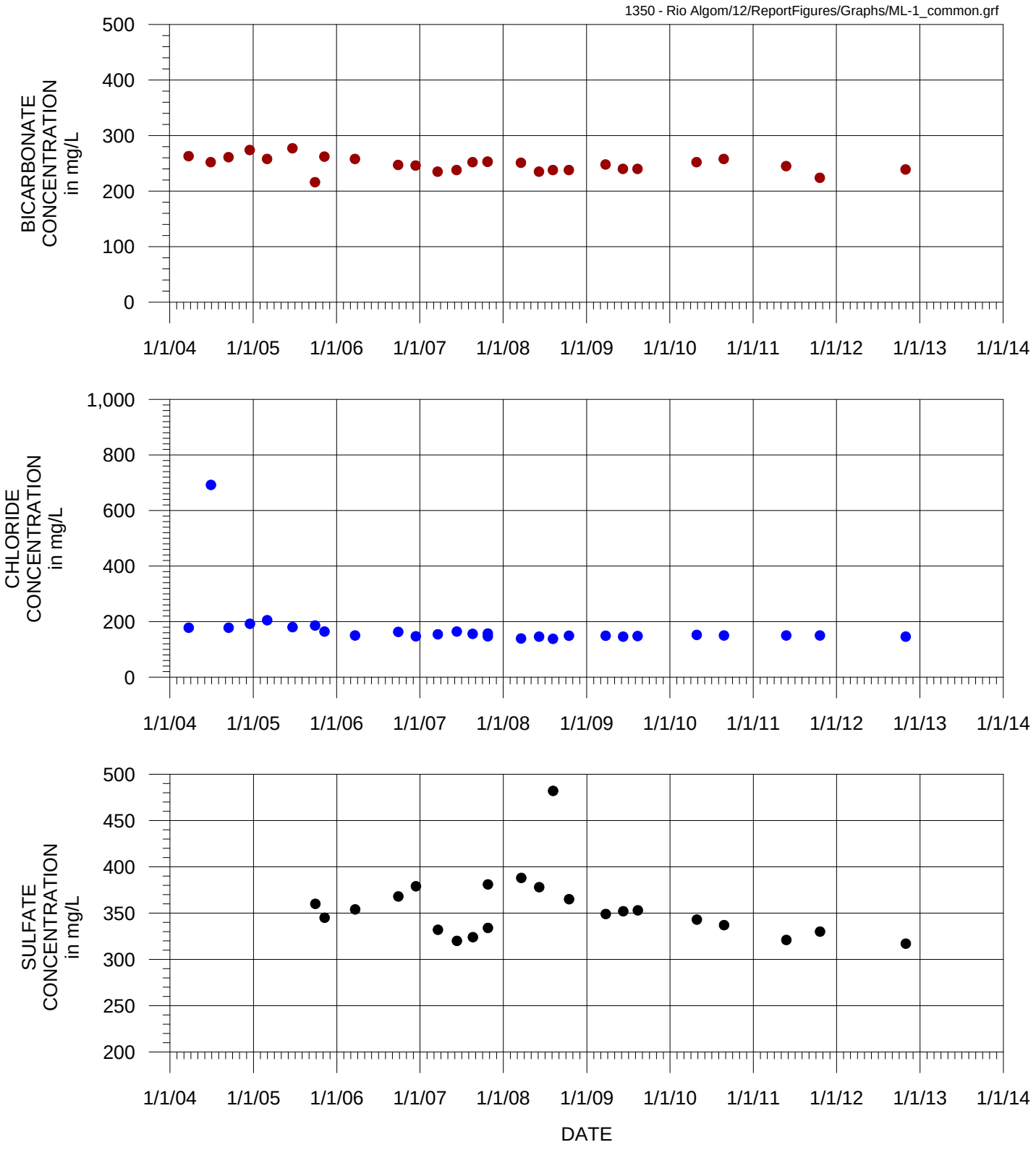


FIGURE E-16. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL ML-1
RIO ALGOM MINING LLC, LISBON FACILITY

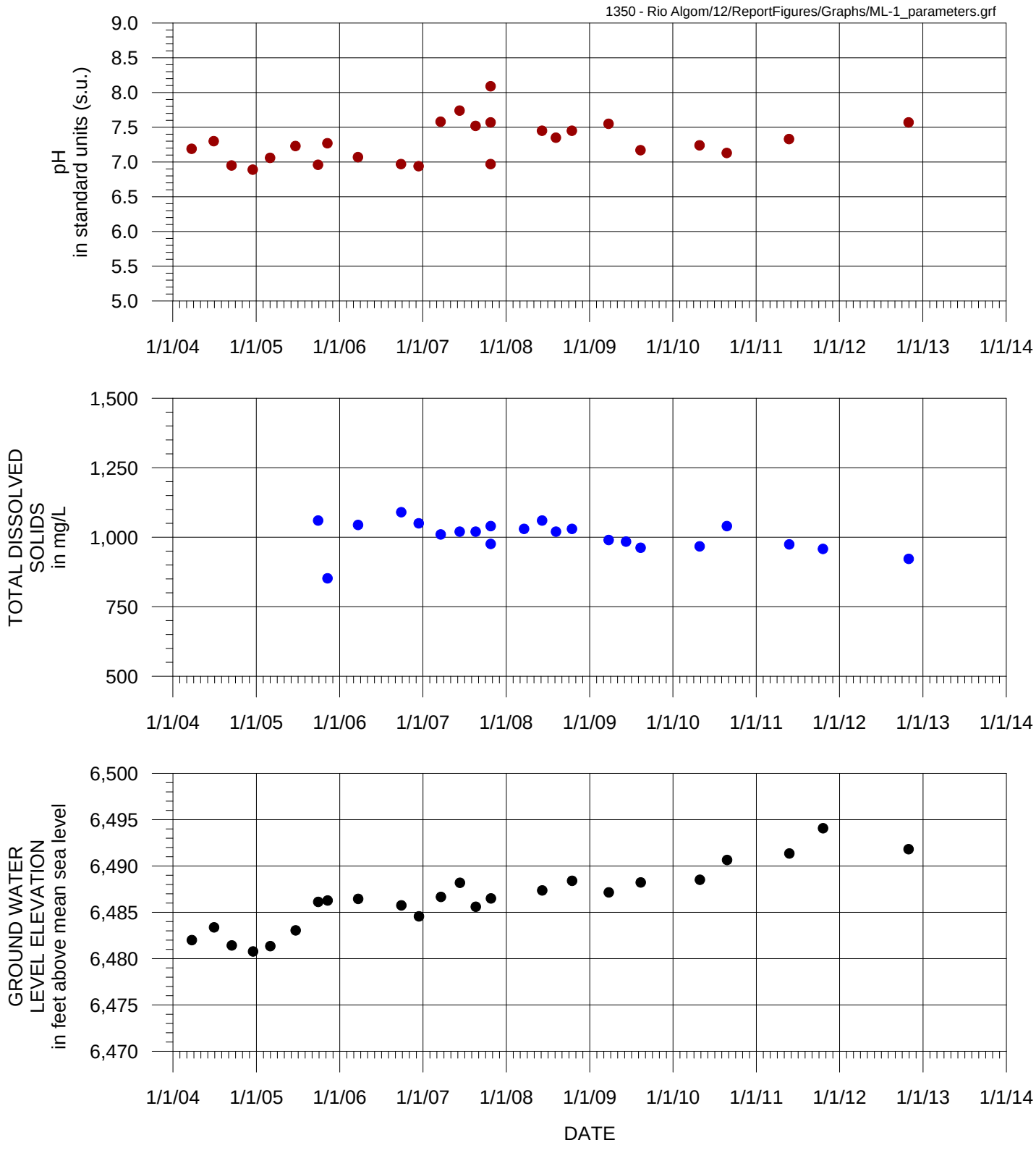
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-17. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL ML-1 RIO ALGOM MINING LLC, LISBON FACILITY

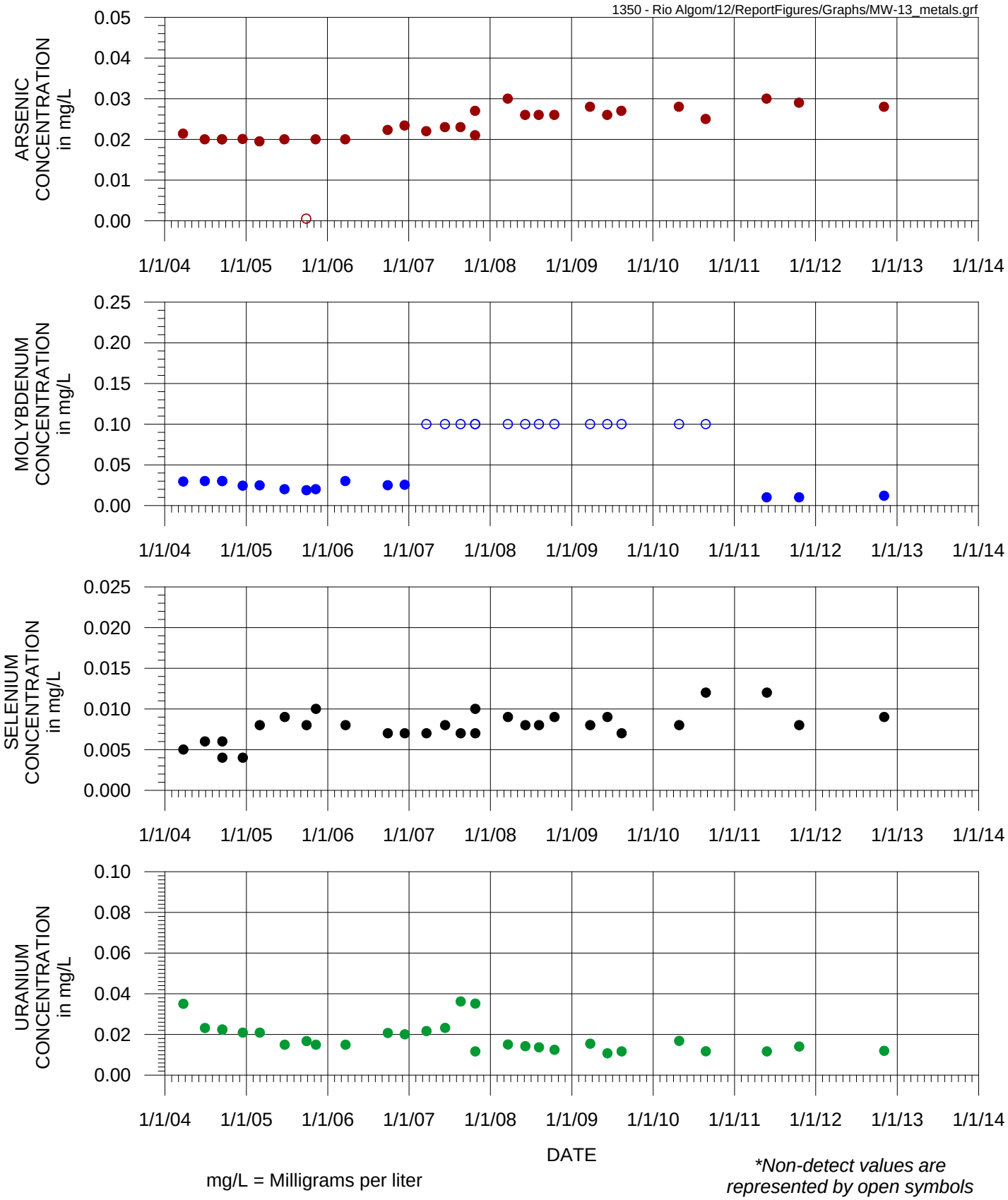
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-18. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL ML-1 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

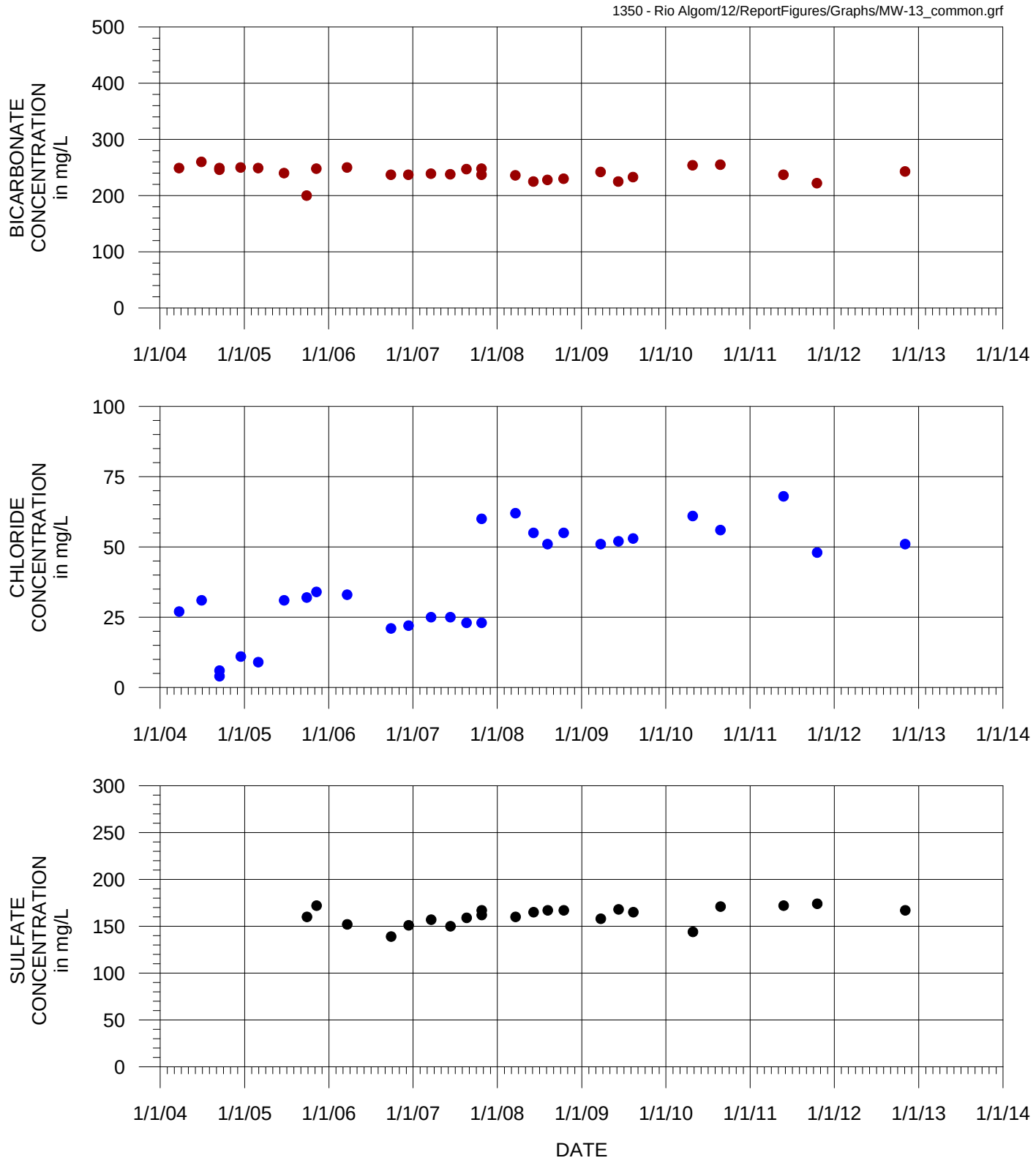


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-19. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR BACKGROUND WELL MW-13
RIO ALGOM MINING LLC, LISBON FACILITY

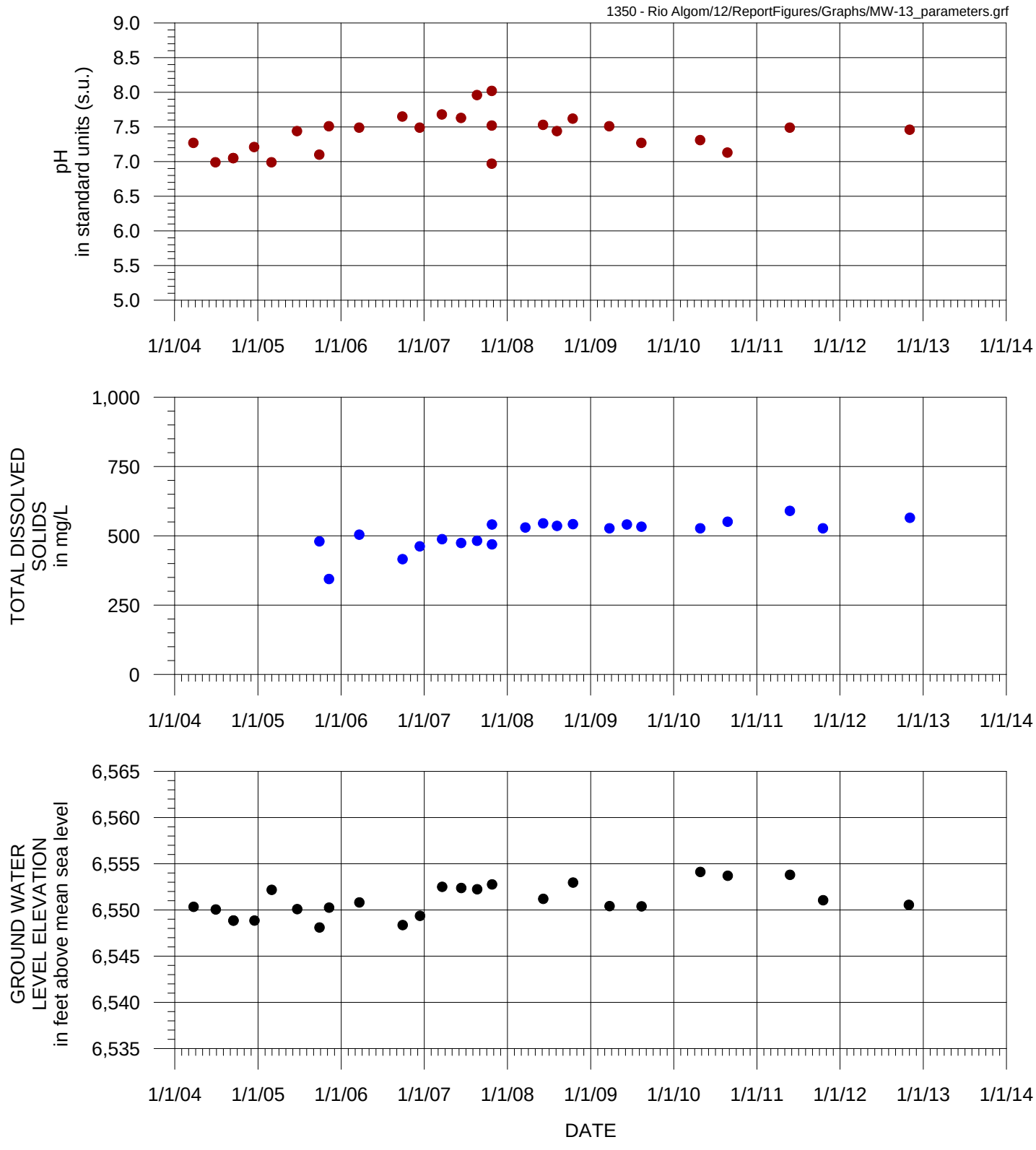
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-20. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR BACKGROUND WELL MW-13 RIO ALGOM MINING LLC, LISBON FACILITY

