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LISBON VALLEY MINING CO

Lisbon Valley Mine

Updated Centennial Pit Backfill Evaluation

March 2014

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Executive Summary

Lisbon Valley Mining Company (LVMC) proposes to partially backfill the Centennial Pit at the Lisbon Valley Mine (LVM), an open-pit copper mine located near La Sal, Utah. LVMC is mining the Centennial Pit in two general phases. The sequence of each phase allows the opportunity to backfill the pit as it is mined. The proposed sequence will involve mining the southwestern portion of the Centennial Pit, referred to as the Penny Phase to an elevation of 6,020 feet above mean sea level (ft amsl) followed by mining of the northeastern portion, referred to as the Keystone Phase, to an elevation of 6,020 ft amsl.

The backfill plan includes four scenarios:

- Backfill the Penny Phase to an elevation of 6,200 ft amsl with 4.6 million tons (MT) of waste rock from the Keystone Phase and leave the Keystone Phase open.
- Backfill both phases to an elevation of 6,200 ft amsl with 25 MT of waste rock.
- Backfill both phases to an elevation of 6,260 ft amsl with 50 MT of waste rock.
- Backfill both phases to an elevation of 6,320 ft amsl with 75 MT of waste rock.

For each scenario, the final backfill elevation will be above the pre-mining static water level of 6,190 ft amsl in the Burro Canyon aquifer.

As required by the Bureau of Land Management (BLM), a Mine Plan Modification must be submitted and approved prior to commencement of the proposed backfill plan. This report provides the technical evaluation required to predict post-closure groundwater conditions resulting from partial backfilling of the Centennial Pit.

Geochemical testing was conducted on the backfill material to characterize its acid generating potential and assess the leachate quality. The characterization program included:

- Acid-base accounting (ABA);
- Solid phase elemental analysis by inductively coupled plasma atomic emission spectroscopy and mass spectrometry (ICP-AES and ICP-MS);

- Mineralogy by transmitted light thin-section microscopy and Rietveld x-ray diffraction (XRD);

- Static water leaching primarily using a Meteoric Water Mobility Procedure (single and multiple extraction);

- Saturated column testing following the procedures specified in the Final Work Plan for Additional Geochemical Testing of Lisbon Valley Mine Waste Rock (Whetstone 2014a); and,

- Groundwater and ephemeral pool water quality.

The characterization program focused on Bed 14 and Bed 15 waste rock from the Centennial Pit area. Mineralogy, total metals, ABA, and column testing results suggest low variability throughout each bed across the mine site.

Bed 14 is the Upper Burro Canyon Formation, which is composed of red shales, green shales, limestones, massive chert beds and conglomerates. Bed 15 is the Lower Burro Canyon Formation, which is composed of white quartzose sandstone with local shale intercalations. Bed 15 is a copper ore host. Samples subjected to mineralogical analysis were consistent with these descriptions. Specifically, the Bed 14 waste rock was identified as sandy, argillaceous limestone with minor detrital quartz and no identifiable allochems, and Bed 15 was identified as massive, moderately well-sorted, clean, fine-grained sandstone with well-developed intergranular macroporosity. Weathering was apparent in Bed 15 sample grains, which were coated by films of clay cement with the interiors of some pores filled by masses of kaolinite clay cement. Pyrite was the only sulfide mineral identified, at trace to minor amounts (0-1 percent [%]).

The characterization program demonstrated that the Bed 14 and Bed 15 backfill material is not acid-generating and is not likely to generate highly alkaline leachates. Single and multiple extract MWMP testing showed that leached concentrations are generally lower than the average concentrations for the shallow aquifer at the site (Burro Canyon aquifer) and largely below the Utah groundwater quality standards (Utah Administrative Code [UAC] R317-6-2.1). Similarly, the Centennial Pit Bed 14 and Bed 15 column leachates met the standards for all constituents except uranium and selenium. Multiple extraction MWMP test and column leachate concentrations decreased over time after an initial “first flush”. MWMP test and column leachates were well buffered solutions with calcium-sulfate compositions. The major ion

composition of the leachates was consistent throughout the leaching cycles, although the total dissolved ions generally decreased with subsequent leaching cycles.

Characterization of Bed 14 and Bed 15 samples from the Sentinel West Pit demonstrated the similarity between each bed collected from different pits.

A numerical groundwater flow model was constructed to predict whether a pit lake would form in the remaining open portion of the pit for Backfill Scenario 1. The model predicted that high evaporation rates would prevent a pit lake from forming. Due to high evaporation in the pit, the Burro Canyon aquifer is not expected to fully rebound to pre-mining levels. Rather, vertical recharge from meteoric precipitation will continue to supply water to the groundwater system, but the loss of water to the pit and evaporation from the pit will result in a lower post-mining equilibrium water level in the Burro Canyon aquifer. The long-term water quality of the Burro Canyon groundwater system would remain unaffected because of the relatively inert properties of the backfill material and continual flow of groundwater in the direction of the pit. The deep aquifer at the site (N-aquifer) is separated from the Burro Canyon aquifer by the Morrison Formation, which has an approximate thickness of 400 ft and comprises a regional aquitard. A downward gradient exists between the shallow Burro Canyon aquifer and the N-aquifer at the LVM. However, for Backfill Scenario 1, no impacts were predicted for the N-aquifer because a pit lake is not expected to form and Burro Canyon aquifer groundwater, which leaks into the N-aquifer, will not be impacted by contact with the backfill.

For Backfill Scenario 1, a sensitivity analysis was conducted in the groundwater model using a higher runoff coefficient than in the base case model (10 % vs. 5% runoff coefficient). For this simulation, two small pit lakes are predicted to form in the open Keystone Phase, with depths of approximately 50 ft. As with the base case model (5% runoff coefficient), the quality of the Burro Canyon aquifer would remain unaffected by the pit lake due to continual flow of groundwater into the pit. The pit water was predicted to be neutral to alkaline pH with elevated total dissolved solids, sulfate, and concentrations of metals including cadmium, selenium, and uranium, relative to groundwater. The elevated concentrations result from the small water volume and high evaporation rate, resulting in evapoconcentration. Approximately 0.3 % of the pit lake volume would seep into the underlying Morrison Formation per year and eventually mix with the N-aquifer; however, the water would not be expected to impact the N-aquifer due to changes in redox conditions in the Morrison Formation and dilution with the N-aquifer. Similar to the Burro Canyon aquifer, the Morrison Formation is likely to

be anoxic, which would result in mineral precipitation and lower aqueous concentrations of nickel, cadmium, uranium, selenium, and zinc.

For Backfill Scenarios 2 through 4, backfill will be placed in both the Penny and Keystone Phases to elevations above the pre-mining static water level. For these scenarios, a pit lake would not be expected to form, due to lack of groundwater inflow and evaporation rates that exceed the total of precipitation and runoff into the partially backfilled Centennial Pit. Therefore the groundwater levels can be expected to rebound to pre-mining levels. Groundwater and meteoric precipitation will contact the backfill as they flow through the backfill. The Bed 14 and Bed 15 backfill material is classified as *Likely Acid Neutralizing* with a Net Neutralization Potential (NNP) greater than 20 tons of calcium carbonate per kiloton of material (t $CaCO_3$/kt) and Neutralization Potential Ratio greater than 3. Leachate concentrations from the backfill material are typically below the Utah groundwater quality standards and the average concentrations in the Burro Canyon aquifer. Therefore, impacts from the range of proposed backfill scenarios are not anticipated to impact the Burro Canyon aquifer or the N-aquifer.

1. Introduction

Lisbon Valley Mining Company (LVMC) proposes to partially backfill the Centennial Pit at the Lisbon Valley Mine (LVM), an open-pit copper mine located near La Sal, Utah. The Centennial Pit is mined in two phases, which allows for in-pit backfilling. The proposed sequence will involve mining the southwestern portion of the Centennial Pit, referred to as the Penny Phase, to an elevation of 6,020 feet above mean sea level (ft amsl) followed by mining of the northeastern portion, referred to as the Keystone Phase, to an elevation of 6,020 ft amsl.

The backfill plan includes four scenarios including backfilling:

- Backfill the Penny Phase to an elevation of 6,200 ft amsl with 4.6 million tons (MT) of waste rock from the Keystone Phase and leave the Keystone Phase open.
- Backfill both phases to an elevation of 6,200 ft amsl with 25 MT of waste rock.
- Backfill both phases to an elevation of 6,260 ft amsl with 50 MT of waste rock.
- Backfill both Phases to an elevation of 6,320 ft amsl with 75 MT of waste rock.

As required by the Bureau of Land Management (BLM), a Mine Plan Modification must be submitted and approved prior to commencement of the proposed backfill plan. This report provides the technical evaluation required to predict post-closure groundwater conditions resulting from partial backfilling of the Centennial Pit. This report has undergone several revisions to address information requested by the BLM and their technical consultants (the United States Geological Survey, USGS) in letters dated February 2nd, 2012 (BLM 2012a), June 14th, 2012 (BLM 2012b), and September 24th, 2013 (BLM 2013).

1.1 Project Description

LVM is located approximately 18 miles southeast of La Sal, Utah, in San Juan County, Sections 25, 26, and 36 of Township 45 North Range 25 East (**Figure 1**). The mine consists of a total of 1,103 acres, including federal (547 acres), state (273 acres), and privately owned land (256 acres). The Final Environmental Impact Statement (FEIS) was published by the BLM in February 1997 (BLM 1997a) followed by the Record of Decision (ROD) approving the mine project in March 1997 (BLM 1997b). Mining began

in August 2005, temporarily ceased from February 2008 to August 2009, and continues to present.

Copper ore has been mined from four open pits: GTO Pit, Centennial Pit, Sentinel West Pit, and Sentinel East Pit (see **Figure 1**). The ultimate depth for each pit will intersect the water table, except the Sentinel East Pit, for which backfilling was approved by the BLM in September 2009 (Whetstone 2010). For the pits that intersect the water table, annual evaluations of the potential for pit lake formation and predicted post-closure water chemistry have been conducted as required by the Groundwater Quality Discharge Permit and the ROD.

1.2 Report Organization

This report includes the following sections:

- **Section 1 – Introduction –** Presents a project narrative, site description, and an overview of the report organization.
- **Section 2 – Backfill Plan –** Summarizes the proposed action.
- **Section 3 – Backfill Characterization Program –** Details the testing methods used to characterize the backfill waste rock.
- **Section 4 – Hydrogeology –** Provides an overview of the hydrogeologic system and summarizes previous simulations of groundwater levels and the Centennial Pit lake chemistry.
- **Section 5 – Groundwater Flow Model –** Focuses on the groundwater flow model used to predict whether a pit lake will form.
- **Section 6 – Characterization Program Results –** Describes of the geochemical properties of the backfill and comparison to background water quality.
- **Section 7 – Assessment of Groundwater Quality –** Provides an evaluation of potential impacts to aquifers.
- **Section 8 – Verification and Post-Mining Monitoring –** Presents the post-mining groundwater monitoring program.

- **Section 9 – Summary and Conclusions –** Summarizes the backfill evaluation results.

- **Section 10 – References**

2. Backfill Plan

The Centennial Pit is divided lengthwise into two lobes, separated by a topographic "ridge" (**Figure 2**). The elongated lobe on the southwest side is known as the Penny Phase, while the lobe on the northeast side is referred to as the Keystone Phase. The Penny Phase will be excavated first, followed later by the Keystone Phase. Both excavations will be mined to a final elevation of 6,020 ft amsl. **Table 1** presents the final pit dimensions. LVMC is proposing to partially backfill the Penny and Keystone Phases, by one of four scenarios. The four proposed scenarios are described below and summarized in **Table 2**.

2.1 Backfill Scenarios

For Backfill Scenario 1, LVMC is proposing to backfill the Penny Phase with approximately 4.6 MT of waste rock from the Keystone Phase. The waste rock will fill the Centennial Pit to an approximate elevation of 6,200 ft amsl. This elevation is above the pre-mining static groundwater level of approximately 6,190 ft amsl in the Burro Canyon aquifer. Under Backfill Scenario 1, the Keystone Phase would remain open as illustrated by the schematic cross-section of the backfill plan (see **Figure 2**).

Three additional scenarios are proposed for backfilling both the Penny and Keystone Phases. Backfill Scenario 2 includes placement of 25 MT of waste rock to an approximate elevation of 6,200 ft amsl (**Figure 3**). Backfill Scenario 3 includes backfilling to an approximate elevation of 6,260 ft amsl with 50 MT of waste rock (**Figure 4**). Backfill Scenario 4 includes backfilling to an approximate elevation of 6,320 ft amsl with 75 MT of waste rock (**Figure 5**). For each scenario, the final backfill elevation will be above the pre-mining static water level of 6,190 ft amsl in the Burro Canyon aquifer.

2.2 Backfill Rock Types

The sedimentary rock sequence in the Centennial Pit area consists of the lower Cretaceous age Burro Canyon Formation and the overlying Dakota Formation (**Figure 6**). These units include interbedded sandstone, siltstone, and shale lithologies. A bedding numbering system was developed to identify the stratigraphic sequence in the deposit area, to facilitate mapping, logging and correlation. A description of each bed is provided in Pincock, Allen & Holt (2005) and presented in **Figure 6**.

The primary source of backfill is Bed 14 waste rock (60%) with a smaller percentage of the backfill being composed of Bed 15 waste rock (40%), as illustrated by the geologic cross-section through the Centennial Pit (**Figure 7**). The lithologic descriptions for these units can be summarized as follows:

- Bed 14 is the Upper Burro Canyon Formation (Kbc) and varies in thickness from 70-120 ft. The bed is composed of red shales, green shales, limestones, massive chert beds and conglomerates. Bed 14 is not a copper ore host.

- Bed 15 is the Lower Burro Canyon Formation (Kbc) and is typically 120 ft thick. This bed is white quartzose sandstone with local shale intercalations. Bed 15 is a copper ore host.

Sulfide mineral species transition with depth at the LVM, while oxides and carbonates predominate from the surface to approximately 150 feet in depth. In general, mineralization transitions from malachite and azurite near the surface to chalcocite at depth.

3. Backfill Characterization

Geochemical characterization was conducted to assess short-term and long-term water quality associated with the backfill material. The characterization program was conducted in several phases: 1) in support of the EIS, 2) for permit compliance and operational waste rock handling, and 3) to address deficiencies identified by the BLM regarding the use of static methods to predict long-term post-mining groundwater quality in saturated backfill.

3.1 Testing Progress Overview

Bed 14 and Bed 15 material from the Centennial Pit area was subjected to the following testing:

- Acid-base accounting (ABA);
- Static water leach testing using single and multiple extraction modified meteoric water mobility procedure (MWMP) and Synthetic Precipitation Leaching Procedure (SPLP) testing; and,
- Saturated column testing following the procedures specified in the Final Work Plan for Additional Geochemical Testing of Lisbon Valley Mine Waste Rock (Whetstone 2014a).

Column testing was conducted to assess the ability of MWMP tests to characterize potential geochemical releases from saturated backfill, and to specifically address issues of contact time and water:rock ratio. In addition to ABA and MWMP testing, the column test samples were also subjected to:

- Solid phase elemental analysis by inductively coupled plasma atomic emission spectroscopy and mass spectrometry (ICP-AES and ICP-MS);
- Mineralogy by transmitted light thin-section microscopy and Rietveld x-ray diffraction (XRD); and,
- Particle size distribution by modified ASTM 702-98 (ASTM 1998).

The column testing program included six wall rock samples from the Centennial Pit (composited into one Bed 14 and one Bed 15 sample) and a replicate Bed 14 sample.

In addition, six wall rock samples from the Sentinel West Pit were collected and composited into one Bed 14 and one Bed 15 sample and characterized. The Sentinel West Pit samples provide an indication of the similarity of each bed collected from different pits.

Data used to characterize the backfill material and associated leachate quality was obtained from several sources including the FEIS (BLM 1997a), operational characterization and compliance monitoring, and the column testing program (Whetstone 2014b). A summary of the characterization program is provided in **Table 3**.

3.2 Data Sources

Geochemical characterization results presented in the FEIS (BLM 1997a) and summarized for this evaluation, include ABA (McClelland 1994, Rocky Mountain Geochemical Corporation 1995 and 1996) and SPLP testing (McClelland Laboratories, Inc. 1996). The associated data directly from the FEIS are provided in **Appendix A-1**. FLSmidth (Lisbon Valley Field Office, La Sal, Utah) also conducted ABA and MWMP testing as part of the LVM operational characterization program. The ABA results are tabulated in **Appendix A-2** and the laboratory reports associated with the MWMP testing are provided in **Appendix A-3**. Additional MWMP testing at pH 7, and solid phase elemental analysis presented in this report was obtained from Adrian Brown Consultants (1997), the associated laboratory reports are provided in **Appendix A-4**.The Adrian Brown Consultants Study also compared leachate quality for MWMP testing at pH 8 and 9.

The column testing program was performed in accordance with procedures specified in the Work Plan for Additional Geochemical Testing prepared by Whetstone. The draft Work Plan was submitted to the BLM and Utah Division of Mining and Geology (DOGM) for review and comment in November 2013 (Whetstone 2013). The Work Plan was finalized in January 2014 (Whetstone 2014a). Analytical work associated with the column testing program was largely conducted by ACZ Laboratories, Inc. (ACZ) (Steamboat Springs, Colorado), a Utah-certified and NELAC-certified laboratory. The mineralogical analyses were conducted by GeoSystems, LLP (Kingwood, Texas). Whetstone provided oversight for the column testing program, and was responsible for sample preparation, particle size analysis, and column testing. The associated laboratory reports are attached to the column testing program report provided in **Appendix A-5** (Whetstone 2014b).

The column testing program report includes representative laboratory reports associated with groundwater sample analyses. Water quality associated with LVM groundwater samples is analyzed in accordance with the Ground Water Quality Discharge Permit UGW370005.

3.3 Analytical Methods

The analytical methods used for the geochemical analysis are described below.

3.3.1 Acid-base Accounting

The ABA methods used to characterize Bed 14 and Bed 15 waste rock include sulfur analysis and neutralization potential determination. Standard Sobek neutralization potential (Sobek et al. 1978; EPA M600/2-78-054) is the primary ABA method used over the life of the Project (1997 to present). This method involves heating a sample in excess acid until the reaction is complete and titrating the remaining unreacted acid with sodium hydroxide to a pH 7.0 endpoint. Results are reported in tons of calcium carbonate per kiloton of material (t $CaCO_3$/kt). Modified Sobek neutralization potential (Lawrence et al. 1989) was used to characterize the samples subjected to column testing. The Modified Sobek method largely follows the standard Sobek methodology except the sample is treated with excess acid at ambient temperature for a 24 hour (hr) period and titrated to a pH 8.3 endpoint.

3.3.2 Elemental Analysis

Solid phase element analysis provides the near-total elemental composition and gives an indication of the potential load of constituents to the environment. Elemental analysis of samples subjected to column testing was performed by acid digestion using EPA method 3050B followed by ICP-AES (EPA 6010) or ICP-MS (EPA 6020) analysis. EPA method 3050B is not a total digestion (e.g., four acid digestion) since some elements bound in silicate structures may not be dissolved by the procedure. Elemental analysis was also conducted on the samples subjected to MWMP testing as summarized in Adrian Brown Consultants (1997). Acid digestion of the MWMP samples was conducted using EPA method 3052, which is a microwave assisted four acid digestion that results in total sample decomposition.

3.3.3 Mineralogy

The thin-section analysis was used to provide information about the texture, mineralogy (non-opaque), weathering, cementation, and porosity of the samples. Samples for the analysis were oriented with respect to bedding, impregnated with epoxy resin, mounted on glass slides, and ground to a thickness of 30 µm. The thin sections were examined using a Zeiss Axioskop 40 petrographic microscope equipped with an electromechanical stage and Leica digital camera.

XRD analysis provided a quantitative assessment of the different mineral phases and distinguished and quantified clay minerals. The waste rock samples were reduced to the optimum grain-size range for quantitative X-ray analysis (<10 µm) by grinding in a McCrone Micronizing mill. The bulk and clay fractions of each sample were analyzed using a PANalytical X'Pert Pro x-ray diffractometer equipped with a PIXcel detector. Samples were scanned from 2 to 60°2θ. Phase identification was performed using PANalytical HighScore Plus software and the digital International Centre for Diffraction Data (ICDD) database. Quantitative mineralogy was performed using full powder pattern Rietveld analysis.

3.3.4 Particle Size Distribution

Particle size analysis using modified ASTM 702-98 (ASTM 1998) was conducted on waste rock samples subjected to saturated column testing. The as-received samples were air-dried to stable weight (21 ± 3 degrees Celsius [°C]) and screened to pass a 0.75-inch wire mesh screen. Oversized material was reduced by hand breaking or jaw crushing to meet the size specification. Furthermore, the MWMP testing included a determination of the portion of particles greater than 5 cm (2 inches) size, which provides some indication of the particle size distribution.

3.3.5 Static Water Leaching

Standard MWMP testing, multiple extraction MWMP testing, and SPLP were conducted on representative samples of waste rock from Centennial Pit, as described below. MWMP testing was used to characterize the potential chemistry of meteoric water infiltrating through unsaturated waste rock.

MWMP testing was conducted on samples of waste rock from Bed 14 and Bed 15. Standard MWMP testing consists of a single extraction column leach over a 24-hour period using Type II reagent grade deionized water (total dissolved solids [TDS] = 0

mg/L) and a 1:1 waste rock to extraction fluid ratio. LVM conducts single extraction MWMP testing on a quarterly basis on composite waste rock samples as part of the operational characterization program. Prior to 2011, MWMP testing was conducted using extraction solutions ranging from pH 5.7 to 9.0. In 2011, Whetstone demonstrated that a pH 7 extraction solution was appropriate given that the median pH of the Burro Canyon aquifer is 7.1 (Whetstone 2011). Quarterly MWMP leachate samples are typically analyzed for eight metals including antimony, arsenic, cadmium, copper, molybdenum, selenium, uranium, and zinc. In 2012 (3rd quarter), MWMP testing was expanded to include a larger analytical suite (i.e., major ions and dissolved metals) and lower method detection limits.

Multiple extraction MWMP testing was also conducted on representative waste rock samples from the Centennial Pit (one Bed 14 sample and one Bed 15 sample) to provide an indication of leachable concentrations over time. Multiple extraction MWMP testing follows the same procedures as described above for the standard MWMP with the addition of repeat extractions over a 24-hour period for each extraction step. In this case, each column was leached four times using new pH 7 extraction fluid.

Leachates from standard and multiple MWMP tests were filtered prior to analysis.

SPLP testing was conducted on waste rock samples as part of the FEIS (BLM 1997a). Four composite samples were analyzed: 1) Beds 6, 7, 8 of Dakota Sandstone; 2) Beds 9 and 10 of Dakota Sandstone; 3) Bed 14 Burro Canyon Mudstone; and 4) Bed 14 Burro Canyon Limestone. SPLP uses a water-to-rock ratio of 20:1 and an acidic extraction solution (pH 5). For this study, MWMP results more adequately represent post-closure backfill leachate quality than SPLP due to the lower water to rock ratio and the use of a neutral to alkaline extraction solution, which is characteristic of the Burro Canyon aquifer groundwater that would be in contact with the backfill.

3.3.6 Saturated Column Testing

Monolithic columns were prepared to provide quantitative estimates of the leaching characteristics of waste rock proposed for backfilling in the Centennial and Sentinel West pits under saturated conditions. The column testing was designed to simulate Burro Canyon aquifer groundwater coming in contact with the pit backfill after mining when the pumps are shut off. The column testing program is detailed in **Appendix A-5** (Whetstone 2014b) and summarized below**.**

The monolithic columns provided individual drainage chemistry information associated with Bed 14 and Bed 15 waste rock, which are visually distinct rock types that may be selectively handled. Four composite samples and one replicate sample (20-kg each) were subjected to saturated column testing, including:

- Two composite samples from Centennial Pit Bed 14 (primary and replicate) and one composite sample from Centennial Pit Bed 15; and,

- One composite sample each from Sentinel West Pit Bed 14 and Bed 15.

The column set up is presented **Figure 8**. Each test was performed in a clear polyvinyl chloride (PVC) column, with an inside diameter of 6-inches, and approximately 36 inches in length. The columns were configured in parallel to permit simultaneous sample collection. The columns were operated under upward flow conditions by applying the head solution to the bottom of the column and collecting the effluent from the top. No evidence of preferential flow, bacterial activity (biofilms), or mineral precipitates was observed with the exception of an orange precipitate in the Centennial Pit Bed 15 column discharge tube, which was observed three days before the third pore volume (PV3) was collected and the columns were shut down.

The test procedure involved repeated leaching cycles using Burro Canyon aquifer groundwater (PW-3) followed by a reaction period. Specifically, initial saturation of each column took approximately one day at a rate of 200 ml/hr (±1%), followed by a 3-day reaction period, and a 10-day solution application period at a rate of 15 ml/hr (±3%) to generate effluent for chemical analysis. Each leaching cycle was designed to produce 3,600 ml (± 5%), or approximately one pore volume. Column tests were performed for three leaching cycles (approximately 40 days). The first cycle included collection of column effluent in two aliquots representing the first (PV0.5) and second (PV1) half pore volumes of solution released from each column. Each leaching cycle after the first cycle required 10 days to complete and included a reaction period (3 days) to allow solution to react with the solid sample and a solution application period (10 days)at an application rate of 15 ml/hr (±3%).

The analyte list for the column leachates included bulk parameters (effluent volume, temperature, pH, dissolved oxygen [DO], oxidation-reduction potential [ORP], and electrical conductivity [EC]) and analysis of major ions, dissolved metals, and other solution parameters needed to evaluate compliance with water quality standards contained in UAC R317-6-2 and to assess long-term water quality (**Table 4**).

3.4 Groundwater Monitoring Program

The groundwater monitoring program and additional sampling and analysis of the groundwater used as head solution for column testing are detailed in Whetstone (2010) and **Appendix A-5** (Whetstone 2014b), respectively, and summarized below.

Groundwater quality has been monitored at the LVM since baseline data collection began in 1994. From 1994 to 1996, water quality samples were collected quarterly to support the impact analysis for the EIS (BLM 1997). In January 1997, UDEQ issued Ground Water Quality Discharge Permit UGW370005 (UDEQ 1997), and since that time, water quality has been monitored in accordance with the Permit and its modifications (UDEQ 2001, 2002, 2004, 2007).

Groundwater for the column testing was collected from PW-3, an ambient monitoring well under the Permit, in conjunction with the 4th quarter 2013 groundwater monitoring event. PW-3 is a 6-inch well completed to a depth of 476 feet in the Burro Canyon aquifer adjacent to the Centennial Pit (see **Figure 2**). Groundwater from PW-3 is a calcium-sulfate type water with TDS of 1,290 mg/L and sulfate at 650 mg/L (December 2013). The water quality at PW-3 is similar to that of other wells completed in the Burro Canyon aquifer near the Centennial Pit, such as MW96-7A, as illustrated by the Stiff diagrams in **Figure 9** and detailed in Section 4 – Hydrogeology**.**

PW-3 was pumping continuously at approximately 15 gpm for at least three days prior to groundwater collection (>60,000 gallons purged). The groundwater was collected in twelve 5-gallon cubitainers and precautions were taken to collect a representative solution and prevent contact with atmospheric oxygen. The low measured DO (0.08 to 0.15 mg/L) was fairly consistent with anticipated redox conditions for the Burro Canyon aquifer which are considered anoxic based on the high average dissolved iron (suggesting ferrous iron, Fe^{2+}) and low dissolved aluminum concentrations. The redox conditions indicate that iron concentrations in the Burro Canyon aquifer are due to dissolved ferrous iron rather than nanoscale ferric iron colloids.

The PW-3 head solution was stored in a common 55 gallon plastic drum that was initially purged with inert nitrogen gas and maintained with a slight positive pressure to prevent head solution contacting atmospheric oxygen. As detailed in **Appendix A-5** (Whetstone 2014b), the water quality at the time of collection and following column testing indicate that the major ion chemistry of the head solution was stable throughout the testing period but redox conditions of the head solution could not reproduce or maintain the highly reducing conditions of in-situ groundwater. This is best illustrated by

the increase in DO (1.1% to 47%) and decrease in dissolved iron (assumed to be Fe^{2+}) from 4.97 mg/L to below detection (<0.02 mg/L).

3.5 Ephemeral Surface Water Quality

Water quality for samples of the ephemeral pool that exists in the Penny Phase following rainfall event are also presented for comparison to groundwater and MWMP testing results. This magnesium-calcium-sulfate type water, sampled in August 2011, February 2012, and May 2012, was characterized by alkaline pH (8.1 - 8.2), high TDS (1950 -4940 mg/L), and high uranium (0.300 to 0.968 mg/L). This water quality is characteristic of evapoconcentration that occurred before the pool dried up.

The elevated uranium is consistent with the formation of weakly adsorbing uranyl carbonate complexes and competition with carbonate for sorption sites. Under oxidizing conditions, uranium(VI) exists as the uranyl ion which undergoes extensive hydrolysis at higher pH and forms aqueous complexes with carbonate and other anions (Grenthe et al. 2004). Uranium(VI) adsorption on metal oxides typically increases up to approximately pH 8, and decreases in the pH 8 to 10 range consistent with formation of weakly adsorbing uranyl carbonate complexes and competition with carbonate for sorption sites. In addition, calcium in solution can decrease uranium(VI) sorption (to ferrihydrite and quartz) under conditions where the aqueous $Ca_2UO_2(CO_3)_3^0$ species dominates (Fox et al. 2006). The dominance of stable aqueous calcium-uranyl carbonate complexes in the ephemeral pool water is supported by geochemical speciation modeling, with approximately 80% as $Ca_2UO_2(CO_3)_3^0$ and 20% as $CaUO_2(CO_3)_3^{2-}$.

4. Hydrogeology

Groundwater at LVM primarily occurs in two aquifers: the Burro Canyon aquifer which occurs at depths of less than 500 feet and the N-aquifer which occurs below about 850 feet (Whetstone 2010). These two aquifer systems are separated by several hundred feet of low-permeability interbedded shale, siltstone, and silty sandstone (Morrison Formation and Summerville Formation) as shown in **Figure 6**. The Morrison Formation is underlain by sandstones and siltstones of the Entrada, Navajo, Kayenta, and Wingate formations of which the saturated portions are collectively referred to as the N-aquifer (BLM 1997a). The Centennial Pit is bounded on the southwest and northeast by faults, with large vertical displacement at the fault on the southwest side of the pit. As detailed in **Appendix B**, these faults limit the extent of the aquifers in the area of the mine.

4.1 Burro Canyon Aquifer

The Burro Canyon aquifer is perched on the Morrison Formation as a graben structure, and limited in lateral extent by the Morrison Formation subsurface topography and by faults. The conceptual model presents the Burro Canyon aquifer as laterally bounded on all sides. No appreciable lateral groundwater flows into the aquifer. As conceptualized, the primary direction of groundwater flow is downward, with some groundwater leakage through both fracture and formation permeability in the underlying Morrison Formation.

In the vicinity of the Centennial Pit, pre-mining static water levels range from 6189.18 to 6190.67 ft amsl. Pumping tests conducted at wells 95R1, SLV-3, PW-3, PW-4, PW-5, PW-6, and PW-9 (**Figure 10**) indicate that the hydraulic conductivity of the Burro Canyon aquifer ranges from approximately 1 x 10^{-5} centimeters per second (cm/s) to 5 x 10^{-3} cm/s (Whetstone 2006a, Whetstone 2009).

The Burro Canyon aquifer has been designated as a Class III Limited Use Groundwater by the Utah Department of Environmental Quality (UDEQ 1998), which indicates that total dissolved solids (TDS) are greater than 3,000 mg/l and less than 10,000 mg/l, or one or more constituents exceed the ground water quality standards. The Burro Canyon aquifer is classified as Class III Limited Use Groundwater due to natural exceedances of Utah Groundwater Quality Standards (Utah Administrative Code [UAC] R317-6-2) for uranium, gross alpha, and gross beta (UDEQ 1998). Water chemistry of the Burro Canyon aquifer is presented in **Table 5**. Site-specific Burro Canyon aquifer water chemistry is available for 34 samples from SLV-1A, 29 samples

from SLV-3, 27 samples from MW-2A and 38 samples from MW96-7A (see **Figure 10)**. Burro Canyon aquifer groundwater is calcium-sulfate type water that is neutral to alkaline (pH ranging from 6.5 to 8.3). Burro Canyon groundwater has high total dissolved solids (TDS) and sulfate, averaging 2,142 milligrams per liter [mg/L]) and 1,111 mg/L, respectively. The Burro Canyon aquifer is also characterized by reducing conditions as illustrated by DO measurements near the instrument detection limit of 1% (0.1 mg/L) and elevated average dissolved iron and manganese concentrations (3.1 and 0.90 mg/L, respectively).

4.2 Morrison Formation

The Morrison Formation, along with the upper, unsaturated portion of the Summerville and Entrada formations, separates the Burro Canyon aquifer from the N-aquifer. The upper member of the Morrison Formation is the Brushy Basin, which is regionally comprised of a mudstone that is rich in volcanic ash and typically forms an aquitard (BLM 1997a). Based on monitoring well MW96-7B east of the Centennial Pit, approximately 390 ft of shale, mudstone, and minor siltstone of the Morrison Formation occur between the Burro Canyon aquifer and underlying N-aquifer, which was encountered at a depth of 810 ft bgs. An unsaturated zone exists below the Morrison Formation, and above the N-aquifer.

4.3 N-Aquifer

The N-aquifer consists of sandstones and siltstones of the Entrada, Navajo, Kayenta, and Wingate formations, of which the three primary sandstone formations may have a combined thickness in excess of 700 ft (BLM 1997a). The maximum total thickness of the N-aquifer in the vicinity of LVM is believed to be approximately 1,200 feet. Beneath the mine site, the N-aquifer is bounded by faults. Due to fault gouge and vertical displacement, these faults act as barriers to groundwater flow. Four wells have been completed in the N-aquifer within the vicinity of the Centennial Pit including MW96-7B, MW97-9, MW97-11, and PW-8 (see **Figure 10**). Average water level elevations in these wells are approximately 5,539 ft amsl at MW96-7B, 5,538 ft amsl at MW97-9, 5,745 ft amsl at well MW-97-11 and 5,539 ft amsl at PW-8. This corresponds to depths of approximately 910, 986, and 862 ft below the top of well casing, respectively. Monitoring well MW97-11 is located on the upthrown side of the Lisbon Valley Fault, which results in groundwater elevations that are approximately 200 ft higher than MW96-7B, MW97-9, and PW-8 on the northeast side of the fault.

N-aquifer water chemistry is available for 22 samples from MW96-7B, 19 samples from MW97-9 and 18 samples from MW97-11 (see **Table 5**). The N-aquifer is sodium-bicarbonate type water that is neutral to alkaline (pH ranging from 6.9 to 9.1). The average TDS of the N-aquifer is 584 mg/L, compared to 2,142 mg/L for the Burro Canyon aquifer. Major ion concentrations vary between the two aquifers, most notably calcium, magnesium, and sulfate concentrations are approximately an order of magnitude lower in the N-aquifer than in the Burro Canyon aquifer. Additionally, total uranium concentrations are lower in the N-aquifer, with an average concentration of 0.005 mg/L, compared to an average concentration of 0.092 mg/L in the Burro Canyon aquifer. The elevated uranium concentrations in the Burro Canyon aquifer compared to the N-aquifer can to some extent be attributed to stabilization of uranium(VI) under anoxic conditions as calcium-uranyl carbonate ternary complexes, as discussed in Section 3- Backfill Characterization, consistent with the order of magnitude higher calcium (and magnesium) concentrations, and lower alkalinity compared to the N-aquifer (see **Table 5**). Under these conditions, in the N-aquifer and the Burro Canyon aquifer, selenium would likely exist as a trace contaminant in pyrite, elemental selenium (and possibly ferroselite [$FeSe_2$]).

4.4 Aquifer Flow Directions, Recharge, and Discharge

The directions of groundwater flow in the Burro Canyon aquifer and N-aquifer have been determined through an extensive network of pumping wells, monitoring wells, and exploration drill holes. The drilling programs encountered dry holes beyond the boundaries of the Burro Canyon aquifer and determined that the Burro Canyon aquifer is laterally bounded on all sides. No appreciable lateral groundwater flows into the aquifer, and recharge occurs from direct precipitation over the footprint of the Burro Canyon Formation. The primary direction of groundwater flow in the Burro Canyon aquifer is downward, evident by a strong vertical gradient, with flow through both fracture and formation permeability in the underlying Morrison Formation (Adrian Brown Consultants 1998).

Due to the lack of a horizontal water level gradient observed in monitor wells proximal to the Centennial Pit, the Burro Canyon aquifer system in the Lisbon Valley is considered a closed system, with all recharge moving downward through the Morrison Formation to the deep N-aquifer. The Morrison Formation downward vertical gradient was determined from pre-mine Burro Canyon aquifer water levels of 6,190 ft amsl and the top of the N-aquifer average water level of 5,600 ft amsl. A thickness of 390 ft for the Morrison Formation was used to estimate the vertical gradient, based on the thickness at MW96-7B, located north of the pit. The pre-mining observed vertical

hydraulic gradient is downward through the confining Morrison Formation at approximately 1.5 ft/ft.

Downward vertical gradients also exist in the N-aquifer and, to the extent possible, water will move downward through the N-aquifer. However, the horizontal permeability of the N-aquifer is higher than the vertical permeability of the confining units below, and groundwater can more easily move laterally except where open fractures exist (Whetstone, 2010). Regional groundwater flow in the N-aquifer is generally west toward the Colorado River; however, because the complex geologic structure in Lisbon Valley isolates the N-aquifer, the groundwater gradient follows the northwest-to-southeast trending valley, with flow in a northeast direction and toward Lisbon Canyon.

4.5 Precipitation, Evaporation, and Runoff

Annual average precipitation and free water surface (FWS) evaporation rates are 15.05 and 48.03 inches per year (inches/year), respectively. These rates are consistent with those used in previous pit modeling by Whetstone (2009, 2010). The annual precipitation rate represents data taken from the La Sal SE station from the 1980 to 1993 period. The evaporation rate of 48 inches per year is the annual free water surface evaporation rate, which was calculated by Hydro-Triad based on mean monthly Class A pan evaporation from several regional weather stations.

Catchment area runoff into the pit will be limited by a berm which will be constructed around the pit rim at closure. It is assumed that the area inside the berm and pit rim is 176 acres. Within this area, precipitation will fall directly on the pit bottom and on the pit walls. A portion of the precipitation that falls on the pit walls will evaporate before it reaches the bottom of the pit. For consistency with previous modeling and site observations, 5% of the precipitation falling on the pit walls is estimated to reach the bottom of the pit or pit lake. This rate was calculated using the Soil Conservation Service method TR55 to determine the runoff curve number and the total runoff per storm event (Adrian Brown Consultants 1998). Assuming a curve number of 87 for dirt roads and hydrologic soil group C and no runoff for storm events with less than 0.5 inches per day, the total runoff for all storm events was estimated to be 0.74 inches. This total runoff is equal to the expected runoff for all storm events up to the 100-year storm event, weighted by probability (Whetstone 2009, 2010). Total runoff of 0.74 inches per year is approximately 5% of the annual precipitation of 15 inches per year.

4.6 Previous Centennial Pit Hydrogeologic Modeling

As required by the Groundwater Quality Discharge Permit and ROD, annual hydrogeologic update reports have been prepared for the Project, which included an evaluation of predicted post-closure Centennial Pit lake water levels and water quality. Adrian Brown Consultants prepared the initial hydrogeologic evaluation in 1998 (Adrian Brown Consultants 1998). Quarterly monitoring reports were submitted from 1999 through 2004, summarizing the groundwater data that was generated during that period. Whetstone prepared the hydrogeologic updates after mining began in 2005 (Whetstone 2006b, 2007, 2009, 2010). The hydrogeologic evaluations included a pit water balance to predict filling rates in the open pit and a geochemical mass balance to predict TDS concentrations in the pit lake. The water balance model estimates flow annually and accounts for runoff into the pit, precipitation, groundwater discharge from the Burro Canyon aquifer into the open pit, vertical leakage to the N-aquifer, and evaporation. The model assumes that the Burro Canyon aquifer is dewatered at the end of mining, and runoff into the pit is 5% of precipitation.

The 2009 hydrogeologic model update predicted that a pit lake would form in the previous proposed Centennial Pit design with a final lake stage of 6,120 ft amsl, which is 40 ft above the bottom of the previous pit design (6,080 ft amsl) (Whetstone 2010). After mining ceases, the pit slowly fills from groundwater inflow, precipitation, and runoff at a rate faster than the evaporation rate for the initial 42 years post-closure. After 42 years, the pit inflows and outflows (evaporation) equilibrate and the final lake stage is reached. The 2009 model was conducted using different final pit dimensions than those used in this report. **Table 1** provides a comparison of the pit dimensions used in the 2009 hydrogeologic update and the updated dimensions used in this report.

Geochemical mass balance modeling of TDS indicated that over the initial 42 years post-closure, water accumulating in the Centennial Pit would be better quality than the Burro Canyon aquifer and therefore would not negatively impact the Burro Canyon aquifer (Whetstone 2010). After 42 years, the model predicted that the higher TDS water from the Burro Canyon aquifer would flow into the Centennial Pit. Evapoconcentration and inflow of Burro Canyon aquifer groundwater resulted in increased TDS concentrations until the pit water reached a solubility-controlled limit, assumed to be a TDS concentration of 3,000 mg/L. As the pit water TDS increased, small concentration increases were predicted for the N-aquifer due to leakage from the bottom of the Centennial Pit. Specifically, TDS in the N-aquifer below the Centennial Pit would increase from 683 mg/L to 724 mg/L, which is a 6% increase compared to pre-mining conditions (Whetstone 2010).

5. Groundwater Flow Model

A three-dimensional groundwater flow model was developed to assess the potential for pit lake formation in the partially backfilled Centennial Pit. The model was developed based on information included in the 2009 Annual Update of the Lisbon Valley Hydrogeologic System Evaluation (Whetstone 2010), updated pit geometry, and the primary backfill scenario, which includes partially backfilling the Centennial Pit to an elevation of 6,200 ft amsl with 4.6 MT of waste rock.

5.1 Objectives and Assumptions

The groundwater flow model was primarily developed to address the following items:

- Evaluate the potential for a pit lake to develop within the Centennial Pit.
- Estimate the rate of recovery of pit lake levels within the Centennial Pit and the maximum pit lake water level, if a pit lake develops.
- Evaluate groundwater inflows into the pit lake over time, if a pit lake develops.
- Evaluate the potential of groundwater seepage through the floor of the pit to the underlying Morrison Formation.

Additional proposed backfill scenarios include placement of waste rock to an elevation above the pre-mining static water level of 6,190 ft amsl for the Burro Canyon aquifer. Therefore, groundwater will not flow into the pit, eliminating the need to conduct a detailed water balance for these scenarios. Rather, the water balance for these scenarios is limited to precipitation, runoff from the pit walls, and evaporation, with evaporation greatly exceeding precipitation and runoff thereby preventing a pit lake from forming under these backfill scenarios.

A model simulation for the open pit without backfill was not performed as part of this evaluation. Without backfill, the bottom of the pit area is 20% greater than the pit with backfill. The greater area would increase net evaporation within the model, which would further decrease the potential for pit lake formation. The base case model showed that no water accumulates within the pit for a smaller pit bottom area, thus running a simulation with greater evaporation was unnecessary. A sensitivity analysis was also conducted using a higher runoff coefficient of 10%, as compared to the 5% runoff coefficient applied in the base case model.

The model represents average annual inflows and outflows and does not consider seasonal fluctuations. Model construction, calibration, and predictions are described in the following subsections.

5.2 Numerical Code

The numerical code MODFLOW-SURFACT version 3 (HydroGeoLogic 1996) was used to solve the groundwater flow equation. The program Groundwater Vistas version 6.52 (Environmental Simulations 2011) was used as the pre and post-processor to construct the model, generate input files, run MODFLOW-SURFACT, and analyze model results. The numerical code is described in additional detail in **Appendix B**.

5.3 Groundwater Flow Model Construction

The groundwater flow model translates the hydrogeologic conceptual model presented in Section 4 into a numerical model that is representative of the physical processes that take place within the groundwater system.

The Centennial Pit model grid covers an area of 6,700 by 8,400 ft and has a total of 13,086 active cells. The model cells are active within the extent of the Burro Canyon aquifer, and surrounded by inactive no-flow cells (that represent the hydraulic barriers of the faults bounding the aquifer). Grid spacing ranges from a minimum of 50 ft in the pit area to a maximum of 100 ft.

There are a total of three model layers, in which layer 1 represents the Burro Canyon aquifer, layer 2 represents the confining Morrison Unit, and layer 3 serves as the discharge area to the N-aquifer. Layer 1 contains the lake cells representing the Centennial Pit and has a thickness of 172 ft, based on the model top elevation of 6,200 ft amsl and Layer 1 bottom elevation of 6,028 ft amsl. The model top was assigned an elevation of 6,200 ft amsl, which is above the maximum expected elevation of a potential pit lake stage, and above the historical water table level in the Burro Canyon aquifer. Layer 2 represents the Morrison Formation with a thickness of 390 ft and bottom elevation of 5,638 ft amsl. Layer 3 has an arbitrary thickness to allow a constant head to be applied to represent the discharge to the N-aquifer.

Hydrogeologic properties were initially assigned to each model layer based on field-measured values of horizontal hydraulic conductivity and literature values of storage. Hydrogeologic parameters were slightly modified as model calibration progressed to meet calibration criteria for a steady state pre-mining water level scenario, and a

transient analysis of historical pumping of the Burro Canyon Aquifer, while still maintaining a value within a reasonable range of field test data.

Recharge was assigned to the top layer of the model based on the theoretical hydraulic gradient (1.5 ft/ft) estimated through the Morrison Formation, per the conceptual model development. The resulting net recharge to achieve the vertical hydraulic gradient is 0.000256 ft/day (1.12 inches/year), based on an assumed vertical hydraulic conductivity of 0.0002 ft/day. The lack of lateral flow observed in the Burro Canyon aquifer and Morrison Formation allows the recharge to be calculated based on the vertical gradient and hydraulic conductivity alone.

Constant head boundary conditions were assigned across layer 3 to simulate the vertical leakage from the Burro Canyon aquifer into the N-aquifer system, such that the only discharge points from the model are the bottom layer. A head value of 5,600 ft was assigned to the constant head cells across Layer 3 to simulate the head gradient within the Morrison Formation, between the Burro Canyon aquifer and underlying N-aquifer system. This head value represents the water level at the top of the N-aquifer, based on pre-pumping water levels of 5,750 ft observed in monitor well MW97-11 and 5,540 ft observed in monitor well MW97-7b and pumping well PW-8.

5.4 Calibration

Model calibration is the process of adjusting hydraulic parameters and boundary conditions within reasonable ranges to achieve an acceptable match between model-simulated and measured calibration targets. Two separate model calibrations were performed: 1) the evaluation of pre-mine water levels as a steady state simulation, and 2) the evaluation of historical dewatering from the start of dewatering in 2004 through 2009 as a transient simulation.

During the steady-state calibration, hydraulic conductivity was adjusted to match calibration targets that are representative of a long-term average hydrologic balance. The results of the steady state calibration provided a reasonable hydraulic conductivity and recharge distribution across the model domain that produced simulated water levels that match observed water levels and average hydrologic conditions.

During transient calibration, model storage parameters were adjusted to match water level data measured from the start of dewatering in 2004 through 2009 in MW96-7A, which is located adjacent to the Centennial Pit (**Figure 10**). Historical dewatering from the Centennial Pit was input to the model, in which pumping was primarily from PW-3,

in addition to SLV-3 and PW-2 (**Appendix B**). As a result of the transient calibration, the amount and rate of drawdown in the Burro Canyon was well matched by the model.

5.5 Model Results

Model calibration results for steady-state and transient conditions indicated that the model can simulate average and transient water levels associated with local aquifer pumping. A predictive model simulation was run for a period of 300 years post-closure to evaluate the water level rise within the Centennial Pit. A net evaporation rate value of -33 inches/year was assigned to the lake cells based on previously discussed values. The model predicted that a pit lake would not form within the Centennial Pit, based on the ultimate pit geometry and an estimated 5% of maximum potential precipitation runoff into the pit. No pit lake forms because the net evaporation acting upon the design pit area (6.9 acres at the pit bottom elevation of 6,020 ft amsl) is greater than the combination of runoff and groundwater seepage into the pit.

5.6 Sensitivity Analysis

A sensitivity analysis of the model was conducted by increasing the runoff to the pit lake to 10%. For this simulation, a pit lake was predicted to form in the Centennial Pit, with an approximate water depth of 40 ft. An estimated 0.4 gallons per minute (gpm) was predicted to leak vertically downward from the bottom of the pit lake to the N-aquifer for the scenario with 10% runoff.

6. Characterization Program Results

Results from the geochemical characterization are discussed in the following subsections. Tables and figures are included to provide supporting information.

6.1 Acid-base Accounting

ABA conducted for the 1997 FEIS, operational characterization (2005 through 2013), and for the column testing program (2014), demonstrates that the Bed 14 and Bed 15 backfill material is unlikely to generate acid due to high excess acid neutralization potential (ANP) compared to acid generation potential (AGP), as detailed below.

ABA is used to estimate the capacity of material to produce and neutralize acid. ABA methods compare the acid AGP with the ANP for a given material using either the total sulfur or sulfide sulfur content. ABA results were used to determine the neutralization potential ratio (NPR = ANP/AGP) and net neutralization potential (NNP), where NNP is the difference between the ANP and AGP (i.e., NNP = ANP - AGP). These criteria are commonly used to categorize material into potentially acid-generating (PAG) or non-acid-generating (non-PAG). Many interpretation schemes have been developed to assess the potential for acid generation using either ANP/AGP or NNP. The BLM uses criteria that categorize samples with ANP/AGP of three or greater and NNP greater than +20 t $CaCO_3$/kt as non-PAG. In contrast, materials with NNP less than -20 t $CaCO_3$/kt and ANP/AGP less than one are considered PAG. Values between these designations are considered to have uncertain acid-generating characteristics (BLM 1996).

The bulk of the waste rock at LVM is low sulfur and considered highly acid neutralizing, as illustrated by plotting the NNP as a function of sulfide sulfur (**Figure 11**). The Bed 14 and Bed 15 waste rock samples had an average NNP of 187.2 t $CaCO_3$/kt. Of the 135 samples subjected to ABA, one sample was characterized as PAG using an NNP criteria for PAG rock of -20 t $CaCO_3$/kt. Six samples were characterized as PAG using an NPR less than one (**Figure 12**). Three of these samples were collected within the perimeter of the GTO and Sentinel pits, and three were collected from within the Centennial Pit. The Bed 14 and Bed 15 samples collected from the Centennial Pit for the column testing program were fairly low sulfur (0.03 to 0.06 wt. % sulfide sulfur) with high excess ANP in the Bed 14 limestone sample (and replicate) compared to the Bed 15 sandstone sample as discussed in the mineralogy section below.

The Bed 14 and Bed 15 waste rock samples collected from the Sentinel West Pit for the column testing program were also non-PAG, with total sulfur below the reporting limit (< 0.01 wt. %) and high excess ANP in the Bed 14 limestone sample compared to the Bed 15 sandstone sample, consistent with samples collected from Centennial Pit .

Overall, the ABA results demonstrate the non-acid generating character of the backfill, which is supported by the mineralogy as discussed below.

6.2 Elemental Analysis

The elemental compositions of Bed 14 and Bed 15 waste rock samples, including the metals/metalloids historically monitored as part of the operational MWMP testing (antimony, arsenic, cadmium, copper, molybdenum, selenium, uranium, and zinc), are presented in (**Table 6**). **Appendix A-5** (Whetstone 2014b) includes results for additional elements analyzed as part of the column study program. The results were compared to the average crustal abundance for sedimentary rocks, specifically carbonate rocks and sandstone (Turekian and Wedepohl 1961). The elemental composition of several Bed 14 samples from the Adrian Brown Consultants (1997) study were elevated in cadmium, copper, and molybdenum compared to a screening criteria of 10 times the crustal abundance. The Bed 14 and 15 samples subjected to column testing were also elevated in cadmium and copper but not molybdenum. The detection limits for antimony made comparisons difficult; however, the recent results suggest antimony was not enriched. It is important to note that enrichment in the solid phase is not necessarily indicative of mobility in water. The uranium and selenium content of samples subjected to column testing was at or near the average crustal abundance.

6.3 Mineralogy

One sample each from Centennial Pit Beds 14 and 15 were subjected to transmitted light thin-section microscopy (thin-section analysis) and quantitative XRD analysis. One sample each from Sentinel Pit Beds 14 and 15 were also subjected to mineralogical analyses as discussed in additional detail in the **Appendix A-5** (Whetstone 2014b).

The thin section and XRD analyses indicate both Centennial Pit samples have low pyrite (0 - 1%) content, which was the only sulfide mineral identified. Apatite grains were visible in small quantities in thin section and shown by XRD to be calcium-fluorapatite (CFA) in trace amounts (< 1 weight %).

The Centennial Pit Bed 14 sample was a sandy, argillaceous limestone with minor detrital quartz and no identifiable allochems. XRD analysis indicated that the Bed 14 sample was primarily composed of calcite (48%) and quartz (37%) with minor pyrite (1%). The sample contained 14% total clays, which were dominated by illite.

The Centennial Pit Bed 15 sample was a massive, moderately well-sorted, clean, fine-grained sandstone with well-developed intergranular macroporosity. Weathering was apparent in the sample grains, which were coated by films of clay cement with the interiors of some pores filled by masses of kaolinite clay cement. The grain rimming clay was identified as possibly illuviated rather than authigenic, further indication of weathering. In contrast to the Bed 14 sample, the Bed 15 sample was dominantly quartz (91%) with trace carbonate minerals and pyrite. Kaolinite (6%), with subordinate illite (1%) were the primary clay minerals. Lazurite, a sulfate-sulfur-chloride tectosilicate, which is a non-acid generating sulfur-containing mineral, comprised 2% of the sample.

The Sentinel West Pit and Centennial Pit samples had similar mineralogy demonstrating the low variability in the geochemistry of each bed across different deposits at the LVM. The mineralogical analysis is consistent with the ABA results presented above, with excess ANP associated with the limestone samples, and low overall sulfide sulfur.

6.4 Particle Size Distribution

In addition to the potential influence on leachate quality, particle size was an important scaling factor for the columns from an operational perspective. As a general rule, the diameter of a column should be at least four times greater than the diameter of the largest particle being leached. This commonly accepted guideline is recommended for samples with grain sizes exceeding 0.2 inches and is intended to prevent preferential flow along the grain-wall contact in the column (Potter 1981, Cathles and Breen 1983).

The results of the sieve analyses indicate that the maximum particle size was less than 0.75 inches. This sizing provides a minimum column diameter to particle size ratio of 8:1 and meets the guidelines for column construction. Unweighted averages for the composite samples indicate that the majority of the rock subjected to column testing (76.2%) was gravel size, a smaller percentage (21.9%) was sand size, and 1.9% of the material was silt size or smaller (**Figure 13**). The fine fraction did not limit the flow through the columns or cause plugging. Tabulated results and photographs of

representative Bed 14 and Bed 15 samples subjected to column testing are provided in **Appendix A-5** (Whetstone 2014b).

The percentage of particles greater than 5 centimeters (cm, approximately 2 inches) was determined for samples subjected to MWMP testing (see **Figure 13**). On average, 49% of particles subjected to MWMP testing were less than 5 cm. These results show that samples subjected to static water leaching and column testing included a wide range of particle sizes, including fines.

6.5 Static Water Leaching

The single extraction and multiple extraction MWMP test results for Bed 14 and Bed 15 waste rock samples are provided in **Table 7** and **Table 8**, respectively, and discussed below.

6.5.1 Single Extraction MWMP Testing

MWMP test results demonstrate that water in contact with the backfill will have a neutral to alkaline pH and will not leach high concentrations of metals. In addition, the leachate results demonstrate that highly alkaline leachate will not be generated by backfilling the Centennial Pit.

The non-potentially acid generating (non-PAG) nature of the backfill is supported by the range of effluent pH values observed for the MWMP test samples (pH 6.3 to 8.5) and pH 8.1 to 8.2 water pooled in the Penny Phase (southwestern portion of the Centennial Pit) for short periods following rainfall events, as illustrated by the box and whisker plot in **Figure 14,** which provide a statistical comparison of the different datasets. Each box and whisker plot displays the upper and lower quartiles of the data by the top and bottom of a rectangle and the median is represented by a horizontal line segment. The spread of the bulk of the data (central 50%) is seen as the length of the box. The tails of the distribution are provided by a line extending from the top and bottom of the box. The data points displayed outside of the “whiskers” may be considered outliers or values that may be implausibly large or small, although they may not necessarily be outliers in a true statistical sense.

Average MWMP leachate concentrations for eight metals routinely analyzed were generally below the associated Standards (see **Table 7**). Of the 52 samples tested, the following exceedances were observed:

- Seven MWMP leachate samples resulted in selenium concentrations that exceeded the Utah groundwater quality standard, with a maximum concentration of 0.08 mg/L, compared to the standard of 0.05 mg/L (see **Figure 14**). Three of the seven samples were samples subjected to column testing.

- One sample exceeded the uranium standard of 0.030 mg/L, with a sample concentration of 0.0885 mg/L (see **Figure 14**).

- Two samples (0.0068 and 0.0234 mg/L) exceeded the cadmium standard of 0.005 mg/L

- One sample exceeded both the antimony (0.006 mg/L) and arsenic standard (0.05 mg/L).

MWMP test results for samples subjected to saturated column testing were consistent with previous testing (see **Table 7**). As noted above, selenium was the only constituent that exceeded of the standard for samples subjected to column testing. Of particular interest, the Centennial Pit Bed 14 wall rock sample at 0.0543 mg/L (replicate 0.0529 mg/L) and 0.0674 mg/L for the Bed 15 sample, produced selenium concentrations were well above the 90th percentile concentration at 0.039 mg/L. In comparison, the Sentinel West Pit sample leachates produced selenium concentrations that were well below average.

Iron concentrations were low (at or near the method detection limit), consistent with the unsaturated conditions associated with MWMP testing.

6.5.2 Multiple Extraction MWMP Testing Results

Figures showing the concentrations of key constituents following each extraction step are shown in **Figure 15** and **Figure 16**.

The multiple extraction MWMP leachate pH values ranged from pH 6.6 to 7.5 for Bed 15 waste rock and from 7.1 to 8.4 from Bed 14 waste rock, which contains limestone. For the multiple extraction MWMP tests on Bed 14 and Bed 15 waste rock samples leachate concentrations were below Standards (UAC R317-6-2.1 Table 1) for the parameters tested.

Multiple extraction MWMP tests demonstrate that in general leachate concentrations will decrease and pH will increase with each subsequent extraction. However, there

are a few exceptions to this trend on the fourth extraction. For example, aluminum, which does not have an associated Groundwater Quality Standard, increased from approximately 0.03 mg/L to 0.25 mg/L on the fourth extraction. Concentrations of iron, silica, and sodium also increase on the fourth extraction for both the Bed 14 and Bed 15 sample. Due to the low concentrations leached after three extractions through the column and the low ionic strength of the extraction solution (Type II reagent grade deionized water), results from the fourth extraction through the column may not be representative of leaching under natural conditions at the mine. The low ionic strength of the leached solution after the initial extraction demonstrates that the backfill material is relatively non-reactive.

Leachate concentrations of several analytes decreased over time, including selenium and uranium. Selenium was detected at a maximum concentration of 0.0033 mg/L on the first extraction from the Bed 15 MWMP column and decreased to 0.0001 mg/L and <0.0001 mg/L after the fourth extraction from Beds 14 and 15 waste rock, respectively. Uranium was present at a maximum concentration of 0.0053 mg/L on the first extraction through Bed 14 column and decreased to 0.0005 mg/L for the subsequent extraction from both Bed 14 and Bed 15 waste rock samples. These results suggest that a “first flush” from the backfill will occur. However, first flush concentrations were low and concentrations will decrease over time.

Multiple extraction MWMP test leachates for Bed 14 and Bed 15 waste rock samples were below Standards, as shown in **Table 8**. Leached concentrations were also lower than average concentrations reported for the Burro Canyon aquifer in the vicinity of the Centennial Pit, except for one or more detections of aluminum, silica, vanadium, and fluoride. These parameters are not expected to be problematic, as described in the bullet list below.

- The aluminum concentration generated from the fourth extraction through the Bed 15 waste rock MWMP column was 0.25 mg/L, which was above the Burro Canyon aquifer average concentration of 0.062 mg/L. Leach concentrations from the first three extractions remained below 0.06 mg/L. As described above, the fourth extraction through the column may not be representative of natural leaching conditions due to the low ionic strength of the extraction solution and removal of readily leachable salts from the previous three extractions.

- MWMP silica concentrations range from 8.0 to 11.4 mg/L, which was above the average concentration for the Burro Canyon aquifer (7.1 mg/L). However, the silica concentrations from the MWMP tests were within range of reported values for

the Burro Canyon aquifer, which had a maximum silica concentration of 14.9 mg/L for wells in the vicinity of the Centennial Pit.

- Several vanadium concentrations from MWMP leachate (maximum of 0.009 mg/L) were higher than the average Burro Canyon concentration of 0.006 mg/L. However, the vanadium detections from the MWMP test were estimated concentrations (between the practical quantitation limit and method detection limit) and are below the maximum concentration reported for the Burro Canyon aquifer (0.050 mg/L). Vanadium does not have an associated Standard.

- Fluoride concentrations for the Bed 14 MWMP column sample ranged from 1.8 mg/L for the initial extraction to 0.3 mg/L after the fourth extraction. Concentrations from first, second, and third extraction were greater than the average Burro Canyon aquifer concentration of 0.4 mg/L. Fluoride concentrations for the Bed 15 MWMP column were lower, ranging from 0.2 mg/L for the first extraction to less than 0.1 mg/L for subsequent leaching steps. Leached fluoride concentrations were below the Utah groundwater quality standard of 4 mg/L.

For the eight metals routinely analyzed, average concentrations of antimony, arsenic, cadmium, copper, molybdenum, uranium, and zinc for Bed 14 were lower than average concentrations for the Burro Canyon aquifer, as represented by wells in the vicinity of the pit (wells SLV-1A, SLV-3, MW-2A, and MW96-7A) (see **Table 5**). This is illustrated with box-and-whisker plots of the selenium and uranium (see **Figure 14**) concentrations in the Burro Canyon aquifer and the single extraction MWMP leachate concentrations for Bed 14 waste rock. On average, uranium in the Burro Canyon aquifer was significantly higher than concentrations obtained during single extraction water leaching of Bed 14 and Bed 15 waste rock. As discussed above, the maximum uranium concentrations obtained by multiple extraction MWMP testing on Bed 14 and Bed 15 waste rock samples (0.0053 and 0.0036 mg/L, respectively) occurred during the first extraction, which is well below the average uranium concentration of 0.092 mg/L in the Burro Canyon aquifer. The maximum selenium concentration for the multiple extraction MWMP tests was 0.0004 mg/L for Bed 14 waste rock and 0.0033 mg/L for Bed 15 waste rock, compared to an average Burro Canyon aquifer concentration of 0.003 mg/L.

6.6 Saturated Column Testing

The saturated column test results are detailed in **Appendix A-5** (Whetstone 2014b) and summarized in the following subsections. Material from the Sentinel West Pit Bed

14 and Bed 15 met the Utah groundwater quality standards except the Bed 14 material exceeded the uranium standard. The discussion below focuses on the column test results for the Centennial Pit Bed 14 and Bed 15 samples.

6.6.1 Major Findings

The column leachates had stable pH in the near neutral to slightly alkaline range (pH 6.49 to 7.70). The leachates were well-buffered solutions with calcium-sulfate compositions (**Figure 17**). The major ion composition of the leachates was consistent throughout the leaching cycles, although the total dissolved ions generally decreased with subsequent leaching cycles.

Dissolved iron was below the detection limit (<0.02 mg/L) in all leachate samples, consistent with the head solution concentrations, which decreased from 4.97 mg/L at the time of collection from PW-3 to below detection (<0.02 mg/L) following column testing. As discussed in Section 3 – Backfill Characterization the head solution became moderately oxidizing (17.7% saturation), although attempts were made to prevent contact with atmospheric oxygen. It follows that the anoxic conditions of the Burro Canyon groundwater (represented by PW-3) was not maintained in the head solution as illustrated by the increase in DO from near the instrument detection limit of 1% during collection to 17.7% during testing (using a flow-through cell). The oxygen intrusion in combination with uranium stabilization as aqueous ternary complexes, resulted in elevated concentrations of uranium compared to groundwater. In addition, oxidation of selenium, which would likely exist as a trace contaminant in pyrite or elemental selenium (and possibly ferroselite [FeSe2]), would be attenuated under the more reducing conditions encountered in the Burro Canyon aquifer.

Time series plots showing the column test results for key constituents associated with the Centennial Pit Bed 14 and Bed 15 waste rock samples are shown in **Figure 18** and **Figure 19.** The leachate water quality was compared to background water quality in the Burro Canyon aquifer near the Centennial Pit as detailed in **Appendix A-5** (Whetstone 2014b). PW-3 is an ambient monitoring well under the permit and the head solution source for the columns, and MW96-7A is a designated compliance well. The results were also compared to the Utah groundwater quality standards.

The column leachates met the Utah groundwater quality standards for all constituents except uranium and selenium as discussed below. The columns containing Centennial Pit Bed 14 and Bed 15 show an initial flushing effect (first flush) in which leachates for the first half and first full cycles had higher concentrations of total dissolved solids,

sulfate, and selenium than leachates from subsequent cycles (see **Figure 18** and **Figure 19**). While selenium exceeded the groundwater standard in the first two leach cycles of (PV0.5 – PV1), the concentrations decreased substantially with subsequent pore volumes and fell well below the water quality standard by PV2.

Leachates from the Bed 15 sample exceeded the Utah groundwater quality standard for uranium of 0.03 mg/L whereas the Bed 14 leachate met the standard. Uranium and its alpha-emitting daughter products are the reason for the Class III aquifer designation at the site. At first glance these findings may be counterintuitive, since the Bed 14 sample was limestone and therefore uranium(VI) should have been stabilized in solution as calcium-uranyl carbonate ternary complexes upon contact with moderately oxidizing conditions associated with the column head solution. However, the reduction in total alkalinity from > 300 mg $CaCO_3$/L to approximately 150 mg $CaCO_3$/L, and associated drop in calcium and magnesium concentrations compared to Bed 15 leachates demonstrated that carbonate mineral precipitation occurred within the Bed 14 column, limiting uranium(VI) aqueous phase stabilization in the Bed 14 column leachates compared to Bed 15. Dissolved and total uranium concentrations in the column leachates were nearly identical, indicating that most uranium occurred in the dissolved phase. Leachates did not show a distinct trend in uranium concentrations with subsequent leach cycles (pore volumes). It is important to note that the uranium content of the samples was at or near the average crustal abundance for sandstone (~ 0.45 mg/kg) and carbonate rocks (<2.2 mg/kg) and is therefore a finite source.

6.7 Comparison of MWMP and Column Leachates

The MWMP results are not expected to correspond directly to the saturated column testing results because the MWMP tests were performed using a deionized water leach solution while the column tests were performed using groundwater from the Burro Canyon aquifer (TDS = 1,300 mg/L). The MWMP tests were well suited to evaluate releases associated with infiltrating precipitation while the saturated column tests were specifically designed to evaluate releases from submerged/saturated backfill in contact with the Burro Canyon aquifer.

The MWMP leachates from Bed 15 had major ion ratios very similar to the major ion ratios in the saturated columns, with lower total ion concentrations in the MWMP leachates as illustrated by the Stiff diagrams in **Figure 20**. The similarity of the Bed 15 MWMP and column leachates occurred because the Burro Canyon aquifer water used as the head solution for the saturated columns is derived primarily from Bed 15. That

is, the saturated aquifer occurs primarily in Bed 15 and the in-situ water chemistry reflects a solution in equilibrium with Bed 15 solids.

The MWMP leachates from Bed 14 had a major ion composition markedly different from the saturated columns **(Figure 21**). The difference is due to the head solution: MWMP testing used deionized water while the saturated columns used Burro Canyon aquifer water.

6.8 Quality Control for Column Leaching Tests

In addition to standard laboratory QA/QC procedures, the column testing program incorporated replicate column samples (Centennial Pit Bed 14 primary and replicate sample discussed above), numerous equipment blanks, and blind duplicate split samples. The equipment blank sample, demonstrated that contamination from the testing apparatus or from sample preparation and analytical procedures did not occur, as shown by dissolved metal concentrations below the method detection limits and low EC of 2 µmhos/cm. The replicate results showed very good agreement for all blind duplicate samples submitted.

7. Assessment of Groundwater Quality

The Burro Canyon aquifer is not expected to be impacted from partially backfilling the Centennial Pit. As described in Section 6 – Characterization Program Results, the quality of leachate associated with the backfill is generally below the Standard values and consistent with existing Burro Canyon aquifer water quality or lower as demonstrated by MWMP and column testing with the exception of uranium and selenium which were mobilized in the saturated columns due to moderately oxidizing conditions and, in the case of uranium, stabilization of uranium(VI) as aqueous calcium-uranyl carbonate ternary complexes. However, selenium and uranium will be attenuated as reduced mineral phases as the backfill leachate enters the more anoxic conditions in the Burro Canyon aquifer and N-aquifer. These findings are supported by equilibrium geochemical modeling. Additionally, constituent concentrations are expected to decrease over time after the initial "first flush" through the backfill material.

For Backfill Scenario 1, the Centennial Pit groundwater model predicts that a pit lake will not form in the remaining open portion of the pit (Keystone Phase) due to high evaporation. Due to the large amount of evaporation, the Burro Canyon aquifer is not expected to fully rebound to pre-mining levels. Rather, vertical recharge from precipitation will continue to supply water to the groundwater system, but the loss of water to the pit and evaporation from the pit will result in a lower post-mining equilibrium water level in the Burro Canyon aquifer. The long-term water quality of the Burro Canyon groundwater system would remain unaffected for two primary reasons: 1) groundwater flows radially towards the open Keystone Phase, and 2) groundwater in contact with the backfill will be consistent with existing groundwater quality particularly once the backfill leachate interacts with the more reducing conditions in the Burro Canyon aquifer. The proposed partial backfill of the Centennial Pit is not anticipated to impact the N-aquifer for the same reasons. For Backfill Scenarios 2 through 4, groundwater is expected to rebound to pre-mining levels. The Burro Canyon groundwater will therefore be in contact with backfill material; however, as described above, contact with the backfill material is not anticipated to degrade the Burro Canyon groundwater quality, particularly as selenium and uranium mineral phases form in the anoxic Burro Canyon aquifer. It follows that the N-aquifer is also not anticipated to be impacted.

Appendix C presents results of a sensitivity pit lake geochemical model simulation for Backfill Scenario 1, in which a runoff coefficient of 10% is used for pit wall runoff. For this simulation, a pit lake is predicted to form in the open Keystone Phase, with an approximate water depth of 40 ft. The pit lake water quality is predicted to be neutral to

alkaline and have elevated TDS, sulfate, and elevated concentrations of metals including cadmium, selenium, and uranium. The elevated concentrations are due to the small water volume and a high evaporation rate, resulting in evapoconcentration. However, the predicted pit lake will be a terminal sink and therefore will not impact the Burro Canyon aquifer. A small portion of the pit water would seep into the underlying Morrison Formation and eventually mix with the N-aquifer. The water is not expected to impact the N-aquifer, due to changes in redox conditions as the seepage mixes with the Burro Canyon aquifer, encounters the Morrison Formation and subsequent dilution with the N-aquifer.

8. Verification and Post-Mining Monitoring

Verification monitoring of post-mining groundwater will be conducted using monitoring wells, water supply wells, and piezometers located adjacent to the Centennial Pit. Water levels will be monitored in piezometer 4R44 and SLV-3 (currently dry) using data-logging transducers (**Table 9**). The transducer sondes may also be equipped with a pH and/or EC probe to monitor potential trends in indicator parameters. Post-mining water quality will be monitored in MW96-7A, MW96-7B, and PW-3 using the comprehensive analytical suite shown in **Table 10**. Water quality and water levels in the wells will be monitored quarterly during the initial aquifer rebound, with the monitoring frequency decreasing over time in accordance with the Ground Water Discharge Permit. The results will be presented in quarterly reports submitted to BLM and UDEQ. The proposed monitoring network is spatially distributed around the Centennial Pit to provide data across the saturated aquifer.

9. Summary and Conclusions

LVMC has proposed a modification to the site's mine plan that includes partial backfilling of the Centennial Pit. Four potential backfill scenarios are proposed. The first (Scenario 1) involves backfill the southwestern portion of the Centennial Pit, (referred to as the Penny Phase) with waste rock from the northeastern portion of the pit (referred to as the Keystone Phase). Waste rock would be placed to an elevation of 6,200 ft amsl, which is above the pre-mining static groundwater level of approximately 6,190 f ft amsl. The other three scenarios (Backfill Scenarios 2 through 4) involve backfill both the Penny and Keystone Phases to elevations of 6,200, 6,260 and 6,320 ft amsl. This report evaluated the potential impacts of backfilling within the Centennial Pit and addresses BLM and USGS comments provided in letters dated February 2nd, 2012 and June 14th, 2012. This analysis focused on the geochemical characteristics of Bed 14 and Bed 15 waste rock that will be used as backfill including the leachate quality and acid generating potential. Based on characterization of waste rock samples representative of the backfill, flow through the backfill material is not expected to generate problematic water chemistry.

The characterization program demonstrated that the Bed 14 and Bed 15 backfill material is not acid-generating and is not likely to generate highly alkaline leachates. Single and multiple extract MWMP testing showed that leached concentrations of constituents are generally lower than the average concentrations for the shallow aquifer at the site (Burro Canyon aquifer) and largely below the Utah groundwater quality standards (Utah Administrative Code [UAC] R317-6-2.1). Similarly, the Centennial Pit Bed 14 and Bed 15 column leachates met the standards for all constituents except uranium and selenium. Multiple extraction MWMP test and column leachate concentrations decreased over time after an initial "first flush". MWMP test and column leachates were well buffered solutions with calcium-sulfate compositions. The major ion composition of the leachates was consistent throughout the leaching cycles, although the total dissolved ions generally decreased with subsequent leaching cycles.

Characterization of Bed 14 and Bed 15 samples from the Sentinel West Pit demonstrated the similarity between each bed collected from different pits.

A groundwater flow model was built, calibrated, and used for predicting the post-mining dynamics of the groundwater system for Backfill Scenario 1. The base case model predicts that a pit lake will not form in the open Keystone Phase due to high evaporation rates. Previous modeling for the entire open Centennial Pit predicted that

a small pit lake would form (Whetstone 2010); however, the updated pit dimensions have a larger bit bottom area and therefore more evaporation. Due to the large amount of predicted evaporation for the updated model, the Burro Canyon aquifer is not expected to fully rebound to pre-mining levels for Backfill Scenario 1. Rather, vertical recharge from precipitation will continue to supply water to the groundwater system, but the loss of water to the pit and evaporation from the pit will result in a lower post-mining equilibrium water level in the Burro Canyon aquifer. The long-term water quality of the Burro Canyon groundwater system would remain unaffected because of the continual flow of water in the direction of the pit.

Appendix C presents results of a sensitivity pit lake geochemical model simulation for Backfill Scenario 1, in which a runoff coefficient of 10% is used for pit wall runoff. After mining and dewatering stops, two small pit lakes were predicted to form when higher runoff was included in the model. Similar to the base case model, groundwater flows towards the pit so that impact to the Burro Canyon aquifer is not expected. The pit lake water quality is predicted to be neutral to alkaline pH and have elevated TDS, sulfate, and concentrations of metals including cadmium, selenium, and uranium, relative to groundwater. The elevated concentrations result from the small water volume and high evaporation rate, resulting in evapoconcentration. Approximately 0.3% of the pit lake volume would seep into the Morrison Formation per year and eventually mix with the N-aquifer; however, the water quality is not expected to impact the N-aquifer due to changes in redox conditions and dilution as the seepage moves through the backfill and into the Burro Canyon aquifer and eventually into the N-aquifer.

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Tables

Table 1
Design Pit Dimensions
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Elevation	Current Design Open Pit		Backfill Scenario 1 (4.6 Million Tons)		Previous Design Open Pit*	
	Area	Volume	Area	Volume	Area	Volume
ft amsl	acres	acre-ft	acres	acre-ft	acres	acre-ft
6020	8.4	0	6.9	0	--	--
6040	9.5	179	7.8	147	--	--
6060	17.0	380	13.6	311	--	--
6080	25.2	736	19.5	596	1.0	0
6100	44.3	1271	27.8	1002	3.4	45
6120	53.6	2183	37.6	1591	4.3	122
6140	69.4	3307	50.6	2398	10.7	272
6160	75.6	4727	55.8	3451	18.4	563
6180	103.4	6265	83.6	4606	30.1	1047
6400 (Top of Pit)	176.3	--	176.3	--	165	--

Notes:
*Whetstone (2010)
Backfill Scenarios 2, 3, and 4 include both the Keystone and Penny Phase, with top of backfill elevations of 6200, 6260, and 6320 ft amsl.

Table 2
Backfill Scenarios
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Backfill Scenario	Backfill Volume (Million Tons)	Phases Backfilled	Top of Backfill Elevation (ft amsl)	Maps and Cross-Sections
1	4.6	Penny	6200	Figure 2
2	25	Penny and Keystone	6200	Figure 3
3	50	Penny and Keystone	6260	Figure 4
4	75	Penny and Keystone	6320	Figure 5

Table 3
Bed 14 and Bed 15 Geochemical Characterization Program Summary
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Test Type	EIS (1997)	Adrian Brown Consultants (1998)	Operational Characterization (2005 - 2013)	Column Testing Program	Total - Current Study
ABA[1]	98	--	32	5	135
SPLP	3	--	--	--	3
MWMP Single Extraction[2]	--	10	42	5	57
MWMP Multiple Extraction[3]	--	--	2	--	2
Mineralogy[4]	--	--	--	4	4
Total Elemental Analyis	--	--	--	4	4
Column Testing[5]	--	--	--	5	5
Particle Size Distribution[5]	--	--	--	5	5

Notes:

-- Not applicable

(1) Seven of the 98 samples subjected to ABA for the EIS were composited with waste rock from other beds. ABA from the column testing prgram included one field duplicate.

(2) No MWMP testing from Jan 2008 - Mar 2009 during the mine shutdown because no waste rock was generated.

(3) Multiple extraction MWMP testing was conducted for the backfill evaluation and is not a standard method associated with the operational characterization program.

(4) X-ray diffraction (XRD) and transmitted light thin-section microscopy.

(5) Includes a Bed 14 primary and duplicate sample from Centennial Pit.