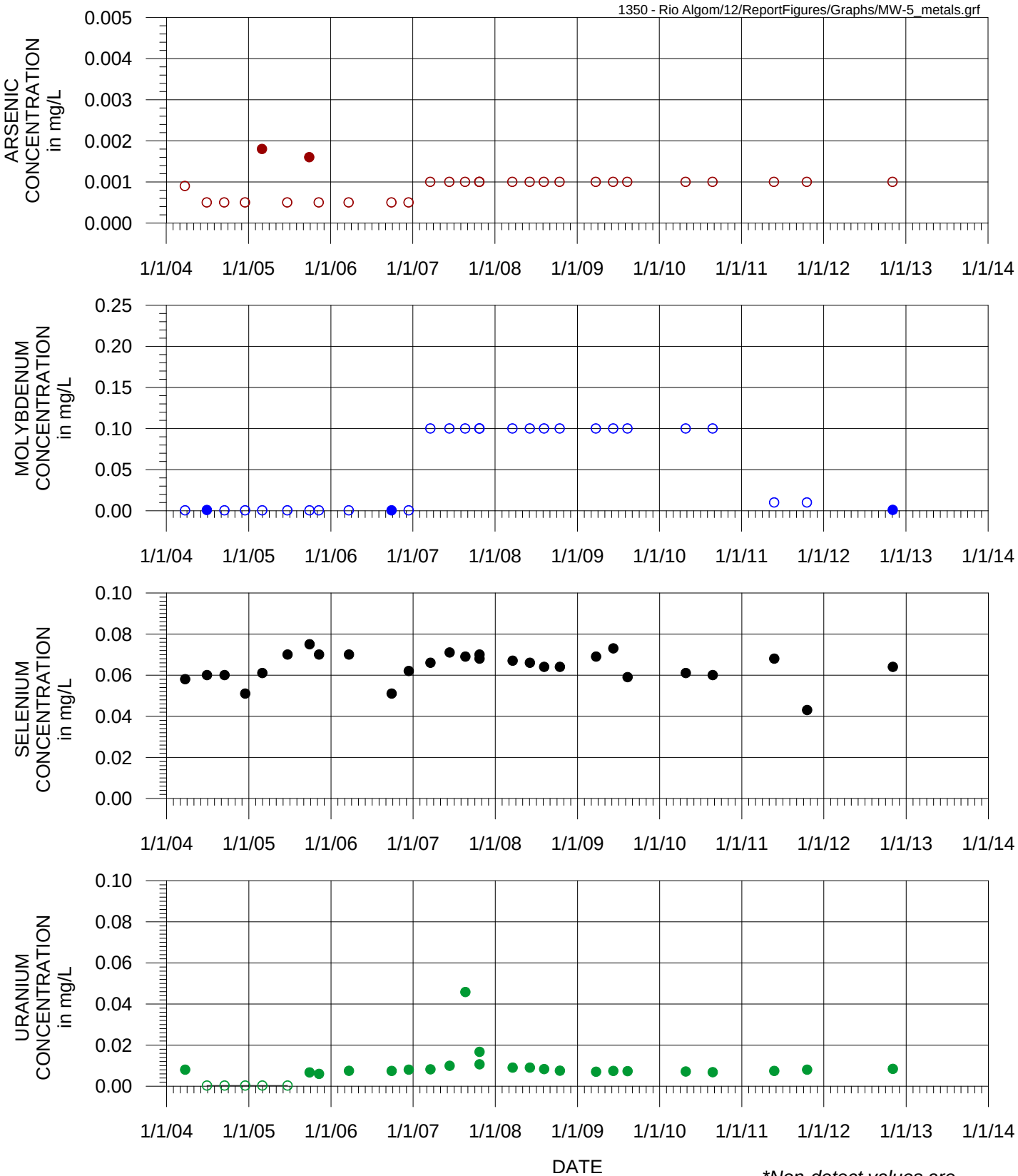
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-21. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR BACKGROUND WELL MW-13 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

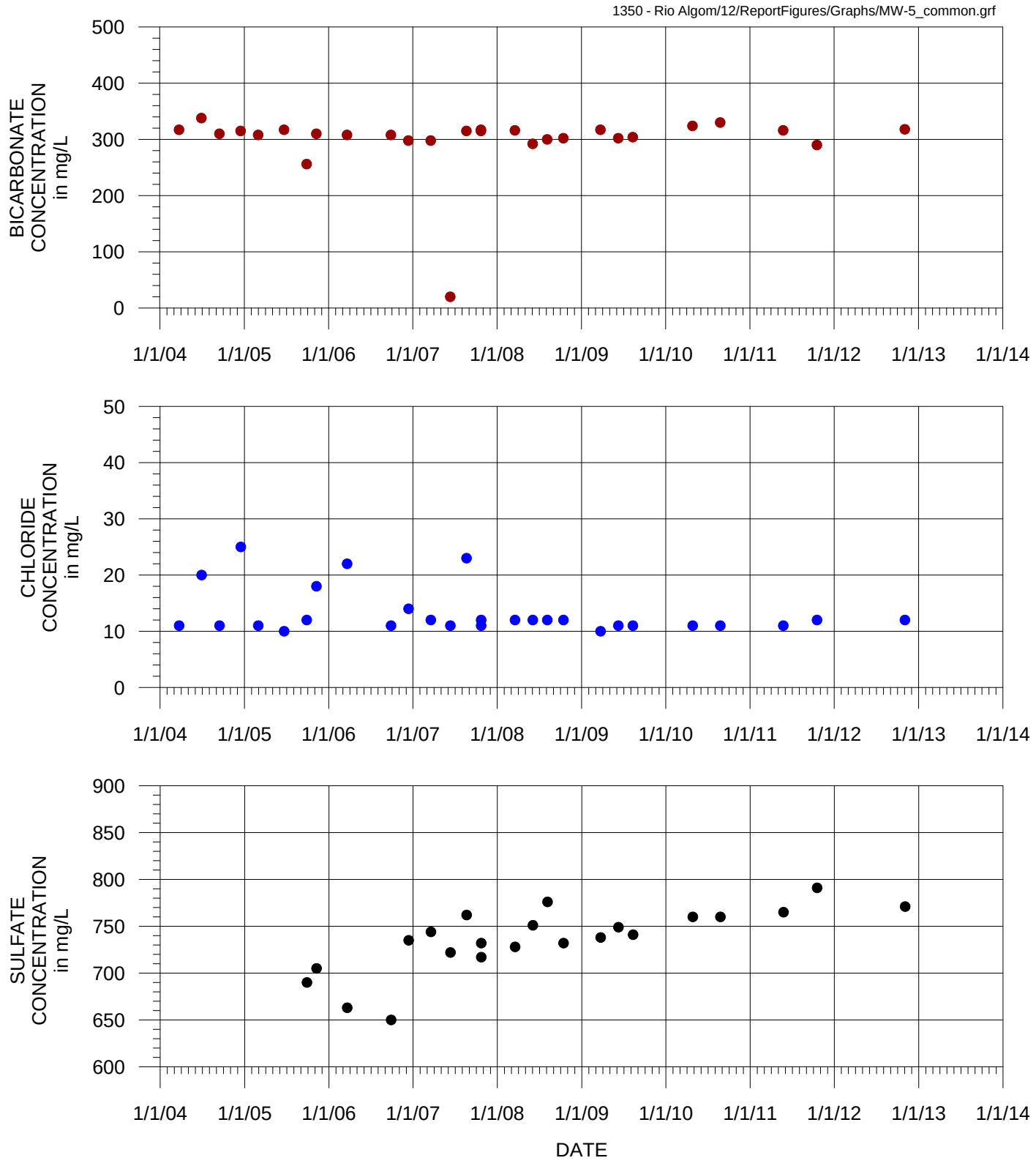


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-22. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR BACKGROUND WELL MW-5
RIO ALGOM MINING LLC, LISBON FACILITY

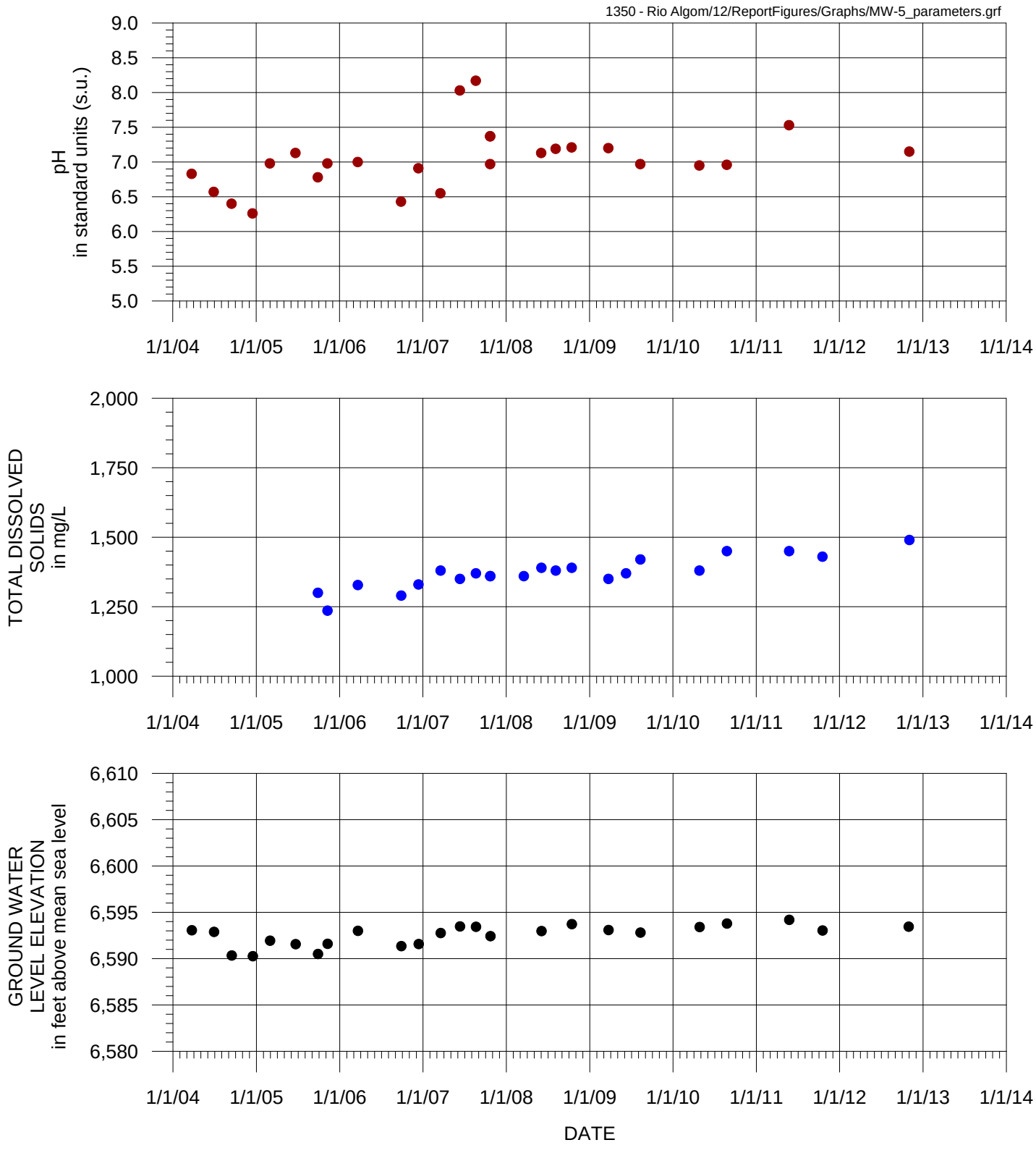
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-23. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR BACKGROUND WELL MW-5 RIO ALGOM MINING LLC, LISBON FACILITY

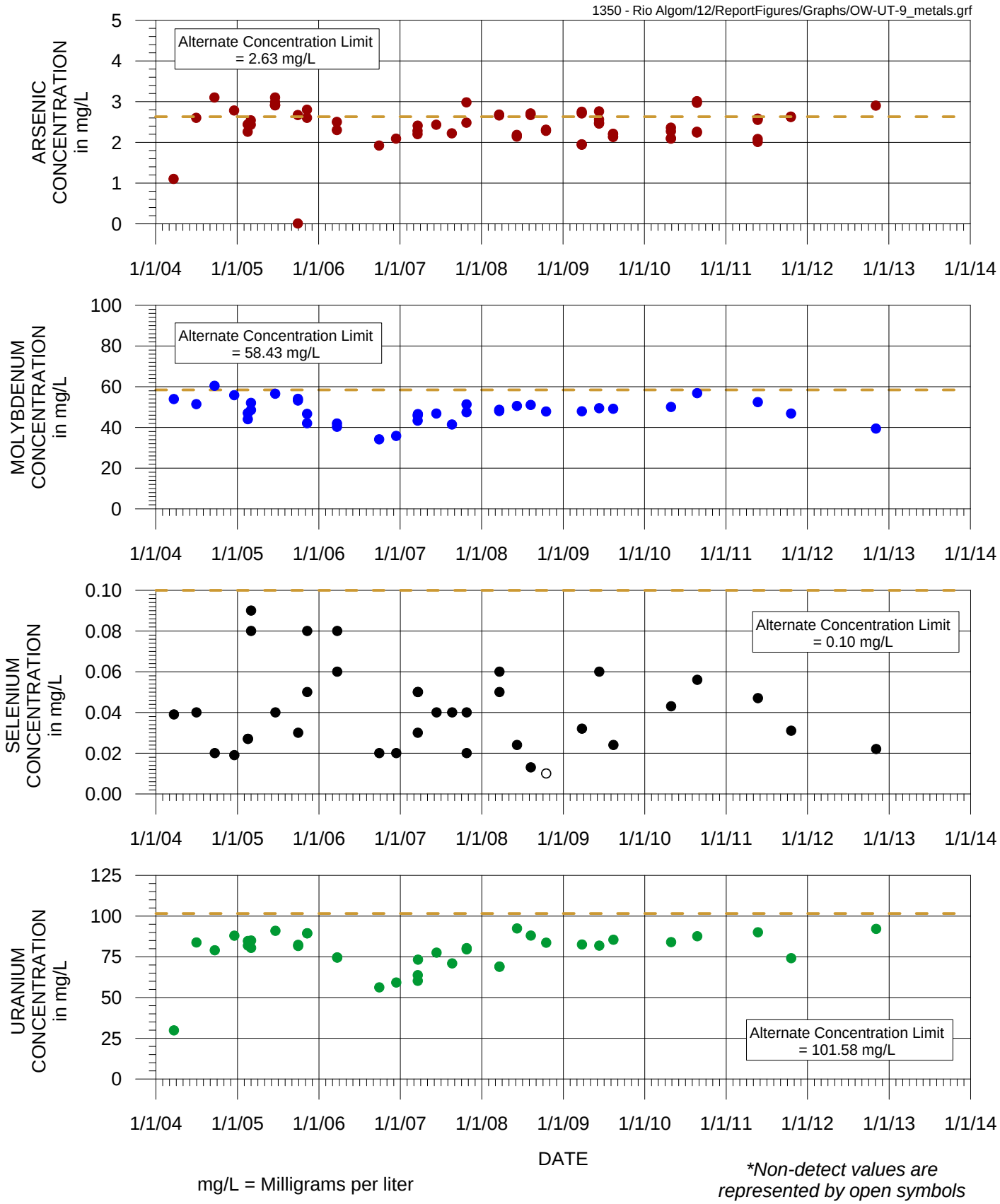
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-24. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR BACKGROUND WELL MW-5 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