Table 4
Laboratory Analytical Suite for Saturated Column Testing
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Laboratory Analytical Method	Detection Limit	Units
Wet Chemistry			
pH	SM 4500H+B	0.1	s.u.
Alkalinity, Total as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Carbonate as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Bicarbonate as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Hydroxide as $CaCO_3$	SM 2320B	2	mg/L
Chloride	EPA 300.0	0.5	mg/L
Fluoride	EPA 300.0	0.1	mg/L
Phosphorus	SM365.1	0.01	mg/L
Sulfate	EPA 300.0	0.5	mg/L
Silica	M200.7	0.428	mg/L
Specific Conductance @25C	SM 2510B	1	umhos/cm
Hardness as $CaCO_3$	SM 2340B	1.5	Calculation
Residue, Filterable (TDS) @180C	SM 2540C	10	mg/L
TDS, Calculated	Calculation	--	--
Anion-Cation Balance	Calculation	--	--
Metals – Dissolved			
Aluminum	EPA 6010B	0.03	mg/L
Antimony	EPA 6020A	0.0004	mg/L
Arsenic	EPA 6020A	0.0002	mg/L
Barium	EPA 6010B	0.003	mg/L
Beryllium	EPA 6020A	0.00005	mg/L
Cadmium	EPA 6020A	0.0001	mg/L
Calcium	EPA 6010B	0.2	mg/L
Chromium	EPA 6020A	0.0005	mg/L
Copper	EPA 6020A	0.0005	mg/L
Iron	EPA 6010B	0.02	mg/L
Lead	EPA 6020A	0.0001	mg/L
Magnesium	EPA 6010B	0.2	mg/L
Manganese	EPA 6020A	0.0005	mg/L
Mercury	EPA 7470A	0.0002	mg/L
Molybdenum	EPA 6010B	0.01	mg/L
Nickel	EPA 6010B	0.01	mg/L
Potassium	EPA 6010B	0.3	mg/L
Selenium	EPA 6020A	0.0001	mg/L
Silver	EPA 6020A	0.00005	mg/L
Sodium	EPA 6010B	0.3	mg/L
Thallium	EPA 6020A	0.0001	mg/L
Uranium	EPA 6020A	0.0001	mg/L
Vanadium	EPA 6020A	0.0002	mg/L
Zinc	EPA 6020A	0.002	mg/L

Table 4
Laboratory Analytical Suite for Saturated Column Testing
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Laboratory Analytical Method	Detection Limit	Units
Metals – Total			
Uranium	EPA 6020A	0.0001	mg/L
Radiological			
Gross alpha activity(1)	M9310	2	pCi/L
"Field" Parameters			
Temperature		0.1	°C
pH		0.1	s.u.
EC		1	µS/cm
ORP		1	mV
DO		0.01	%, mg/L

Notes:
(1) Gross alpha activity analyzed only when sufficient volume was available

Table 5
Burro Canyon and N-Aquifer Water Quality in the Centennial Pit Area
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Burro Canyon Aquifer					N-Aquifer				
	Count	%NDs	Average	Median	Maximum	Count	%NDs	Average	Median	Maximum
DISSOLVED METALS (mg/L)										
Aluminum	142	71%	0.062	0.025	1.100	78	68%	0.044	0.015	0.52
Antimony	139	74%	0.0019	0.0010	0.0200	78	64%	0.0018	0.0010	0.01
Arsenic	142	50%	0.0040	0.0025	0.1000	78	28%	0.0418	0.0048	0.746
Barium	142	11%	0.055	0.013	0.93	78	0%	0.20	0.09	1.29
Beryllium	142	96%	0.0006	0.0005	0.0083	78	94%	0.0003	0.0005	0.0025
Cadmium	142	61%	0.0034	0.0005	0.0377	78	87%	0.0006	0.0003	0.013
Calcium	142	0%	334.1	323.0	560.0	78	0%	30.7	26.7	96.2
Chromium	142	60%	0.003	0.003	0.025	78	53%	0.004	0.003	0.0805
Copper	142	71%	0.043	0.005	0.380	78	83%	0.006	0.005	0.02
Iron	142	5%	3.1	1.3	28.0	78	21%	0.93	0.16	15.7
Lead	139	63%	0.0025	0.0020	0.0140	78	78%	0.0017	0.0011	0.01
Magnesium	142	0%	126.5	105.5	269.0	78	0%	14.7	13.3	26.3
Manganese	142	2%	0.90	0.76	2.6	78	9%	0.35	0.09	5.4
Mercury	142	89%	0.0002	0.0001	0.0028	78	86%	0.0003	0.0001	0.0106
Molybdenum	141	66%	0.02	0.01	0.06	78	40%	0.04	0.01	0.28
Nickel	142	46%	0.015	0.010	0.090	78	56%	0.504	0.005	17.3
Potassium	142	0%	15.35	14.70	22.40	78	0%	6.85	6.80	11.3
Selenium	139	71%	0.003	0.001	0.032	78	82%	0.002	0.001	0.03
Silicon	142	3%	7.1	6.1	14.9	78	1%	9.3	9.1	18.1
Silver	142	89%	0.03	0.0003	0.51	78	87%	0.04	0.0003	0.50
Sodium	142	0%	90.9	74.4	228.0	78	0%	143.1	144.5	325
Thallium	139	78%	0.0007	0.0005	0.0120	78	92%	0.0005	0.0003	0.009
Vanadium	142	92%	0.006	0.005	0.050	78	92%	0.004	0.005	0.014
Zinc	142	13%	0.513	0.210	8.010	78	29%	0.526	0.020	20.8
TOTAL METALS (mg/L)										
Uranium	122	0%	0.092	0.021	0.996	77	27%	0.005	0.001	0.053
GENERAL CHEMISTRY (mg/L, except where noted otherwise)										
Chloride	142	0%	40	21	118	78	0%	50	12	310
Fluoride	142	8%	0.4	0.4	0.8	78	1%	0.7	0.7	1.3
Sulfate	142	0%	1111	1030	2030	78	0%	130	136	443
pH (s.u.)	142	0%	7.2	7.1	8.3	78	0%	7.8	7.9	8.8
Conductivity (umhos/cm)	142	0%	2428	2260	3860	78	0%	911	846	1630
Hardness as $CaCO_3$	142	0%	1395	1235	2510	78	0%	136	117	282
TSS	142	3%	838	357	17960	78	0%	406	210	2370
TDS	142	0%	2142	1936	3760	78	1%	564	552	1080
Alkalinity as $CaCO_3$	142	0%	457	446	1726	78	0%	278	266	433
Bicarbonate, total	139	0%	456	439	1725	78	0%	273	262	433
Bicarbonate, diss.	87	0%	412	407	575	50	0%	272	255	430
Carbonate	130	94%	1.1	1.0	10.0	78	60%	6.7	1.0	70.4
Hydroxide	130	96%	0.9	1.0	2.5	78	94%	1.0	1.0	2.5
Ammonia as N	142	27%	0.3	0.2	1.4	78	31%	0.2	0.2	1.7
Nitrate as N	141	57%	0.1	0.1	1.7	78	51%	0.6	0.1	40
Nitrite as N	139	71%	0.007	0.005	0.050	78	77%	0.011	0.005	0.094
NO_3+NO_2 as N	141	57%	0.1	0.1	1.7	78	49%	0.6	0.1	40

Notes:

Burro Canyon aquifer represented by wells SVL-1A, SVL-3, MW-2A, and MW96-7A, N-aquifer by MW96-7B, MW97-9, and MW-97-11

%NDs: percentage of non-detects in the dataset; non-detects replaced with 1/2 detection limit for average and median calculations.

Table 6
Elemental Analysis
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Data Source	Bed	Sample ID	Antimony (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Uranium (mg/kg)	Zinc (mg/kg)
ABC 1997	14	97R1	<10	10 B	6 B	18 B	69	<0.5	2 B	107
ABC 1997	14	97R2	<10	10 B	5 B	266	72	<0.5	2 B	104
ABC 1997	14	97R3	<2	9 B	6 B	23 B	<5	<0.5	2.1	90
ABC 1997	14	97R4	<10	<10	10	59	73	<0.5	<1.31	105
ABC 1997	14	97R6	<10	10 B	4 B	19 B	64	<0.5	<1.27	80
ABC 1997	14	97R7	<10	10 B	4	197	63	<0.5	<1.26	80
ABC 1997	14	97R8	<2	4.2	4 B	278	<5	<0.5	4.2	95
ABC 1997	14	97R10	<2	10	10	60	<5	<0.6	3.5	169
ABC 1997	14	97R13	<2	3 B	5 B	54	<5	<0.5	1.4	126
ABC 1997	14	97R9	<2	3.0	4 B	5670	<5	<0.5	4.0	134
Whetstone 2014	14	CENT-14	<0.2	2.2	12.5	79	<2	0.24	0.36	48
Whetstone 2014	15	CENT-15	<0.2	2.2	0.11 B	40	<2	0.15	0.38	10
Whetstone 2014	14	SW-14	<0.2	1.6	0.73	10	<2	<0.05	0.59	20
Whetstone 2014	15	SW-15	<0.2	3.7	5.09	91	<2	0.09 B	0.36	16

Notes:
B = Below PQL
ABC 1997 used EPA 3052 (total digestion) and Whetstone 2014 used EPA 3050 (near total).

Table 7
Siingle Extraction Meteoric Water Mobility Procedure Results
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Bed	Sampling Period	Sample ID	Extraction pH	Leachate pH	Particle Size > 5 cm (%)	Antimony (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Uranium (mg/L)	Zinc (mg/L)
Operational Characterization Program													
Bed 14	4th Qtr 2005	Cent. 14	6.7	7.62	55	<0.0004	<0.04	<0.005	<0.01	<0.01	<0.04	0.0022	<0.01
Bed 14	1st Qtr 2006	Cent 6420 Bed 14	5.6	7.5	60.7	<0.0008	<0.04	<0.005	<0.01	0.01	<0.04	0.0009	<0.01
Bed 14	2nd Qtr 2006	Cent Bed 14 6420	7.3	7.2	53.7	<0.0008	<0.04	<0.005	0.01	0.03	<0.04	0.0003	<0.01
Bed 14	3rd Qtr 2006	Cent 6400 14	6.46	6.73	76	<0.0004	<0.04	<0.005	<0.01	<0.01	<0.04	0.0007	<0.01
Bed 14	4th Qtr 2006	Cent Bed 14	4.78	6.5	33	0.0005	<0.04	<0.005	<0.01	<0.01	<0.04	0.0013	<0.01
Bed 14	1st Qtr 2007	Cent 6380 Bed 14	6.24	6.97	83	<0.0004	<0.04	<0.005	<0.01	<0.01	<0.04	0.0007	0.01
Bed 14	2nd Qtr 2007	Cent 6360 Bed 14	6.245	6.73	74	0.0006	<0.04	<0.005	0.04	<0.01	<0.04	0.0047	0.02
Bed 14	3rd Qtr 2007	Cent 6340 Bed 14	5.7	8.1	70	<0.0004	<0.04	<0.005	0.03	<0.01	<0.04	0.0013	<0.01
Bed 14	4th Qtr 2007	Cent 6280 Bed 14	6	7.3	68.7	<0.0004	<0.04	<0.005	<0.01	<0.01	<0.04	0.0052	<0.01
Bed 14/15	3rd Qtr 2009	RT7 Sept/Oct 2009	5.8	7.47	37.1	<0.0004	<0.06	<0.005	<0.01	<0.01	0.07	0.0014	<0.01
Bed 14/15	4th Qtr 2009	RT7 4th Qtr 2009	5.8	8.17	46	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.06	0.0003	<0.01
Bed 14/15	1st Qtr 2010	RT7-Q1-2010	5.7	8.17	29.4	<0.0004	<0.06	<0.005	<0.01	0.01	<0.06	0.0019	<0.01
Bed 14/15	2nd Qtr 2010	RT7 Q2 2010	5.7	8.24	61.1	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.06	0.0011	<0.01
Bed 14/15	3rd Qtr 2010	RT7 Q3 2010	5.7	8.18	63.8	<0.0004	<0.06	<0.005	<0.01	<0.01	0.08	0.0027	<0.01
Bed 14/15	4th Qtr2010	Q4 2010 RT7	7.5	7.3	71.4	0.0013	<0.06	<0.005	<0.01	0.01	<0.06	0.0027	<0.01
Bed 14	1st Qtr 2011	BED 14	5.7	7.91	0	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.06	0.0011	0.02
Bed 14	2nd Qtr 2011	BED 14	5.7	7.82	22.9	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.06	0.0023	<0.01
Bed 14	3rd Qtr 2011	BED 14	7.0	7.87	18.1	<0.0004	<0.06	<0.005	<0.01	0.02	0.07	0.0008	<0.01
Bed 14	3rd Qtr 2011	BED 14	5.7	8.18	11.7	0.0004	<0.06	<0.005	<0.01	0.03	<0.06	0.0173	<0.01
Bed 14	4th Qtr 2011	BED 14	7.0	7.18	33.7	0.0007	<0.0005	<0.005	0.04	0.02	0.0004	0.00053	<0.01
Bed 14	4th Qtr 2011	BED 14	5.7	8.52	48.4	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.06	0.0006	<0.01
Bed 14	4th Qtr 2011	BED 14	7.0	8.44	5.3	0.0006	<0.06	<0.005	<0.01	<0.01	<0.06	0.0005	<0.01
Bed 14	1st Qtr 2012	Bed 14 1st Qtr 2012	5.7	7.61	70.6	0.0005	<0.06	<0.005	<0.01	<0.01	<0.05	0.0048	<0.01
Bed 14	1st Qtr 2012	Bed 14 1st Qtr 2012	5.7	7.83	73.2	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.05	0.0152	<0.01
Bed 14	1st Qtr 2012	Bed 14 1st Qtr 2012	DI water*	7.78	66.6	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.05	0.0042	0.01
Bed 15	2nd Qtr 2012	Bed 15 2nd Qtr 2012	DI water*	7.46	88.4	0.0007	<0.06	<0.005	<0.01	0.18	<0.05	0.0885	0.02
Bed 14	2nd Qtr 2012	Bed 14 2nd Qtr 2012	DI water*	7.97	8.9	<0.0004	<0.06	<0.005	0.01	0.01	<0.05	0.0010	0.01
Bed 14	2nd Qtr 2012	Bed 14 2nd Qtr 2012	DI water*	7.78	57.0	0.0006	<0.06	<0.005	0.03	0.01	<0.05	0.0016	0.02
Bed 15	2nd Qtr 2012	Bed 15 2nd Qtr 2012	DI water*	7.77	97.1	<0.0004	<0.06	<0.005	<0.01	0.03	<0.05	0.0065	0.02
Bed 15	2nd Qtr 2012	Bed 15 2nd Qtr 2012	DI water*	7.76	94.5	<0.0004	<0.06	<0.005	<0.01	0.09	<0.05	0.0214	0.02
Bed 14	2nd Qtr 2012	Bed 14 2nd Qtr 2012	DI water*	8.09	78.9	<0.0004	<0.06	<0.005	<0.01	<0.01	<0.05	0.0023	0.02
Bed 14	3rd Qtr 2012	Bed 14 3rd Qtr 2012	DI water*	7.98	16.7	<0.0004	0.0014	<0.0001	0.0005	0.0035	0.0022	0.0054	<0.01
Bed 14	3rd Qtr 2012	Bed 14 3rd Qtr 2012	DI water*	8.25	42.8	<0.0004	0.0003	<0.0001	0.001	0.0069	0.0004	0.0019	<0.01
Bed 15	3rd Qtr 2012	Bed 15 3rd Qtr 2012	DI water*	8.28	54.0	<0.0004	0.0003	<0.0001	0.0005	0.005	0.0009	0.0029	<0.01
Bed 14	3rd Qtr 2012	Bed 14 3rd Qtr 2012	DI water*	8.16	49.1	<0.0004	0.0007	<0.0001	<0.0005	0.0091	0.0006	0.0020	<0.01
Bed 15	3rd Qtr 2012	Bed 15 3rd Qtr 2012	DI water*	8.04	36.7	<0.0004	0.0003	<0.0001	0.0375	0.0463	0.0036	0.0048	<0.01

Table 7
Siingle Extraction Meteoric Water Mobility Procedure Results
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Bed	Sampling Period	Sample ID	Extraction pH	Leachate pH	Particle Size > 5 cm (%)	Antimony (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Uranium (mg/L)	Zinc (mg/L)
Bed 15	4th Qrt 2012	Bed 15	6.86	7.1	92.1	0.0011	0.0091	0.0068	0.0035	0.0595	0.0185	0.0088	<0.01
Bed 14	4th Qrt 2012	Bed 14	6.86	7.69	6.9	<0.0004	0.0002	<00001	0.0006	0.003	0.0001	0.0004	<0.01
Bed 15	4th Qrt 2012	Bed 15	6.96	6.63	68.1	0.0005	0.0002	<00001	0.0058	0.0087	0.0003	0.0089	<0.01
Bed 15	4th Qrt 2012	Bed 15 Backfill	6.96	6.26	30.2	<0.0004	0.0006	0.0234	0.0234	0.1874	0.0004	0.0003	<0.01
Bed 14	4th Qrt 2012	Bed 14 Backfill	6.96	6.53	39.3	<0.0004	0.0006	<00001	0.0052	0.009	0.0027	0.0088	<0.01
Bed 14/15	4th Qrt 2012	RT7 Bed 14, 15	6.96	6.8	41.1	<0.0004	0.0017	<00001	0.001	0.0095	0.0005	0.0023	<0.01
Adrian Brown Consultants (1997)													
Bed 14	10/16/1997	97R1	7.05	7.9	NA	<0.002	0.001	<0.0005	0.01	0.02	<0.001	0.0120	0.03
Bed 14	10/16/1997	97R2	7.05	6.9	NA	<0.002	<0.001	<0.0005	0.02	0.01	<0.001	0.0023	0.01
Bed 14	11/12/1997	97R3	7.00	7.6	NA	0.002	0.001	<0.0005	<0.01	0.02	0.001	0.0109	<0.01
Bed 14	10/19/1997	97R4	6.95	7.4	NA	<0.002	0.001	<0.0005	<0.01	0.03	<0.001	0.0006	0.02
Bed 14	10/19/1997	97R6	6.95	7.7	NA	<0.002	<0.001	<0.0005	<0.01	0.05	<0.001	0.002	0.02
Bed 14	10/30/1997	97R7	6.94	7.7	NA	<0.002	0.001	<0.0005	<0.01	0.02	0.001	0.0023	0.02
Bed 14	11/13/1997	97R8	7.00	9.2	NA	0.008	0.195	<0.0005	0.12	0.06	0.03	0.0104	0.07
Bed 14	11/16/1997	97R10	7.02	7.9	NA	<0.002	0.007	<0.0005	<0.05	0.39	0.001	0.0043	<0.05
Bed 14	11/6/1997	97R13	7.09	7.8	NA	<0.002	<0.001	0.0015	<0.05	0.02	0.005	0.0013	<0.05
Bed 14	11/12/1997	97R9*	8.94	8.7	NA	<0.002	0.001	<0.0005	0.24	<0.005	<0.001	0.0004	0.01
Column Testing Program (Whetstone 2014)													
Bed 14	4th Qrt 2013	CENT-14	NA	7.1	0	<0.0004	0.0003	0.0003	0.0031	<0.02	0.0543	0.0034	0.004
Bed 14	4th Qrt 2013	CENT-16**	NA	7.2	0	<0.0004	0.0004	0.0005	0.0026	<0.02	0.0529	0.0036	0.004
Bed 15	4th Qrt 2013	CENT-15	NA	6.9	0	<0.0004	0.0014	0.0005	0.0054	<0.02	0.0674	0.0059	0.006
Bed 14	4th Qrt 2013	SW-14	NA	7.0	0	<0.0004	0.0003	<0.0001	0.0009	<0.02	0.0003	0.0021	0.003
Bed 15	4th Qrt 2013	SW-15	NA	6.7	0	<0.0004	0.0081	0.0013	0.0042	0.05	0.0087	0.0029	0.003

Notes:

Not Applicable

* No pH 7 extraction was collected due to flow issues - pH 9 samples shown above for completeness.

**Cent-14 replicate.

Table 8
Multiple Extraction Meteoric Water Mobility Procedure Results
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Bed 14				Bed 15				Utah Ground Water Standards	Burro Canyon Aquifer Average	Burro Canyon Aquifer Maximum
	Pass 1	Pass 2	Pass 3	Pass 4	Pass 1	Pass 2	Pass 3	Pass 4			
Dissolved Metals (mg/L)											
Aluminum	0.04 B	0.04 B	0.06 B	0.24	<0.03	<0.03	<0.03	0.25	--	0.062	1.100
Antimony	0.0007 B	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.006	0.002	0.020
Arsenic	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.05	0.004	0.100
Barium	0.016 B	0.022	0.023	0.036	0.023	0.028	0.039	0.037	2	0.055	0.930
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.004	0.001	0.008
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.003	0.038
Calcium	20.9	10.8	8.1	8.6	121	73.4	52.9	8.7	--	334	560
Chromium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.1	0.003	0.025
Copper	0.04 B	<0.01	<0.01	<0.01	<0.01	0.04 B	<0.01	<0.01	1.3	0.043	0.380
Iron	<0.02	<0.02	0.03 B	0.09	<0.02	<0.02	<0.02	0.10	--	3.1	28.0
Lead	<0.0001	<0.0001	<0.0001	0.0001 B	<0.0001	<0.0001	<0.0001	<0.0001	0.015	0.002	0.014
Magnesium	5.7	2.8	2.0	2.1	29	8.9	4.0	2.1	--	127	269
Manganese	<0.005	<0.005	<0.005	<0.005	0.427	0.216	0.109	<0.005	--	0.90	2.55
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.002	0.0002	0.0028
Molybdenum	0.02 B	0.01 B	<0.01	<0.01	<0.01	0.01 B	<0.01	<0.01	--	0.016	0.060
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	0.015	0.090
Potassium	9.7	6.2	5.1	4.9	5.5	1.9 B	1.1 B	5.0	--	15	22
Selenium	0.0004	<0.0001	<0.0001	0.0001 B	0.0033	0.0010	0.0006	<0.0001	0.05	0.003	0.032
Silica	11.4	9.2	8.0	10.2	3.7	1.9 B	1.5 B	10.2	--	7.1	14.9
Silver	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.1	0.029	0.506
Sodium	9.4	2.3	1.3 B	1.6 B	3.0	0.8 B	0.5 B	1.6 B	--	91	228
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	0.0001 B	<0.0001	<0.0001	<0.0001	0.002	0.001	0.012
Uranium	0.0053	0.0004 B	0.0004 B	0.0005	0.0036	0.0005 B	0.0003 B	0.0005	0.03	0.092	0.996
Vanadium	0.006 B	<0.005	0.008 B	0.008 B	0.007 B	<0.005	<0.005	0.009 B	--	0.006	0.050
Zinc	<0.01	<0.01	<0.01	<0.01	<0.01	0.02 B	<0.01	<0.01	5	0.51	8.01

Table 8
Multiple Extraction Meteoric Water Mobility Procedure Results
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Bed 14				Bed 15				Utah Ground Water Standards	Burro Canyon Aquifer Average	Burro Canyon Aquifer Maximum
	Pass 1	Pass 2	Pass 3	Pass 4	Pass 1	Pass 2	Pass 3	Pass 4			
Anions (mg/L)											
Sulfate	21	5	3 B	75	420	210	140	138	--	1111	2030
Total Alkalinity	78	47	38	32	24	21	19 B	26	--	457	1726
Bicarbonate as CaCO3	78	47	38	32	24	21	19 B	26	--	456	1725
Carbonate as CaCO3	<2	<2	<2	<2	<2	<2	<2	<2	--	1.1	10
Hydroxide as CaCO3	<2	<2	<2	<2	<2	<2	<2	<2	--	0.9	2.5
Chloride	5	<1	<1	<1	<1	<1	<1	<1	--	40	118
Fluoride	1.8	1.0	0.5	0.3 B	0.2 B	<0.1	<0.1	<0.1	4	0.4	0.8
MWMP Parameters											
Dry Weight (g)	4977.8	4977.8	4977.8	4977.8	4985.9	4985.9	4985.9	4985.9	--	--	--
Extraction pH	7	7	7	7	7	7	7	7	--	--	--
Extraction Time (hrs)	25	25	25	25	25	25	25	25	--	--	--
Leachate pH	7.18	7.08	7.44	7.69	6.71	6.63	7.00	7.45	--	7.2	8.3
Leachate Volume (mL)	5023.9	5231.5	5199.2	5125.3	5011.2	5114.9	5031.0	5079.5	--	--	--
Particle Size>5 cm(%)	33.7	33.7	33.7	33.7	97.1	97.1	97.1	97.1	--	--	--
Retained Moisture (%)	12.27	12.27	12.27	12.27	5.72	5.72	5.72	5.72	--	--	--
Soil Analyses											
pH	7.2	7.1	7.4	7.7	6.7	6.6	7.0	7.5	--	--	--

Notes:
Non-detect parameters are presented as less than the method detection limit.
Average Burro Canyon aquifer concentrations were calculated using 1/2 the detection limit for non-detects.
Utah Ground Water Quality Standards: UAC R317-6-2.1 Table 1.

Table 9
Monitoring Well Network and Post-Mining Monitoring Frequency
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Hole ID	Type	Easting	Northing	Surface Elevation (ft)	Casing Elevation (ft)	Boring TD (ft bgs)	Casing TD (ft bgs)	Diameter	Screened Interval (ft)	Lithologic Unit	Post-Mining Monitoring Frequency	Monitoring Parameters
4R44	PZ	39587.4	42143.2	6378.4	6379.9	540.0	444.4	2"	409-414	Burro Canyon Fm.	Daily w/ quarterly download	Water level, pH, EC
SLV-3	PW	42924.5	40715.9	6460.2	6461.5	344.0	344.1	8"	278-344	Burro Canyon Fm.	Daily w/ quarterly download	
MW96-7A	MW	42061.4	41494.2	6446.5	6448.1	1195.0	411.6	2"	305-405	Burro Canyon Fm.	Quarterly	Water level, comprehensive analytical suite
MW96-7B	MW	42061.7	41494.3	6446.5	6448.3	1195.0	1001.0	4"	959-999	N-aquifer	Quarterly	
PW-3	PW	40509.5	42052.5	6390.2	6392.0	485.0	476.0	8"	302-468	Burro Canyon Fm.	Quarterly	

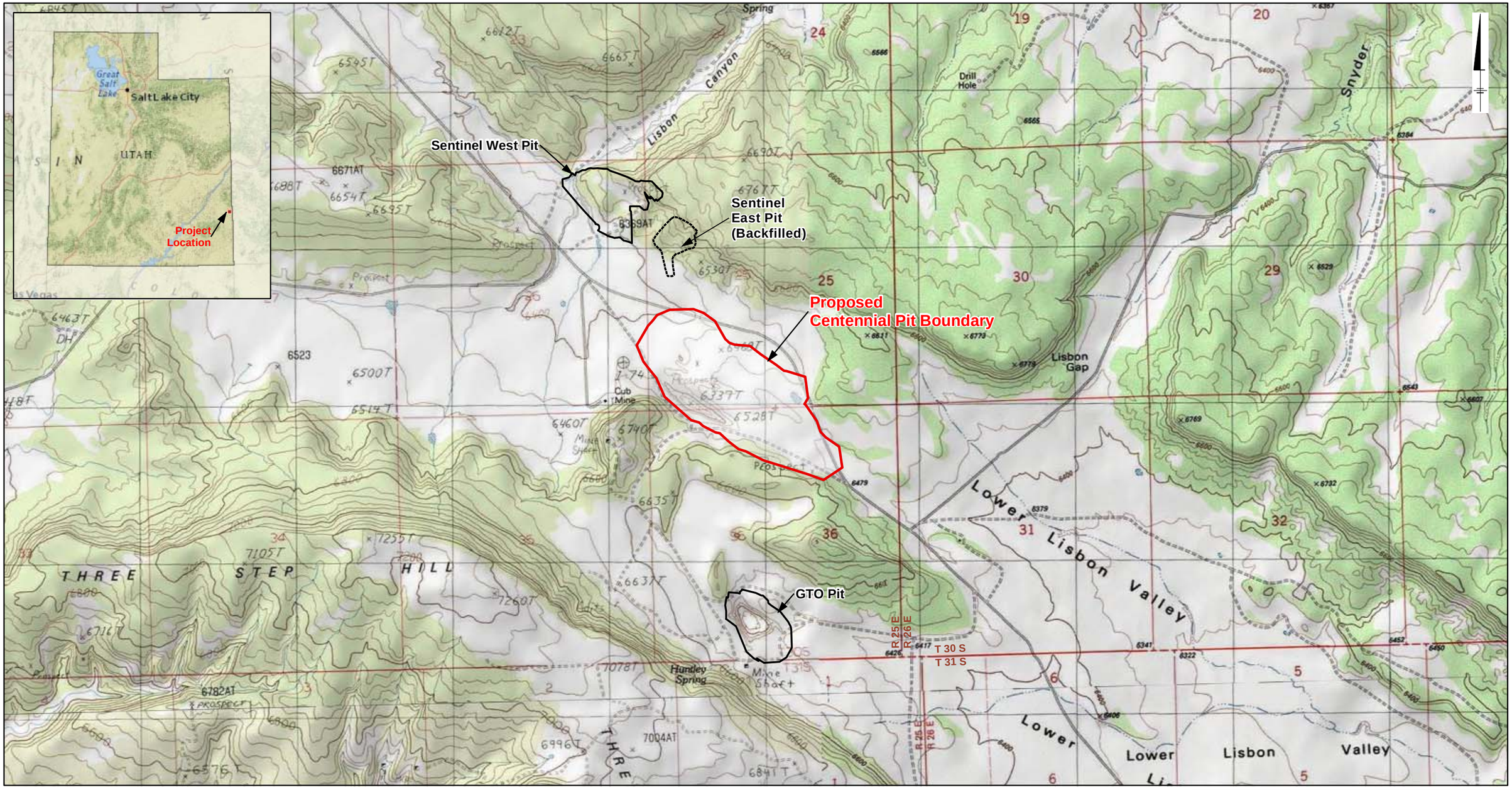
Notes
PZ = Piezometer
PW = Process Water Supply
MW = Monitoring well

Table 10
Groundwater Monitoring Analytical Suite
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter	Laboratory Analytical Method	Detection Limit	Units
Wet Chemistry			
pH	EPA 150.1	0.1	SI units
Alkalinity, Total as $CaCO_3$	SM 2320B	1	mg/L
Alkalinity, Carbonate as $CaCO_3$	SM2320B	1	mg/L
Alkalinity, Bicarbonate as $CaCO_3$	SM 2320B	1	mg/L
Alkalinity, Hydroxide as $CaCO_3$	SM 2320B	1	mg/L
Ammonia as NH_3-N	EPA 350.1	0.4	mg/L
Nitrate as NO_3-N	Calculation	0.02	mg/L
Nitrite as NO_2-N	EPA 353.2	0.01	mg/L
NO_3-N + NO_2-N	EPA 353.2	0.02	mg/L
Chloride	EPA 325.2	2	mg/L
Fluoride	SM4500F-C	0.3	mg/L
Phosphorus, total	EPA365.1	0.05	mg/L
Sulfate	EPA 375.3	2	mg/L
Specific Conductance @25C	EPA 120.1	10	umhos/cm
Hardness as $CaCO_3$	SM2340B	2	mg/L
TSS	EPA 160.2	1	mg/L
TDS	EPA 160.1	5	mg/L
Dissolved Metals			
Aluminum	EPA 200.7	0.03	mg/L
Antimony	EPA 200.8	0.002	mg/L
Arsenic	EPA 200.8	0.005	mg/L
Barium	EPA 200.7	0.01	mg/L
Beryllium	EPA 200.8	0.001	mg/L
Cadmium	EPA 200.8	0.001	mg/L
Calcium	EPA 200.7	0.1	mg/L
Chromium	EPA 200.8	0.005	mg/L
Copper	EPA 200.7	0.01	mg/L
Iron	EPA 200.7	0.01	mg/L
Lead	EPA 200.8	0.005	mg/L
Magnesium	EPA 200.7	0.1	mg/L
Manganese	EPA 200.7	0.01	mg/L
Mercury	EPA 245.1	0.0002	mg/L
Molybdenum	EPA 200.7	0.1	mg/L
Nickel	EPA 200.7	0.01	mg/L
Potassium	EPA 200.7	0.05	mg/L
Selenium	SM3114 B	0.002	mg/L
Silicon	EPA 200.7	0.5	mg/L
Silver	EPA 200.8	0.002	mg/L
Sodium	EPA 200.7	0.1	mg/L
Thallium	EPA 200.8	0.001	mg/L
Vanadium	EPA 200.7	0.01	mg/L
Zinc	EPA 200.7	0.05	mg/L
Radiological			
Gross Alpha	M9310	2	pCi/L
Gross Beta	M9310	4	pCi/L
Uranium, total	EPA 200.8	0.001	mg/L

ARCADIS

Figures



BASEMAP SOURCE:
USA TOPO MAPS (MAIN MAP), AND NATIONAL GEOGRAPHIC (INSET), BOTH SERVICED BY ESRI ARCGIS ONLINE AND ACCESSED USING ARCMAP 10.1 ON 3/28/2014.

Lisbon Valley Mining Company
La Sal, Utah

Updated Centennial Pit Backfill Evaluation

Project Location

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FIGURE
1

PATH: C:\USERS\JCHEN\DOCUMENTS\ PROJECTS\KC0001676_LISBON\VALLEY\MINE\2_GIS\ARCMAPS\2014_BACKFILL\EVAL_CENTENNIAL\PIT_UPDATED\FIG1_PROJECT LOCATION.MXD SAVED ON: 3/28/2014 LAST SAVED BY: JCHEN

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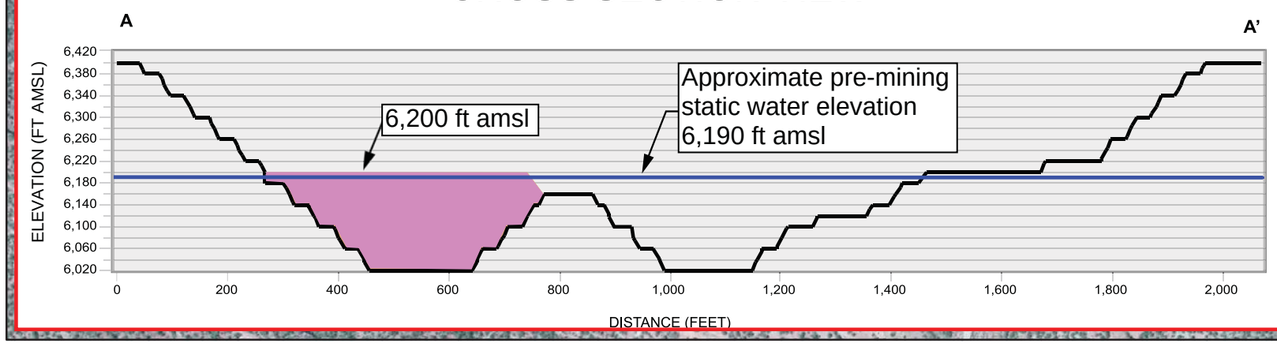
Edited in: Fig3_CrossSection_4_6M.ai

PLAN VIEW

PW-3
MW96-7B
MW96-7A
MW:2A
SLV-3
SLV-1A
MW97-9
MW97-11
A
A'
ULTIMATE PIT BOUNDARY

6020 6040 6060 6080 6100 6120 6140 6160 6200 6220 6240 6260 6280 6300 6320 6340 6360 6380 6400

CROSS SECTION VIEW



LEGEND

- BURRO CANYON WELL IN THE VICINITY OF THE CENTENNIAL PIT
- N-AQUIFER WELL IN THE VICINITY OF THE CENTENNIAL PIT
- PIT CONTOURS
- 4.6 MILLION TONS BACKFILL (ELEVATION 6,200 FT AMSL)

0 500 1,000
SCALE IN FEET

NOTES:
1) AERIAL IMAGERY PROVIDED BY ESRI ARCGIS ONLINE WORLD IMAGERY SERVICE ACCESSED USING ARCMAP 10.1 ON Date: 3/28/2014
2) DIGITAL ELEVATION MODEL PROVIDED BY USDA GEOSPATIAL DATA GATEWAY (http://datagateway.nrcs.usda.gov/)
3) ft amsl = FEET ABOVE MEAN SEA LEVEL.

Lisbon Valley Mining Company
La Sal, Utah

Updated Centennial Pit Backfill Evaluation

Backfill Scenario 1

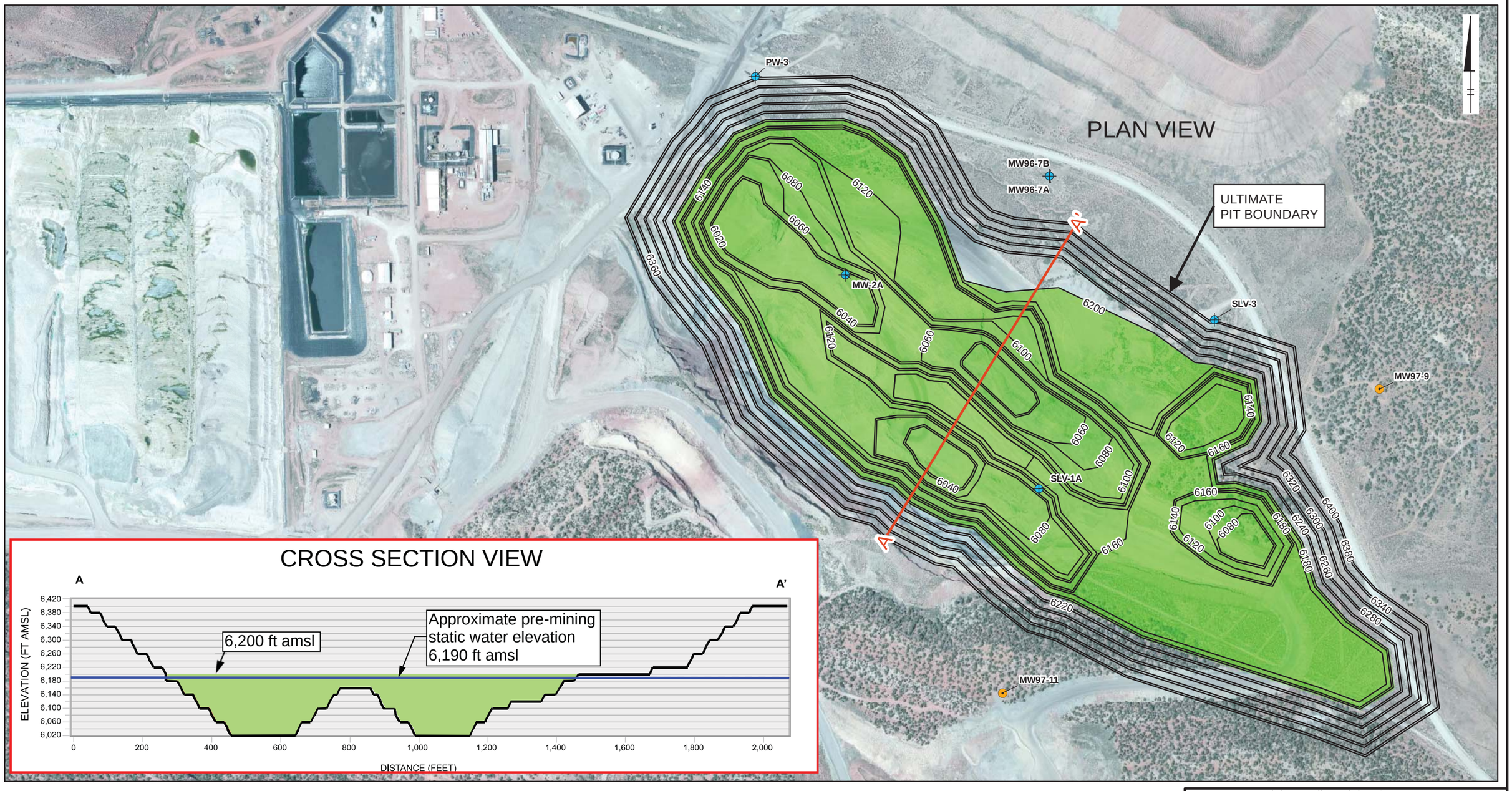
ARCADIS

FIGURE
2

PATH: C:\USERS\JCHEN\DOCUMENTS_PROJECTS\KCG0001676_LISBONVALLEYMINE\2_GIS\ARCMAPS\2014_BACKFILLEVAL_CENTENNIALPIT_UPDATEDCROSSSECTION_25M.MXD SAVED ON: 3/28/2014 LAST SAVED BY: JCHEN

Edited in: Fig4_CrossSection_25M.ai

PLAN VIEW



CROSS SECTION VIEW

LEGEND

- BURRO CANYON WELL IN THE VICINITY OF THE CENTENNIAL PIT
- N-AQUIFER WELL IN THE VICINITY OF THE CENTENNIAL PIT
- PIT CONTOURS
- 25 MILLION TONS BACKFILL (ELEVATION 6,200 FT AMSL)

0 500 1,000

SCALE IN FEET

NOTES:
1) AERIAL IMAGERY PROVIDED BY ESRI ARCGIS ONLINE WORLD IMAGERY SERVICE ACCESSED USING ARCMAP 10.1 ON Date: 3/28/2014
2) DIGITAL ELEVATION MODEL PROVIDED BY USDA GEOSPATIAL DATA GATEWAY (http://datagateway.nrcs.usda.gov/)
3) ft amsl = FEET ABOVE MEAN SEA LEVEL.

Lisbon Valley Mining Company
La Sal, Utah

Updated Centennial Pit Backfill Evaluation

Backfill Scenario 2

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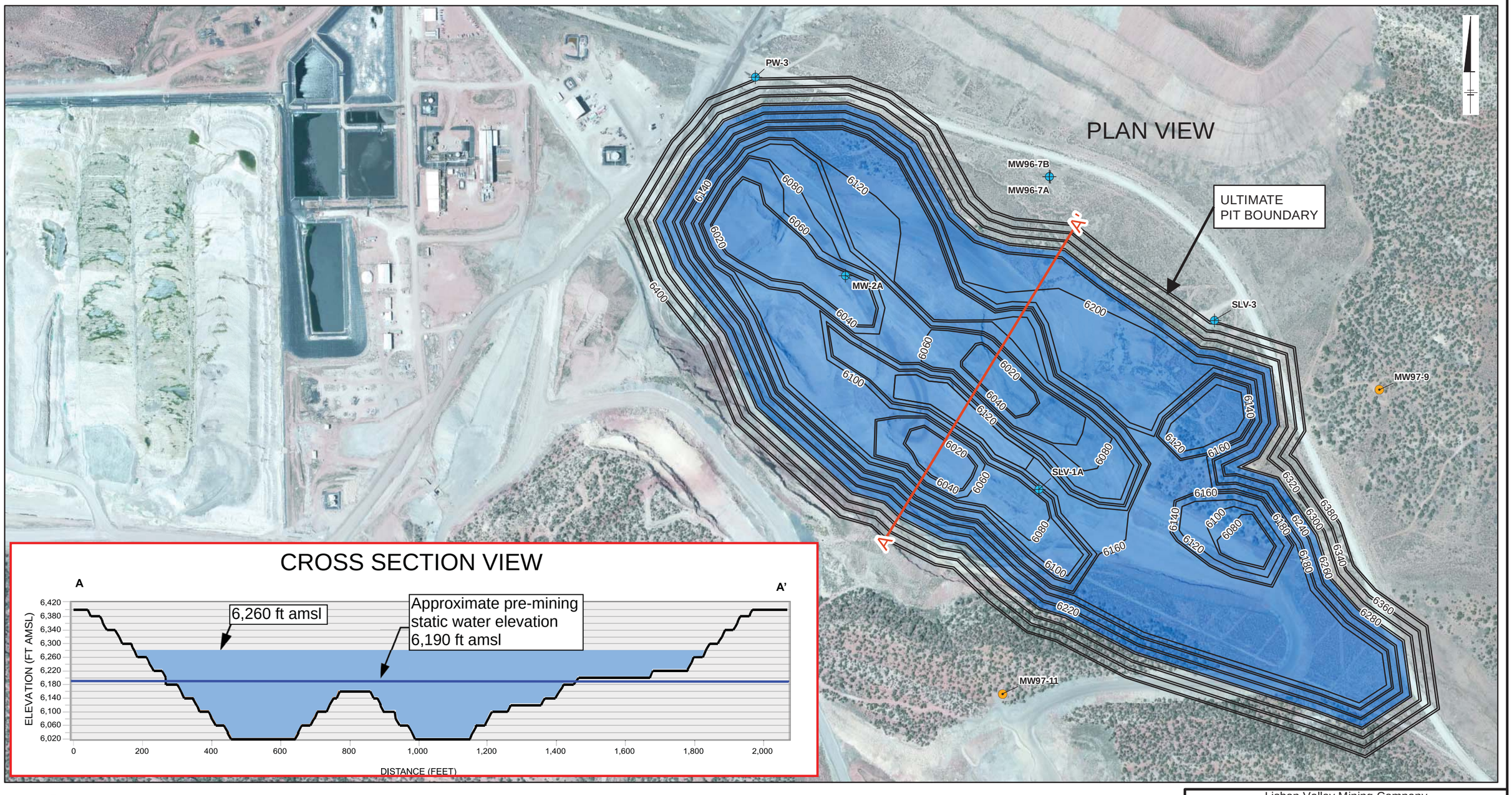
FIGURE
3



CROSS SECTION VIEW

LEGEND

- BURRO CANYON WELL IN THE VICINITY OF THE CENTENNIAL PIT
- N-AQUIFER WELL IN THE VICINITY OF THE CENTENNIAL PIT
- PIT CONTOURS
- 50 MILLION TONS BACKFILL (ELEVATION 6,260 FT AMSL)

0 500 1,000

SCALE IN FEET

NOTES:
1) AERIAL IMAGERY PROVIDED BY ESRI ARCGIS ONLINE WORLD IMAGERY SERVICE ACCESSED USING ARCMAP 10.1 ON Date: 3/28/2014
2) DIGITAL ELEVATION MODEL PROVIDED BY USDA GEOSPATIAL DATA GATEWAY (http://datagateway.nrcs.usda.gov/)
3) ft amsl = FEET ABOVE MEAN SEA LEVEL.

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Updated Centennial Pit Backfill Evaluation

Backfill Scenario 3

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FIGURE
4

Edited in: Fig5_CrossSection_50M.ai
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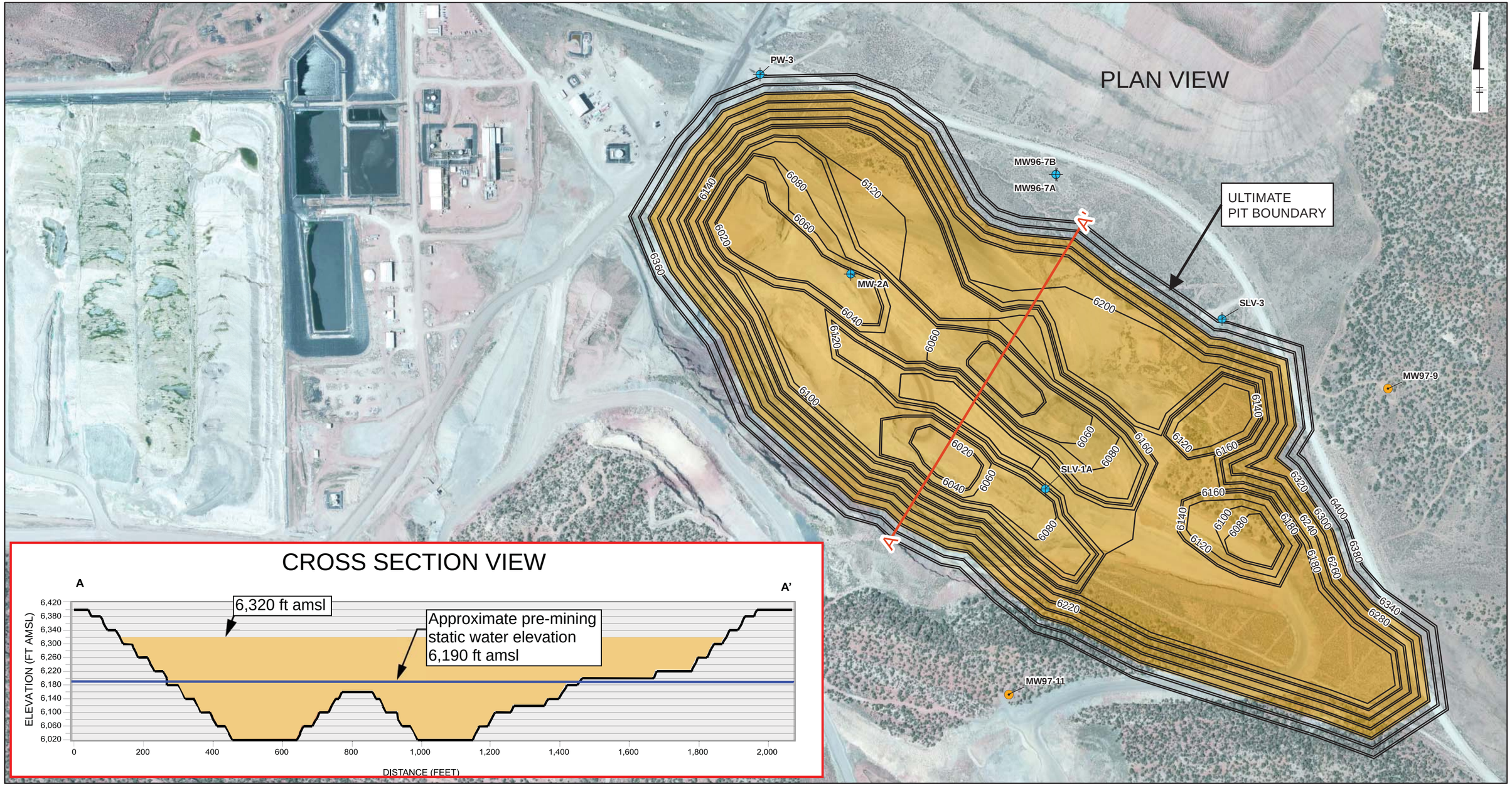
Edited in: Fig6_CrossSection_75M.ai

PLAN VIEW



CROSS SECTION VIEW

LEGEND

- BURRO CANYON WELL IN THE VICINITY OF THE CENTENNIAL PIT
- N-AQUIFER WELL IN THE VICINITY OF THE CENTENNIAL PIT
- PIT CONTOURS
- 75 MILLION TONS BACKFILL (ELEVATION 6,320 FT AMSL)

0 500 1,000

SCALE IN FEET

NOTES:
1) AERIAL IMAGERY PROVIDED BY ESRI ARCGIS ONLINE WORLD IMAGERY SERVICE ACCESSED USING ARCMAP 10.1 ON Date: 3/28/2014
2) DIGITAL ELEVATION MODEL PROVIDED BY USDA GEOSPATIAL DATA GATEWAY (http://datagateway.nrcs.usda.gov/)
3) ft amsl = FEET ABOVE MEAN SEA LEVEL.

Lisbon Valley Mining Company
La Sal, Utah

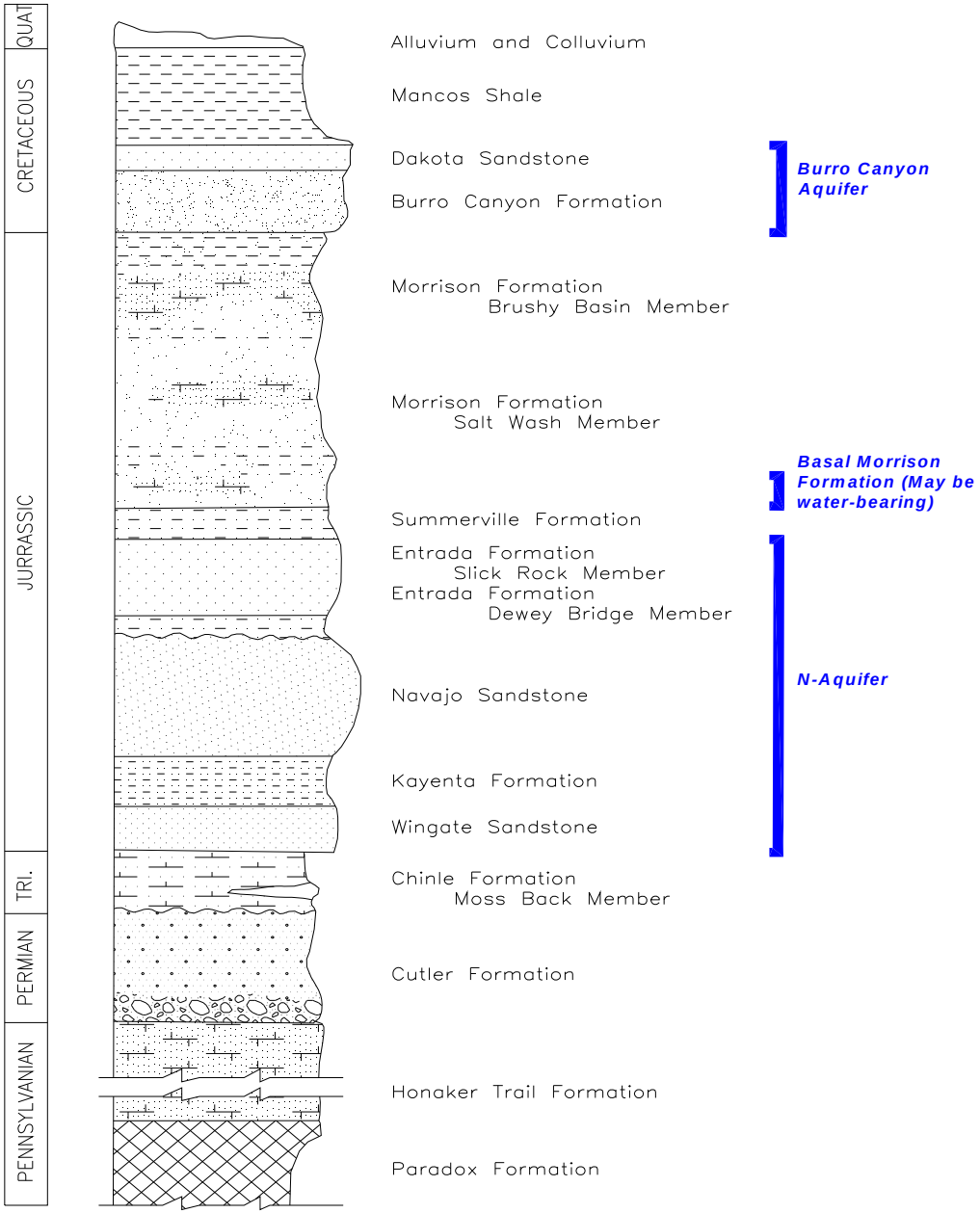
Updated Centennial Pit Backfill Evaluation

Backfill Scenario 4

ARCADIS

FIGURE
5

Bed Numbering System for the Lisbon Valley Mine



Unit Number	Formation	Lithology	Thickness (ft)	Copper Mineralization
1	Quaternary	red and yellow sand and silt, aeolian or alluvial	0-40	None
2	Mancos	black to brownish-green shale with local gypsum	0-70 in drillholes	sporadic, low-grade
3	Dakota	buff to white sandstone, may have shale at base	15-20	`
4	Dakota	buff to white sandstone, minor gray shale	15-20	local economic grades
5	Dakota	buff sandstone, fine- to medium-grained	15-20	local economic grades at base
6	Dakota	coal, grades into carbonaceous shale	20-May	minor, at top
7	Dakota	light gray shale, may grade into sandstone	20-Oct	None
8	Dakota	coal, similar to #6 but shaley or sandy with pyrite balls	20-May	low-grade
9	Dakota	light gray shale, grading into fine-grained sandstone as #10	10-May	None
10	Dakota	sandstone with local mudstone, similar to #9	0-15	local economic grades
11	Dakota	white or buff sandstone, 1-10% shale or organics, similar to #11 when white	Feb-35	major ore host, GTO & Centennial
12	Dakota	greenish shale and sandstone, often pyritic	20-May	locally minor
13	Dakota	white, buff or orange sandstone, poorly-cemented, similar to #11	20-50	major ore host, GTO & Centennial
14	Burro Canyon	varicolored shale, may grade into cherty limestone or conglomerate	70-120	
15	Burro Canyon	pure white quartzose sandstone, local shale intercalations	90-150	major ore host in Sentinel Pit
16	Burro Canyon	transition from #15 to #16; not always logged separately.	30-Oct	none
17	Morrison	red or white shale, some red sandstone	10+	minor
none	Morrison	mainly shale and sandstone, some limestone and conglomerate	600-800	minor
none	pre-Morrison	other Jurassic, Triassic, Permian, and Pennsylvanian sandstones, shales, etc.	several thousand	minor except possibly Cutler Fm.

Source: Pincock, Allen & Holt (2005)

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Updated Centennial Pit Backfill Evaluation

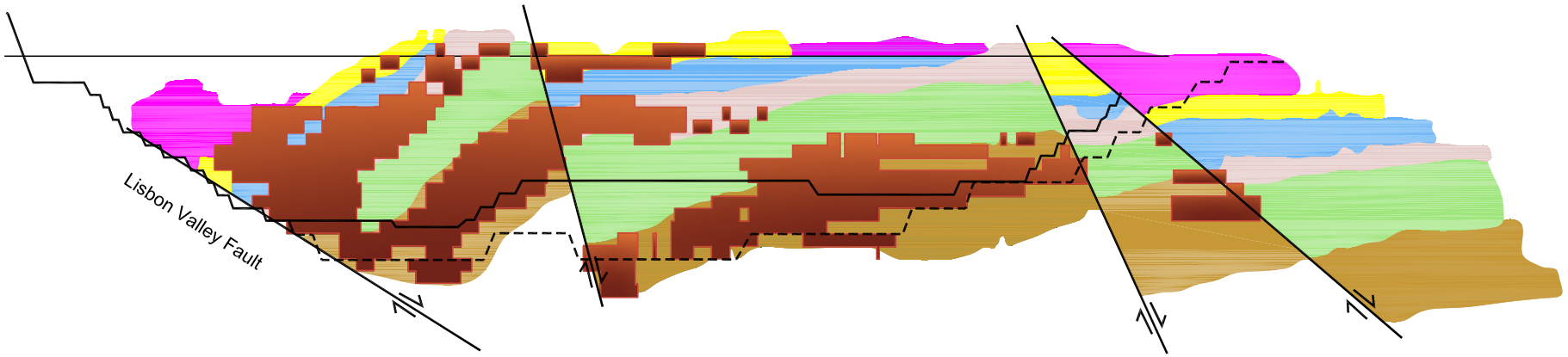
Stratigraphic Column Showing Burro Canyon Aquifer and N-Aquifer at Lisbon Valley Mine

ARCADIS

FIGURE
6

Path: K:\CO001676_LisbonValleyMine\3_IMAGES\2014\Fig7_Geologic Cross Section through Centennial Pit.ai Formatted by: JCHEN Saved on: 03/26/2014

Centennial Pit
Looking Northwest



Pit Bottom 8/2012

Ultimate Pit

Bed 3

Bed 6

Bed 9

Bed 13

Bed 14

Bed 15

Cu Ore Blocks

NOTE: FIGURE PROVIDED BY LISBON VALLEY MINING COMPANY.

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Geologic Cross-section Through Centennial Pit

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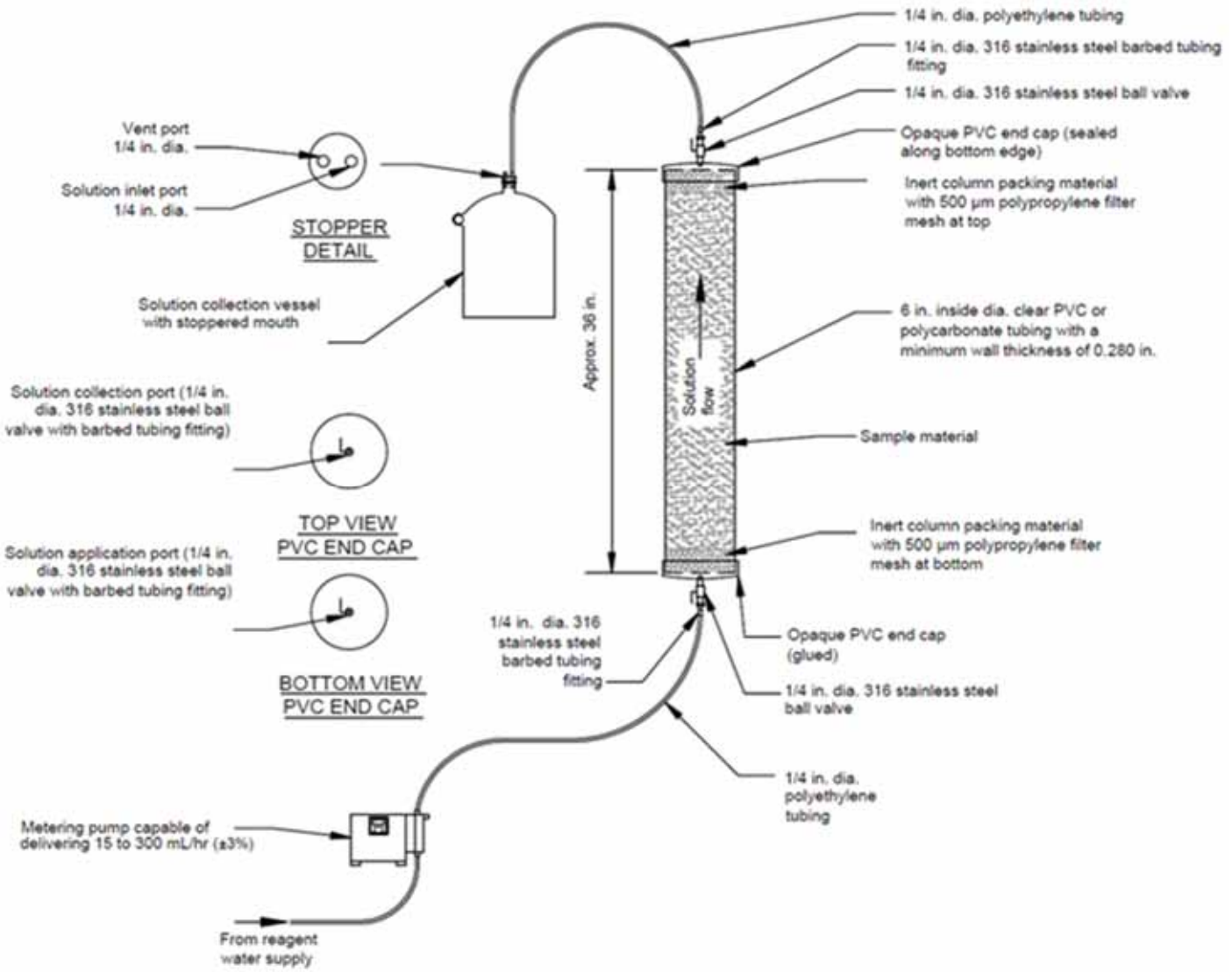
FIGURE
7



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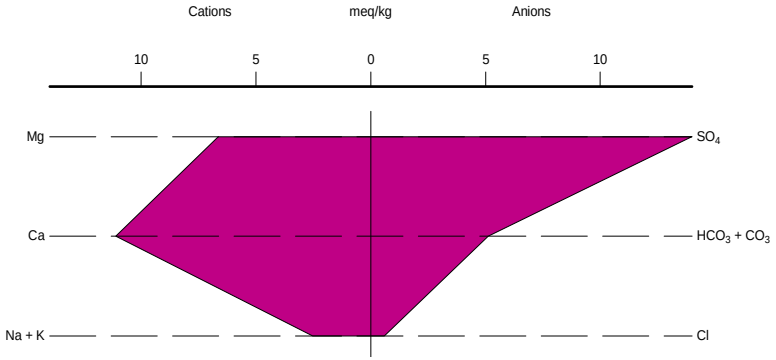
Updated Centennial Pit Backfill Evaluation

Saturated Column Schematic

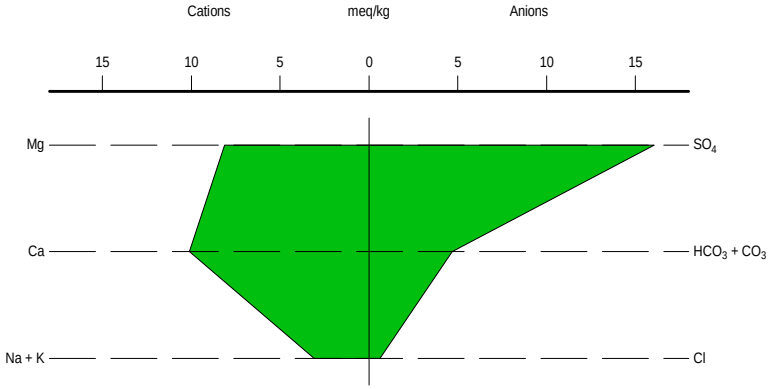
ARCADIS

FIGURE
8

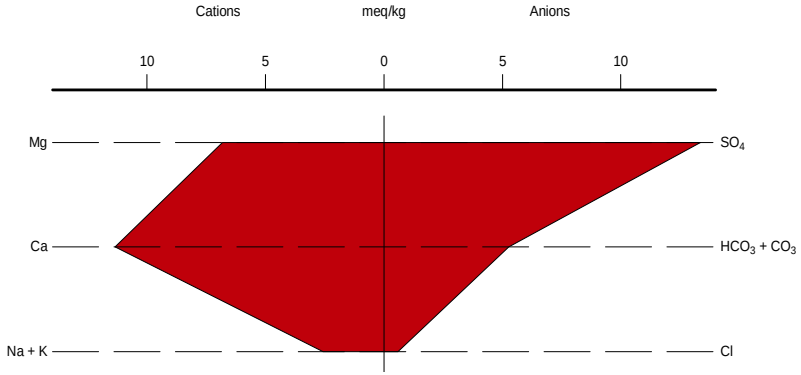
PW-3
August 2013



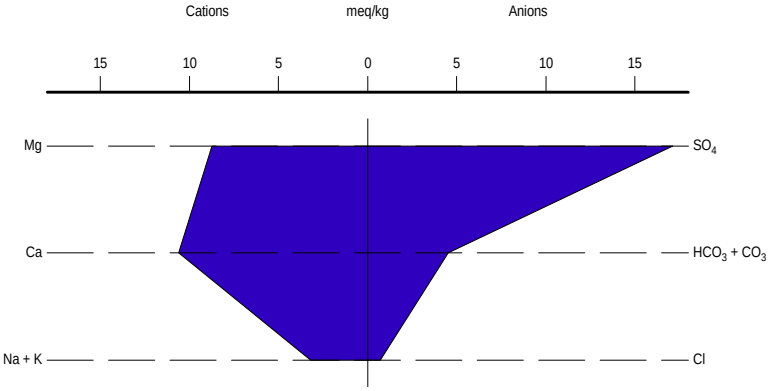
MW96-7A
August 2013



PW-3
March 2012



MW96-7A
August 2012

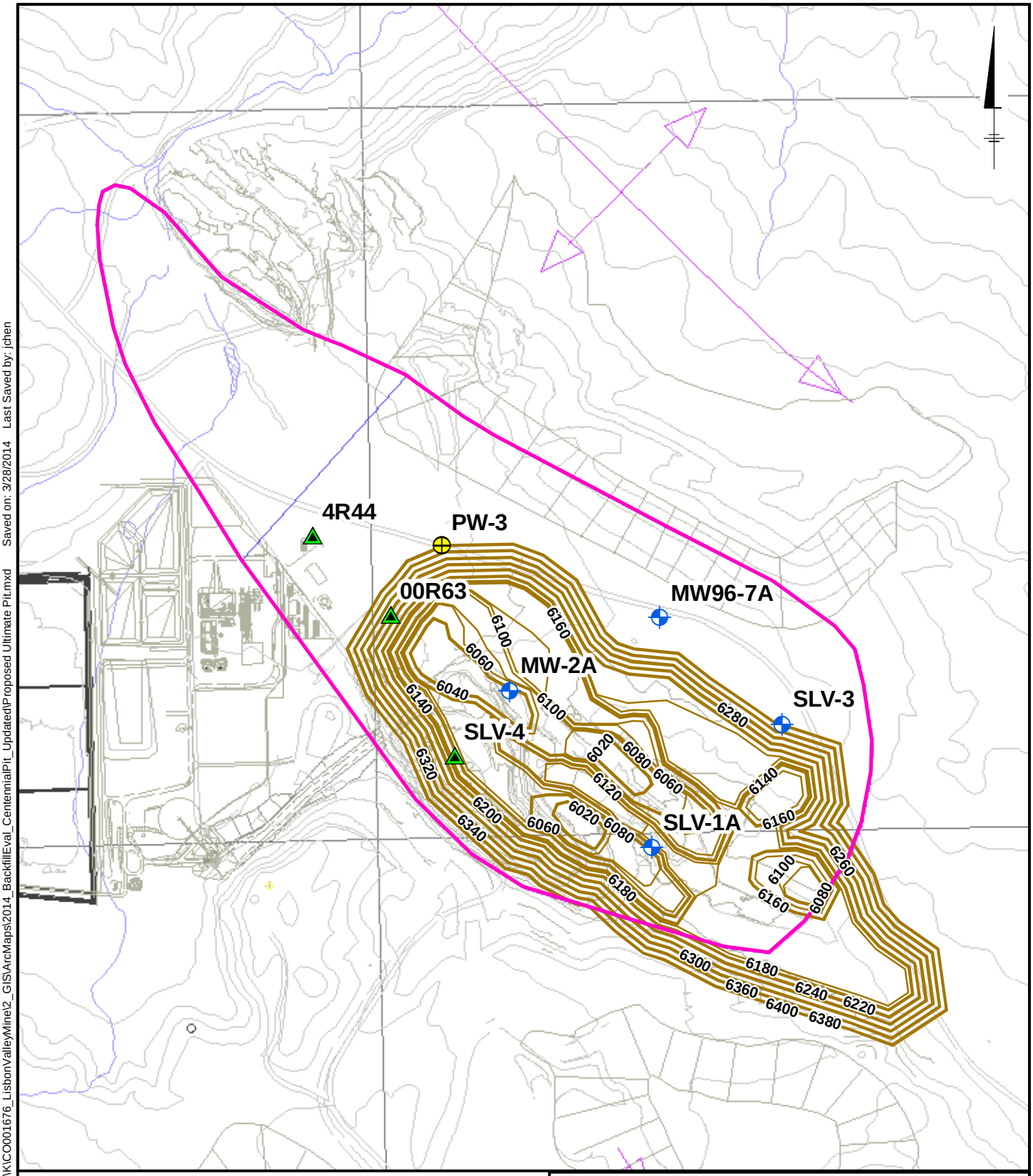


Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Stiff Diagrams Comparing Major Ion Chemistry in Burro Canyon Aquifer Wells

ARCADIS

FIGURE
9



LEGEND

- MONITORING WELL
- PUMP WELL
- PIEZOMETER
- BURRO CANYON AQUIFER
- CENTENNIAL PIT ELEVATION CONTOURS (FEET)

0 150 300
SCALE IN FEET

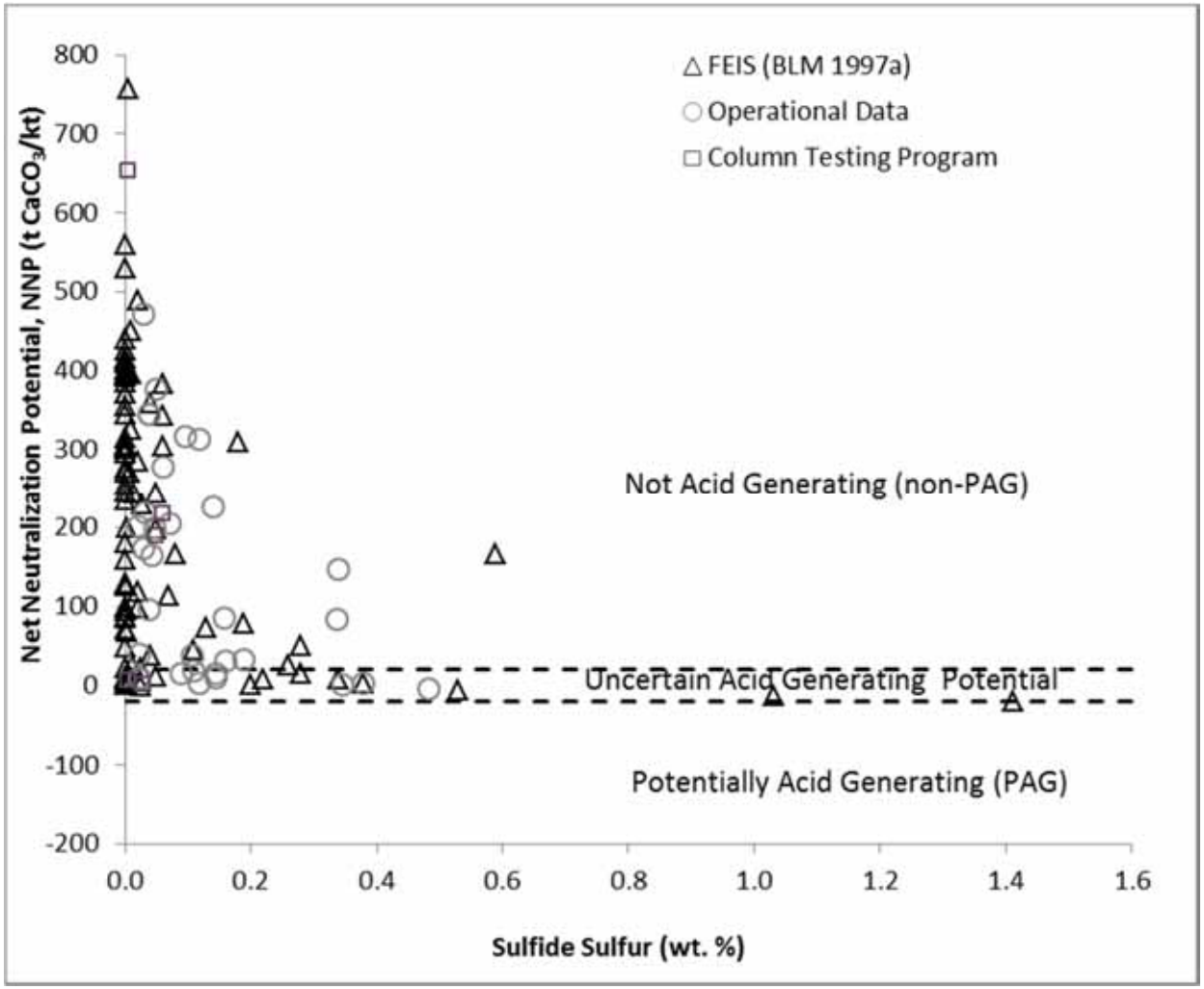
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Proposed Ultimate Centennial Pit and Well Locations

ARCADIS

FIGURE
10

Path: C:\Users\jchen\Documents_PROJECTS\KICO001676_LisbonValleyMine\2_GIS\ArcMaps\2014_BackfillEval_CentennialPit_Updated\Proposed Ultimate Pit.mxd Saved on: 3/28/2014 Last Saved by: jchen

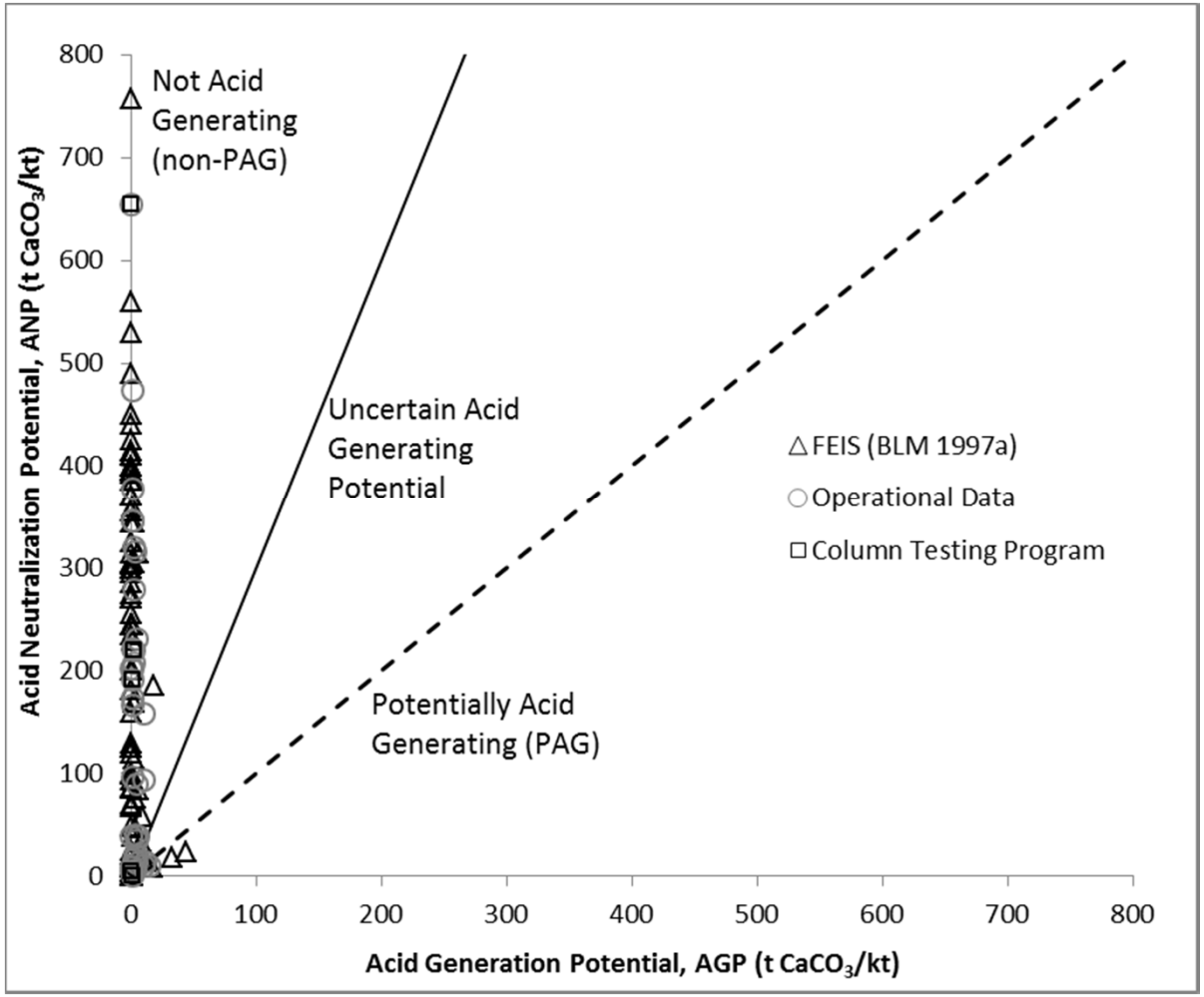


Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Net Neutralization Potential as a function of Sulfide Sulfur