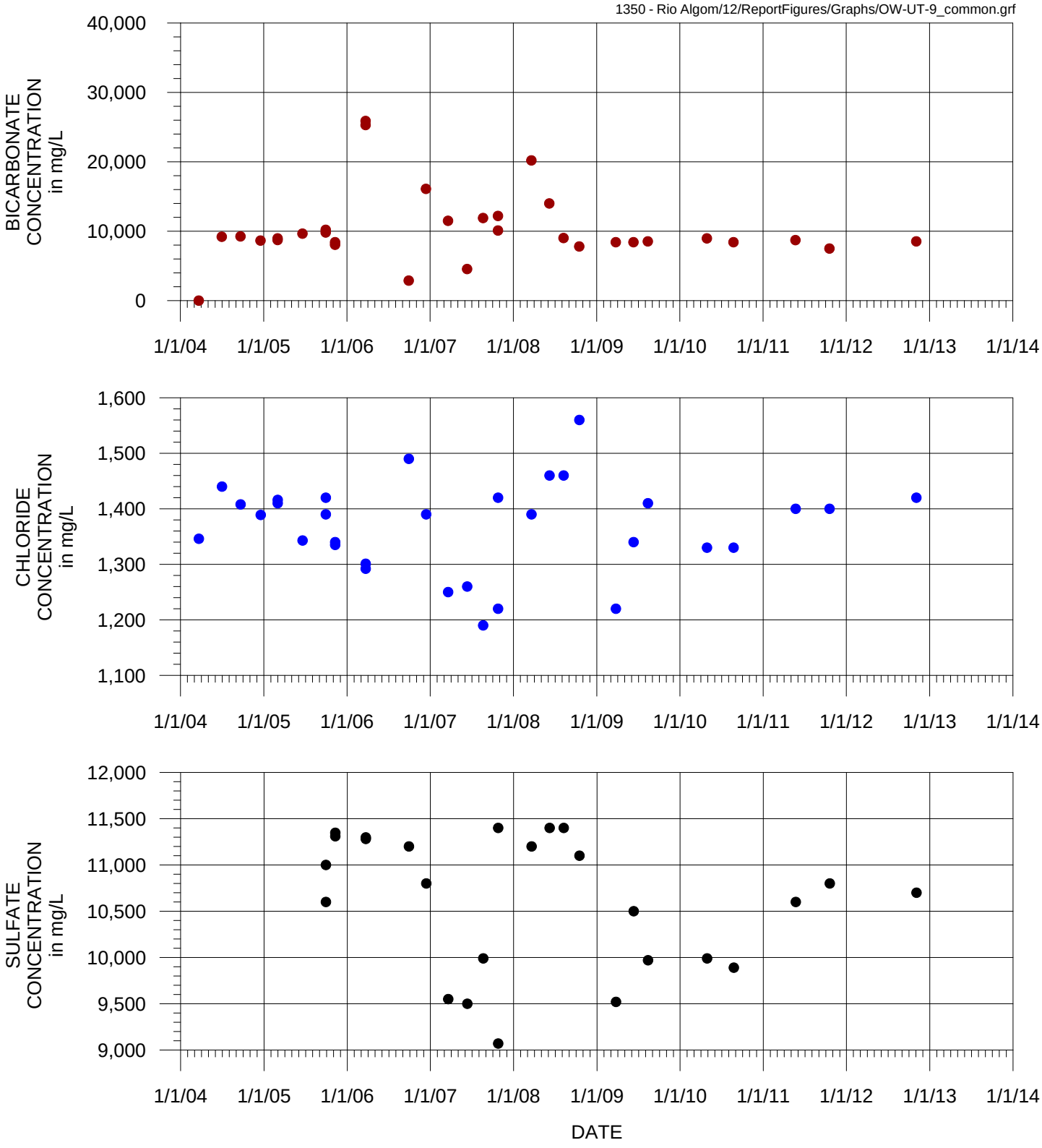


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-25. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR POINT OF COMPLIANCE WELL OW-UT-9 RIO ALGOM MINING LLC, LISBON FACILITY

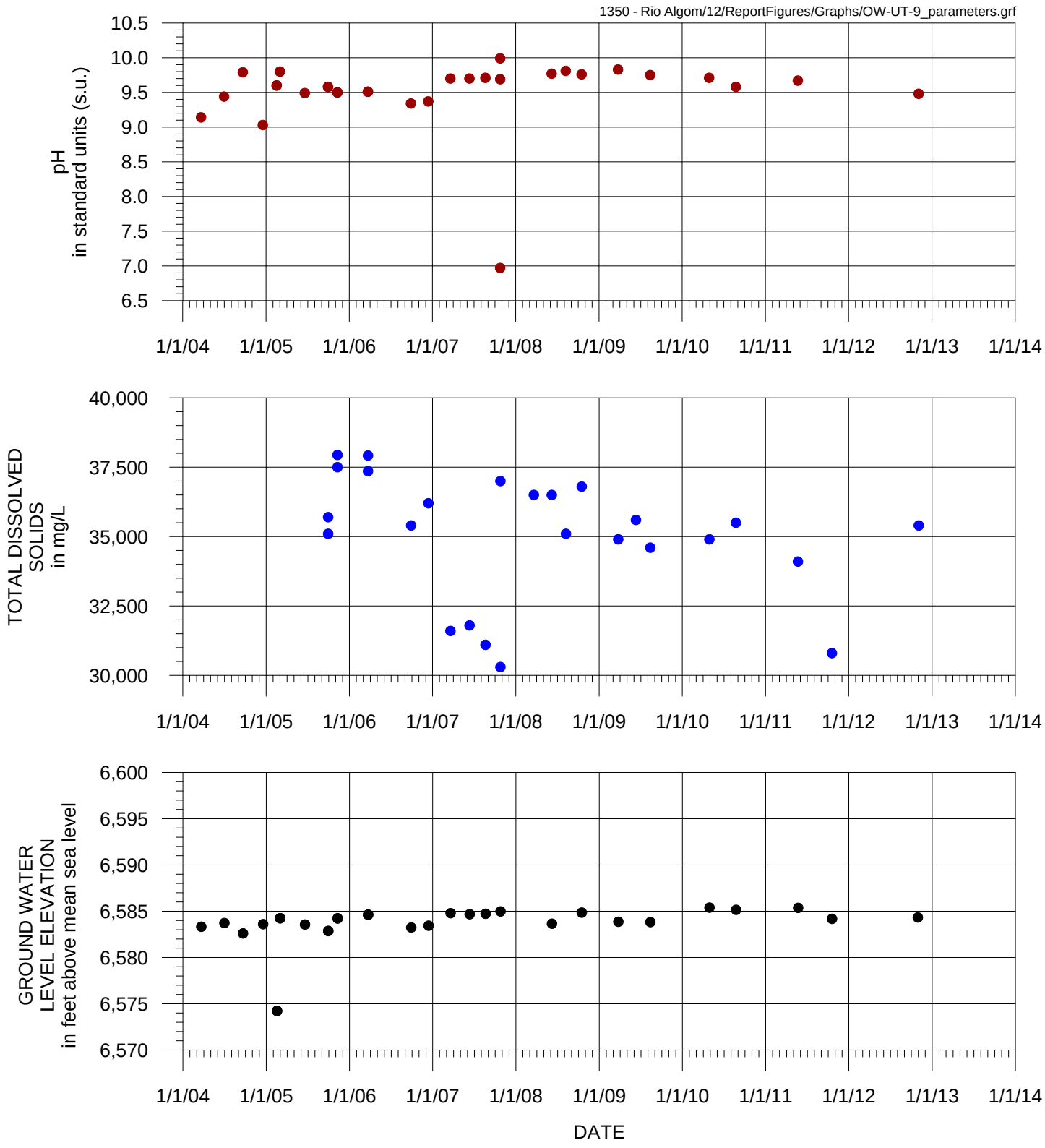
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-26. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR POINT OF COMPLIANCE WELL OW-UT-9 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-27. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR POINT OF COMPLIANCE WELL OW-UT-9 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

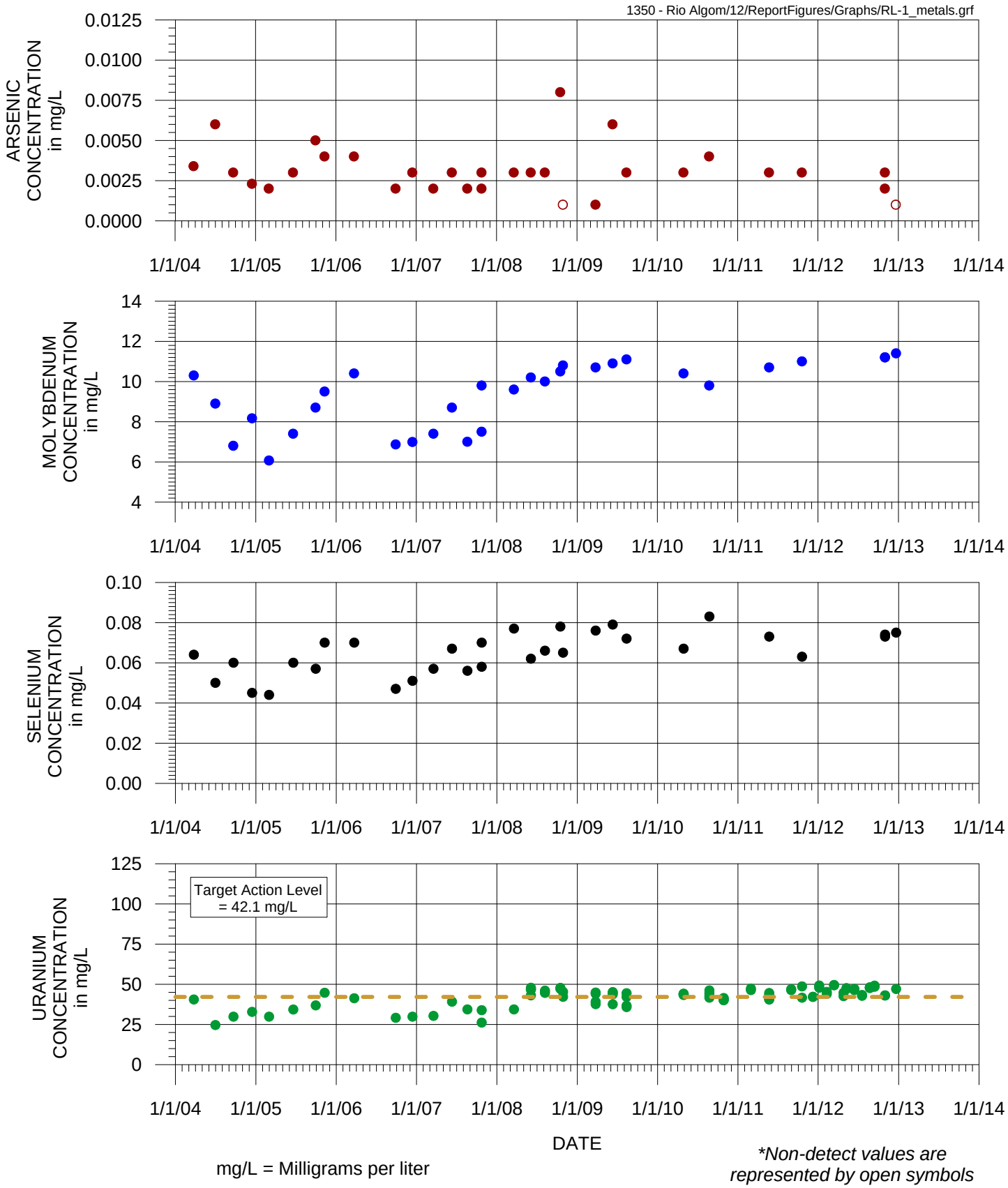
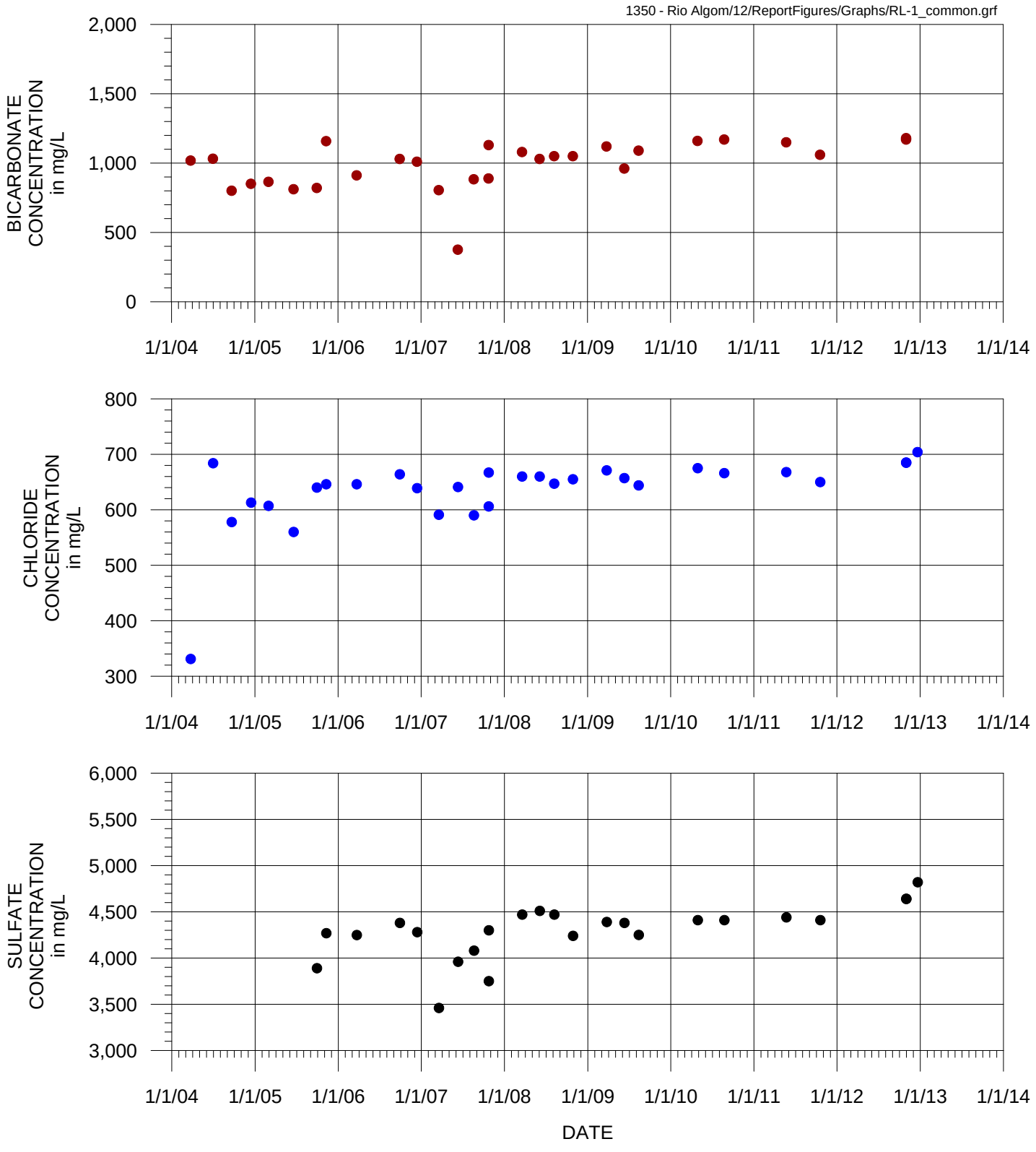


FIGURE E-28. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL RL-1
RIO ALGOM MINING LLC, LISBON FACILITY

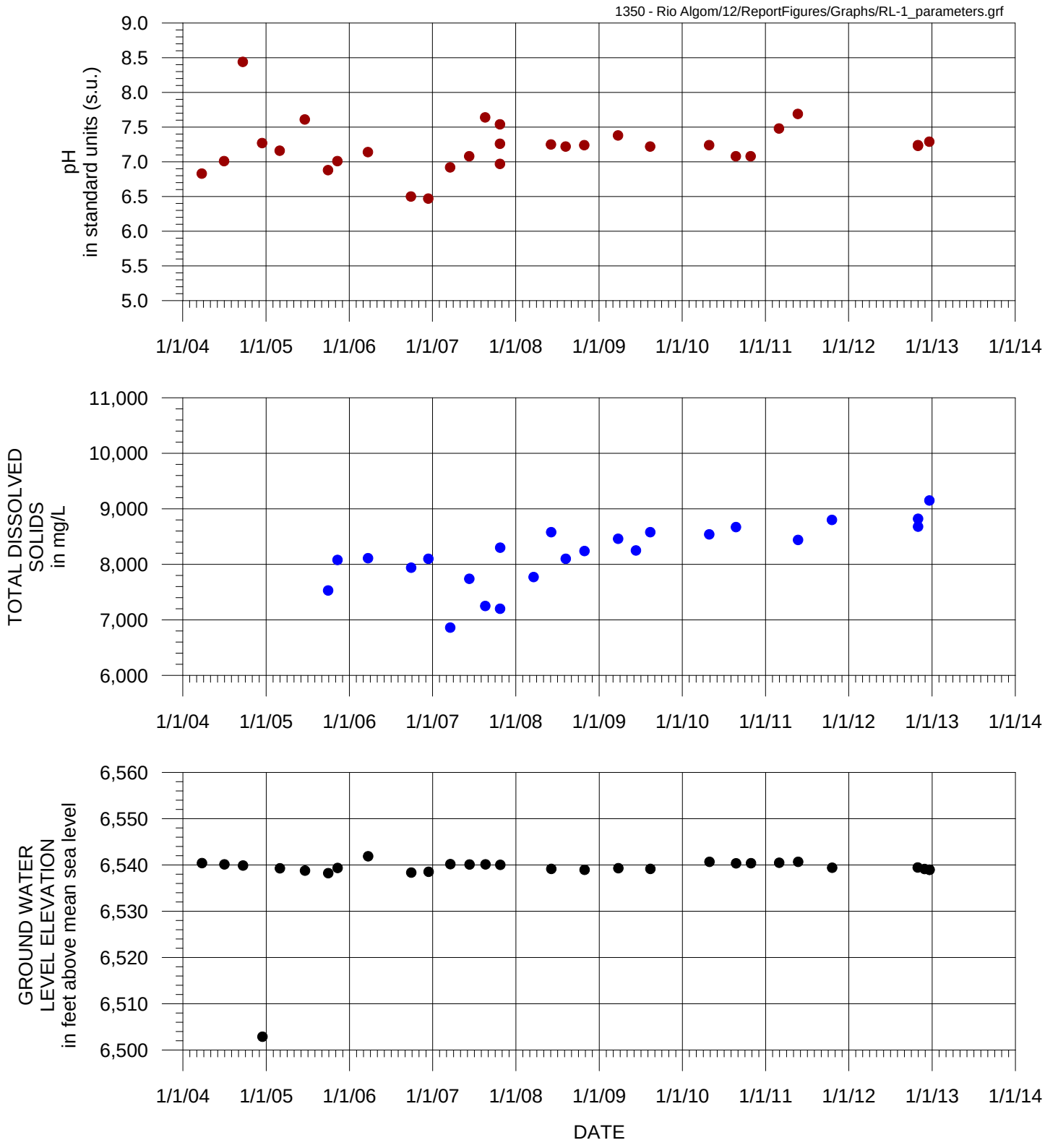
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-29. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL RL-1 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-30. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL RL-1 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