ARCADIS

FIGURE
11



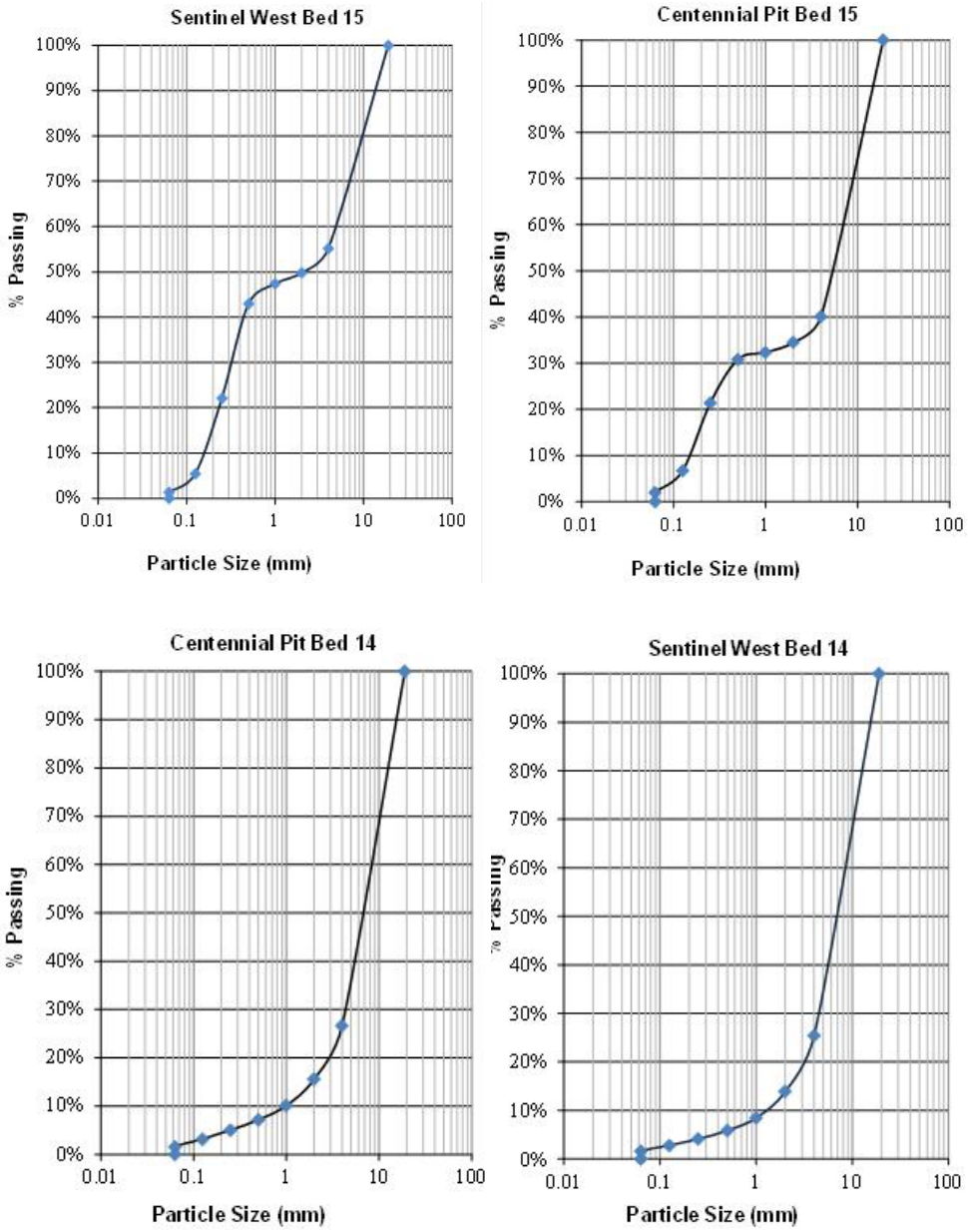
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Acid Neutralization Potential as a function of Acid Generation Potential

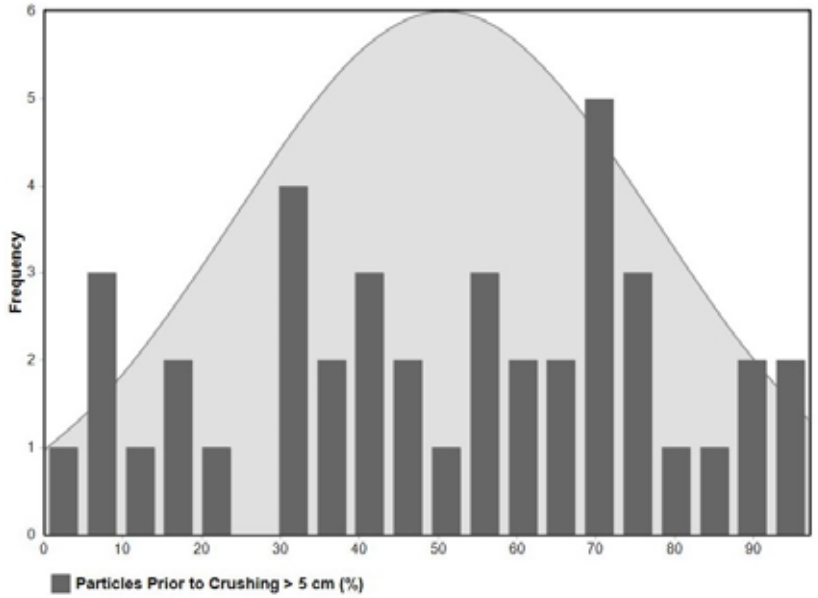
ARCADIS

FIGURE
12

Column Testing Samples



MWMP Samples

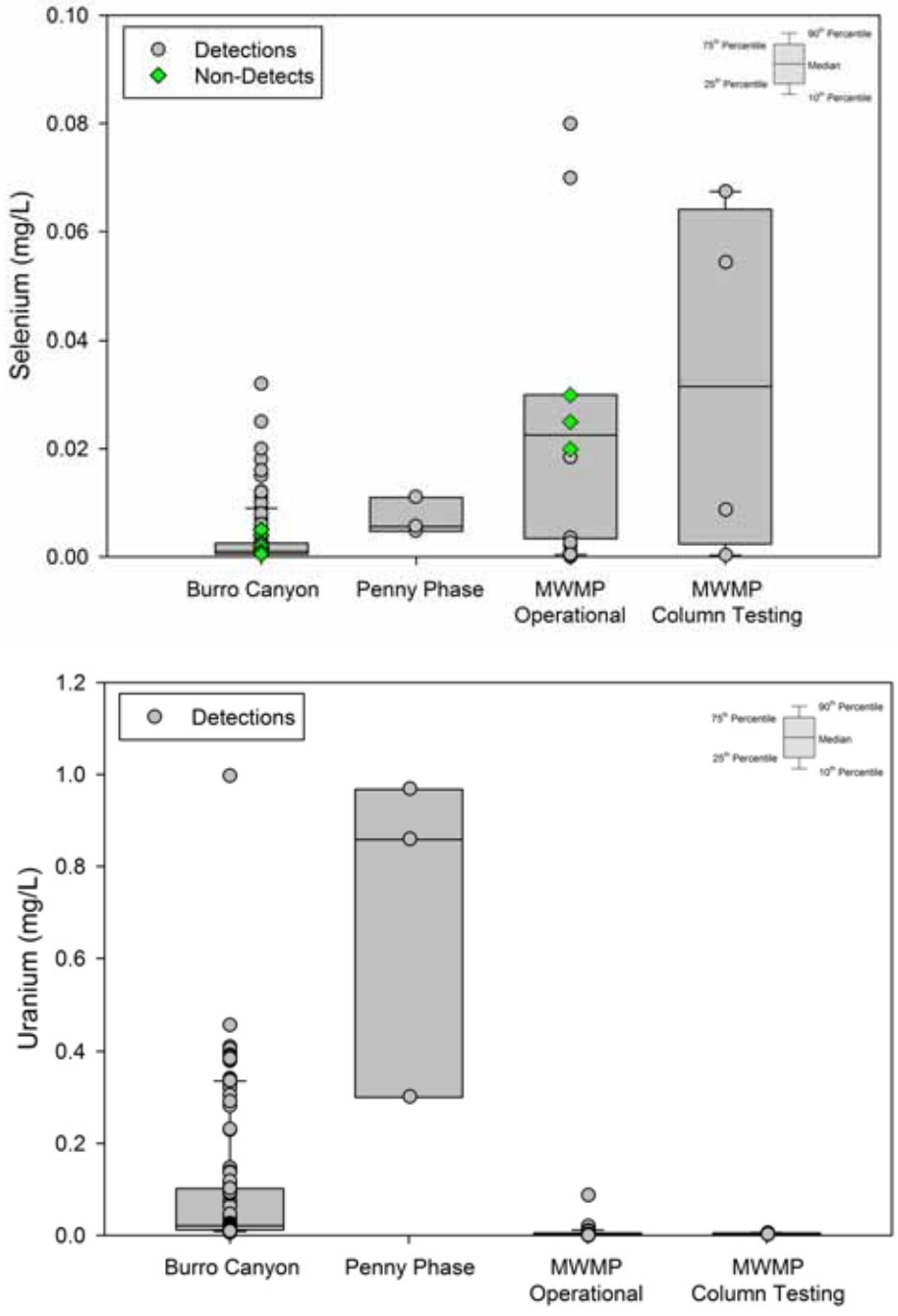


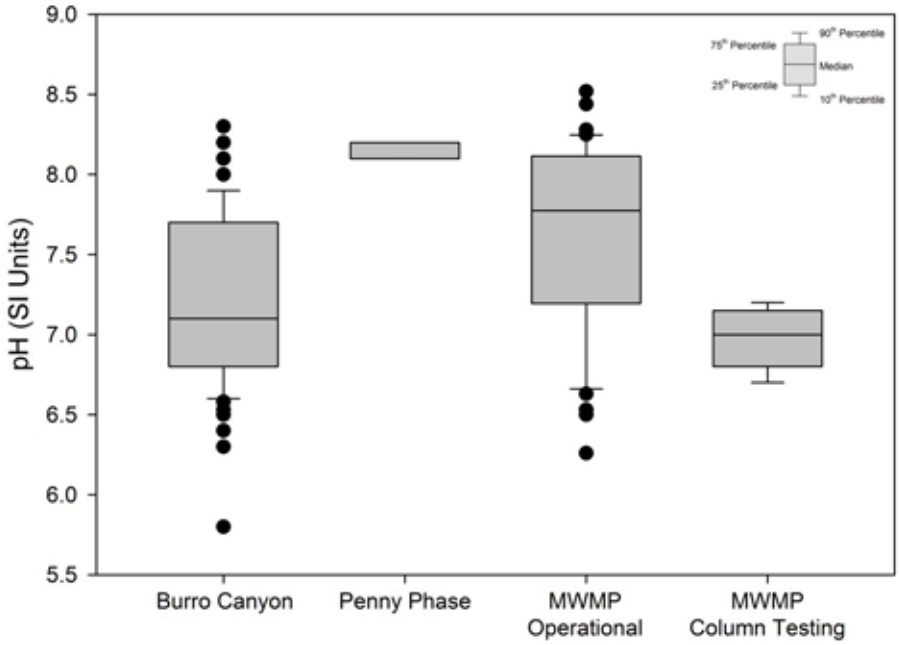
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Particle Size Distributions in Column Testing and MWMP Samples

ARCADIS

FIGURE
13





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Updated Centennial Pit Backfill Evaluation

Box and Whisker Plots – pH, Selenium, and Uranium

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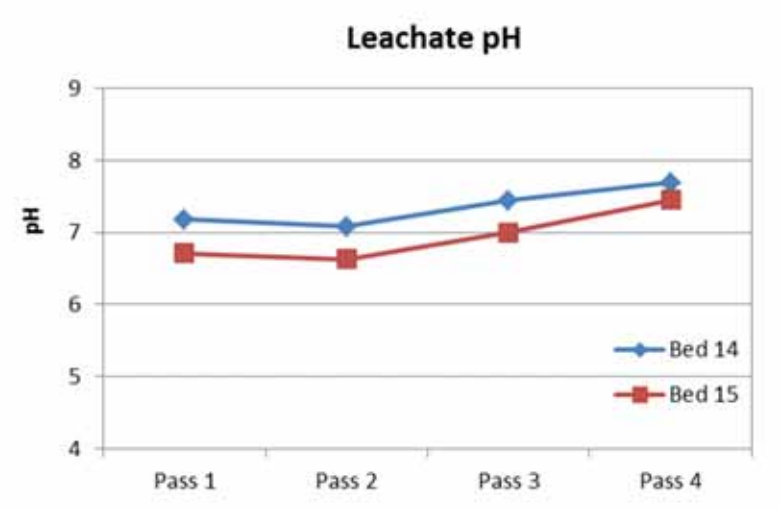
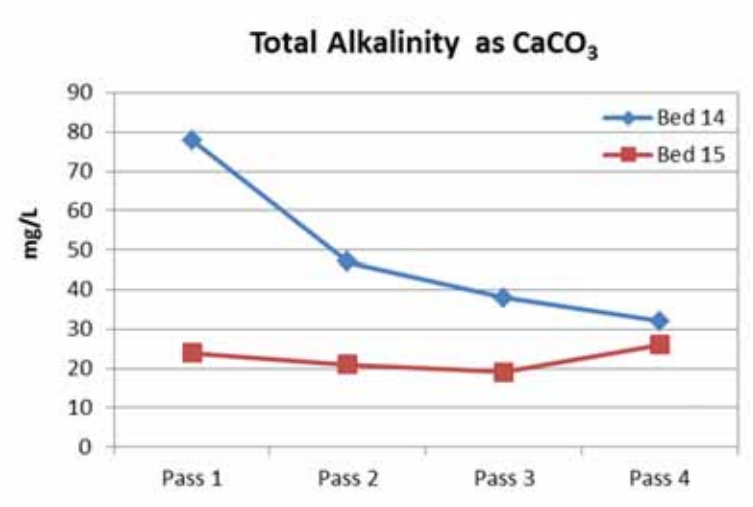
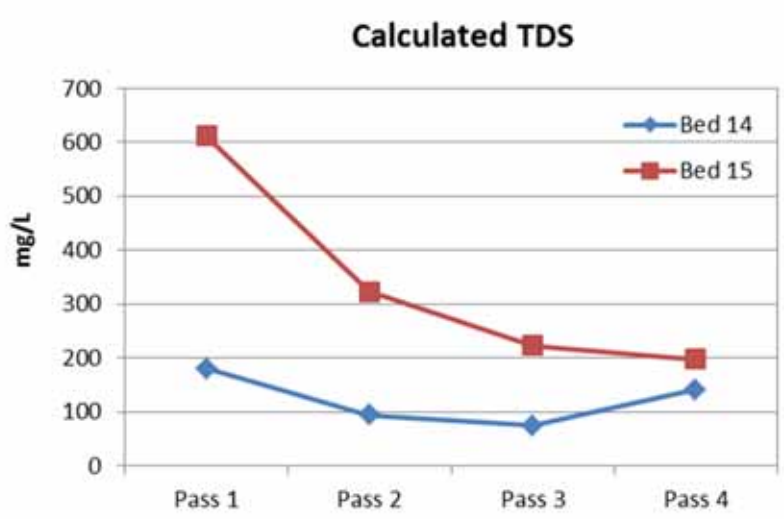
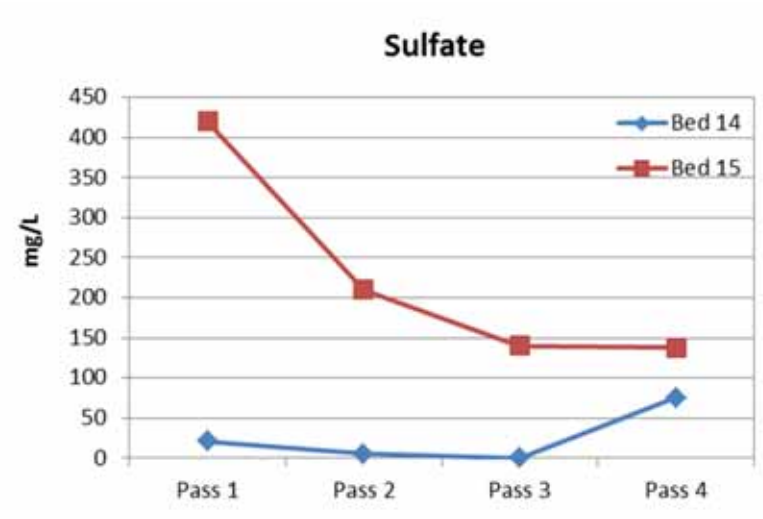
FIGURE
14







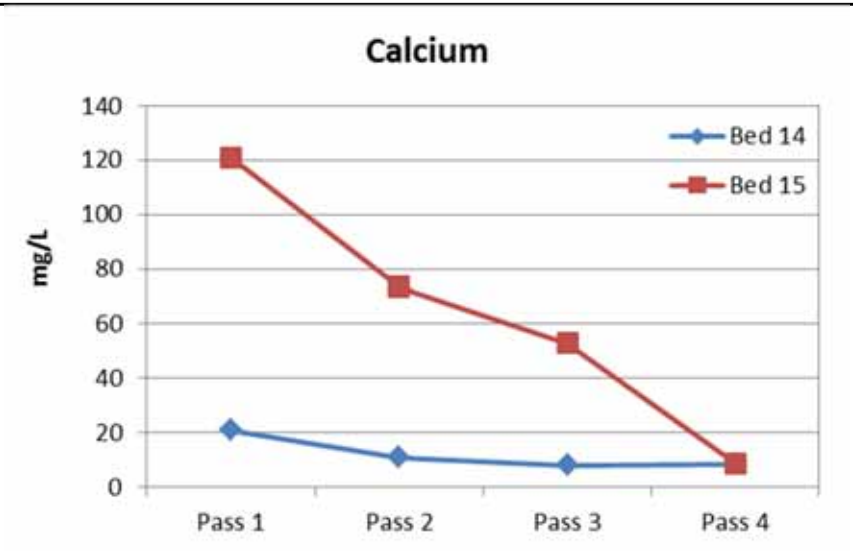


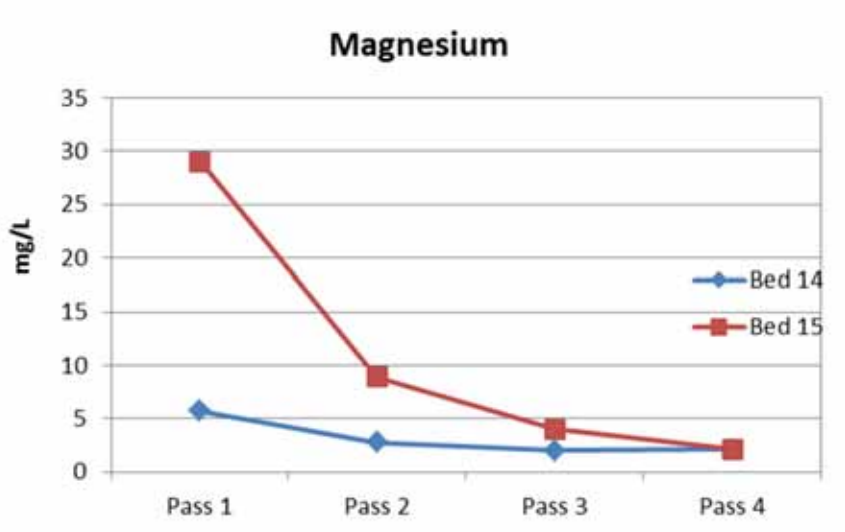
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

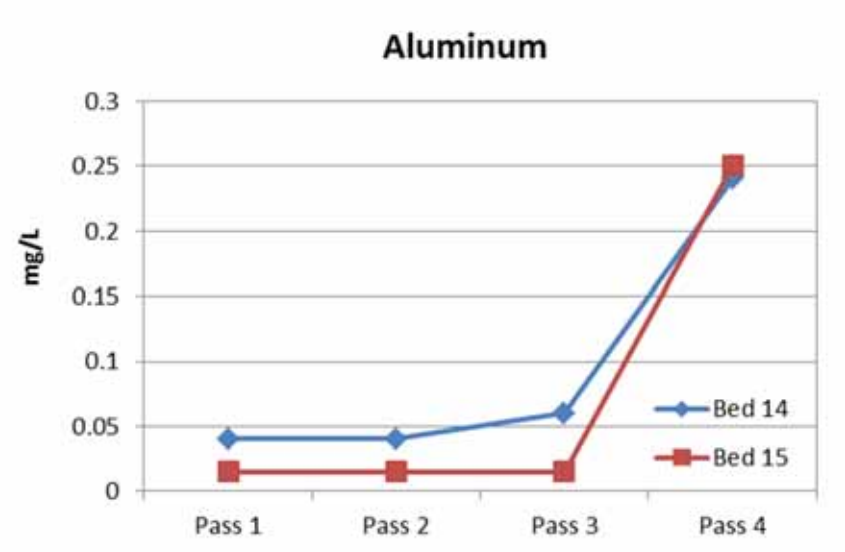
Multiple Extraction MWMP (pH, Sulfate, TDS, and Alkalinity)

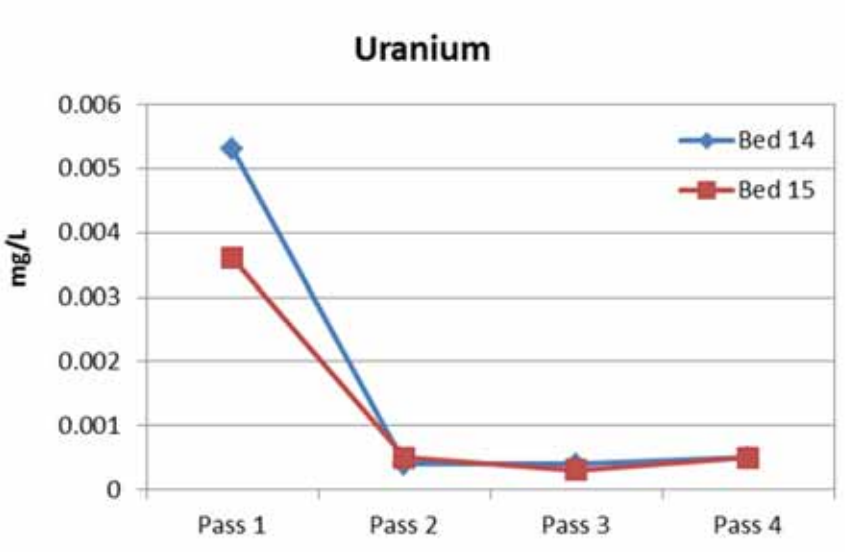
ARCADIS

FIGURE
15







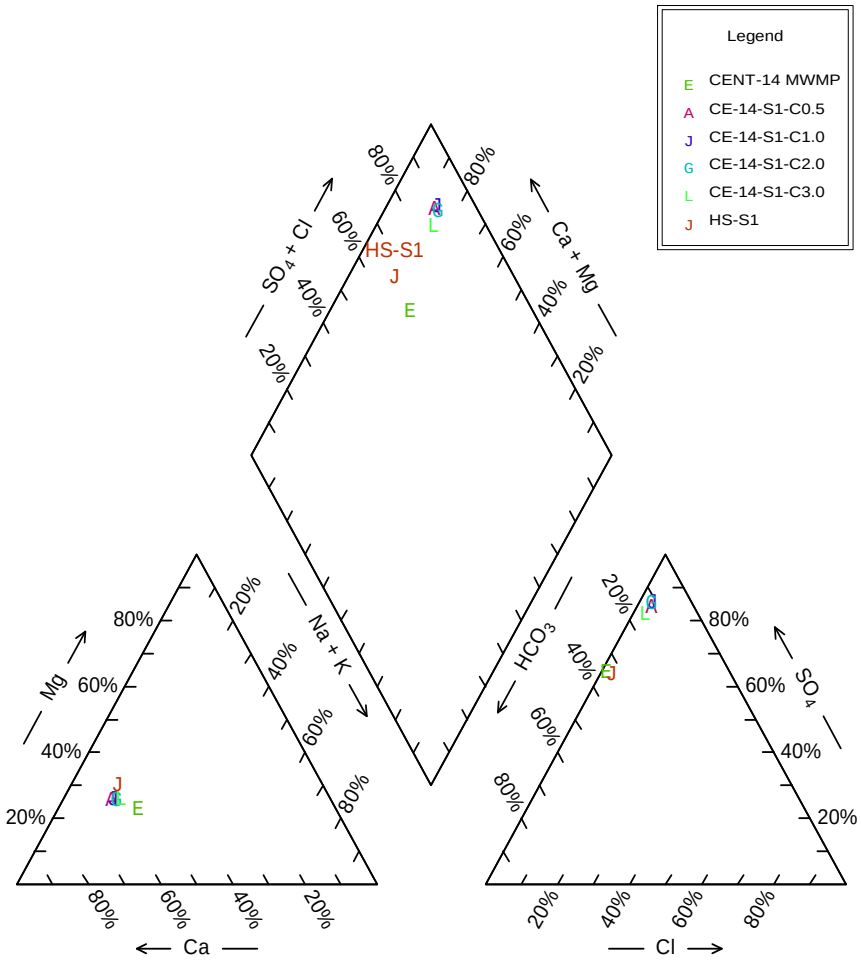


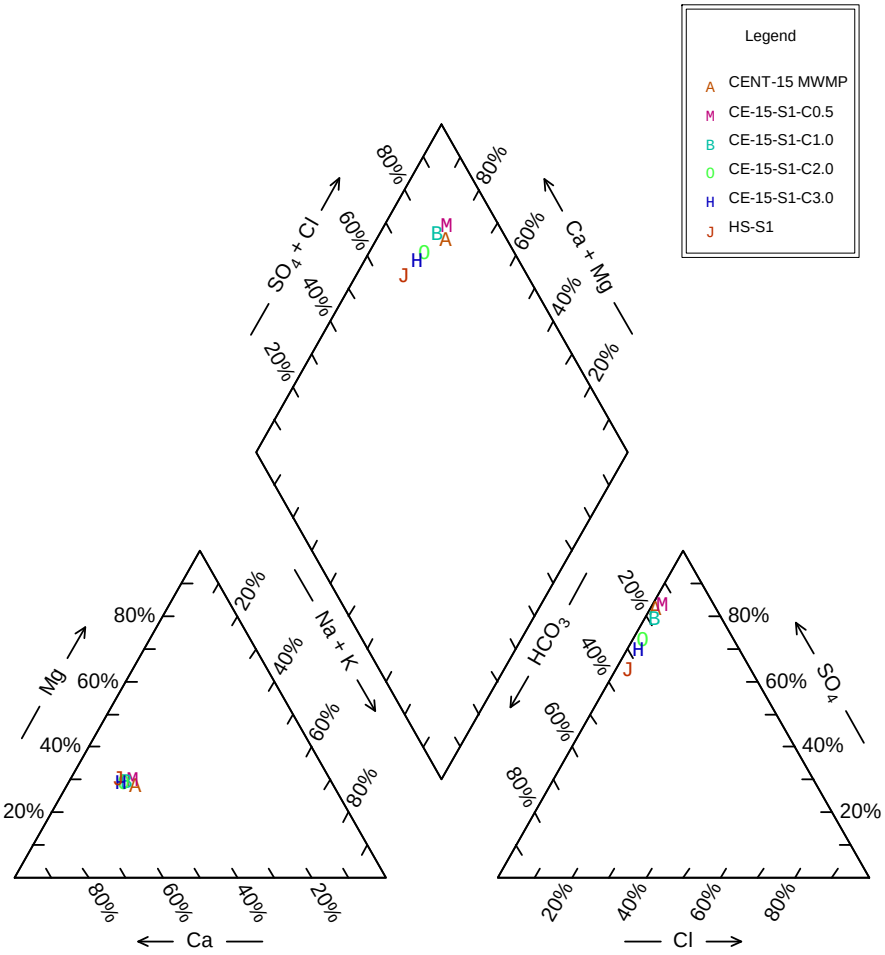
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Multiple Extraction MWMP Results (Calcium, Magnesium, Aluminum and Uranium)

ARCADIS

FIGURE
16



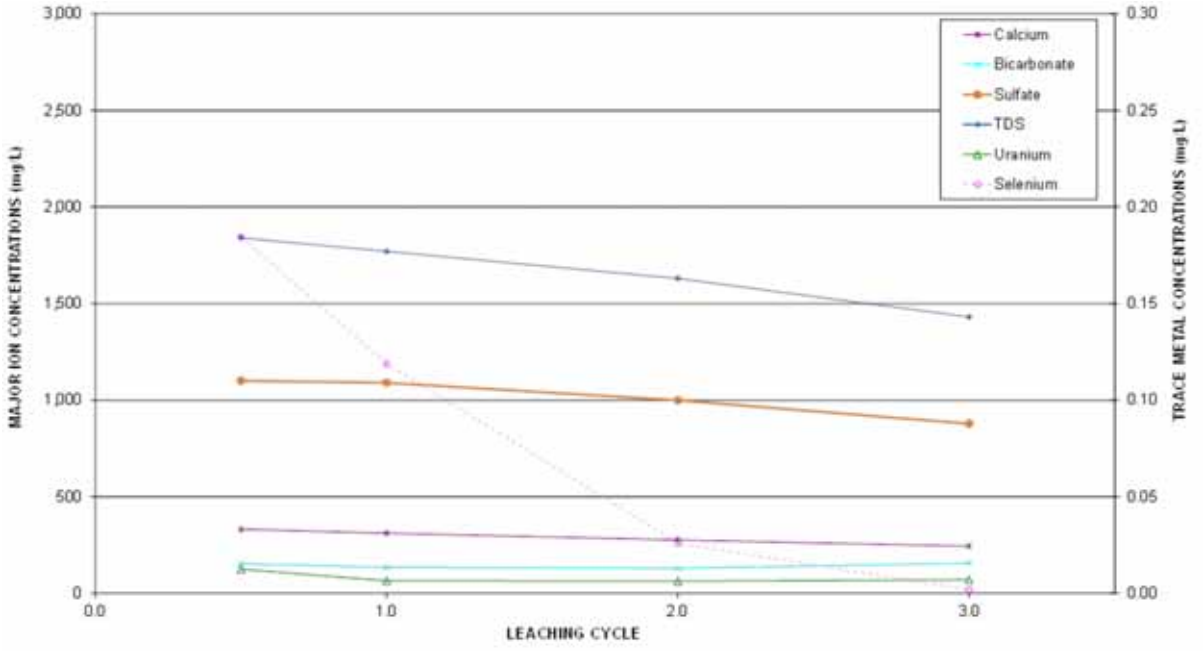


Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

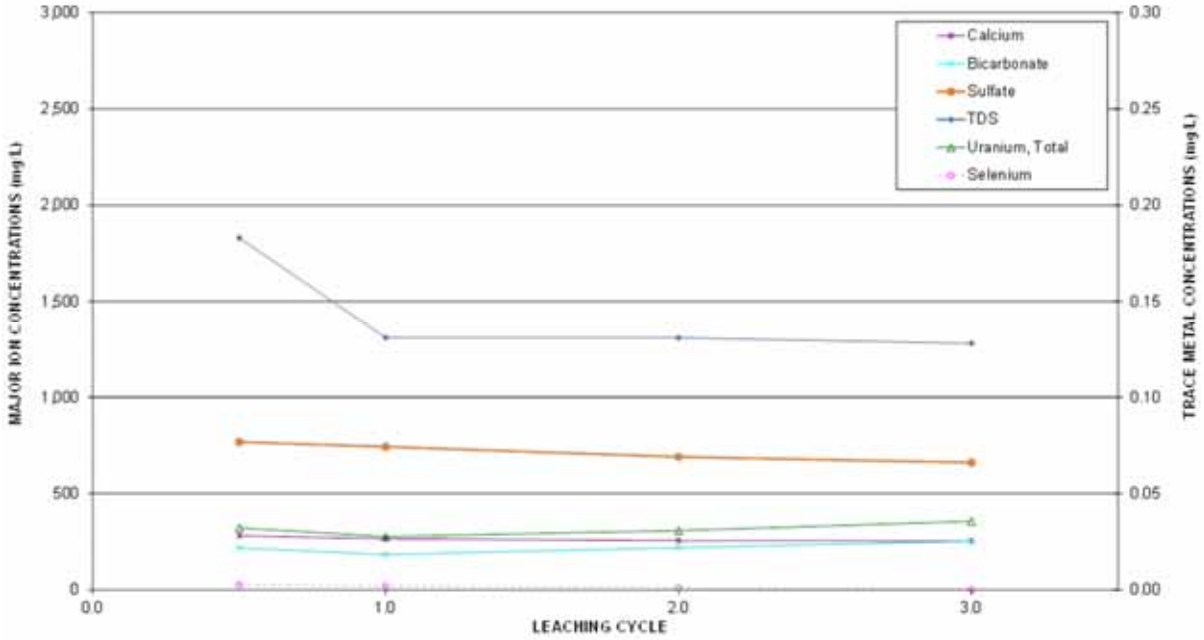
Piper Diagrams – Bed 14 and Bed 15 MWMP, Column Leachates, and Head Solution

ARCADIS

FIGURE
17



a) Centennial Pit
Bed 14 Column
Leachate Quality



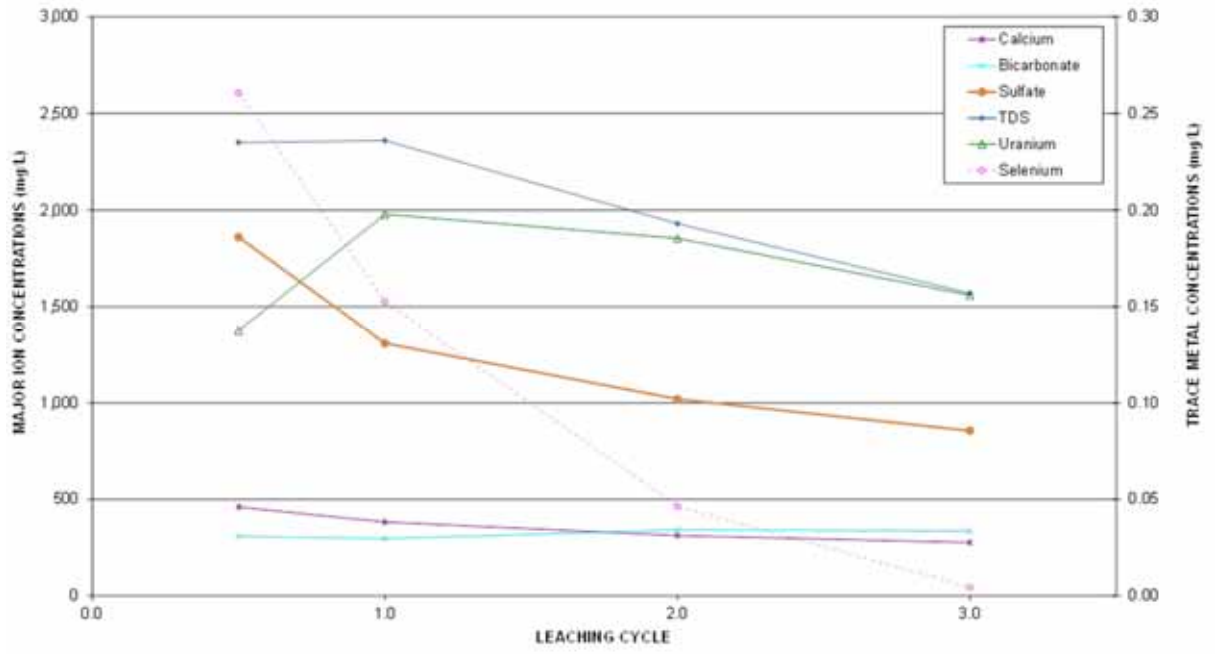
b) Sentinel West Pit
Bed 14 Column
Leachate Quality

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

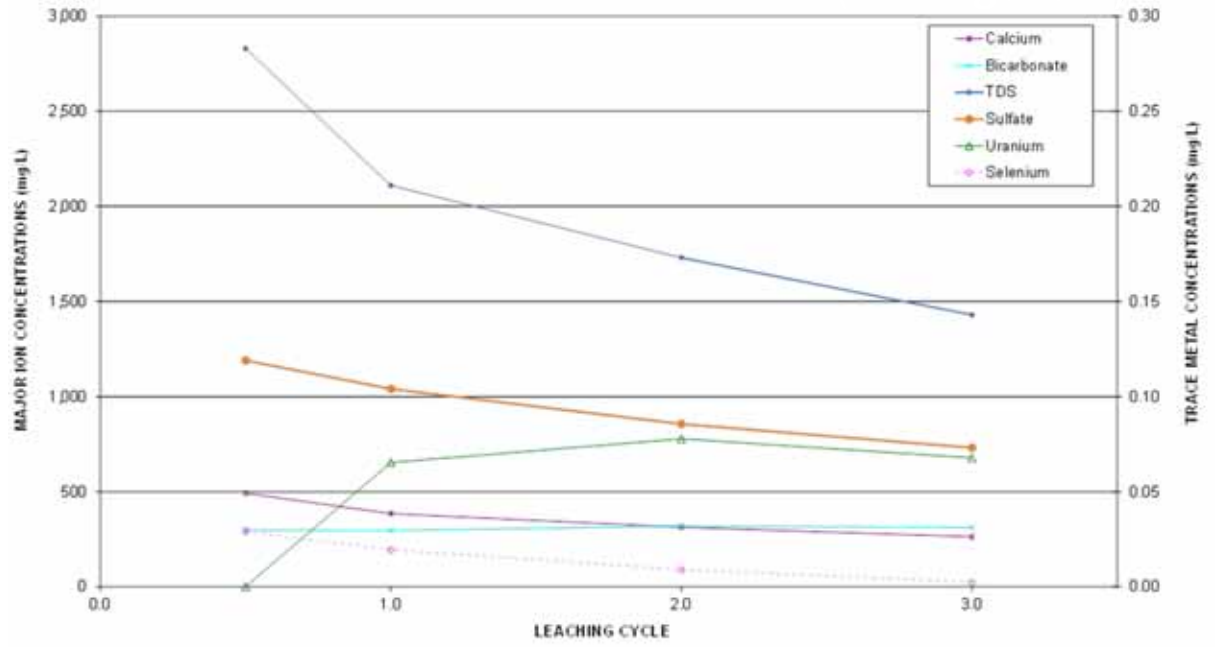
Representative Bed 14 Column Leachate Quality

ARCADIS

FIGURE
18



a) Centennial Pit
Bed 15 Column
Leachate Quality



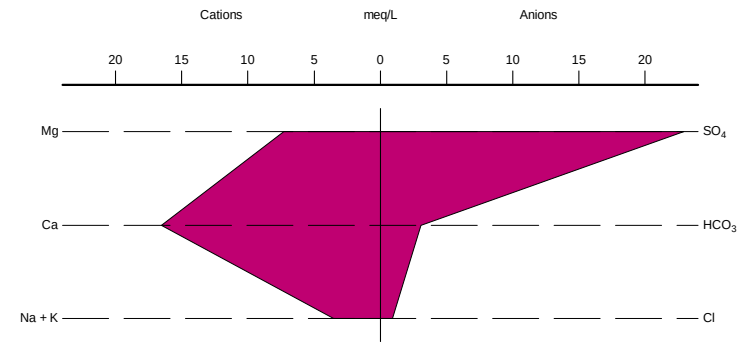
b) Sentinel West Pit
Bed 15 Column
Leachate Quality

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

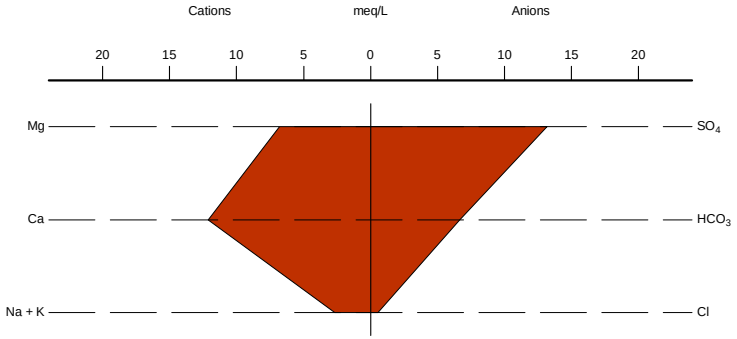
Representative Bed 15 Column Leachate Quality

ARCADIS

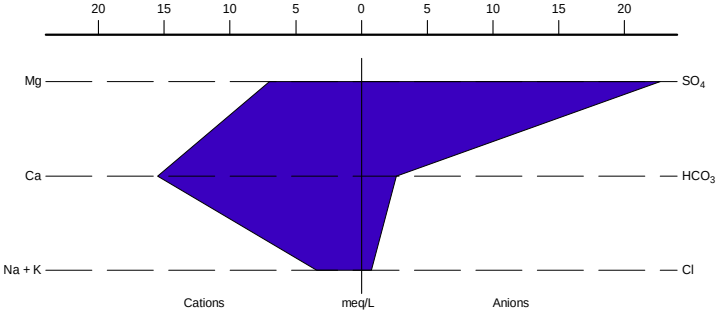
FIGURE
19



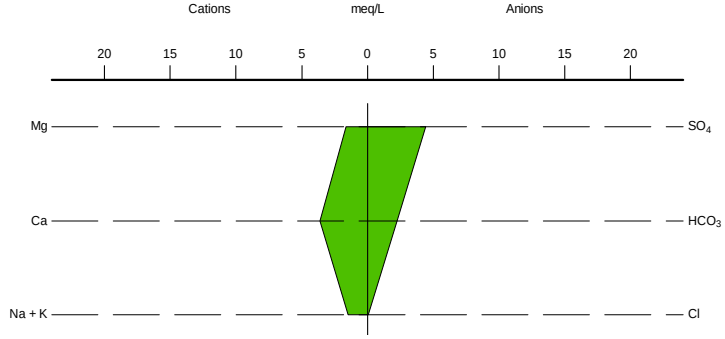
Bed 14 Pore Volume 0.5



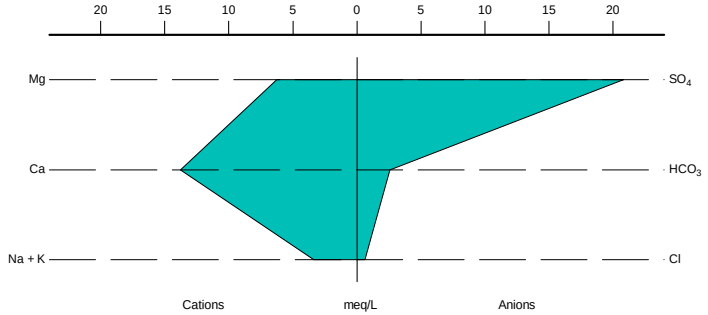
PW-3 Head Solution



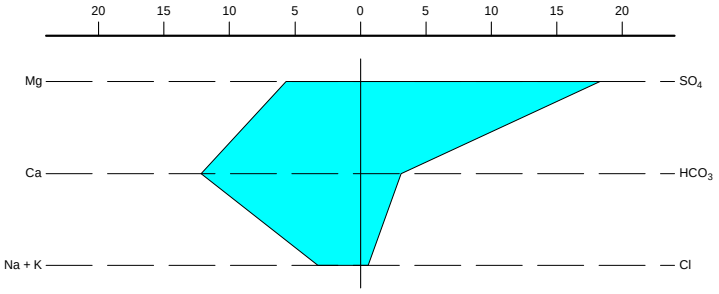
Bed 14 Pore Volume 1



Bed 14 MWMP



Bed 14 Pore Volume 2



Bed 14 Pore Volume 3

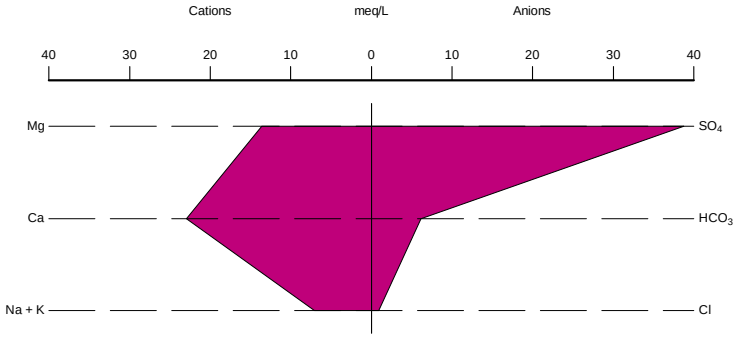
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Stiff Diagrams – Bed 14 MWMP, Column Leachates, and Head Solution

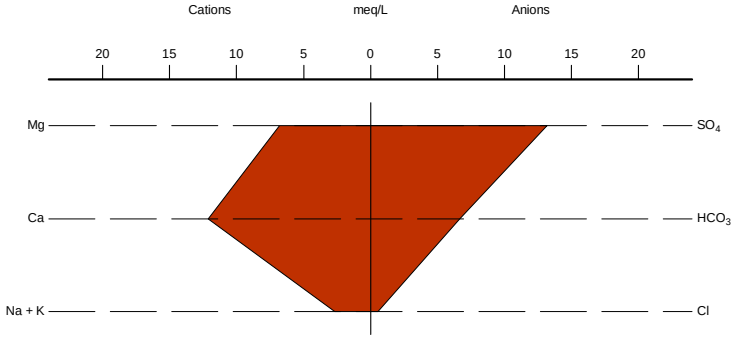
ARCADIS

FIGURE
20

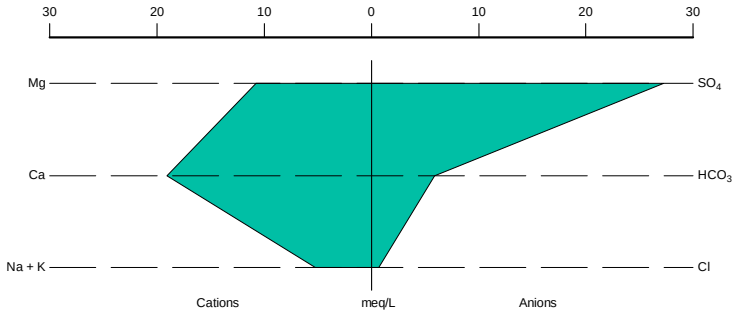
Note difference in scales



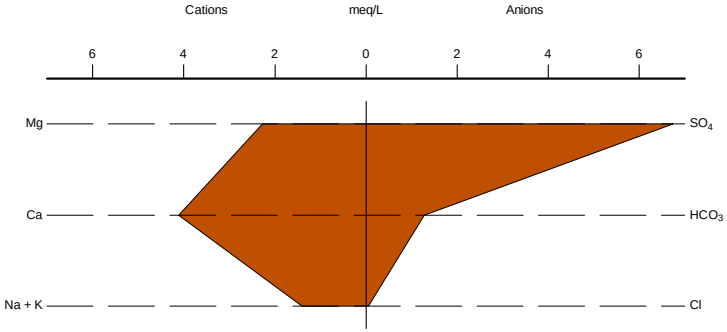
Bed 14 Pore Volume 0.5



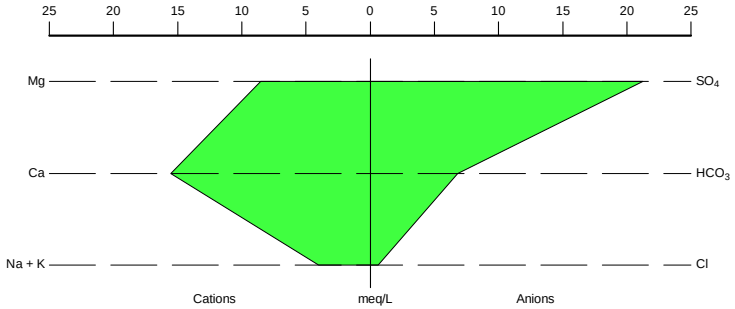
PW-3 Head Solution



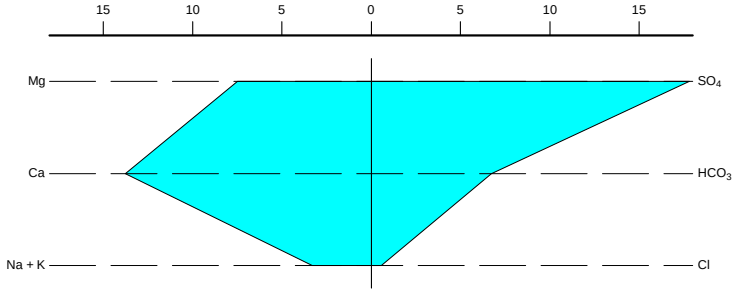
Bed 15 Pore Volume 1



Bed 15 MWMP



Bed 15 Pore Volume 2



Bed 15 Pore Volume 3

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Stiff Diagrams – Bed 15 MWMP, Column Leachates, and Head Solution

ARCADIS

FIGURE
21

ARCADIS

Appendix A

Geochemical Characterization

ARCADIS

Appendix A-1

Final Environmental Impact Statement Static Tests Results

(BLM 1997a)

TABLE B-1

STATIC TEST RESULTS

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93-C1	19	LS/MS	14	0.032	<0.001	0.032	<0.03	392	+392	>13,000
93-C1	21	MS	14	0.028	0.002	0.026	0.06	303	+302.9	5,050
93-C1	30.5	MS	14	0.016	<0.001	0.016	<0.03	8.7	+8.7	>290
93-C1	35.5	LS/SLST	14	0.016	0.002	0.014	0.06	181	+180.9	3,017
93-C1	44.5	SLST/MS	14	0.088	0.008	0.080	0.25	4.4	+4.1	17.6
93-C1	46.5	LS	14	0.018	0.006	0.012	0.19	757	+756.8	3,984
93-C2	17	SLST/SH	9-10	0.018	0.002	0.016	0.06	4.4	+4.3	73
93-C4[1]	13	COAL	8	0.600	0.510	0.090	15.94	<0.5	-15.4	<0.03
93-C4[1]	24	SS/SH	9	0.630	0.520	0.110	16.25	5.1	-11.2	0.31
93-C5[1]	22	COAL	8	0.900	0.620	0.280	19.38	<0.5	-18.9	<0.03
93-C5[1]	27	SS (?)	9	4.150	3.900	0.250	121.88	<0.5	-121.4	<0.004
93-C5[1]	34	SH/MS	10	0.750	0.665	0.085	20.78	<0.5	-20.3	<0.02
93R2[1]	20-40	COAL	6-8	0.320	0.180	0.140	5.63	<0.5	-5.6	<0.09
93R2	40-60	SS	9-13	0.360	0.200	0.160	6.25	9.3	3.1	1.49
93R2	60-80	SS	9-13	0.190	0.070	0.120	2.19	22.8	20.6	10.4
93R2[1]	140-160	SS/MS	9-14	0.110	0.025	0.085	0.78	<0.5	-0.8	<0.64
93R2[1]	160-180	MS	14	0.032	0.002	0.030	0.06	<0.5	-0.1	<8.00
93R2[1]	180-200	MS	14	0.045	0.003	0.042	0.09	<0.5	-0.1	<5.33
93R2[1]	200-220	MS	14	0.049	0.004	0.045	0.13	<0.5	-0.1	<4.00
93R2[1]	220-240	MS	14	0.054	0.003	0.051	0.09	<0.5	-0.1	<5.33

15-2

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93R4	40-60	MS	14	0.021	0.001	0.020	0.03	160	160.0	5,120
93R4	60-80	MS	14	0.037	0.003	0.034	0.09	200	199.9	2,133
93R4	80-100	MS	14	0.029	0.001	0.028	0.03	300	300.0	9,600
93R4	100-120	MS	14	0.025	0.001	0.024	0.03	315	315.0	10,080
93R4	120-140	MS	14	0.031	0.001	0.030	0.03	300	300.0	9,600
93R6[1]	5-20	COAL	6-8	0.540	0.370	0.170	11.56	<0.5	-11.6	<0.04
93R6[1]	20-40	COAL/SS	6-8	0.620	0.563	0.057	17.59	<0.5	-17.6	<0.03
			9-13							
93R6[1]	40-60	SS	9	0.380	0.240	0.140	7.50	6	-1.5	0.80
93R6[1]	60-80	SS	9	0.530	0.310	0.220	9.69	3.8	-5.9	0.39
93R6	80-100	SS	9-13	0.700	0.310	0.390	9.69	20.1	10.4	2.07
93R6	140-160	MS	14	0.330	0.130	0.200	4.06	76	71.9	18.7
93R6	160-180	MS	14	0.060	0.001	0.059	0.03	87.1	87.1	2,787
93R6	180-200	MS	14	0.110	0.021	0.089	0.66	98.7	98.0	150
93R6	200-220	MS	14	0.052	0.001	0.051	0.03	270	270.0	8,640
93R6	220-240	MS	14	0.029	<0.001	0.029	<0.03	370	370.0	>12,333
93R6	240-260	MS	14	0.040	0.002	0.038	0.06	345	344.9	5,520
93R6	260-280	MS	14	0.042	0.002	0.040	0.06	275	274.9	4,400

15-3

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93R6	280-300	MS	14	0.037	0.001	0.036	0.03	370	370.0	11,840
93R7[1]	5-20	SS	3-5	0.048	0.008	0.040	0.25	<0.5	-0.2	<2.00
93R7[1]	20-40	SS/COAL	3-8	0.190	0.010	0.180	0.31	<0.5	-0.3	<1.60
93R7[1]	40-60	COAL/SS	6-13	0.720	0.390	0.330	12.19	<0.5	-12.2	<0.04
93R7	60-80	SS	9-13	0.250	0.080	0.170	2.50	8.5	6.0	3.40
93R7	80-100	SS	9-13	0.140	0.030	0.110	0.94	19	18.1	20.3
93R7	100-120	SS	9-13	0.150	0.020	0.130	0.62	150	149.4	240
93R7	120-140	SS	9-13	0.074	0.002	0.072	0.06	105	104.9	1,680
93R7	140-160	MS	14	0.078	0.004	0.074	0.13	125	124.9	1,000
93R7	160-180	MS	14	0.044	0.002	0.042	0.06	125	124.9	2,000
93R7	180-200	MS	14	0.100	0.004	0.096	0.13	400	399.9	3,200
93R7	200-220	MS	14	0.074	<0.001	0.074	<0.03	425	425.0	>14,167
93R7	220-240	MS/SS	14-15	0.210	0.050	0.160	1.56	245	243.4	157
93R12	5-20	SS	11-13	0.030	0.002	0.028	0.06	12.6	12.5	202
93R12	20-40	SS	11-13	0.040	0.001	0.039	0.03	37.7	37.7	1,206
93R12	40-60	SS	11-13	0.018	0.002	0.016	0.06	11.9	11.8	190
93R12	60-80	SS/MS	14	0.018	0.003	0.015	0.09	67.6	67.5	721
93R12	80-100	MS	14	0.046	0.001	0.045	0.03	100	100.0	3,200

15-4

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93R12	100-120	MS	14	0.034	<0.001	0.034	<0.03	395	395.0	>13,167
93R12	120-140	MS	14	0.082	0.001	0.081	0.03	410	410.0	13,120
93R12	140-160	MS	14	0.150	<0.001	0.150	<0.03	305	305.0	>10,167
93R17	5-20	COAL	6-8	0.160	<0.001	0.160	<0.03	28.7	28.7	>957
93R17	20-40	COAL	6-8	0.076	<0.001	0.076	<0.03	2.9	2.9	>96.7
93R17	40-60	COAL	6-8	0.024	<0.001	0.024	<0.03	86.3	86.3	>2,877
93R17	60-80	MS	14	0.026	0.002	0.024	0.06	84.9	84.8	1,358
93R17	80-100	MS	14	0.052	<0.001	0.052	<0.03	400	400.0	>13,333
93R17	100-120	MS	14	0.082	<0.001	0.082	<0.03	440	440.0	>14,667
93R17	120-140	MS	14	0.160	0.010	0.150	0.31	325	324.7	1,040
93R23	5-20	COAL	6-8	0.380	0.010	0.370	0.31	4.3	4.0	13.8
93R23[1]	20-40	COAL	6-8	0.470	0.210	0.260	6.56	<0.5	-6.6	<0.08
93R23[1]	40-60	SS	9-13	0.350	0.180	0.170	5.62	5.2	-0.4	0.92
93R23	60-80	SS	9-13	0.180	0.030	0.150	0.94	15.2	14.3	16.2
93R23	80-100	SS	9-13	0.180	0.020	0.160	0.62	89.9	89.3	144
93R23	100-120	SS	9-13	0.120	0.010	0.110	0.31	75.7	75.4	242
93R23	120-140	SS/MS	14	0.092	0.026	0.066	0.81	23.2	22.4	28.6
93R23	140-160	MS	14	0.040	0.002	0.038	0.06	93.4	93.3	1,494

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TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93R23	160-180	MS	14	0.120	0.027	0.093	0.84	230	229.2	273
93R23	180-200	MS	14	0.110	0.010	0.100	0.31	395	394.7	1,264
93R23	200-220	MS	14	0.084	0.001	0.083	0.03	415	415.0	13,280
93R23	220-240	MS	14	0.180	0.060	0.120	1.88	345	343.1	184
93R25	5-20	COAL/SS	6-13	0.096	0.001	0.095	0.03	<0.5	0.0	<16.0
93R25	20-40	SS	9-13	0.260	0.020	0.240	0.63	3.2	2.6	5.12
93R25	40-60	SS	9-13	0.086	0.001	0.085	0.03	13.6	13.6	435
93R25	60-80	SS	9-13	0.240	0.040	0.200	1.25	93.8	92.6	75.0
93R25	80-100	SS	9-13	0.028	0.001	0.027	0.03	11.8	11.8	378
93R25	100-120	SS/MS	9-13	0.059	0.002	0.057	0.06	4.3	4.2	68.8
			14							
93R25	120-140	MS	14	0.042	<0.001	0.042	<0.03	70.9	70.9	>2,363
93R25	140-160	MS	14	0.100	0.014	0.086	0.44	245	244.6	560
93R25	160-180	MS	14	0.140	<0.001	0.140	<0.03	385	385.0	>12,833
93R25	180-200	MS	14	0.120	0.010	0.110	0.31	450	449.7	1,440
93R29	5-20	SS	3-5	0.070	0.021	0.049	0.66	32.2	31.5	49.1
93R29	20-40	SS	3-5	0.061	0.002	0.059	0.06	32.2	32.1	515
93R29	40-60	SS	3-5	0.013	0.007	0.006	0.22	7.6	7.4	34.7

15-6

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
93R29	60-80	SS/MS	3-5,14	0.032	0.002	0.030	0.06	48.3	48.2	773
93R29	80-100	MS	14	0.023	<0.001	0.023	<0.03	130	130.0	>4,333
93R29	100-120	MS	14	0.025	<0.001	0.025	<0.03	410	410.0	>13,667
93R29	120-140	MS	14	0.036	0.003	0.033	0.09	400	399.9	4,267
93R29	140-160	MS	14	0.140	0.020	0.120	0.63	285	284.4	456
94R6	0.0-20.0	ALLUV	1	0.640	<0.001	0.640	<0.03	17.6	17.6	>587
94R6	20.0-40.0	ALLUV/SS	3-5	0.300	<0.001	0.300	<0.03	47.1	47.1	>1,570
94R6	40.0-60.0	SS	3-5	0.090	<0.001	0.090	<0.03	5.9	5.9	>196
94R6	60.0-80.0	SS	3-5	0.030	<0.001	0.030	<0.03	2.3	2.3	>75.7
94R6	80.0-100.0	SS/COAL	6-8	0.036	<0.001	0.036	<0.03	3.9	3.9	>130
94R6[1]	100.0-120.0	COAL	6-8	0.940	0.690	0.250	21.56	4.6	-17.0	0.21
94R6[1]	120.0-140.0	COAL/SS	6-13	0.640	0.480	0.160	15.00	9.9	-5.1	0.66
94R6	140.0-160.0	SS	9-13	0.340	0.210	0.130	6.56	24.2	17.6	3.69
94R6	160.0-180.0	SS	9-13	0.400	0.260	0.140	8.13	53.6	45.5	6.60
94R6	180.0-200.0	SS	9-13	0.100	<0.001	0.100	<0.03	6.3	6.3	>209
94R7	220.0-240.0		9-13	0.280	0.180	0.100	5.63	35.6	30.0	6.3
94R7	240.0-260.0		14	0.220	0.040	0.180	1.25	39.1	37.9	31.3
94R7	260.0-280.0		15	0.370	0.260	0.110	8.13	33.7	25.6	4.1

15-7

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94R7	280.0-300.0		17	0.024	<0.001	0.024	<0.03	5.9	5.9	>188.8
94R12[1]	0.0-20.0	ALLUV/SS	3-5	0.170	<0.001	0.170	<0.03	<0.5	0.5	16.7
94R12[1]	20.0-40.0	SS	3-5	0.180	0.030	0.150	0.94	<0.5	-0.44	<0.53
94R12[1]	40.0-60.0	COAL	6-8	1.160	0.870	0.290	27.19	1.1	-26.1	0.04
94R12[1]	60.0-80.0	COAL/SS	6-13	0.720	0.520	0.200	16.25	11.9	-4.4	0.73
94R12	80.0-100.0	SS	9-13	0.540	0.370	0.170	11.56	21.4	9.8	1.85
94R12	100.0-120.0	SS/MS	9-14	0.520	0.380	0.140	11.88	13.9	2.0	1.17
94R12	120.0-140.0	MS	14	0.200	0.080	0.120	2.50	169.0	166.5	67.6
94R12	140.0-160.0	MS	14	0.200	0.060	0.140	1.88	385.0	383.1	205
94R12	160.0-180.0	MS	14	0.100	0.008	0.092	0.25	270.0	269.8	1,080
94R12	280.0-300.0		17	0.030	<0.001	0.030	<0.03	8.1	8.1	>259.2
94R14	0.0-20.0	ALLUV/SS	9-13	0.340	<0.001	0.340	<0.03	225.0	225.0	>7,500
94R14	20.0-40.0	SS	9-13	1.020	0.010	1.010	0.31	160.0	159.7	512
94R14	40.0-60.0	SS	9-13	0.880	0.260	0.620	8.13	39.2	31.1	4.82
94R14	60.0-80.0	SS	9-13	0.580	0.430	0.150	13.44	23.6	10.2	1.76
94R14	80.0-100.0	SS	9-13	0.500	0.380	0.120	11.88	33.5	21.6	2.82
94R14	100.0-120.0	SS	9-13	0.640	0.450	0.190	14.06	66.0	51.9	4.69
94R14	120.0-140.0	SS	9-13	0.360	0.210	0.150	6.56	26.7	20.1	4.07

8-5/

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94R14	180.0-200.0	MS	14	0.200	0.050	0.150	1.56	200.0	198.4	128
94R14	200.0-220.0	MS	14	0.180	0.060	0.120	1.88	305.0	303.1	163
94R14	220.0-240.0	MS	14	0.086	<0.001	0.086	<0.03	305.0	305.0	>10,167
94R14	240.0-260.0	MS	14-15	0.078	<0.001	0.078	<0.03	255.0	255.0	>8,500
94R14	340.0-360.0		15	0.072	0.012	0.060	0.38	25.5	25.1	68.0
94R14	360.0-380.0		15	0.044	<0.001	0.044	<0.03	21.1	21.1	>675.2
94R14	380.0-400.0		17	0.072	0.020	0.052	0.63	16.4	15.8	26.2
94S8	0.0-20.0	MS	14	0.018	<0.001	0.018	<0.03	235.0	235.0	>7,833
94S8	20.0-40.0	MS	14	0.028	0.002	0.026	0.06	400.0	399.9	6,400
94S8	40.0-60.0	MS	14	0.028	<0.001	0.028	<0.03	415.0	415.0	>13,933
94S8	60.0-80.0	MS	14	0.018	<0.001	0.018	<0.03	355.0	355.0	>11,833
94S8	80.0-100.0		14-15	0.024	<0.001	0.024	<0.03	245	245.0	>7840
94S8	100.0-120.0		15	0.084	0.002	0.082	0.06	8.3	8.2	132.3
94S8	120.0-140.0		15	0.034	<0.001	0.034	<0.03	5.0	5.0	>160
94S8	140.0-160.0		15	0.020	<0.001	0.020	<0.03	9.6	9.6	>307.2
94S8	160.0-180.0		15-17	0.074	0.20	0.054	0.63	1.4	0.8	2.2
94S15	0.0-20.0	MS	14	0.022	<0.001	0.022	<0.03	395.0	395.0	>13,167
94S15	20.0-40.0	MS	14	0.032	<0.001	0.032	<0.03	560.0	560.0	>18,667

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94S15	40.0-60.0	MS/SS	14-15	0.020	<0.001	0.020	<0.03	295.0	295.0	>9,833
94S15	160.0-180.0		15	0.160	0.050	0.110	1.56	12.3	10.7	7.9
94S15	180.0-200.0		15	0.026	<0.001	0.026	<0.03	<0.5	0.5	1.0
94S15	200.0-220.0		15	0.016	<0.001	0.016	<0.03	<0.5	0.5	1.0
94S15	220.0-240.0		15	0.012	0.002	0.010	0.06	<0.5	-0.6	<8.0
94S15	240.0-260.0		15	0.024	<0.001	0.024	<0.03	<0.5	0.5	1.0
94S29	0.0-20.0	SS	9-13	0.200	<0.001	0.200	<0.03	9.0	9.0	>301
94S29[1]	20.0-40.0	SS	9-13	0.290	0.100	0.190	3.12	1.7	-1.5	0.53
94S29[1]	40.0-60.0	SS	9-13	0.570	0.340	0.230	10.62	1.6	-9.0	0.15
94S29[1]	60.0-80.0	SS	9-13	0.190	0.070	0.120	2.19	<0.5	-2.7	<0.23
94S29[1]	80.0-100.0	SS	9-13	0.240	0.030	0.210	0.94	<0.5	-1.4	<0.53
94S29	100.0-120.0	SS/MS	14	0.380	0.110	0.270	3.44	47.2	43.8	13.7
94S29	120.0-140.0	MS	14	0.340	0.190	0.150	5.94	84.0	78.1	14.1
94S29	140.0-160.0	MS	14	0.130	0.020	0.110	0.63	120.0	119.4	192
94S29	160.0-180.0	MS	14	0.210	0.020	0.190	0.62	490.0	489.4	784
94S29	180.0-200.0	MS	14	0.120	<0.001	0.120	<0.03	530.0	530.0	>17,667
94S29	200.0-220.0	MS	14	0.190	0.040	0.150	1.25	360.0	358.8	288
94S29	240.0-260.0	SS	15	0.230	0.070	0.160	2.19	115.0	112.8	52.6

15-10

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94S29	320.0-340.0		15	0.720	0.530	0.190	16.56	9.0	-7.6	0.5
94S29	340.0-350.0		17	0.072	0.012	0.060	0.38	12.0	11.6	32.0
94S36	0.0-20.0	ALLUV	1	0.028	<0.001	0.028	<0.03	145.0	145.0	>4,833
94S36	20.0-40.0	ALLUV/ COAL	6-8	0.044	<0.001	0.044	<0.03	84.5	84.5	>2,817
94S36[1]	40.0-60.0	COAL	6-8	0.640	0.490	0.150	15.31	5.1	-10.3	0.33
94S36[1]	60.0-80.0	COAL/SS	6-13	1.250	1.080	0.170	33.75	11.7	-22.1	0.35
94S36	80.0-100.0	SS	9-13	0.330	0.210	0.120	6.56	12.7	6.1	1.94
94S36[1]	100.0-120.0	SS	9-13	0.470	0.350	0.120	10.94	8.6	-2.3	0.79
94S36	120.0-140.0	SS	9-13	0.350	0.220	0.130	6.87	13.0	6.1	1.89
94S36	140.0-160.0	SS	9-13	0.260	0.168	0.092	5.25	25.6	20.4	4.88
94S36	160.0-180.0	SS	9-13	0.310	0.200	0.110	6.25	44.7	38.5	7.15
94S36	180.0-200.0	MS	14	0.320	0.180	0.140	5.63	315.0	309.4	56.0
94S36	320.0-340.0		15	0.043	0.280	0.150	8.75	58.7	50.0	6.7
94S36	340.0-350.0		17	0.250	0.180	0.074	5.63	55.0	49.4	9.3
94G1	15.0-20.0	ALLUV	1	0.028	<0.001	0.028	<0.03	64.0	64.0	>2,133
94G1	35.0-40.0	SH	2	0.370	<0.001	0.370	<0.03	19.2	19.2	>640
94G1	55.0-60.0	SH	2	0.480	0.020	0.460	0.62	14.0	13.4	22.4
94G1	75.0-80.0	SH	2	1.130	0.700	0.430	21.88	77.5	55.6	3.54

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TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94G1	95.0-100.0	SH	2	1.200	0.680	0.520	21.25	135.0	113.8	6.35
94G1	115.0-120.0	SH	2	1.360	0.790	0.570	24.69	180.0	155.3	7.29
94G1	135.0-140.0	SH	2	1.510	0.860	0.650	26.88	320.0	293.1	11.9
94G1	155.0-160.0	SH	2	0.870	0.420	0.450	13.13	650.0	636.9	49.5
94G1	175.0-180.0	SH	2	0.650	0.300	0.350	9.38	500.0	490.6	53.3
94G1	195.0-200.0	SH	2	0.660	0.400	0.260	12.50	265.0	252.5	21.2
94G1	215.0-220.0	SH	2	0.720	0.420	0.300	13.13	92.3	79.2	7.03
94G1	235.0-240.0	SS	3-5	0.210	0.130	0.080	4.06	7.7	3.7	1.90
94G1[1]	255.0-260.0	COAL	6-9	1.830	1.710	0.120	53.44	11.7	-41.7	0.22
94G1[1]	275.0-280.0	SS	6-9	1.050	0.880	0.170	27.50	9.4	-18.1	0.34
94G1	295.0-300.0	SS	9-13	0.880	0.640	0.240	20.00	37.0	17.0	1.85
94G1[1]	300.0-320.0	SS	9-13	1.290	1.090	0.200	34.06	16.7	-17.4	0.49
94G1[1]	320.0-340.0	SS	9-13	0.960	0.760	0.200	23.75	13.1	-10.7	0.55
94G1	340.0-360.0	SS	9-13	0.780	0.580	0.200	18.13	29.3	11.2	1.62
94G1[1]	360.0-380.0	MS	14	1.320	1.030	0.290	32.19	18.1	-14.1	0.56
94G1	380.0-400.0	MS	14	0.340	0.220	0.120	6.88	14.0	7.1	2.04
94G1	400.0-420.0	MS	14	0.780	0.590	0.190	18.44	185.0	166.6	10.0
94G7	15.0-20.0	ALLUV	1	0.064	0.032	0.032	1.00	46.4	45.4	46.4

15-12

TABLE B-1

STATIC TEST RESULTS (Continued)

SAMPLE Number	DEPTH (ft)	ROCK TYPE	Bed Number	SULFUR (%)			AGP	ANP	NNP	ANP:AGP (sulfidic sulfur)
				TOTAL	SULFIDE	SULFATE	TONS $CaCO_3$/1000 tons of sample			
94G7	35.0-40.0	SH	2	0.058	<0.001	0.058	<0.03	73.5	7	>2,450
94G7	55.0-60.0	SH	2	1.160	0.380	0.780	11.87	92.1	80.2	7.76
94G7	75.0-80.0	SH	2	1.630	1.110	0.520	34.69	145.0	110.3	4.18
94G7	95.0-100.0	SH	2	1.560	0.890	0.670	27.81	325.0	297.2	11.7
94G7	115.0-120.0	SH	2	1.500	0.890	0.610	27.81	475.0	447.2	17.1
94G7	135.0-140.0	SH	2	0.680	0.320	0.360	10.00	655.0	645.0	65.5
94G7	155.0-160.0	SH	2	0.620	0.310	0.310	9.69	480.0	470.3	49.5
94G7	175.0-180.0	SH	2	1.080	0.680	0.400	21.25	215.0	193.8	10.1
94G7	180.0-200.0	SH/COAL	6-8	1.070	0.750	0.320	23.44	110.0	86.6	4.69
94G7[1]	200.0-220.0	COAL/SS	6-14	1.560	1.410	0.150	44.06	23.4	-20.7	0.53
94G7	240.0-260.0		9-14	0.450	0.280	0.170	8.75	22.7	14.0	2.6
94G7	260.0-280.0		9-14	0.540	0.340	0.200	10.63	17.6	7.0	1.7
94G7	280.0-300.0			0.310	0.120	0.190	3.75	82.7	79.0	22.1

13-13

TABLE B-1

STATIC TEST RESULTS (Continued)

1 These rock types are acid generating with net neutralization potential less than zero (i.e., NNP < 0), and the ANP:AGP ratio is less than three.

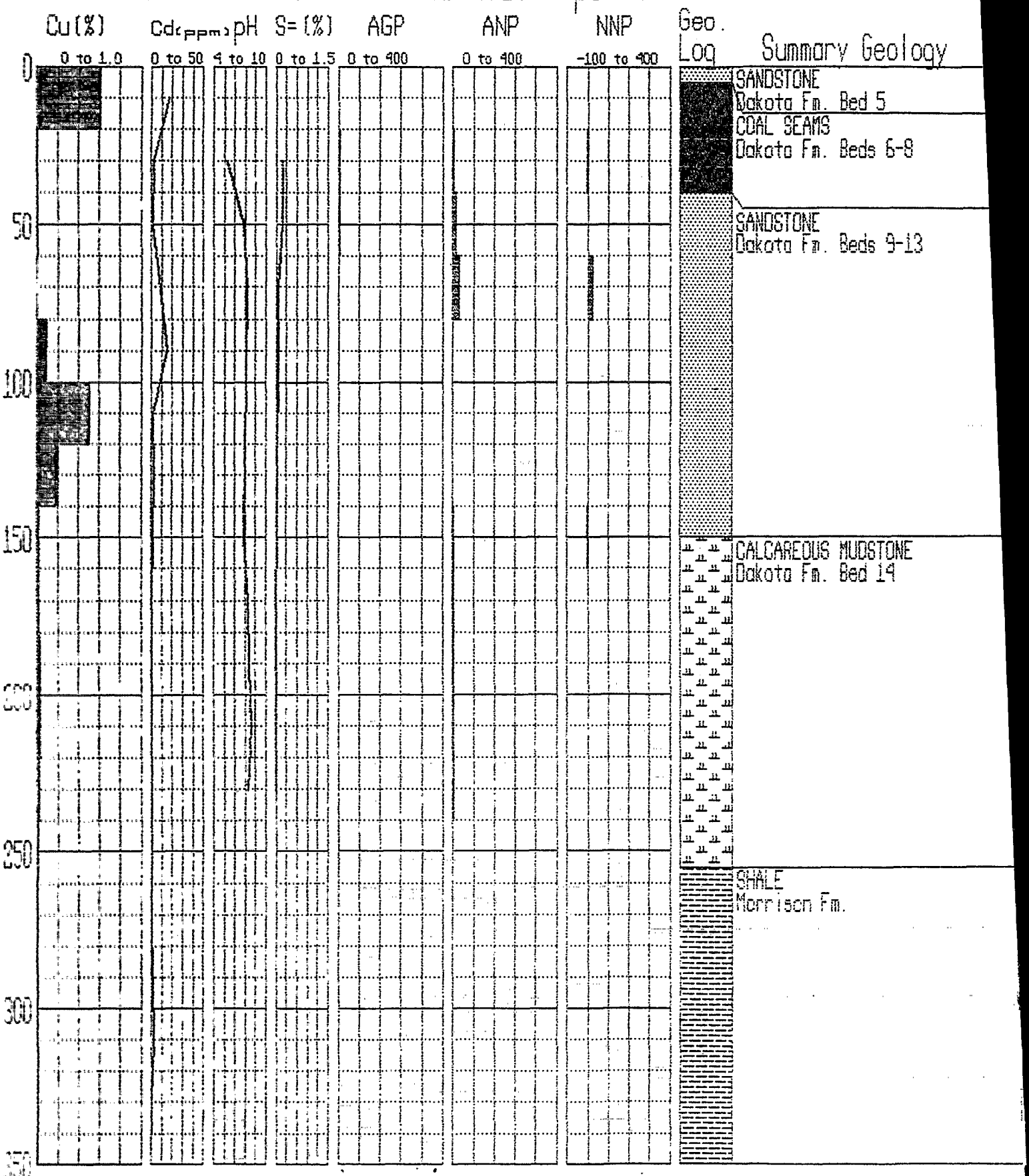
Key to Rock Types:

LS	=	limestone	AGP	=	Acid Generation Potential
MS	=	mudstone	ANP	=	Acid Neutralization Potential
SLST	=	siltstone	NNP	=	Net Neutralization Potential
SS	=	sandstone	ANP:AGP	=	Ratio of Acid Neutralization Potential to Acid Generation Potential
SH	=	shale			
ALLUV	=	alluvium			

Source: McClelland 1994.