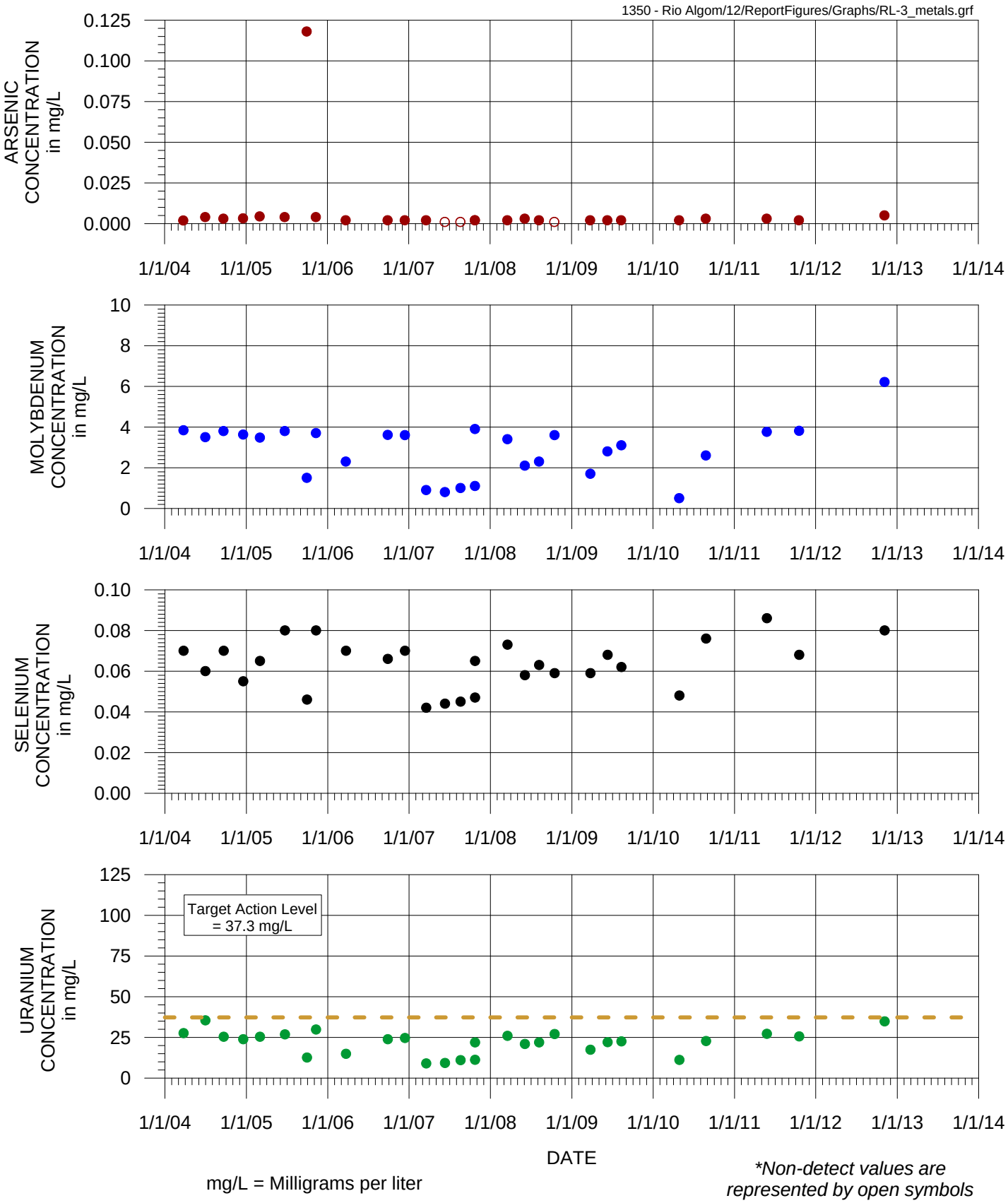
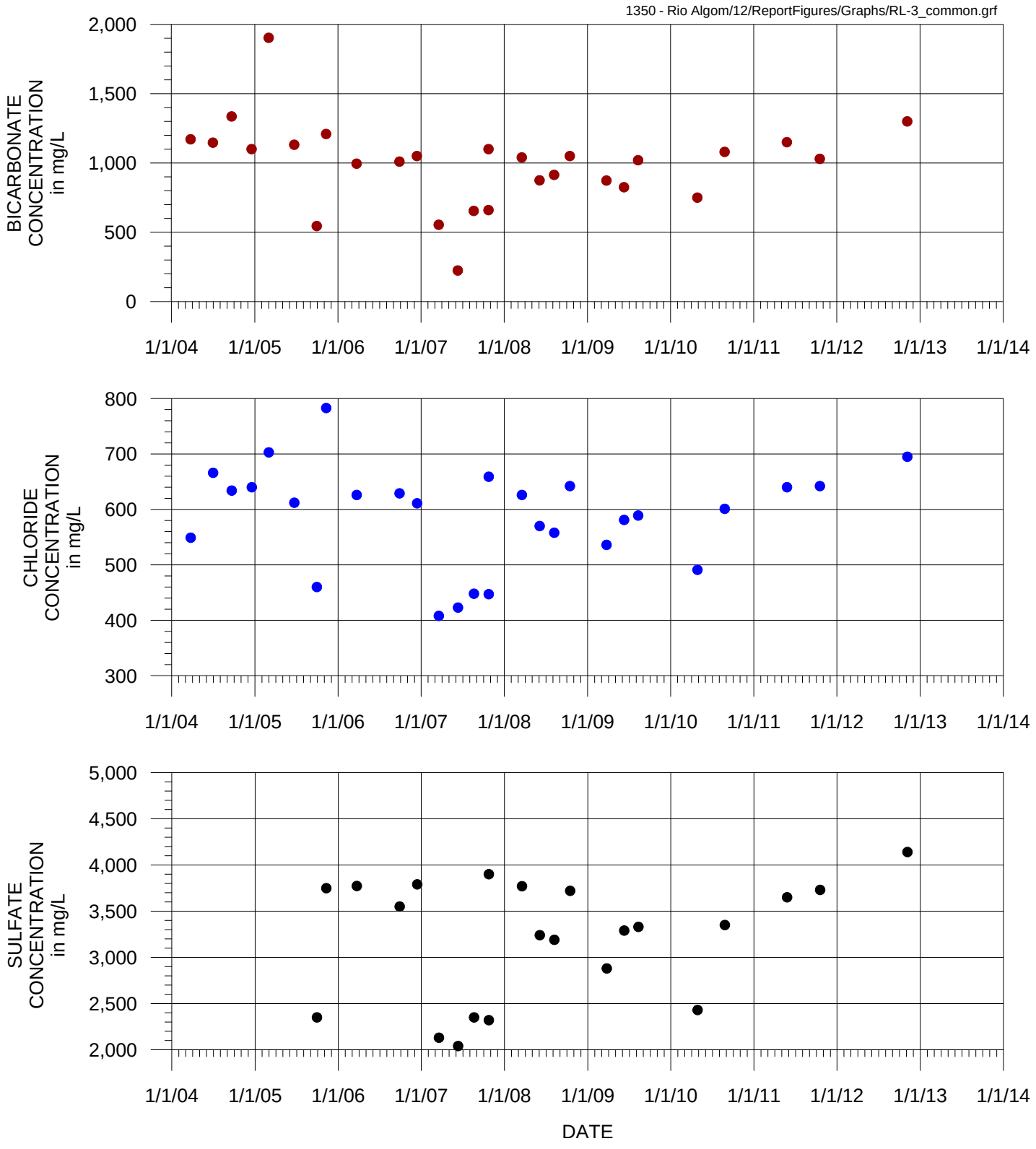


FIGURE E-31. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR TREND WELL RL-3
RIO ALGOM MINING LLC, LISBON FACILITY

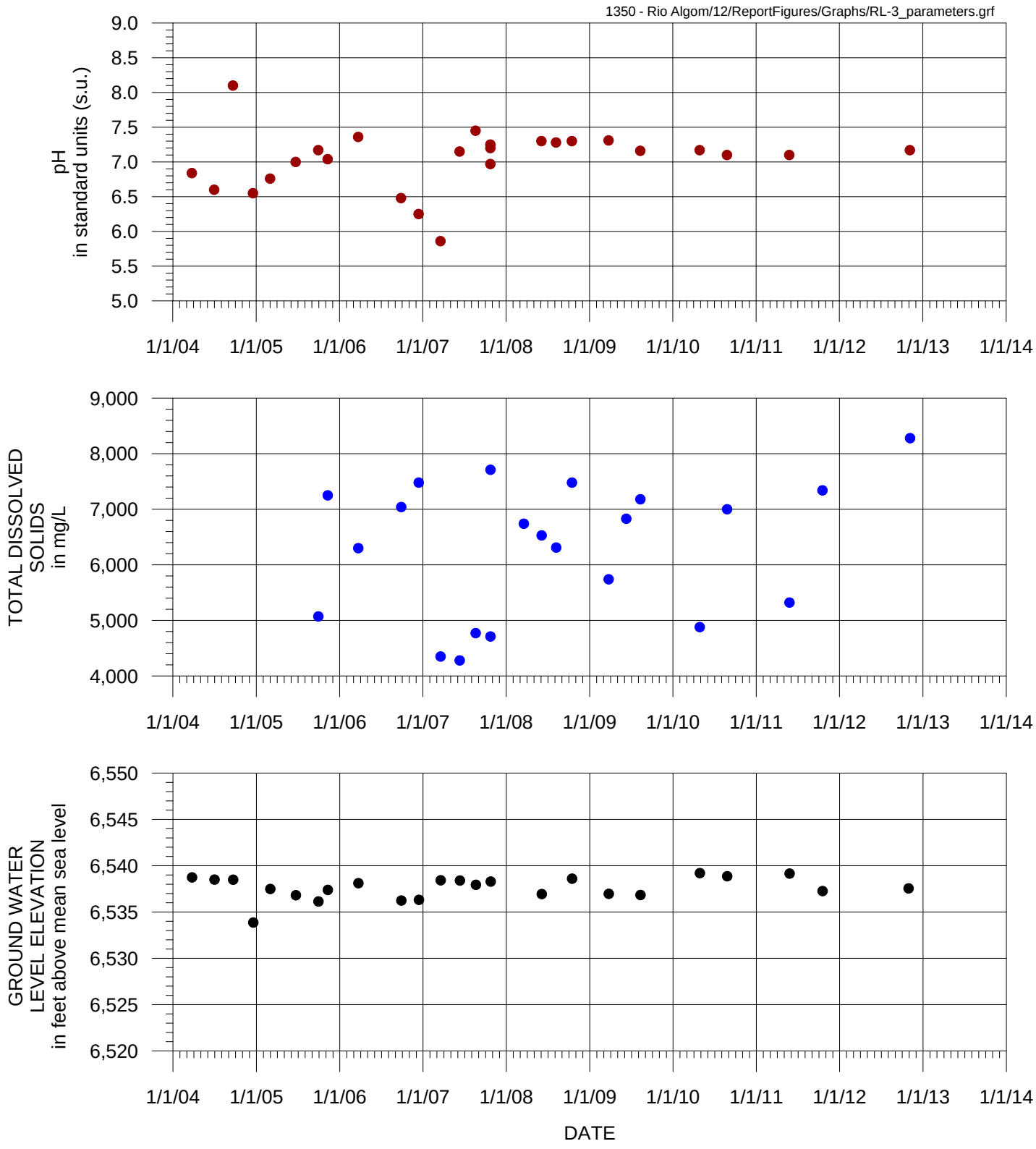
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-32. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR TREND WELL RL-3 RIO ALGOM MINING LLC, LISBON FACILITY

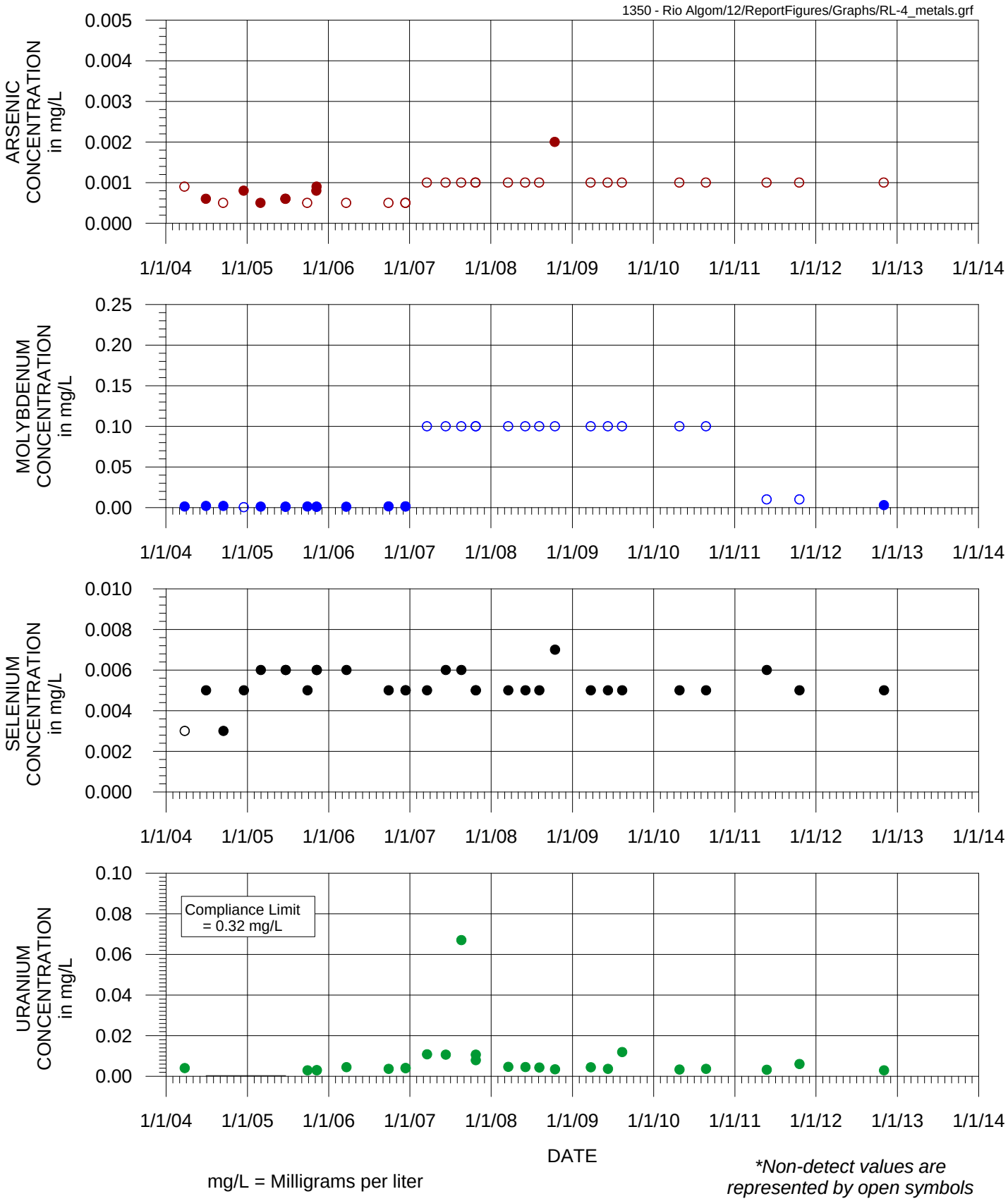
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-33. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR TREND WELL RL-3 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