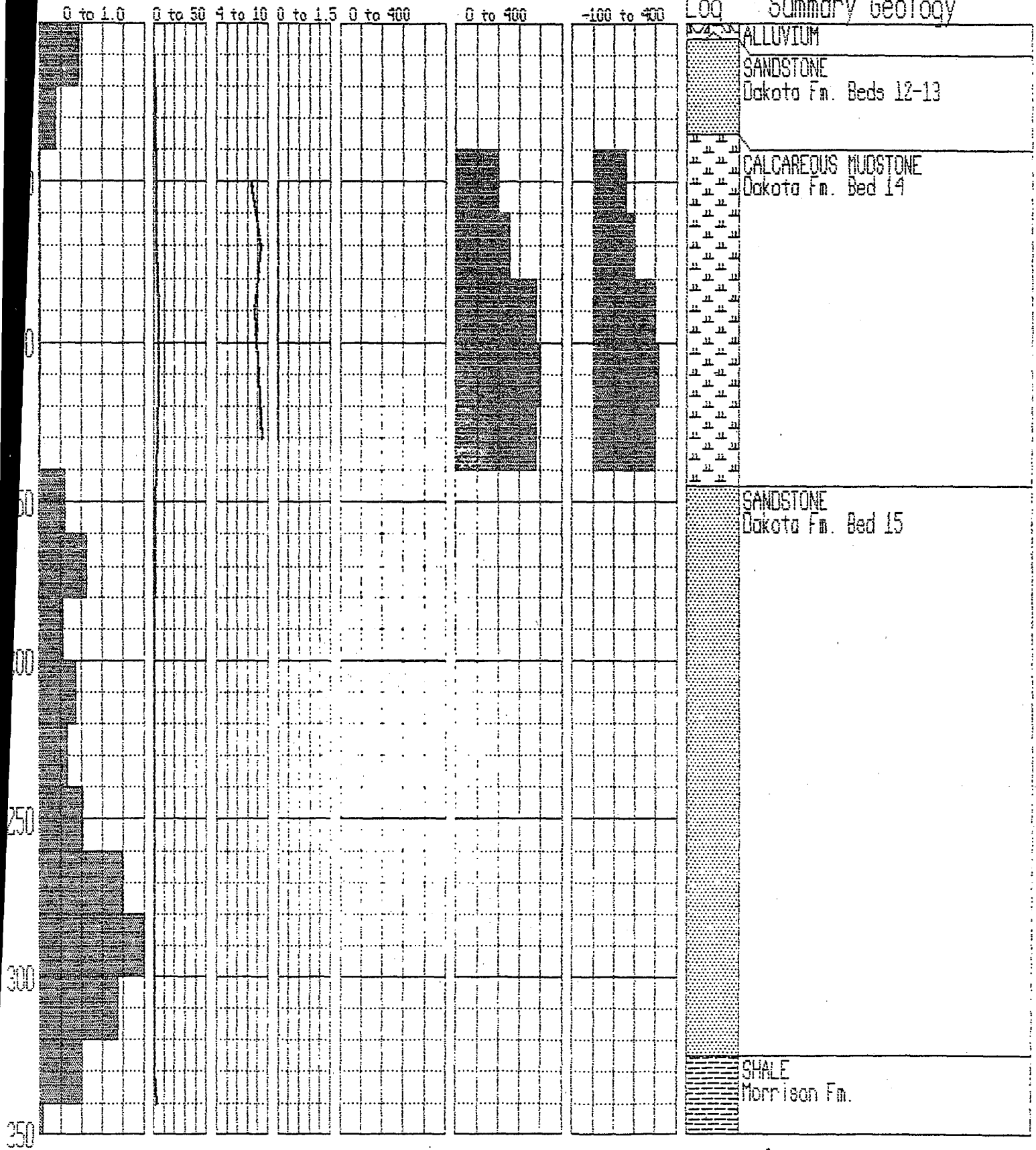
15-14

LISBON VALLEY PROJECT: Centennial Deposit: 93R2



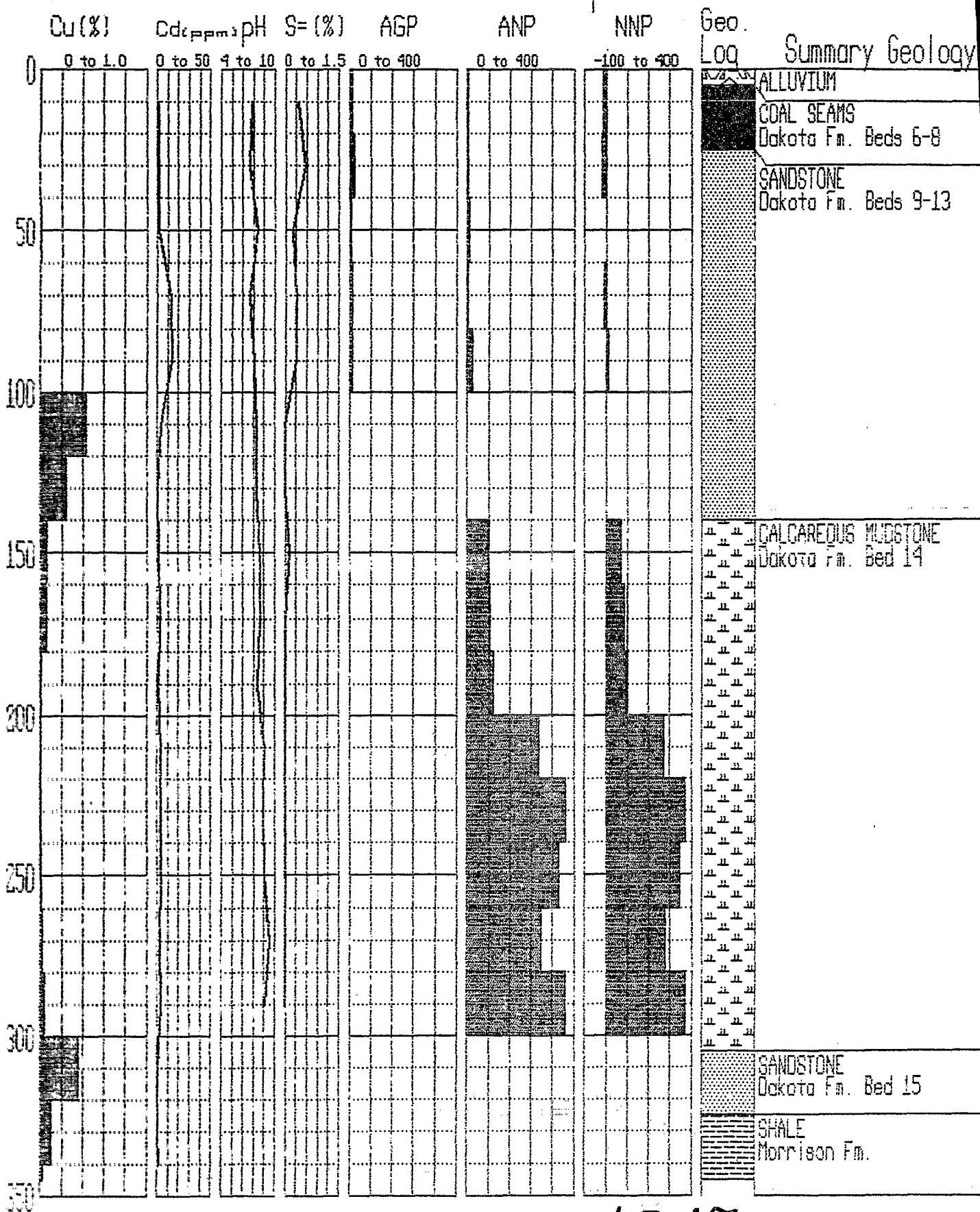
15-15

LISBON VALLEY PROJECT: Centennial Deposit: 93R4



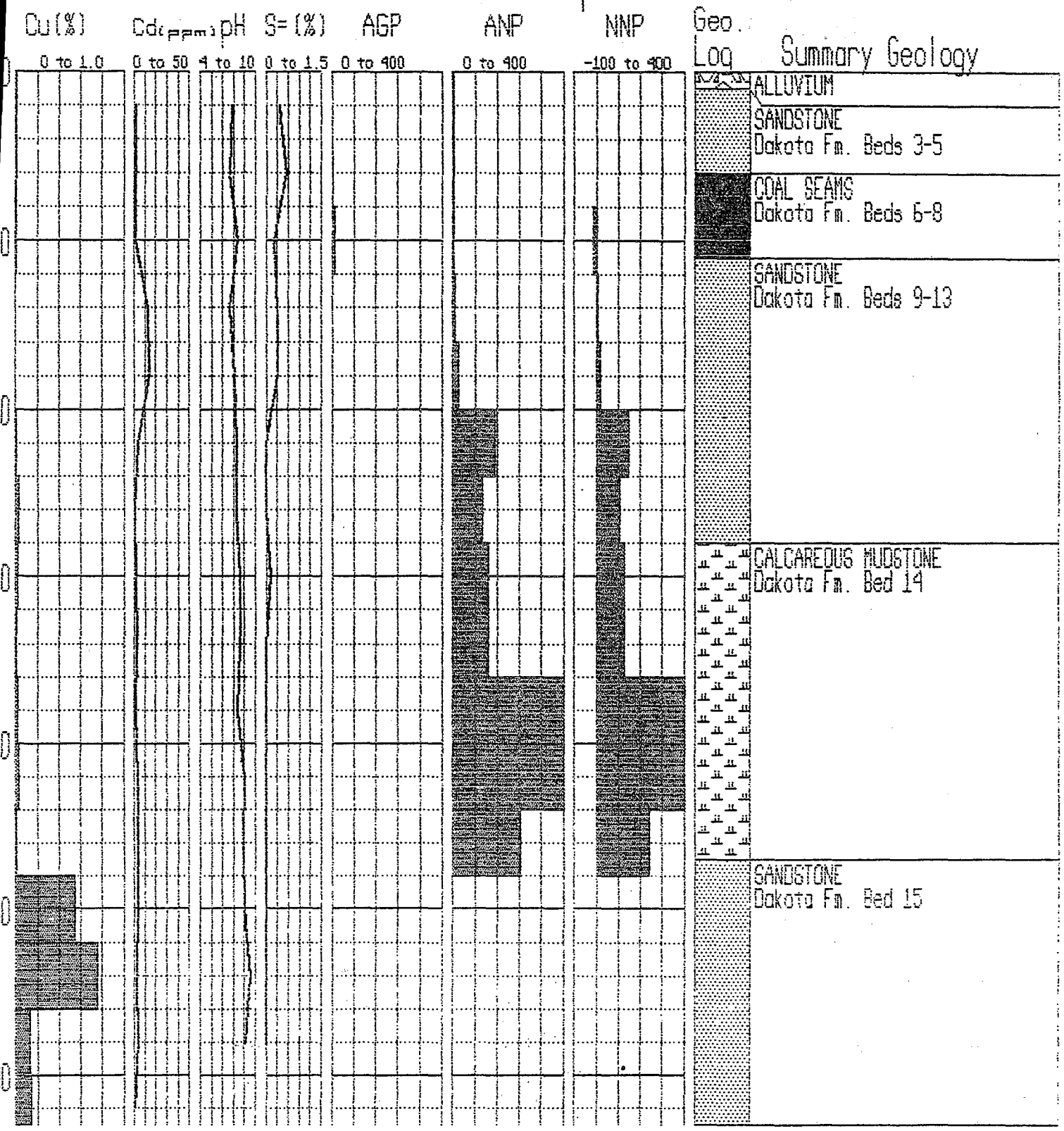
15-16

LISBON VALLEY PROJECT: Centennial Deposit: 93R6



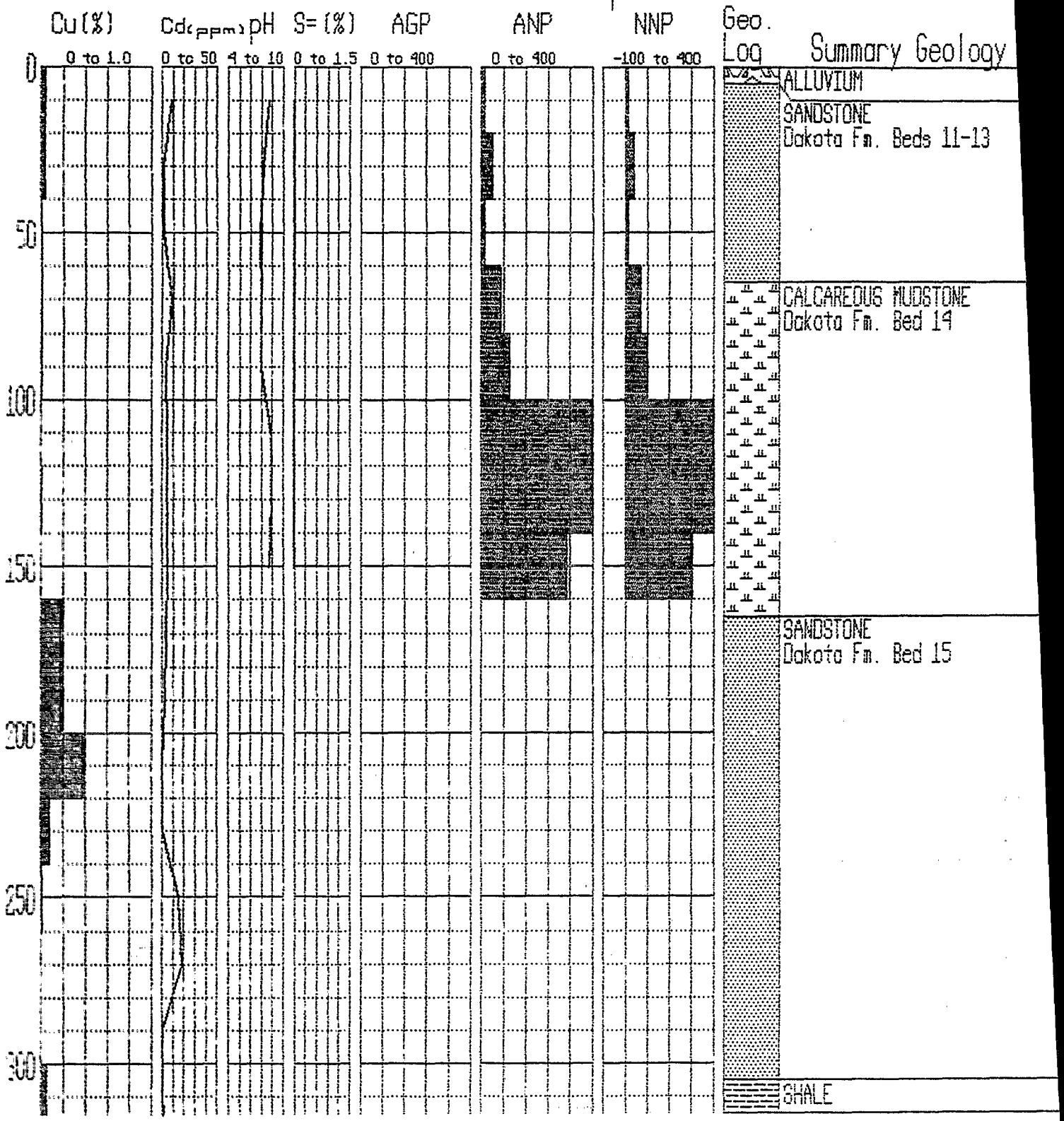
15-17

LISBON VALLEY PROJECT: Centennial Deposit: 93R7



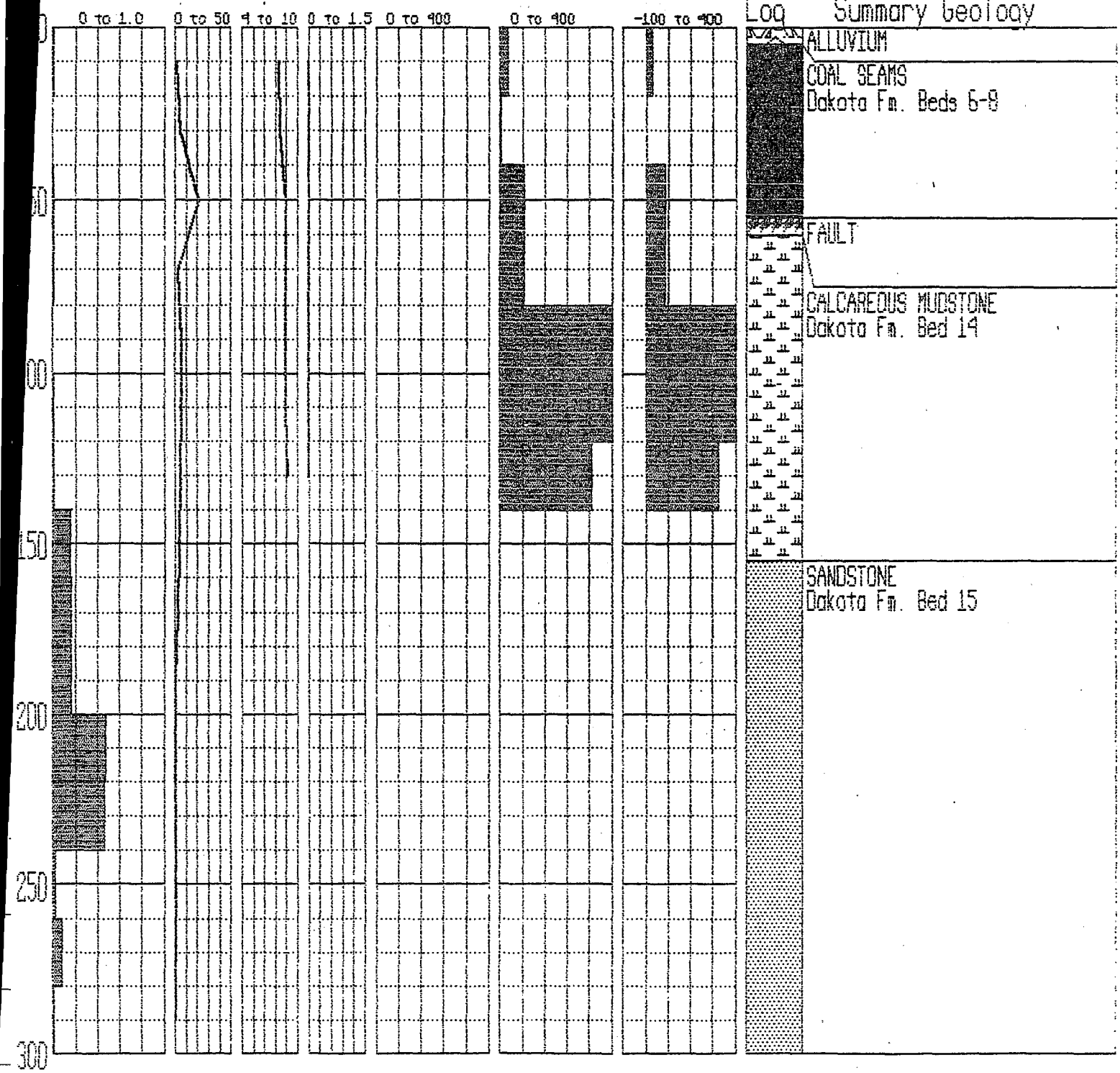
15-18

LISBON VALLEY PROJECT: Centennial Deposit: 93R12



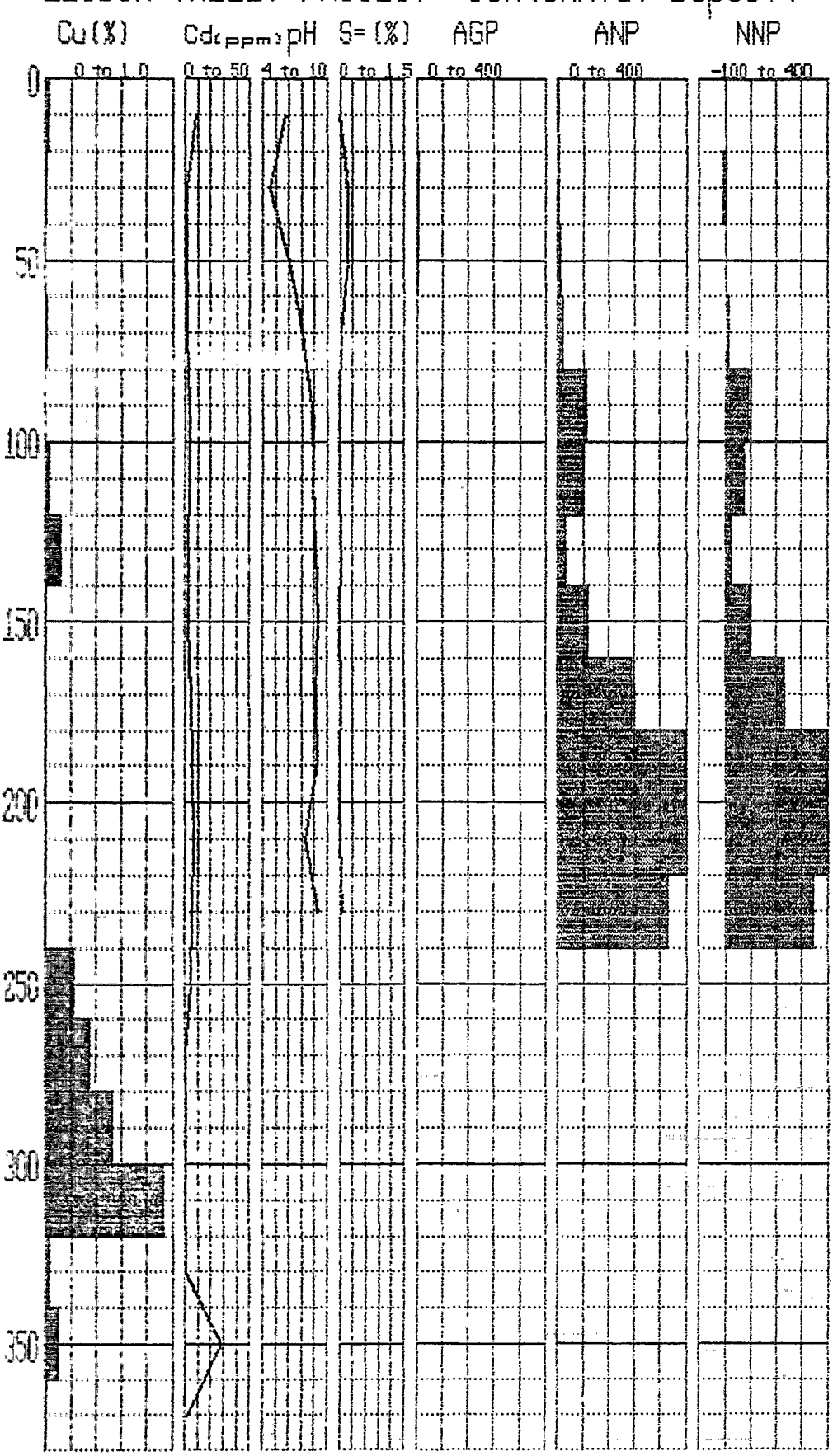
15-19

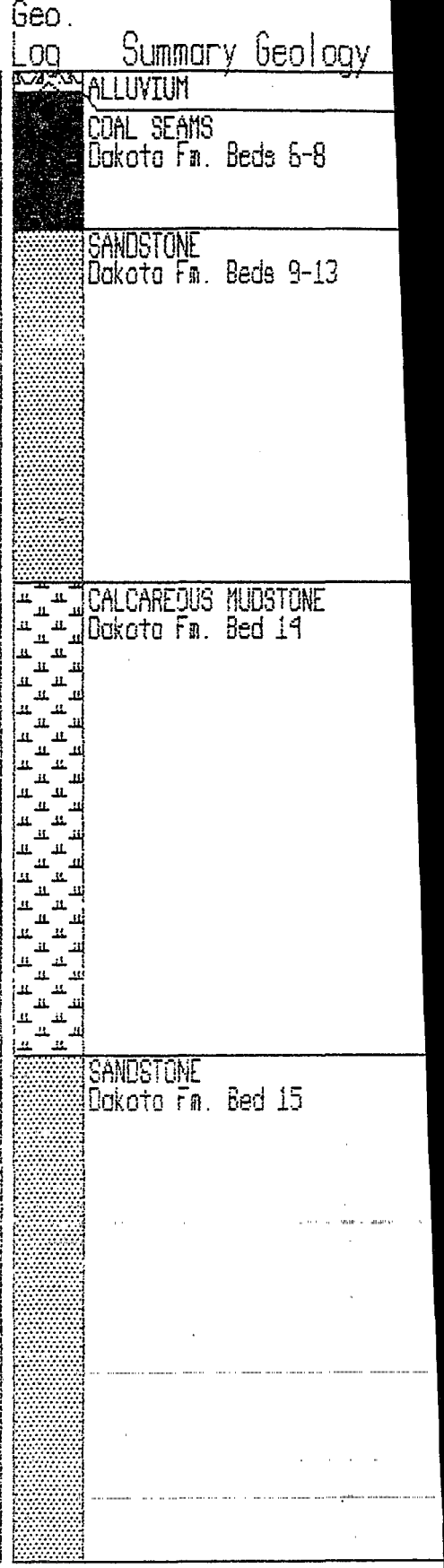
LISBON VALLEY PROJECT: Centennial Deposit: 93R17



15-20

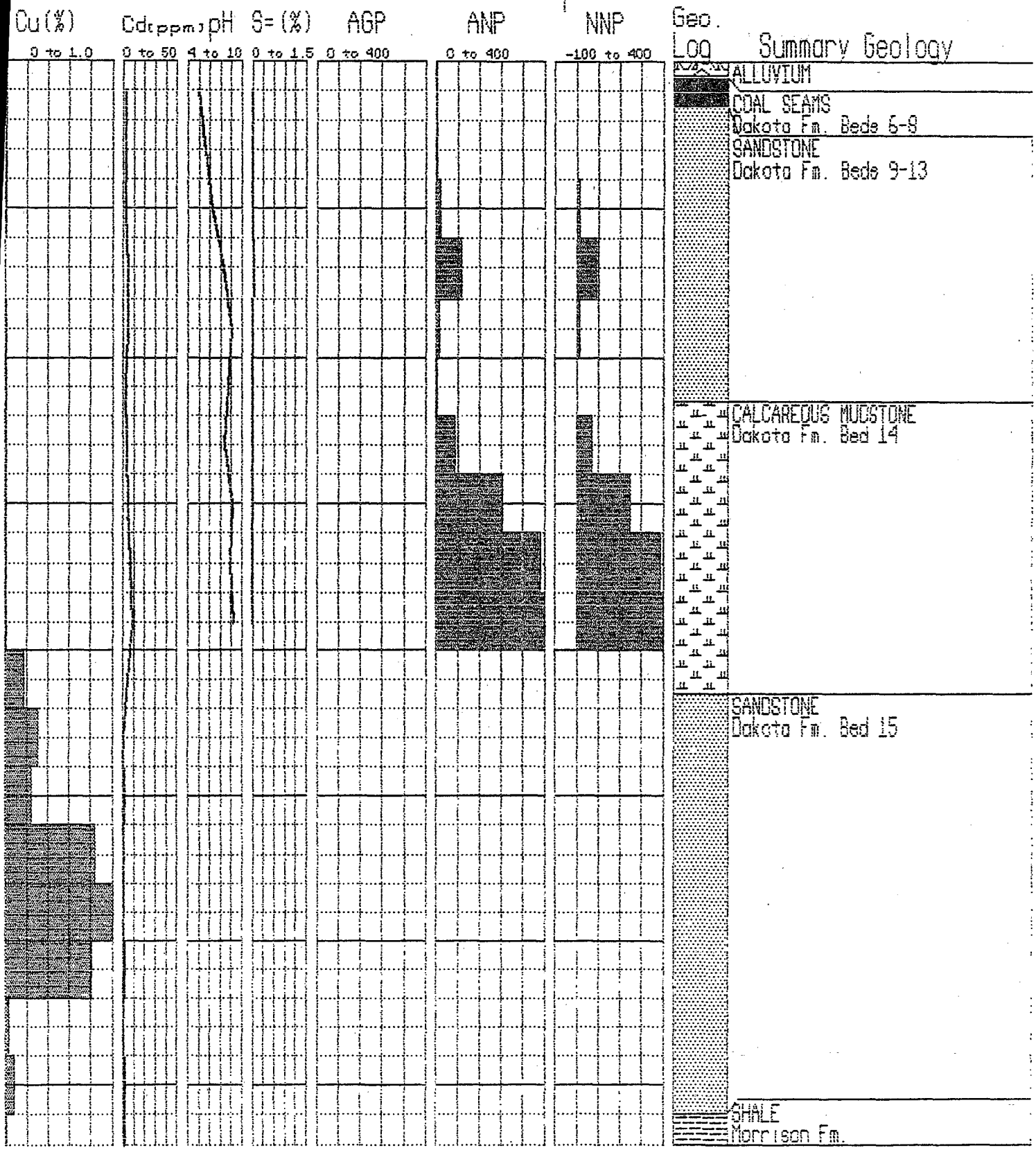
LISBON VALLEY PROJECT: Centennial Deposit: 93R23