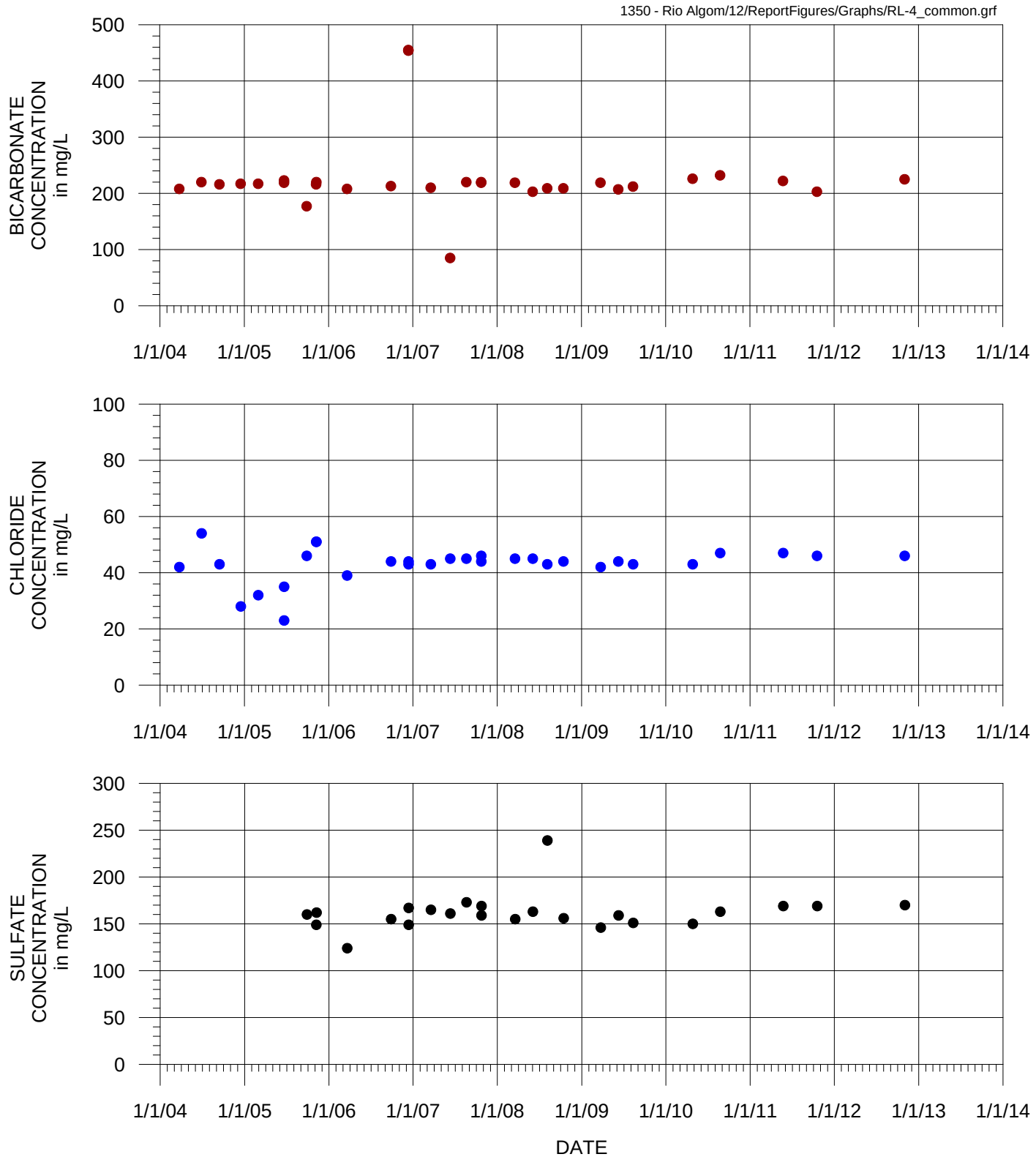


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-34. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-4 RIO ALGOM MINING LLC, LISBON FACILITY

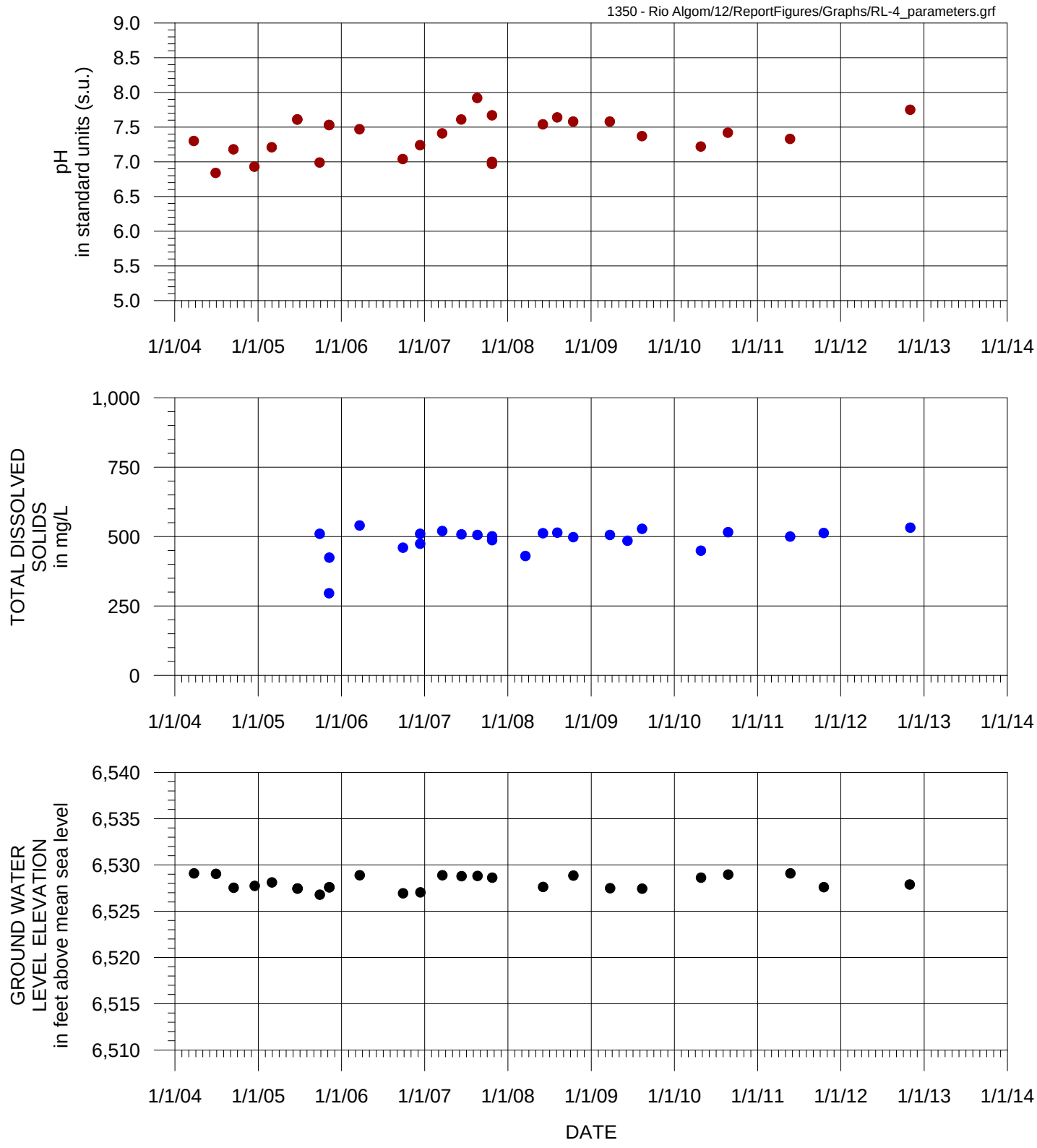
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-35. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-4 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-36. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR POINT OF EXPOSURE WELL RL-4 RIO ALGOM MINING LLC, LISBON FACILITY

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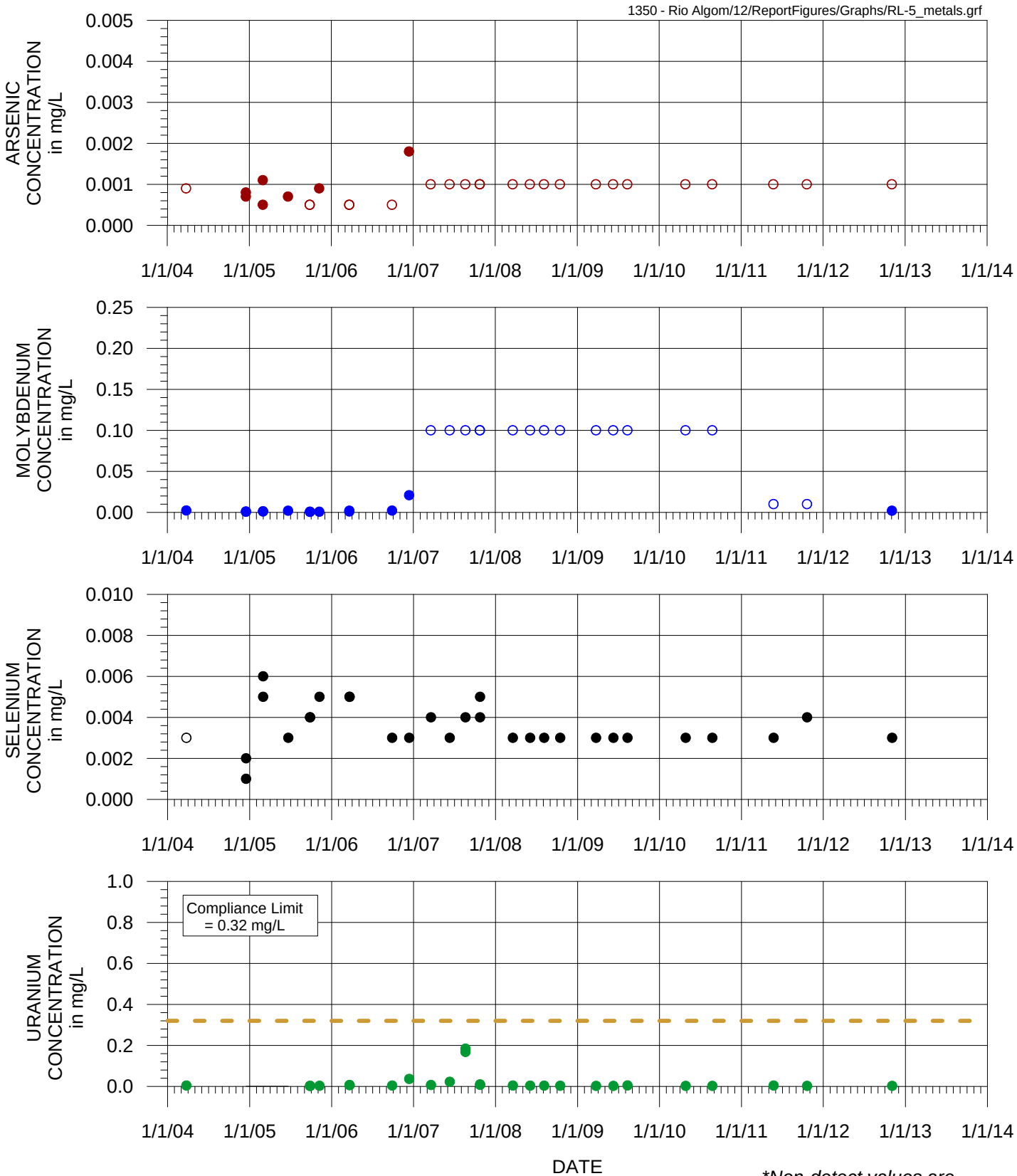
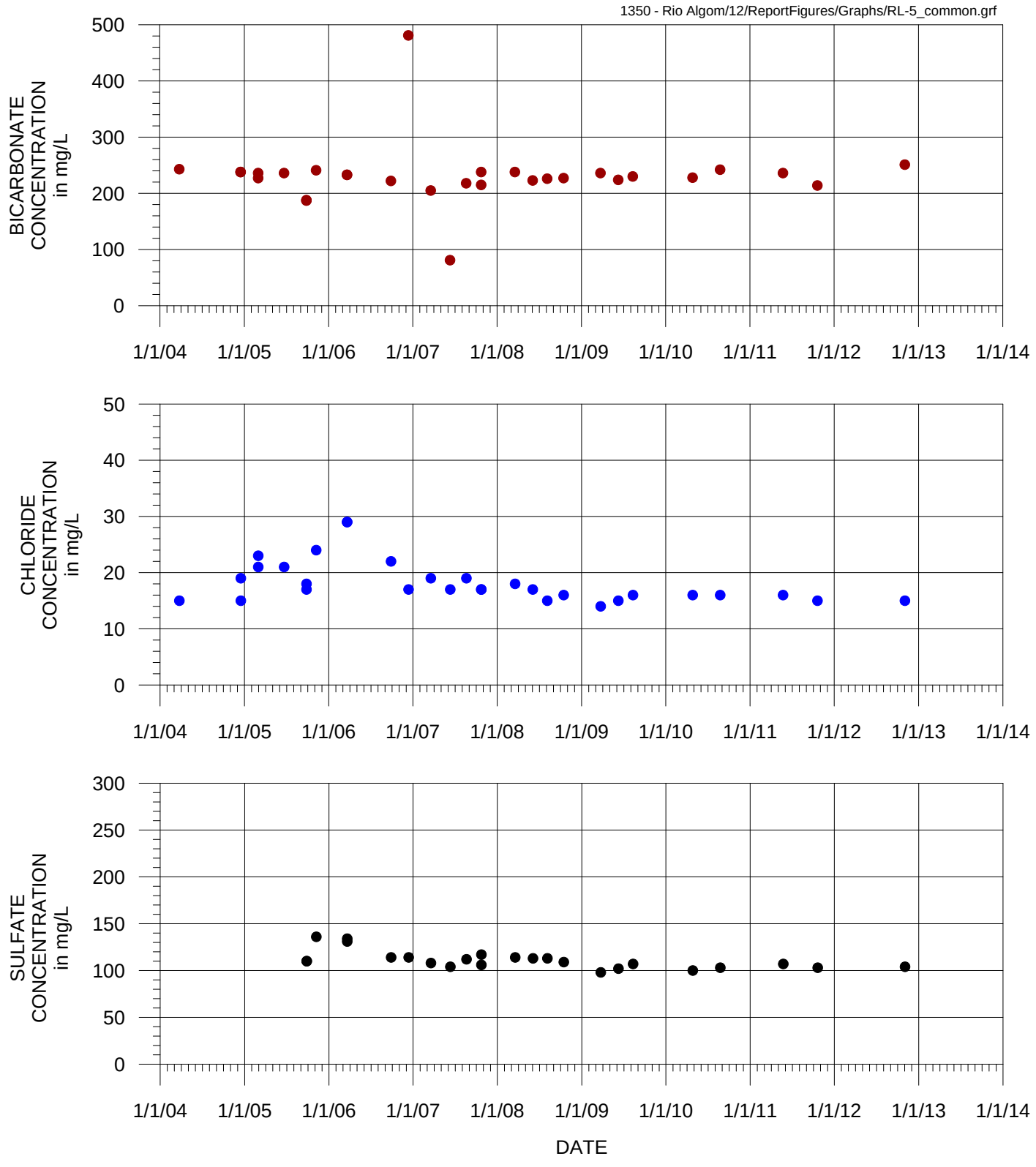


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-37. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-5 RIO ALGOM MINING LLC, LISBON FACILITY

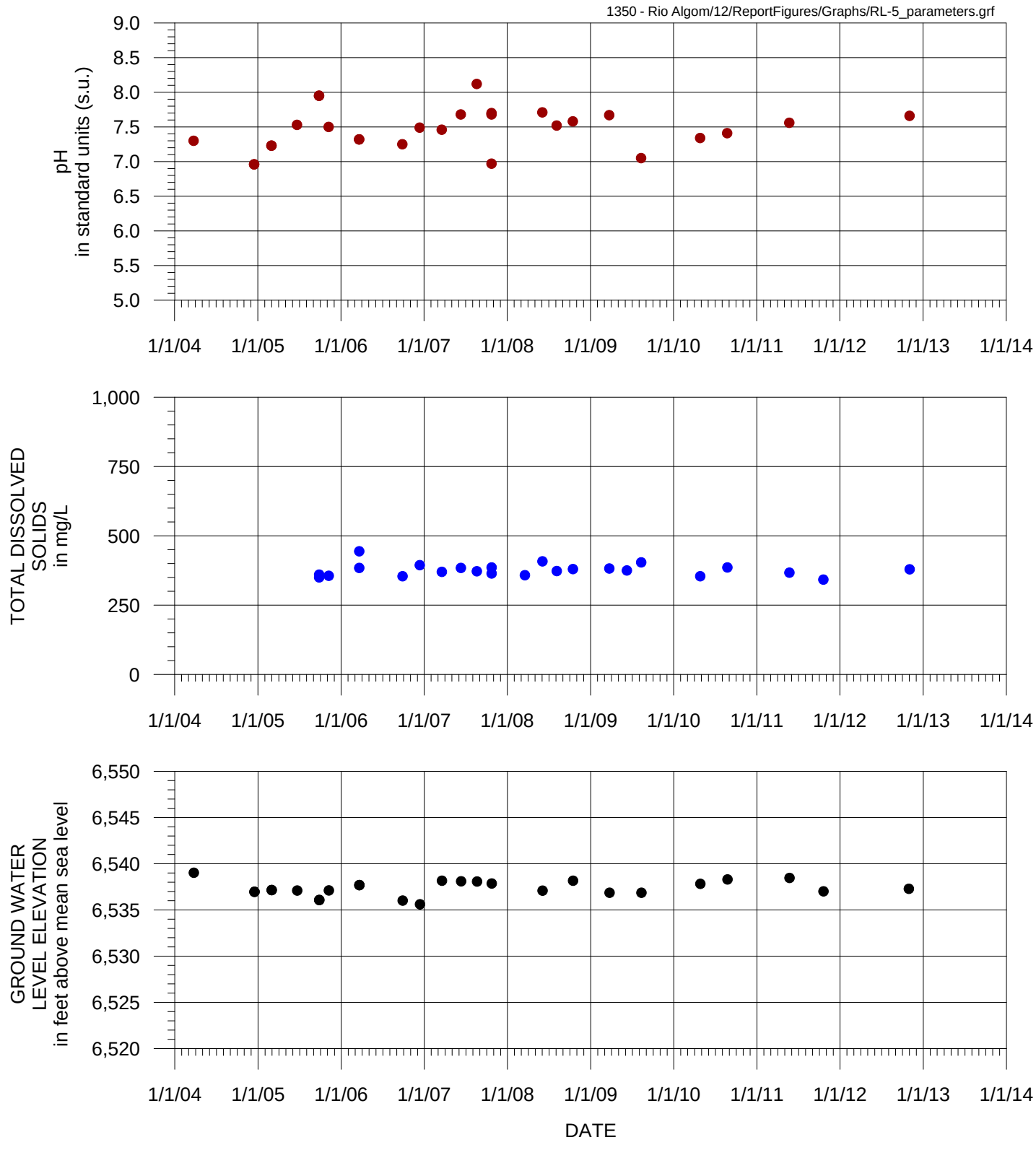
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-38. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-5 RIO ALGOM MINING LLC, LISBON FACILITY

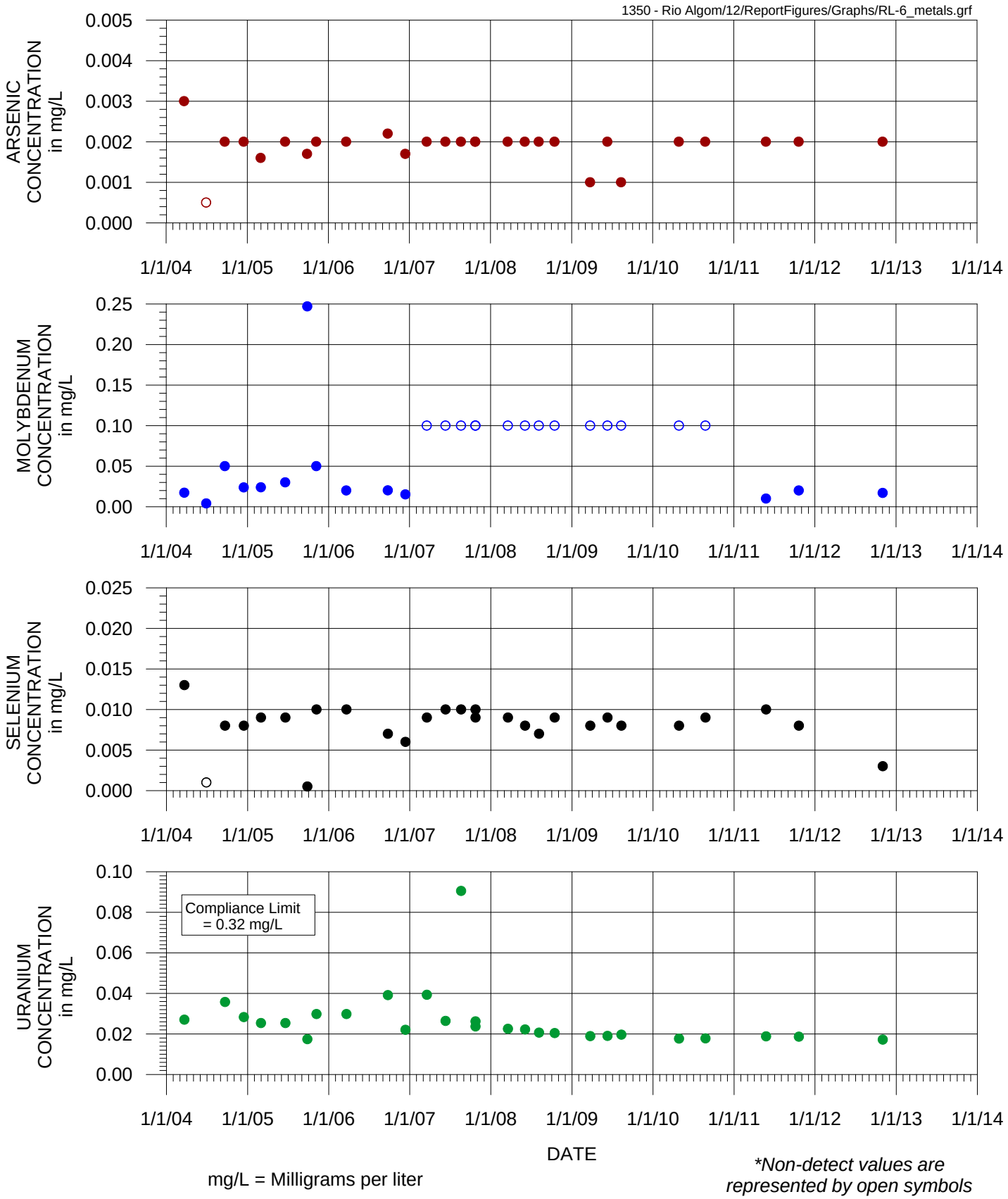
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-39. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR POINT OF EXPOSURE WELL RL-5 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES

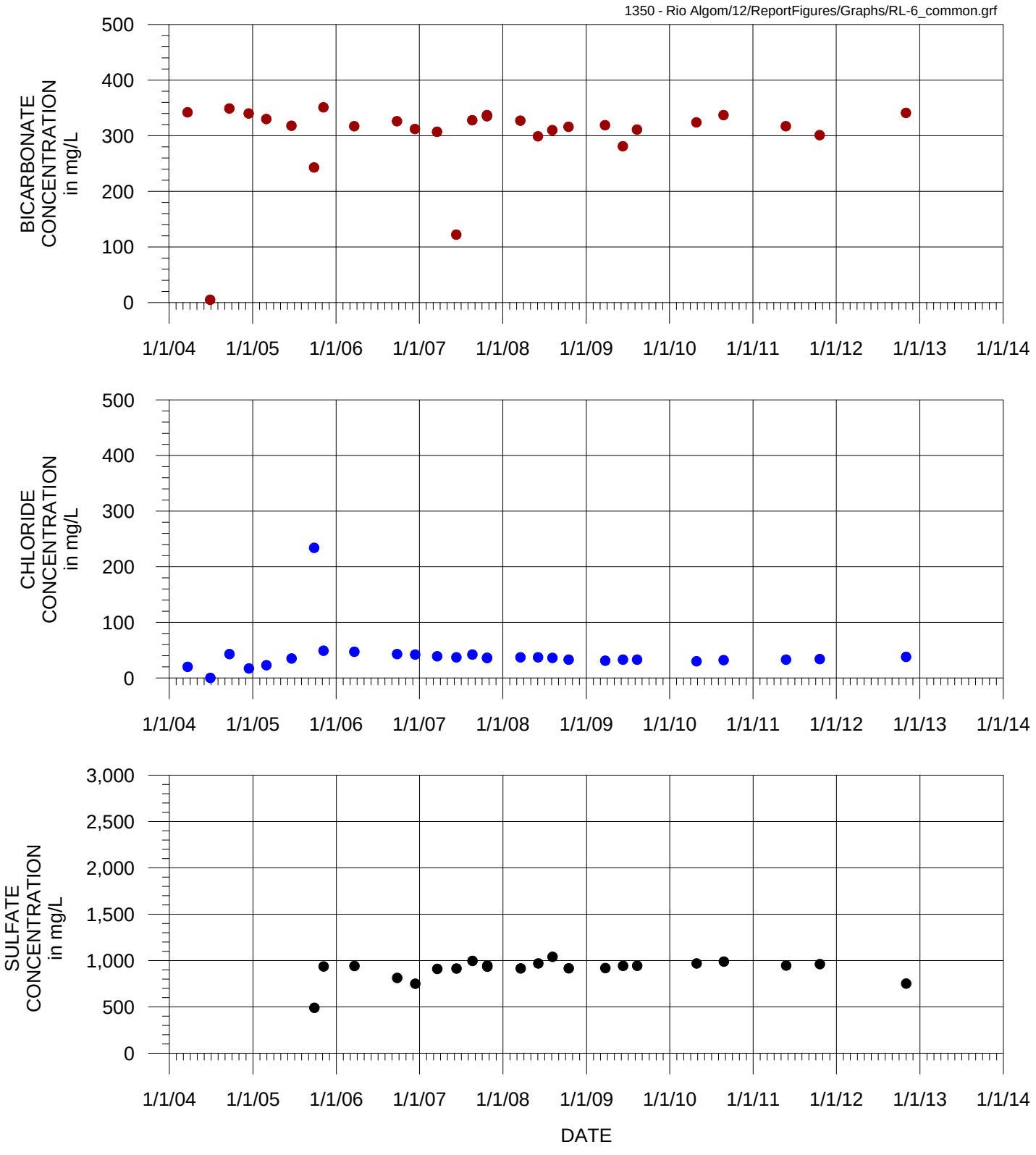


mg/L = Milligrams per liter

**Non-detect values are represented by open symbols*

FIGURE E-40. TIME SERIES GRAPHS OF ARSENIC, MOLYBDENUM, SELENIUM, AND URANIUM CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-6 RIO ALGOM MINING LLC, LISBON FACILITY

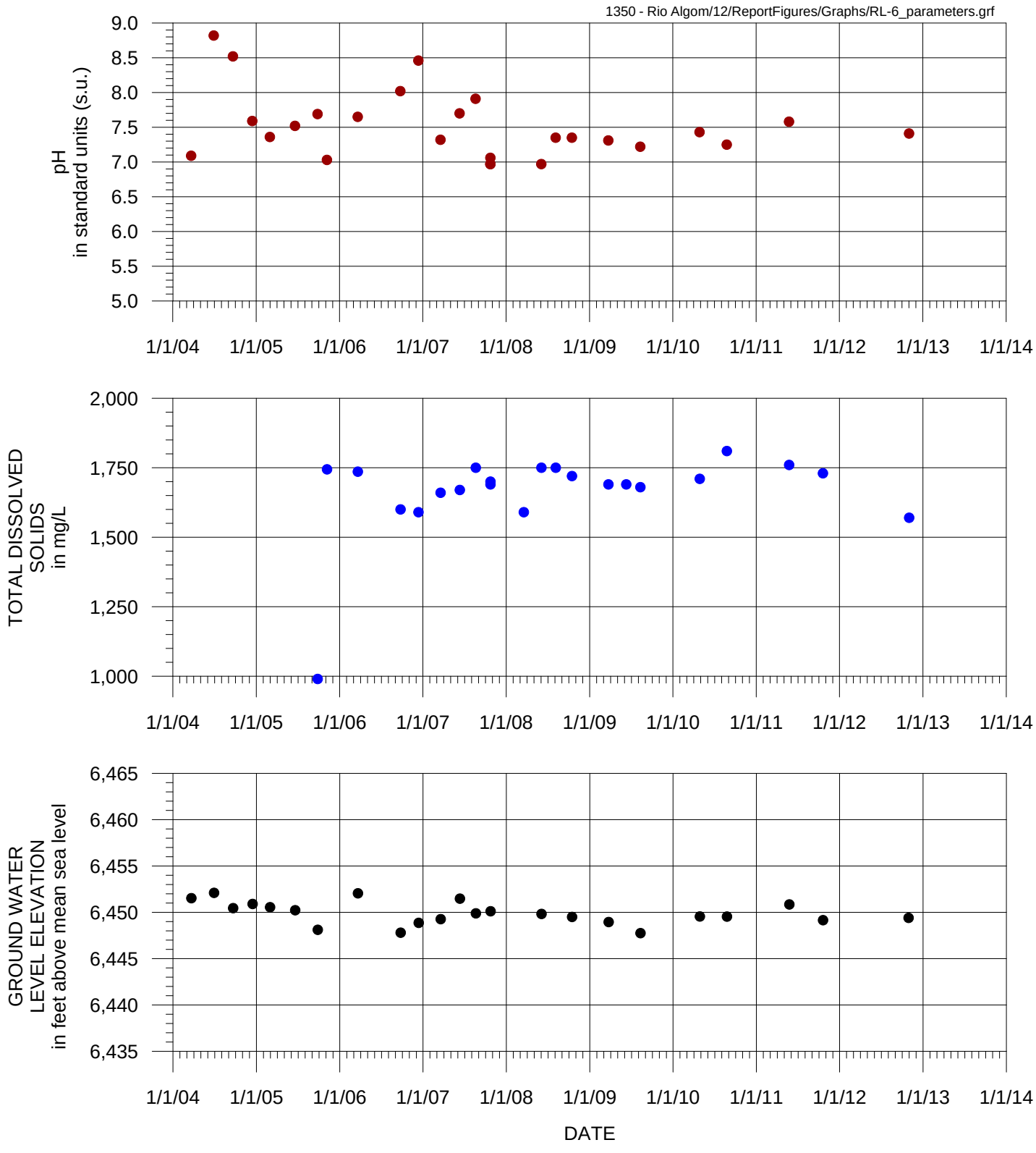
MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-41. TIME SERIES GRAPHS OF BICARBONATE, CHLORIDE, AND SULFATE CONCENTRATIONS FOR POINT OF EXPOSURE WELL RL-6 RIO ALGOM MINING LLC, LISBON FACILITY

MONTGOMERY & ASSOCIATES



mg/L = Milligrams per liter

FIGURE E-42. TIME SERIES GRAPHS OF pH, TOTAL DISSOLVED SOLIDS CONCENTRATION AND GROUND WATER ELEVATION FOR POINT OF EXPOSURE WELL RL-6 RIO ALGOM MINING LLC, LISBON FACILITY

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APPENDIX F

ANALYSIS OF GROUNDWATER QUALITY DATA FROM WELL MW-102DB

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

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APPENDIX F

ANALYSIS OF GROUNDWATER QUALITY DATA FROM WELL MW-102DB

Groundwater sampling was conducted in Brushy Basin Member (BBM) well MW-102DB during the Phase 1 hydrogeologic investigation at the Rio Algom Mining LLC's Lisbon Facility (Site) located in San Juan County, Utah. The well was sampled using three methods: (1) no-purge (by disposable bailer and HydraSleeve), (2) low-flow minimal purge, and (3) standard volume-based purge. Review of laboratory analytical data from the well sampling indicated significantly higher dissolved constituent concentrations in the purge sample results than the no-purge and low-flow minimal purge sample results. This appendix summarizes a brief analysis of this difference in concentration, with a focus on dissolved uranium. Dissolved uranium is the primary constituent of concern in groundwater at the Site. Similar differences in concentration are evident in the analytical data for other dissolved common water quality constituents and trace metals.

Well MW-102DB is screened in the upper 40 feet of the BBM and is paired with shallow well MW-102, which is screened in the lower 20 feet of the Burro Canyon Aquifer (BCA). **Appendix A** of this report includes well construction schematics and lithologic logs for these wells. The concentration of dissolved uranium at well MW-102DB was reported as 11.4 mg/L after purging over 100 gallons of water from the well. Prior to purging, the average dissolved uranium concentration from the pre-development, HydraSleeve, and low-flow sample (both originals and duplicates) was approximately 0.06 mg/L. An analysis of the water quality data from wells MW-102 and MW-102DB was conducted to understand the nature of the change in uranium concentration observed in well MW-102DB.

Figure F-1 presents a scatter plot of all concentration data collected in well MW-102 and MW-102DB during Phase 1. The data plot beneath the 1:1 line, indicating that concentrations are higher in MW-102 than MW-102DB. The HydraSleeve and low-flow data plot farther from the 1:1 line, indicating a greater discrepancy between the well concentrations for these two sampling methods. In contrast, the purge data plot closer to the 1:1 line, indicating more similarity between the concentrations in the two wells for this sampling method. **Figure F-1** may indicate that the groundwater quality purged from well MW-102DB was becoming similar to the groundwater quality sampled by well MW-102.

Figure F-2 presents a piper diagram illustrating major ion water chemistry from the three sampling methods for wells MW-102 and MW-102DB. Plotting cations and anions on a piper diagram can be used to identify types of water. The four quadrants of the diamond in a piper diagram represent four classes of water: permanent hardness (top), saline (right), alkali carbonate (bottom), and temporary hardness (left). All data from well MW-102 plot in the saline quadrant. Data from the low-flow and HydraSleeve sampling methods for well

MW-102DB plot in the alkali-carbonate quadrant of the piper diagram. However, data from the purge sampling method in well MW-102DB plot in the saline portion of the diagram. Similar to **Figure F-1**, **Figure F-2** indicates that purge sampling resulted in an apparent convergence of the groundwater quality between well MW-102DB and well MW-102.

Analysis of water chemistry data for BBM well MW-102DB indicates that post-purge groundwater quality in the well is similar to the groundwater quality found in adjacent shallower BCA well MW-102. The similarity in groundwater quality may indicate that purging groundwater from MW-102DB causes shallower groundwater to flow from the BCA into the BBM. Alternatively, purge sampling may be required in well MW-102DB in order to sample groundwater representative of broader BBM groundwater quality. Additional evaluation of existing data and additional sampling are required to improve understanding of the observed groundwater quality conditions near BMM well MW-102DB. Additional groundwater sampling will be conducted in wells MW-102 and MW-102DB in March 2013.

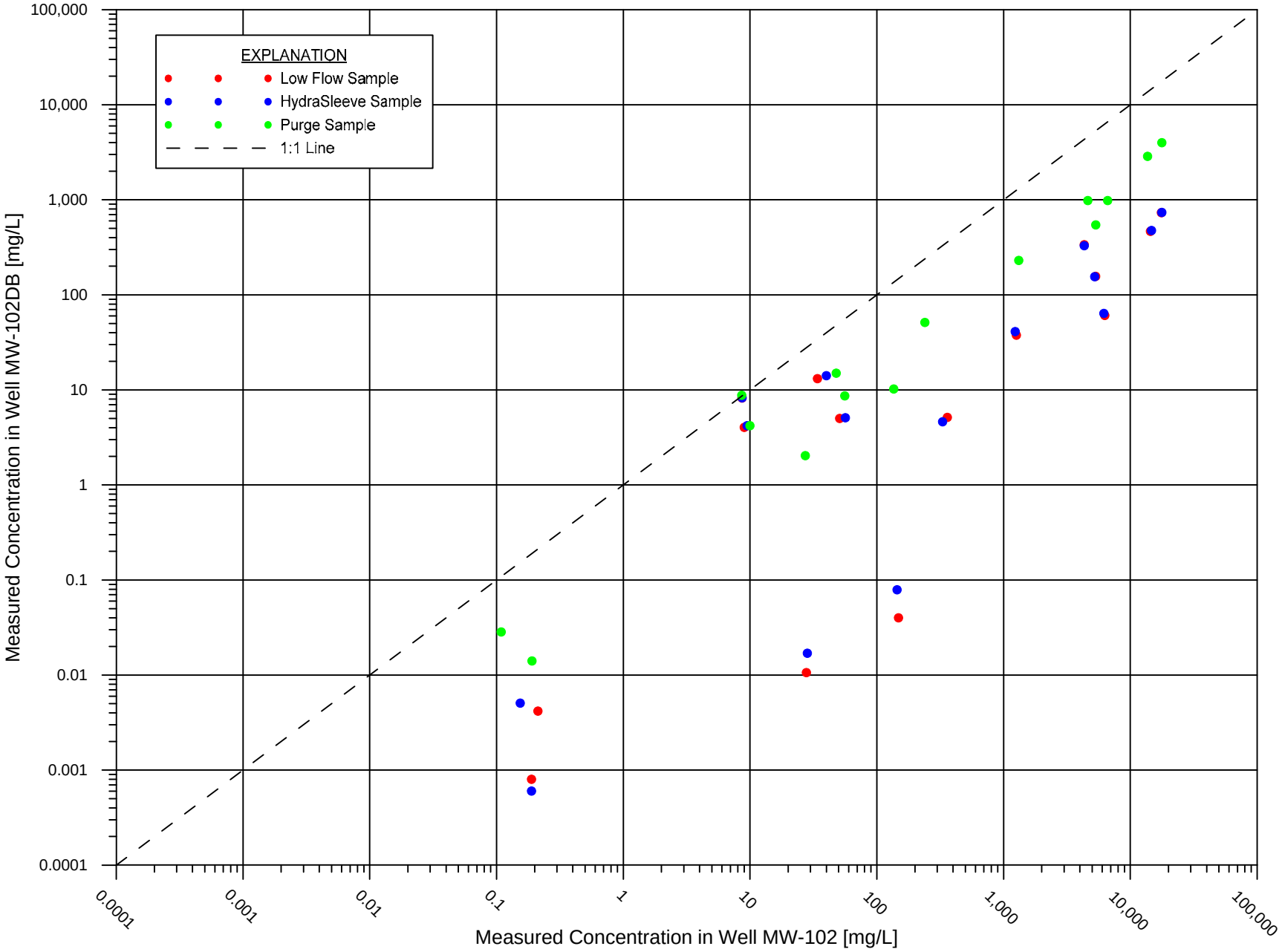

FIGURE F-1. SCATTER PLOT OF MEASURED CONCENTRATION FOR ALL ANALYTES IN WELLS MW-102 AND MW-102DB, LISBON FACILITY, RIO ALGOM MINING LLC

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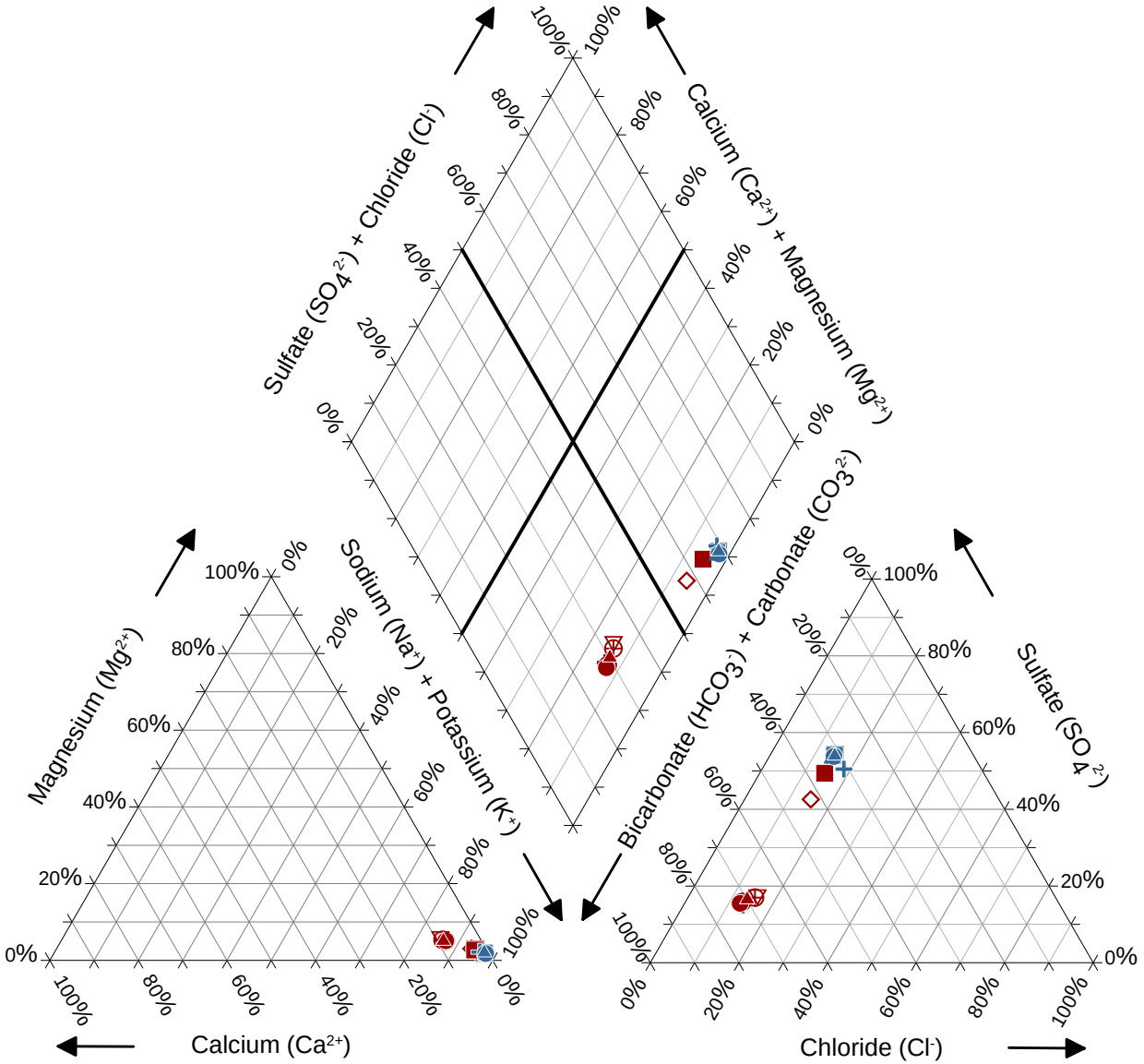

EXPLANATION

Color Indicating Well Identifier

- MW-102
- MW-102DB

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Hydrasleeve Split
- Low-Flow Purge
- Low-Flow Purge Split
- Low-Flow Purge Duplicate
- Pre-Development
- Purge
- Purge Split

FIGURE F-2. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN MW-102 AND MW-102DB RIO ALGOM MINING, LISBON FACILITY

1350 - Rio Algom\WQ_trends\MW-102_MW-102DB_Piper.grf 14Feb2013

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APPENDIX G

PIPER DIAGRAMS

PHASE 1 REPORT FOR SUPPLEMENTAL SITE ASSESSMENT TO ADDRESS OUT-OF-COMPLIANCE STATUS AT TREND WELLS RL-1 AND EF-8, LISBON FACILITY

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APPENDIX G

PIPER DIAGRAMS

Groundwater sampling was conducted from October 30th to November 7th at the Rio Algom Mining LLC Lisbon Facility (Site) during Phase 1 of the hydrogeologic investigation. A site map is shown on **Figure G-1.** Major cation and anion concentration data obtained from the Phase 1 sampling were used to generate piper diagrams. Piper diagrams are a graphical depiction of major ion water chemistry that can be used to classify waters and identify mixing of waters (Hounslow, 1995).

Figures G-2 through G-6 present piper diagrams for the following five selected areas at the Site:

1. **Northwest Transect (Figure G-2)** – includes data from Burro Canyon Aquifer (BCA) wells MW-101, MW-102, OW-UT-9, RL-1, RL-3, RL-4, and RL-5, which are oriented along a southeast-northwest transect emanating from the tailings impoundments on the northeast side of the Lisbon Valley Anticline (LVA).
2. **Southwest Transect (Figure G-3)** – includes data from BCA wells EF-3A, EF-6, EF-8, and ML-1, which are oriented along a southeast-northwest transect on the southwest side of the LVA.
3. **Southern Wells (Figure G-4) –** includes data from BCA wells H-63, MW-105, MW-13, UW-1, and MW-104, which are generally clustered on the south side of the tailings impoundment and on the south side of the LVA axis.
4. **Perimeter Wells (Figure G-5)** – includes data BCA wells LW-1, MW-100, MW-5, and RL-6, which are generally located along the perimeter of the Site study area.
5. **Brushy Basin Member Wells (Figure G-6)** – includes data from BBM wells MW-102DB, MW-103, and MW-106.

The piper diagrams were prepared to evaluate whether the major cation/anion data could be used, either independently or in tandem with other water quality data, to analyze and interpret groundwater data, and to characterize groundwater quality conditions at the Site. On piper diagrams, cations are plotted on the lower left triangle, anions are plotted on the lower right triangle, and cations and anions are projected onto the upper diamond. The four quadrants of the upper diamond represent four classes of water: permanent hardness (top), saline (right), alkali carbonate (bottom), and temporary hardness (left).

Preliminary evaluation of the piper diagrams indicates that they are useful for interpreting groundwater quality conditions at the Site. In particular, they reflect areas of groundwater mixing, they indicate different water types, and may be useful for

discriminating between impacted and unimpacted groundwater. Additional and more detailed evaluation of major cation/anion data will be conducted during Phase 2 of the hydrogeologic investigation.

REFERENCES

Hounslow, A.W. 1995. Water Quality Data: Analysis and Interpretation, CRC Lewis Publishers, Boca Raton, FL.

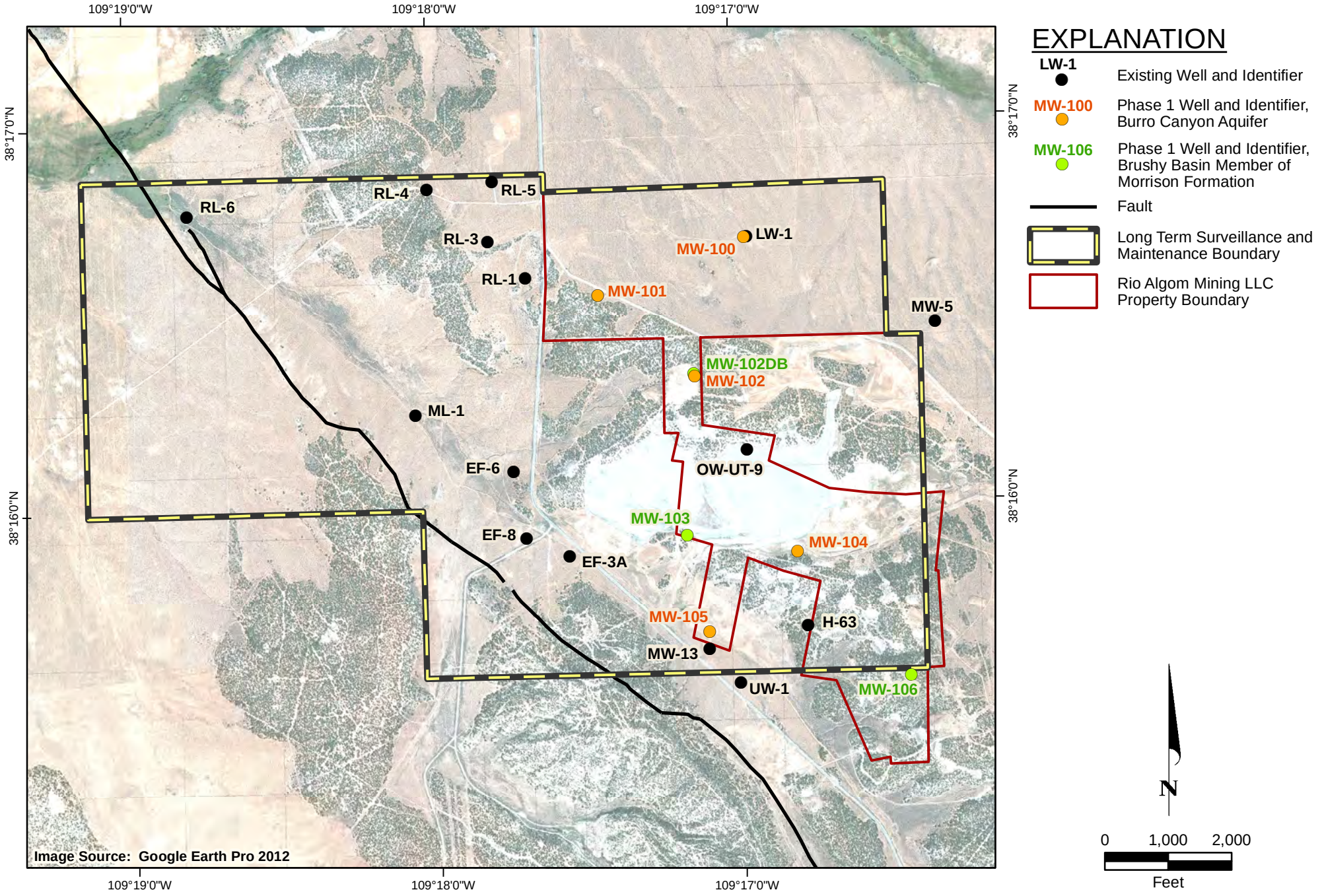

FIGURE G-1. WELL LOCATIONS, RIO ALGOM MINING LLC, LISBON FACILITY

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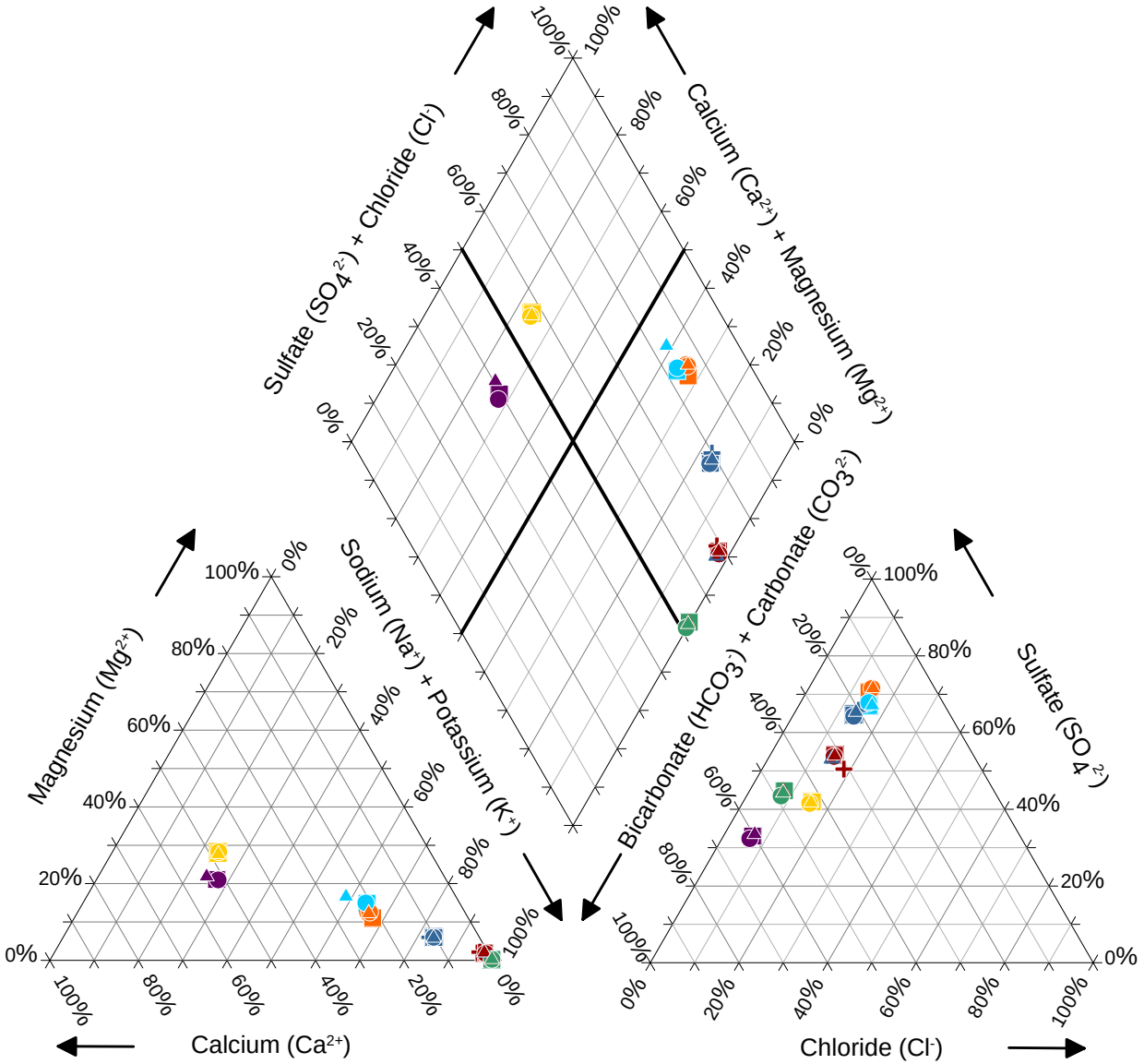

EXPLANATION

Color Indicating Well Identifier

- MW-101
- MW-102
- OW-UT-9
- RL-1
- RL-3
- RL-4
- RL-5

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Hydrasleeve Duplicate
- Low-Flow Purge
- Low-Flow Purge Duplicate
- Pre-Development
- Purge
- Purge Duplicate

FIGURE G-2. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN NORTHWEST TRANSECT WELLS RIO ALGOM MINING, LISBON FACILITY

1350 - Rio Algom\WQ_trends\Northwest_Transect_Wells.grf 14Feb2013

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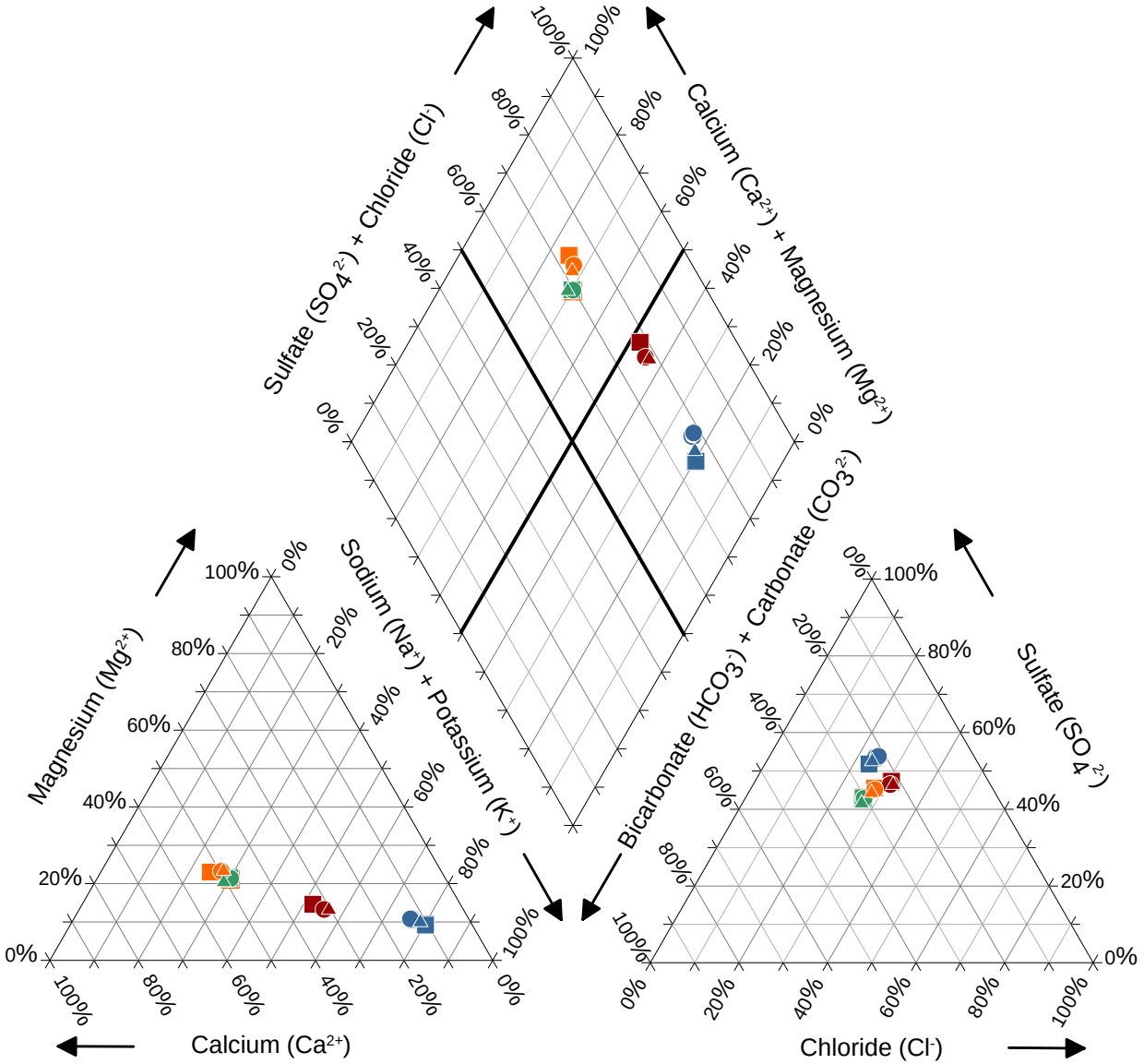

EXPLANATION

Color Indicating Well Identifier

- EF-3A
- EF-6
- EF-8
- ML-1

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Low-Flow Purge
- Low-Flow Purge Duplicate
- Purge
- Purge Duplicate

FIGURE G-3. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN SOUTHWEST TRANSECT WELLS RIO ALGOM MINING, LISBON FACILITY

1350 - Rio Algom\WQ_trends\Southwest_Transect_Wells.grf 14Feb2013

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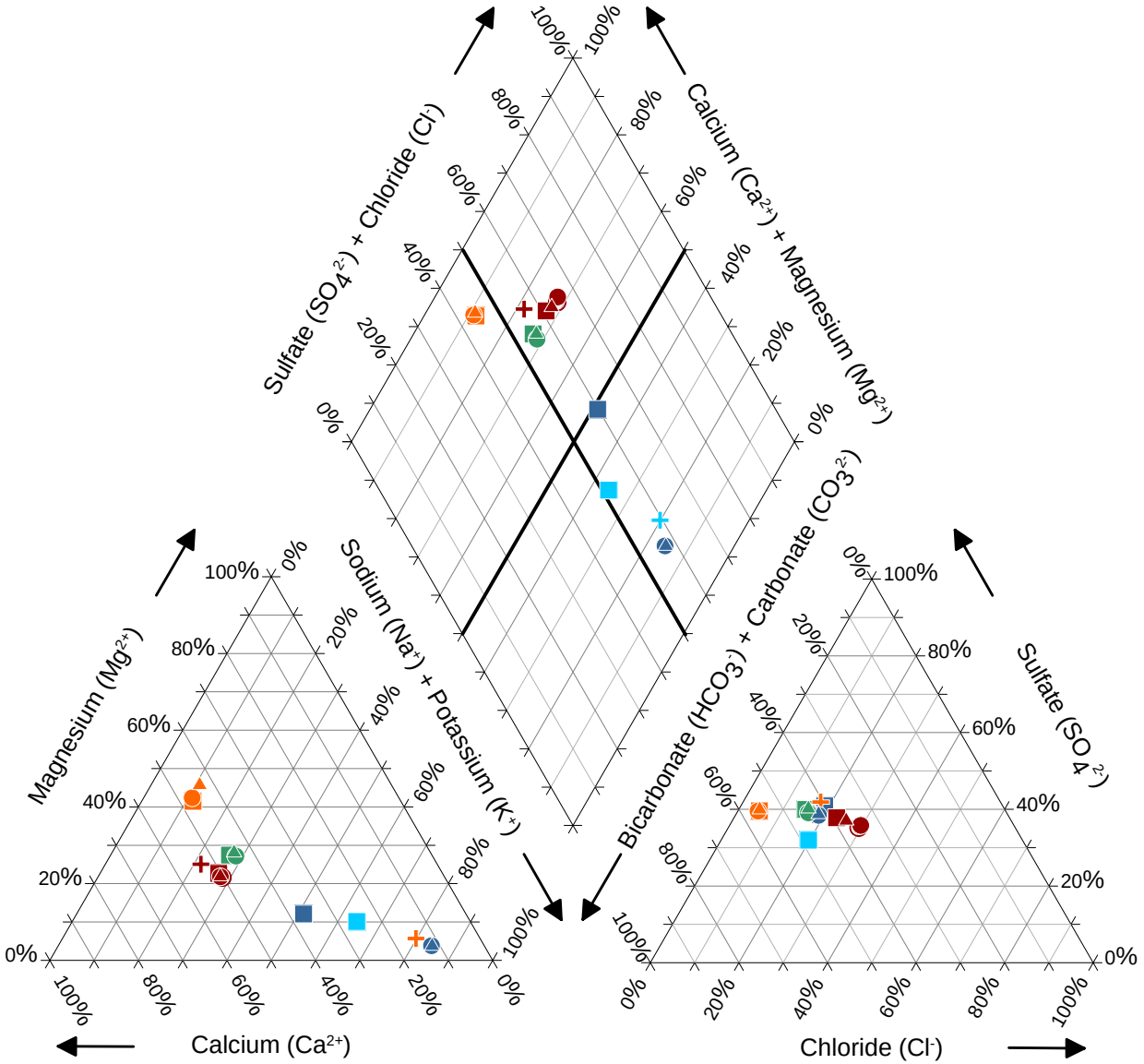

EXPLANATION

Color Indicating Well Identifier

- H-63
- MW-105
- MW-13
- UW-1
- MW-104

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Low-Flow Purge
- Low-Flow Purge Duplicate
- Pre-Development
- Purge

FIGURE G-4. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN SOUTHERN BCA WELLS RIO ALGOM MINING, LISBON FACILITY

1350 - Rio Algom\WQ_trends\Southern_BCA_Wells.grf 14Feb2013

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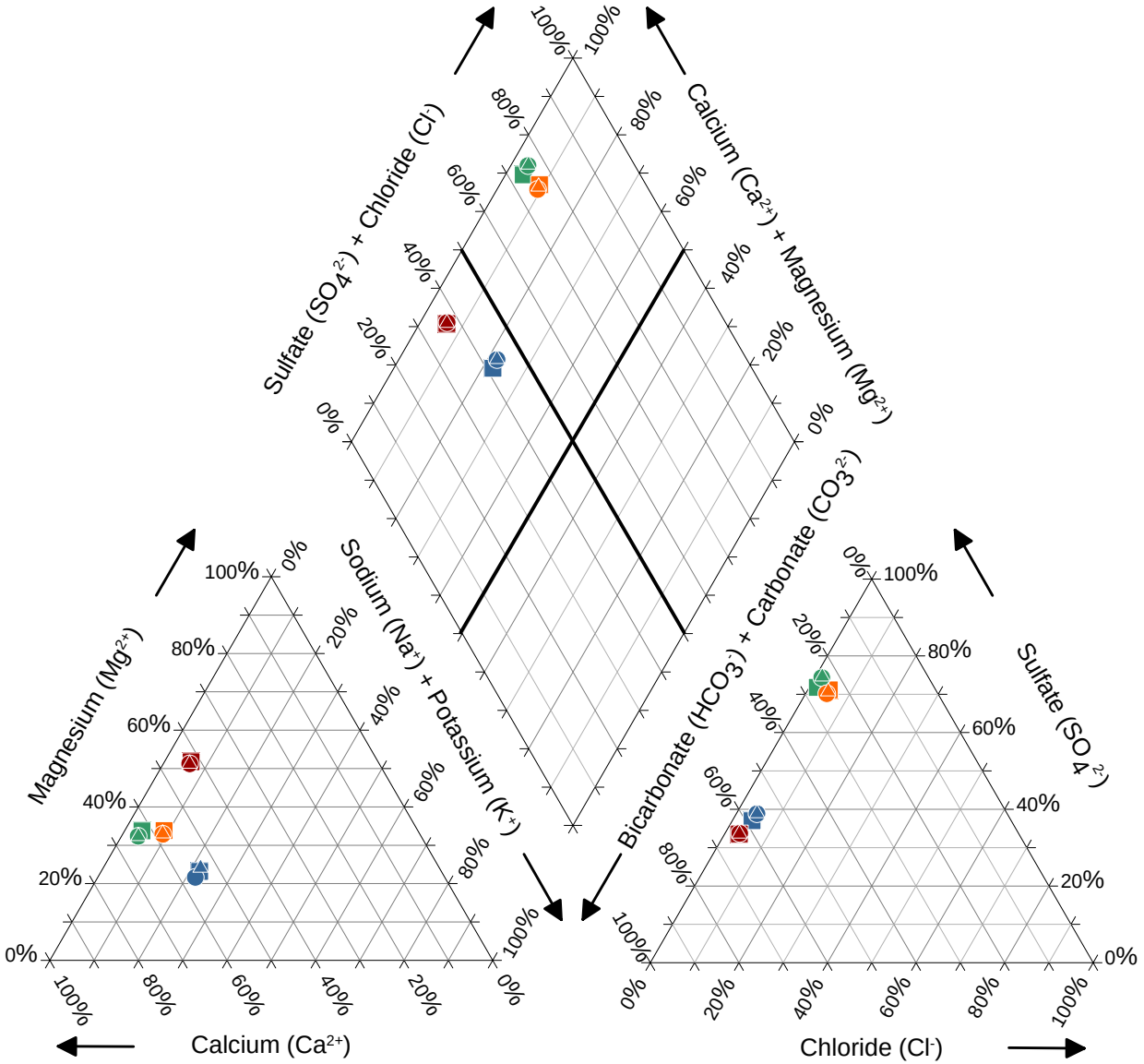

EXPLANATION

Color Indicating Well Identifier

- LW-1
- MW-100
- MW-5
- RL-6

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Low-Flow Purge
- Purge

FIGURE G-5. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN LW-1, MW-100, MW-5, AND RL-6 RIO ALGOM MINING, LISBON FACILITY

1350 - Rio Algom\WQ_trends\BackgroundWells_and_RL-6.grf 14Feb2013

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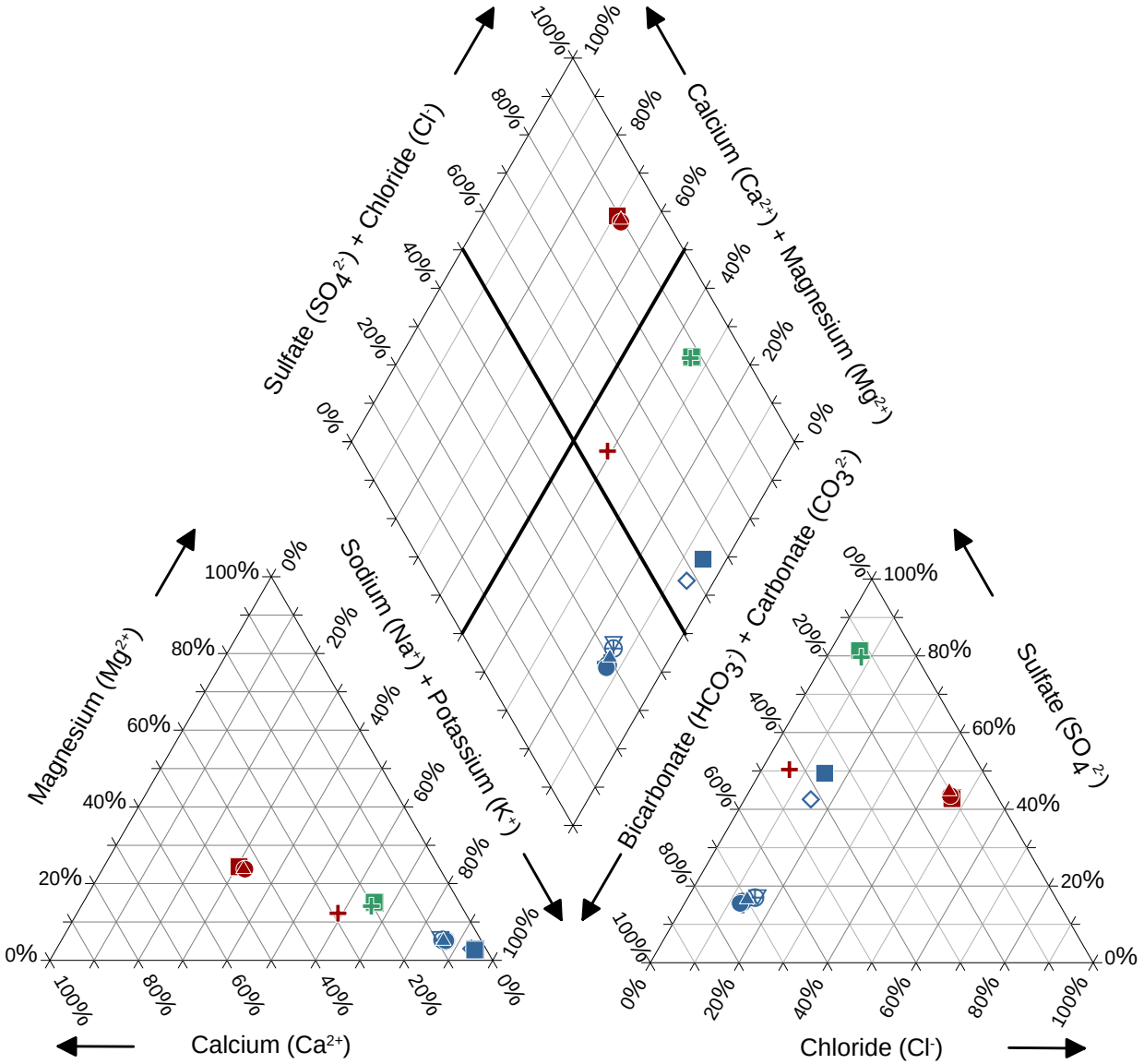

EXPLANATION

Color Indicating Well Identifier

- MW-102DB
- MW-103
- MW-106

Symbol Indicating Sampling Method and Sample Type

- Hydrasleeve
- Hydrasleeve Split
- Low-Flow Purge
- Low-Flow Purge Split
- Low-Flow Purge Duplicate
- Pre-Development
- Purge
- Purge Split

FIGURE G-6. PIPER DIAGRAM SHOWING COMMON ION COMPOSITION OF GROUNDWATER AND SAMPLING METHOD IN BRUSHY BASIN WELLS RIO ALGOM MINING, LISBON FACILITY

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