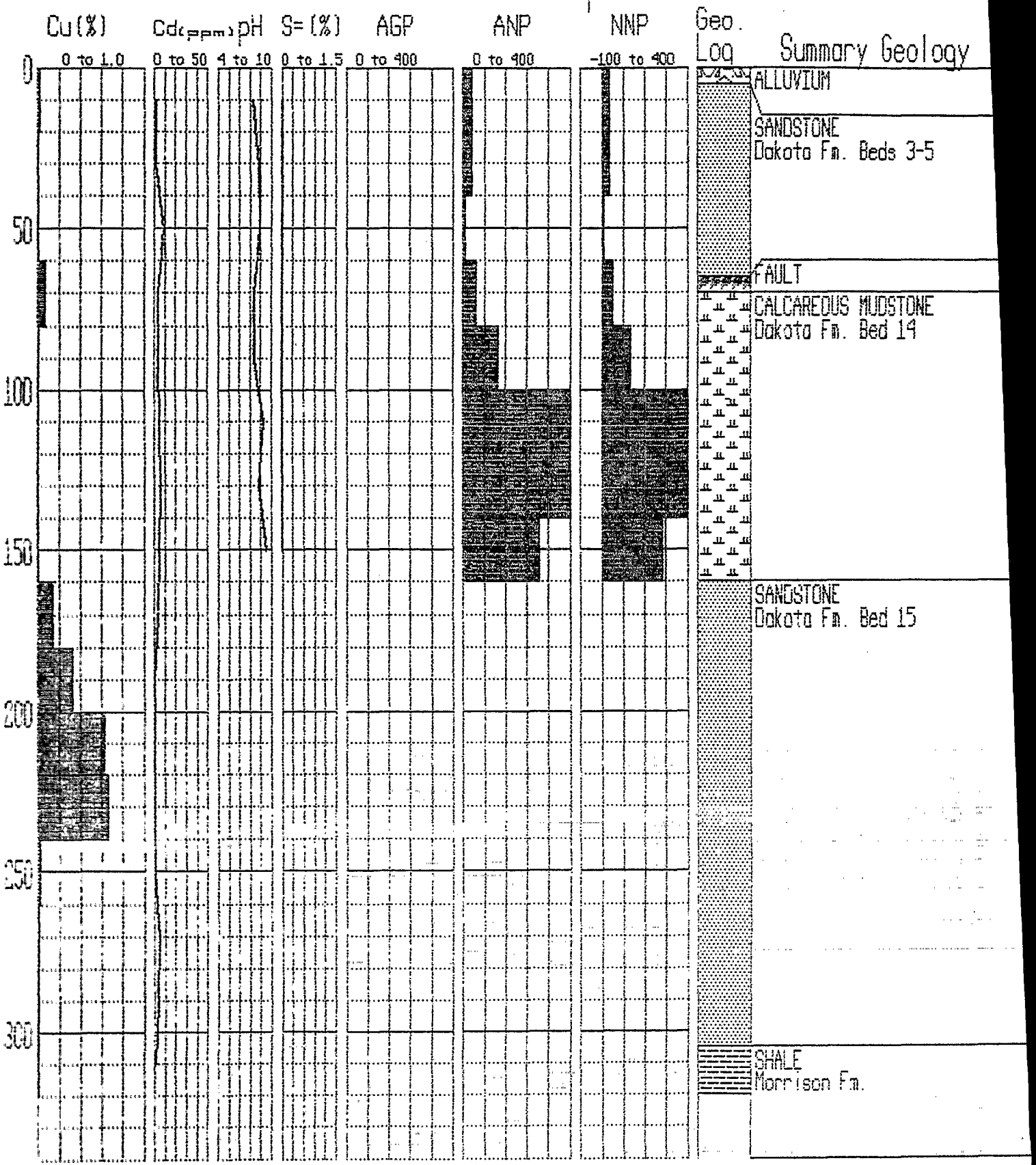
15-21

LISBON VALLEY PROJECT: Centennial Deposit: 93R25



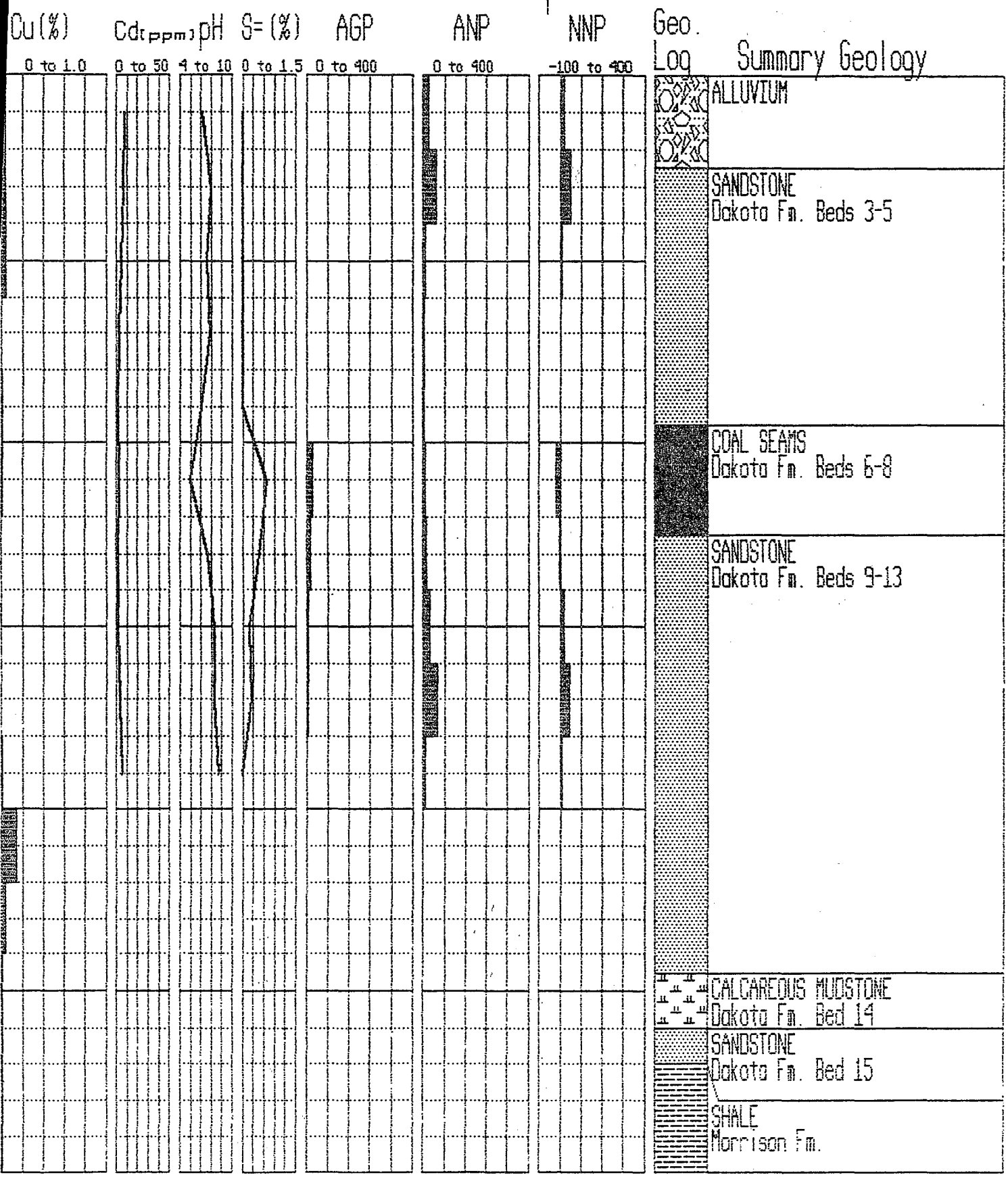
15-22

LISBON VALLEY PROJECT: Centennial Deposit: 93R29



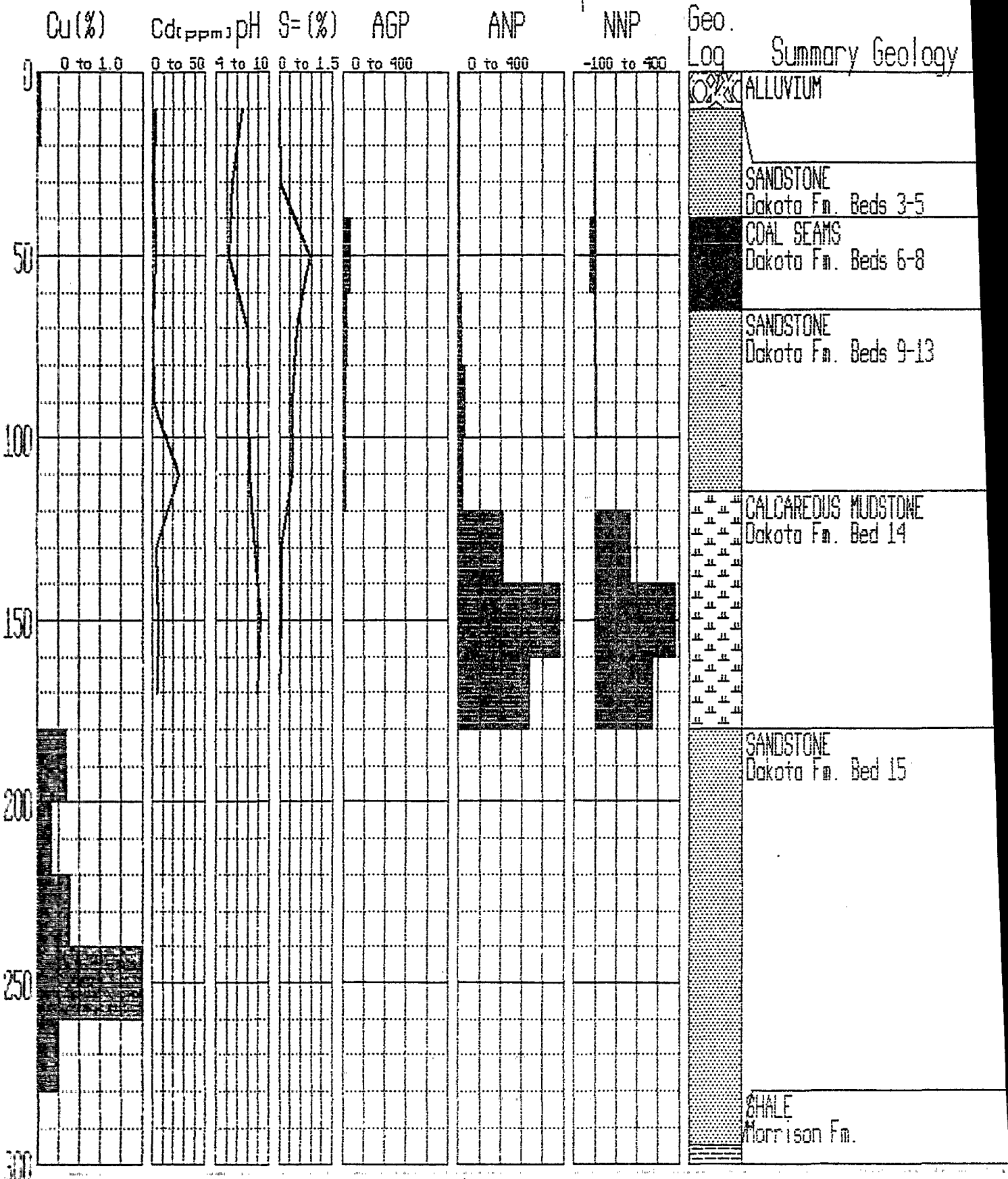
15-23

LISBON VALLEY PROJECT: Centennial Deposit: Hole 94R6-94R7



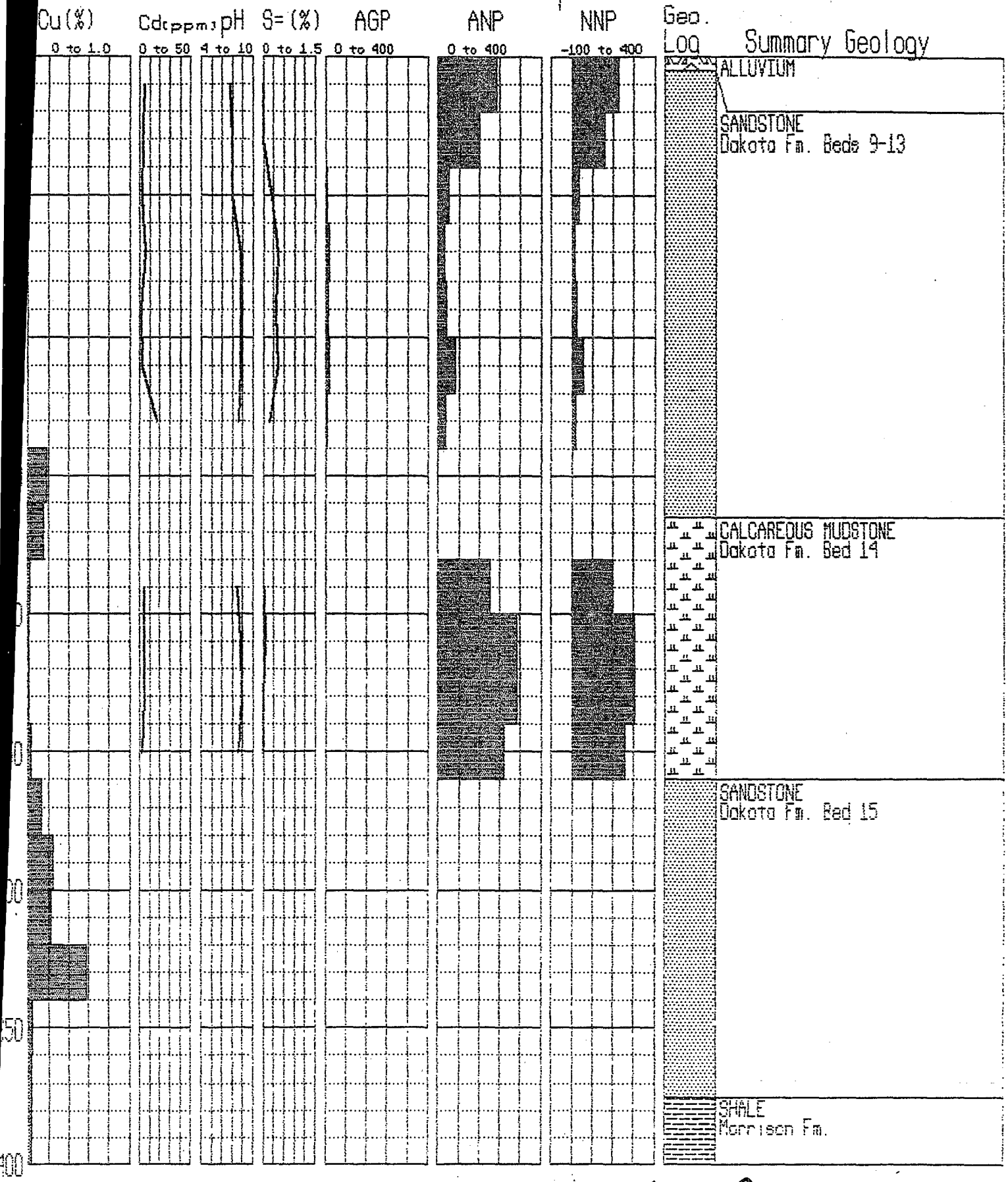
15-24

LISBON VALLEY PROJECT: Centennial Deposit: Hole 94R12



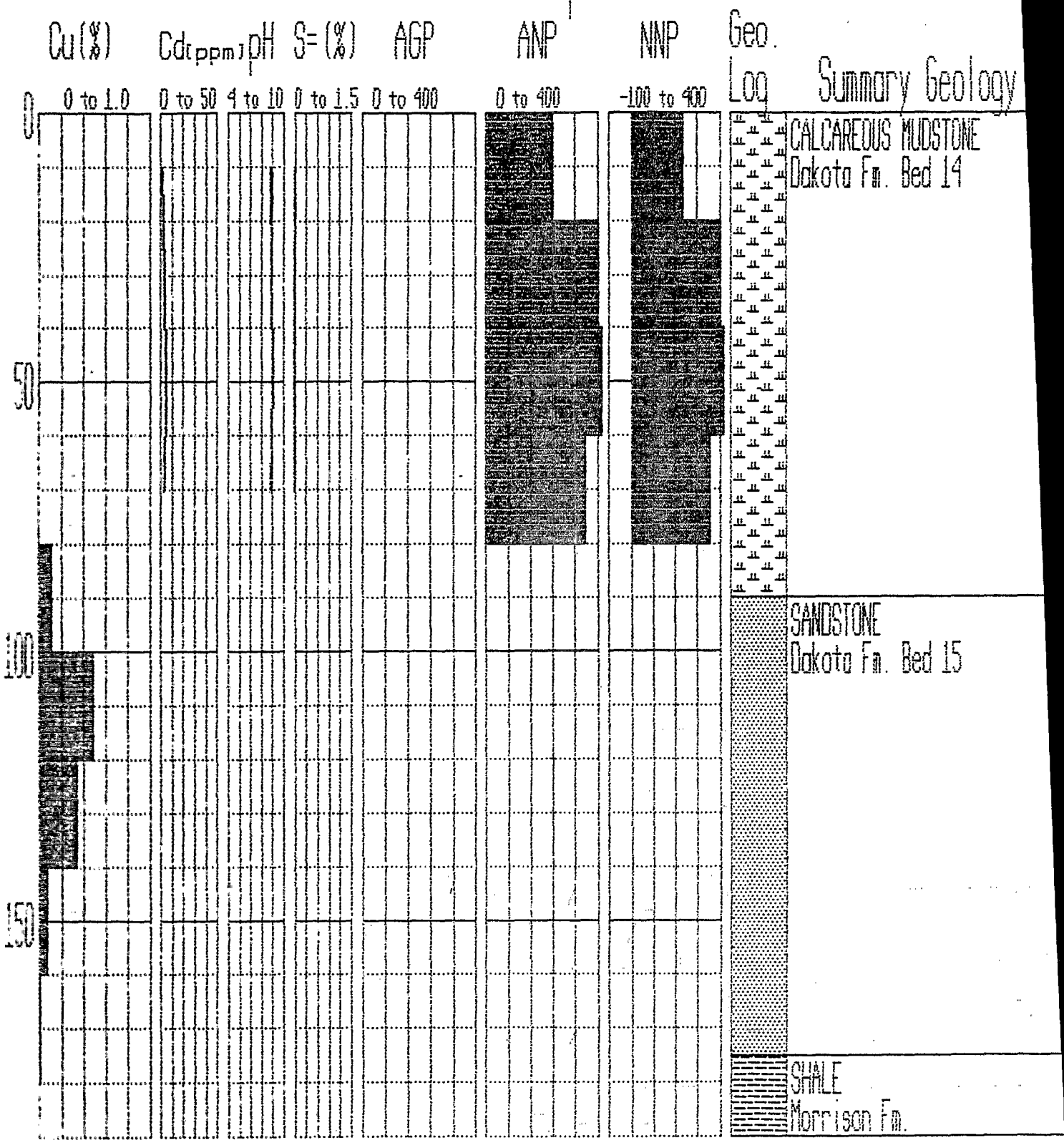
15-25

ISBON VALLEY PROJECT: Centennial Deposit: Hole 94R14



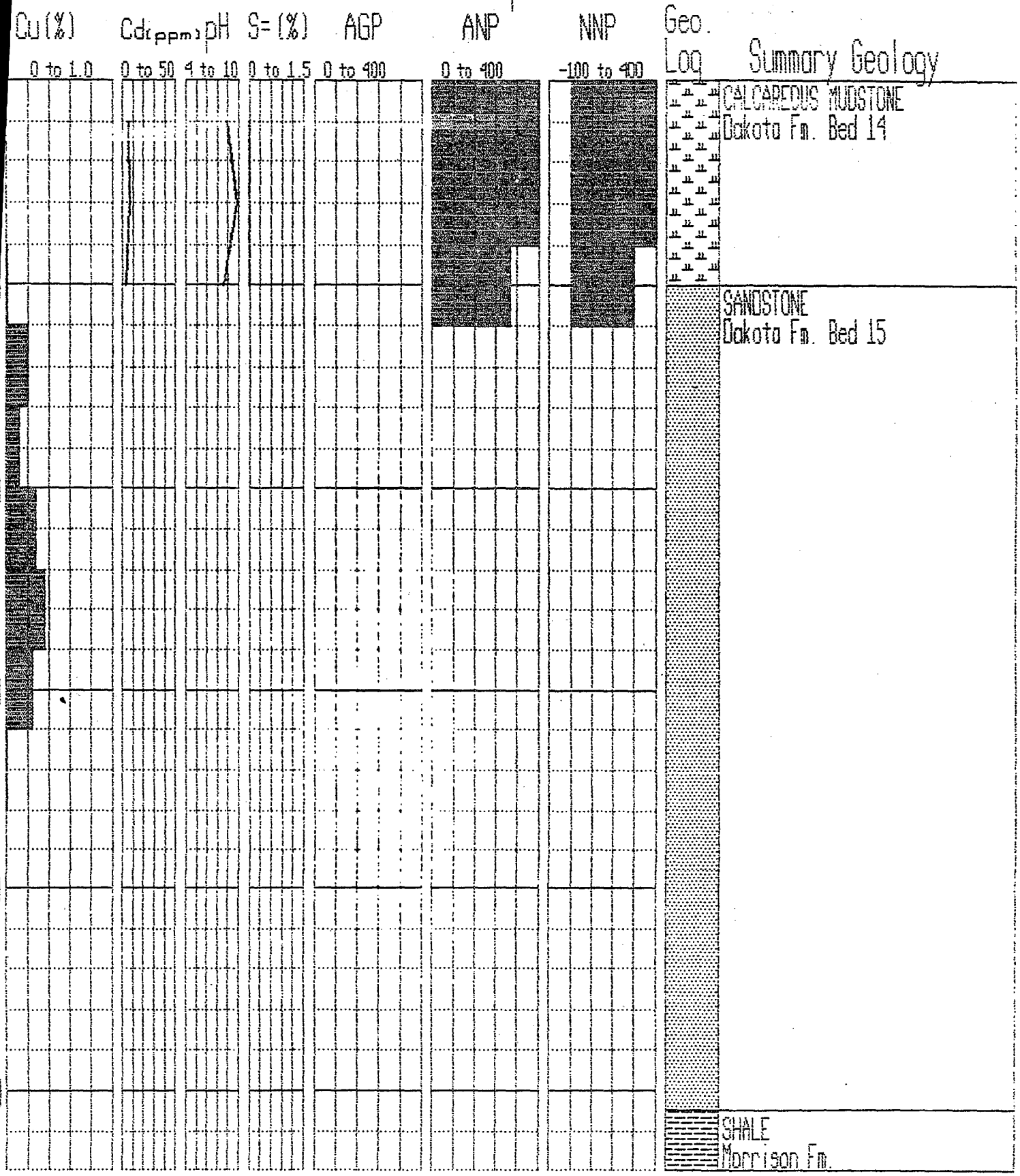
15-26

LISBON VALLEY PROJECT: Sentinel Deposit: Hole 9458



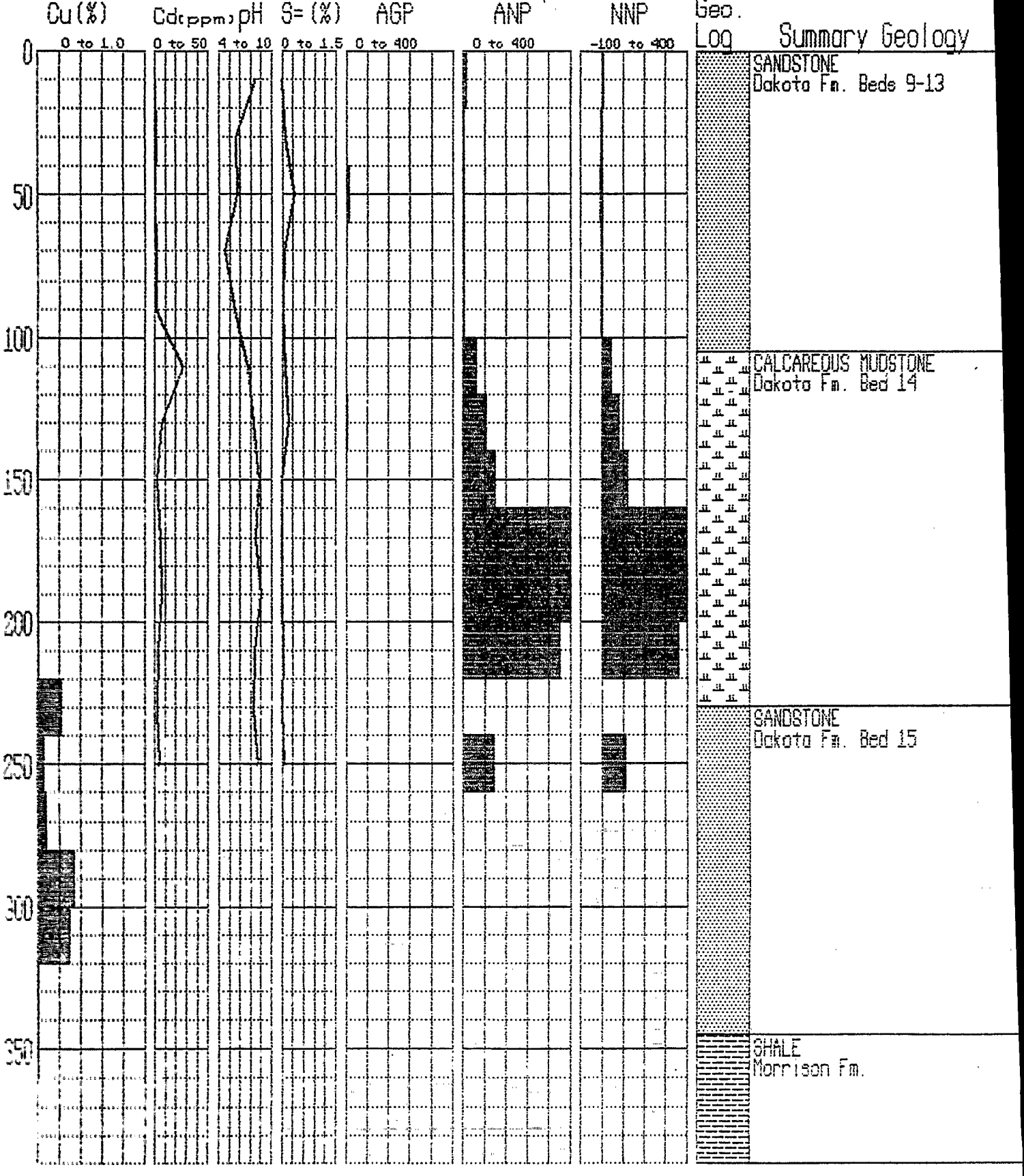
15-27

LISBON VALLEY PROJECT: Sentinel Deposit: Hole 94S15



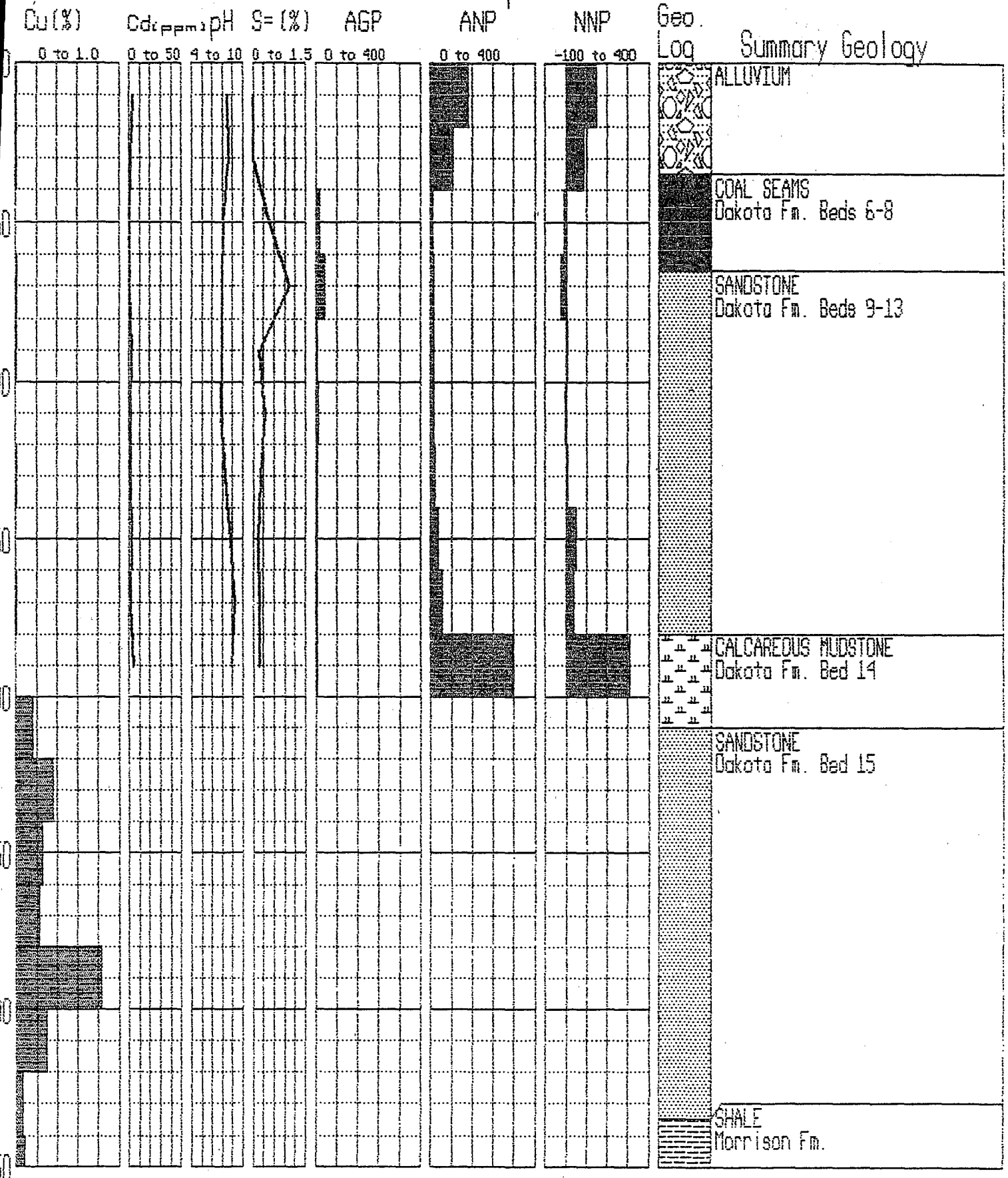
15-28

LISBON VALLEY PROJECT: Sentinel Deposit: Hole 94S29

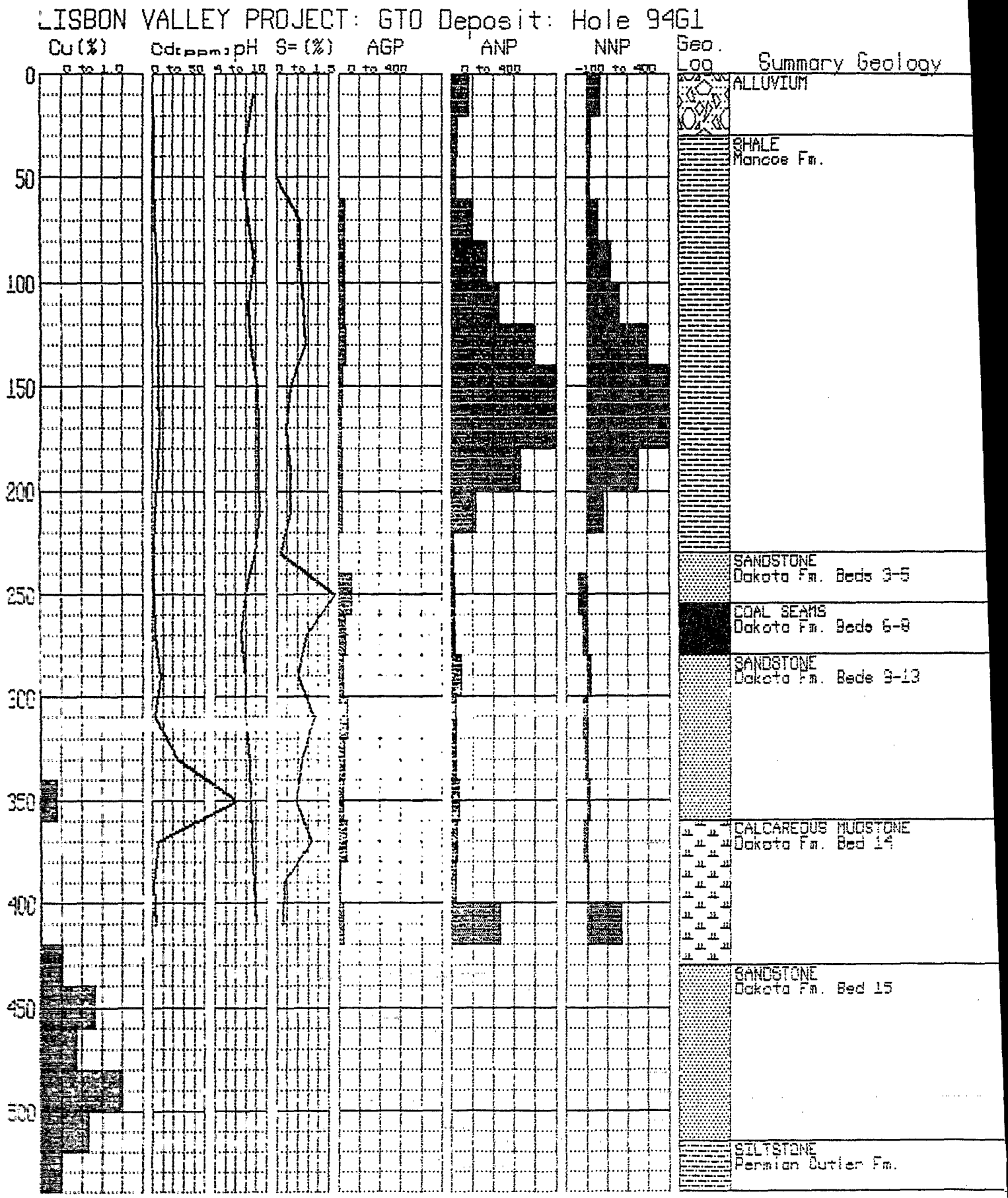


15-29

LISBON VALLEY PROJECT: Sentinel Deposit: Hole 94S36

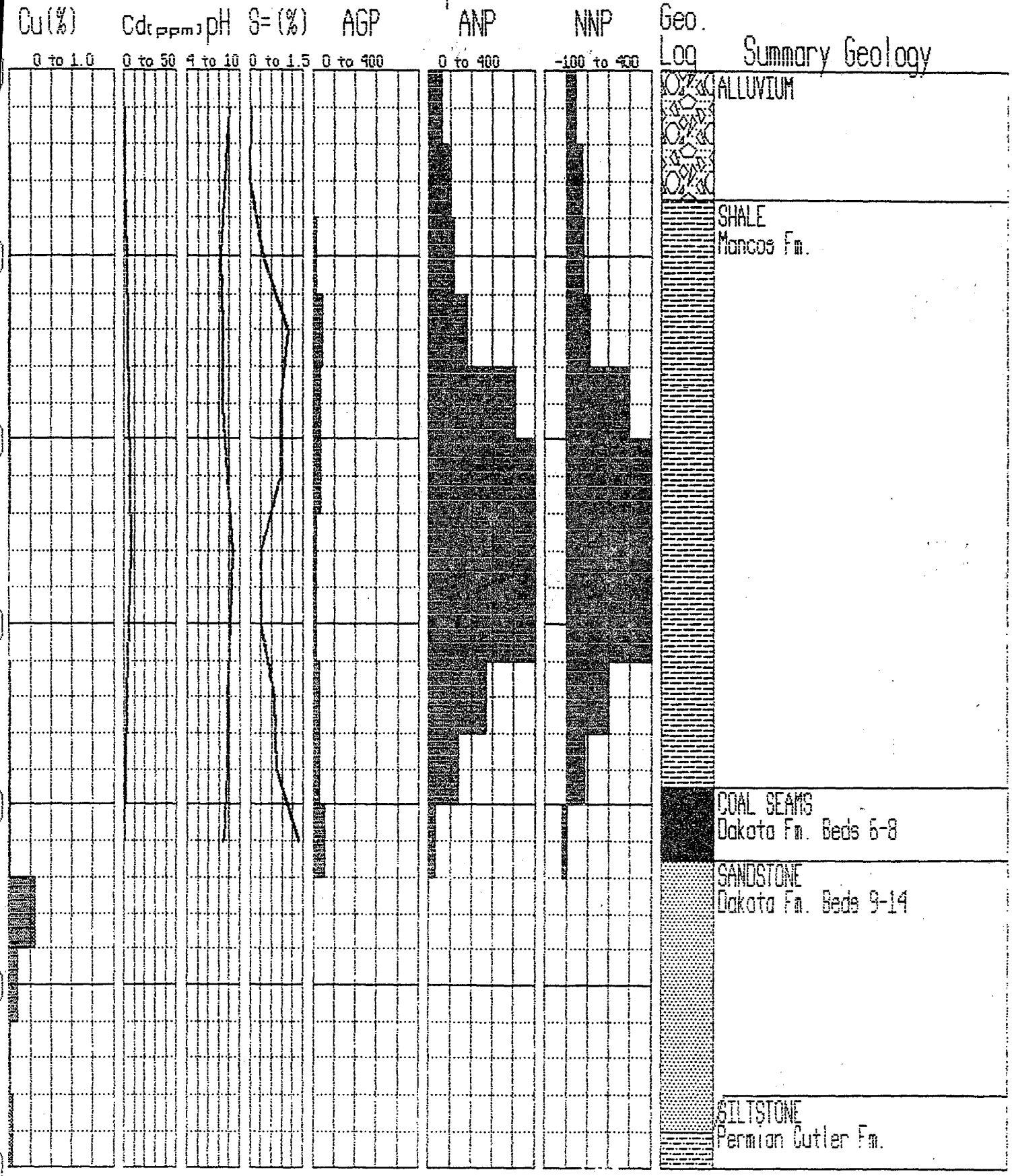


15-30


LISBON VALLEY PROJECT: GTO Deposit: Hole 9461
Cu(%)
0 to 1.0
Cd ppm
0 to 50
pH
4 to 10
S=(%)
0 to 1.5
AGP
0 to 900
ANP
0 to 900
NNP
-100 to 400
Geo. Log
Summary Geology
0
50
100
150
200
250
300
350
400
450
500
ALLUVIUM
SHALE
Mancos Fm.
SANDSTONE
Dakota Fm. Beds 3-5
COAL SEAMS
Dakota Fm. Beds 6-8
SANDSTONE
Dakota Fm. Beds 9-13
CALCAREOUS MUDSTONE
Dakota Fm. Bed 14
SANDSTONE
Dakota Fm. Bed 15
SILTSTONE
Permian Cutler Fm.

15-31

LISBON VALLEY PROJECT: GTO Deposit: Hole 94G7



15-32

TABLE B-2

ANALYTICAL RESULTS
SPLP EXTRACT (mg/l)

ELEMENT	COMP #1	COMP #2	COMP #3	COMP #4
Alkalinity, as $mgCaCO_3/l$	19	26	85	144
Aluminum	0.038	0.21	1.3	1.5
Antimony	<0.003	<0.003	<0.003	<0.003
Arsenic	<0.005	<0.005	<0.005	<0.005
Barium	<0.25	0.33	0.60	0.47
Beryllium	<0.002	<0.002	<0.002	<0.002
Bismuth	<0.5	<0.5	<0.5	<0.5
Boron	<0.05	0.081	0.12	0.081
Cadmium	<0.005	<0.005	<0.005	<0.005
Calcium	22	6.9	7.4	8.9
Chloride	<5.0	<5.0	<5.0	<5.0
Chromium	<0.05	<0.05	<0.05	<0.05
Cobalt	<0.5	<0.5	<0.5	<0.5
Copper	<0.05	<0.05	<0.05	<0.05
Fluoride	0.33	0.32	0.45	0.36
Gallium	<0.5	<0.5	<0.5	<0.5
Iron	<0.05	0.72	0.39	0.57
Lanthanum	<0.5	<0.5	<0.5	<0.5
Lead	<0.005	<0.005	<0.005	<0.005
Lithium	<0.5	<0.5	<0.5	<0.5
Magnesium	5.0	2.5	2.4	2.2
Manganese	<0.03	<0.03	<0.03	<0.03
Mercury	<0.001	<0.001	<0.001	<0.001
Molybdenum	<0.25	<0.25	<0.25	<0.25
Nickel	<0.05	<0.05	<0.05	<0.05
Nitrate as N	<0.5	<0.5	<0.5	<0.5
pH	7.74	8.56	9.10	9.09
Phosphorus	<0.5	<0.5	<0.5	<0.5
Potassium	<2.5	<2.5	<2.5	<2.5
Scandium	<0.5	<0.5	<0.5	<0.5
Selenium	<0.005	<0.005	<0.005	<0.005
Silver	<0.02	<0.02	<0.02	<0.02
Sodium	1.5	3.0	4.7	3.3
Strontium	0.59	<0.5	<0.5	<0.5
Sulfate	76	18	12	19
Thallium	<0.001	<0.001	<0.001	<0.001
Tin	<0.5	<0.5	<0.5	<0.5
Titanium	<0.1	<0.1	<0.1	<0.1
Total Dissolved Solids	130	52	90	94
Vanadium	<0.15	<0.15	<0.15	<0.15
WAD Cyanide	<0.04	<0.04	<0.04	<0.04
Zinc	<0.05	<0.05	<0.05	<0.05

Synthetic Precipitation Leaching Procedure Results (BLM 1997a)
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Parameter (mg/L)	**Composite #1** Beds 6, 7, 8 of Dakota Sandstone	**Composite #2** Beds 9 and 10 of Dakota Sandstone	**Composite #3** Bed 14 Burro Canyon Mudstone	**Composite #4** Bed 14 Burro Canyon Limestone
Alkalinity as $CaCO_3$	19	26	85	144
Aluminum	0.038	0.21	1.3	1.5
Antimony	<0.003	<0.003	<0.003	<0.003
Arsenic	<0.005	<0.005	<0.005	<0.005
Barium	<0.25	0.33	0.6	0.47
Beryllium	<0.002	<0.002	<0.002	<0.002
Bismuth	<0.5	<0.5	<0.5	<0.5
Boron	<0.05	0.081	0.12	0.081
Cadmium	<0.005	<0.005	<0.005	<0.005
Calcium	22	6.9	7.4	8.9
Chloride	<5.0	<5.0	<5.0	<5.0
Chromium	<0.05	<0.05	<0.05	<0.05
Cobalt	<0.5	<0.5	<0.5	<0.5
Copper	<0.05	<0.05	<0.05	<0.05
Fluoride	0.33	0.32	0.45	0.36
Gallium	<0.5	<0.5	<0.5	<0.5
Iron	<0.05	0.72	0.39	0.57
Lanthanum	<0.5	<0.5	<0.5	<0.5
Lead	<0.005	<0.005	<0.005	<0.005
Lithium	<0.5	<0.5	<0.5	<0.5
Magnesium	5	2.5	2.4	2.2
Manganese	<0.03	<0.03	<0.03	<0.03
Mercury	<0.001	<0.001	<0.001	<0.001
Molybdenum	<0.25	<0.25	<0.25	<0.25
Nickel	<0.05	<0.05	<0.05	<0.05
Nitrate as N	<0.5	<0.5	<0.5	<0.5
pH	7.74	8.56	9.1	9.09
Phosphorus	<0.5	<0.5	<0.5	<0.5
Potassium	<2.5	<2.5	<2.5	<2.5
Scandium	<0.5	<0.5	<0.5	<0.5
Selenium	<0.005	<0.005	<0.005	<0.005
Silver	<0.02	<0.02	<0.02	<0.02
Sodium	1.5	3	4.7	3.3
Strontium	0.59	<0.5	<0.5	<0.5
Sulfate	76	18	12	19
Thallium	<0.001	<0.001	<0.001	<0.001
Tin	<0.5	<0.5	<0.5	<0.5
Titanium	<0.1	<0.1	<0.1	<0.1
TDS	130	52	90	94
Vanadium	<0.15	<0.15	<0.15	<0.15
WAD Cyanide	<0.04	<0.04	<0.04	<0.04
Zinc	<0.05	<0.05	<0.05	<0.05

Results are in units of mg/L, except for pH
Results are from the Final Environmental Imact Statement, Lisbon Valley Copper Project (BLM 1997)

ARCADIS

Appendix A-2

Acid-base Accounting - Operational Characterization Program

Acid-base Accounting Summary
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Data Source	Sulfide Sulfur wt. %	Sulfate Sulfur wt. %	Total Sulfur wt. %	AGP Sulfide-based t $CaCO_3$/kt	ANP t $CaCO_3$/kt	NNP Sulfide-based (ANP-AGP)	NPR Sulfide-based (ANP/AGP)
FEIS (BLM 1997a)	0.002	0.030	0.032	0.06	48.3	48.2	805.0
FEIS (BLM 1997a)	***0.0005***	0.032	0.032	***0.015***	392	392.0	26133.3
FEIS (BLM 1997a)	0.002	0.026	0.028	0.06	303	302.9	5050.0
FEIS (BLM 1997a)	***0.0005***	0.016	0.016	***0.015***	8.7	8.69	580.0
FEIS (BLM 1997a)	0.002	0.014	0.016	0.06	181	180.9	3016.7
FEIS (BLM 1997a)	0.008	0.08	0.088	0.25	4.4	4.15	17.6
FEIS (BLM 1997a)	0.006	0.012	0.018	0.19	757	756.8	3984.2
FEIS (BLM 1997a)	0.002	0.030	0.032	0.06	***0.25***	0.19	4.17
FEIS (BLM 1997a)	0.003	0.042	0.045	0.09	***0.25***	0.16	2.78
FEIS (BLM 1997a)	0.004	0.045	0.049	0.13	***0.25***	0.12	1.92
FEIS (BLM 1997a)	0.003	0.051	0.054	0.09	***0.25***	0.16	2.78
FEIS (BLM 1997a)	0.001	0.020	0.021	0.03	160	160.0	5333.3
FEIS (BLM 1997a)	0.003	0.034	0.037	0.09	200	199.9	2222.2
FEIS (BLM 1997a)	0.001	0.028	0.029	0.03	300	300.0	10000.0
FEIS (BLM 1997a)	0.001	0.024	0.025	0.03	315	315.0	10500.0
FEIS (BLM 1997a)	0.001	0.030	0.031	0.03	300	300.0	10000.0
FEIS (BLM 1997a)	0.130	0.200	0.330	4.06	76.0	71.9	18.7
FEIS (BLM 1997a)	0.001	0.059	0.060	0.03	87.1	87.1	2903.3
FEIS (BLM 1997a)	0.021	0.089	0.110	0.66	98.7	98.0	149.5
FEIS (BLM 1997a)	0.001	0.051	0.052	0.03	270	270.0	9000.0
FEIS (BLM 1997a)	***0.0005***	0.029	0.029	***0.015***	370	370.0	24666.7
FEIS (BLM 1997a)	0.002	0.038	0.040	0.06	345	344.9	5750.0
FEIS (BLM 1997a)	0.002	0.040	0.042	0.06	275	274.9	4583.3
FEIS (BLM 1997a)	0.001	0.036	0.037	0.03	370	370.0	12333.3
FEIS (BLM 1997a)	0.004	0.074	0.078	0.13	125	124.9	961.5
FEIS (BLM 1997a)	0.002	0.042	0.044	0.06	125	124.9	2083.3
FEIS (BLM 1997a)	0.004	0.096	0.100	0.13	400	399.9	3076.9
FEIS (BLM 1997a)	***0.0005***	0.074	0.074	***0.015***	425	425.0	28333.3
FEIS (BLM 1997a)	0.003	0.015	0.018	0.09	67.6	67.5	751.1
FEIS (BLM 1997a)	0.001	0.045	0.046	0.03	100	100.0	3333.3
FEIS (BLM 1997a)	***0.0005***	0.034	0.034	***0.015***	395	395.0	26333.3
FEIS (BLM 1997a)	0.001	0.081	0.082	0.03	410	410.0	13666.7
FEIS (BLM 1997a)	***0.0005***	0.150	0.150	***0.015***	305	305.0	20333.3
FEIS (BLM 1997a)	0.002	0.024	0.026	0.06	84.9	84.8	1415.0
FEIS (BLM 1997a)	***0.0005***	0.052	0.052	***0.015***	400	400.0	26666.7

ARCADIS

Acid-base Accounting Summary
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Data Source	Sulfide Sulfur wt. %	Sulfate Sulfur wt. %	Total Sulfur wt. %	AGP Sulfide-based t $CaCO_3$/kt	ANP t $CaCO_3$/kt	NNP Sulfide-based (ANP-AGP)	NPR Sulfide-based (ANP/AGP)
FEIS (BLM 1997a)	***0.0005***	0.082	0.082	***0.015***	440	440.0	29333.3
FEIS (BLM 1997a)	0.010	0.150	0.160	0.31	325	324.7	1048.4
FEIS (BLM 1997a)	0.026	0.066	0.092	0.81	23.2	22.4	28.6
FEIS (BLM 1997a)	0.002	0.038	0.040	0.06	93.4	93.3	1556.7
FEIS (BLM 1997a)	0.027	0.093	0.120	0.84	230	229.2	273.8
FEIS (BLM 1997a)	0.010	0.100	0.110	0.31	395	394.7	1274.2
FEIS (BLM 1997a)	0.001	0.083	0.084	0.03	415	415.0	13833.3
FEIS (BLM 1997a)	0.060	0.120	0.180	1.88	345	343.1	183.5
FEIS (BLM 1997a)	***0.0005***	0.042	0.042	***0.015***	70.9	70.9	4726.7
FEIS (BLM 1997a)	0.014	0.086	0.100	0.44	245	244.6	556.8
FEIS (BLM 1997a)	***0.0005***	0.140	0.140	***0.015***	385	385.0	25666.7
FEIS (BLM 1997a)	0.010	0.110	0.120	0.31	450	449.7	1451.6
FEIS (BLM 1997a)	***0.0005***	0.023	0.023	***0.015***	130	130.0	8666.7
FEIS (BLM 1997a)	***0.0005***	0.025	0.025	***0.015***	410	410.0	27333.3
FEIS (BLM 1997a)	0.003	0.033	0.036	0.09	400	399.9	4444.4
FEIS (BLM 1997a)	0.020	0.120	0.140	0.63	285	284.4	452.4
FEIS (BLM 1997a)	0.040	0.180	0.22	1.25	39.1	37.9	31.3
FEIS (BLM 1997a)	0.080	0.120	0.200	2.5	169.0	166.5	67.6
FEIS (BLM 1997a)	0.060	0.140	0.200	1.88	385.0	383.1	204.8
FEIS (BLM 1997a)	0.008	0.092	0.100	0.25	270.0	269.8	1080.0
FEIS (BLM 1997a)	0.050	0.150	0.200	1.56	200.0	198.4	128.2
FEIS (BLM 1997a)	0.060	0.120	0.180	1.88	305.0	303.1	162.2
FEIS (BLM 1997a)	***0.0005***	0.086	0.086	***0.015***	305.0	305.0	20333.3
FEIS (BLM 1997a)	***0.0005***	0.018	0.018	***0.015***	235.0	235.0	15666.7
FEIS (BLM 1997a)	0.002	0.026	0.028	0.06	400.0	399.9	6666.7
FEIS (BLM 1997a)	***0.0005***	0.028	0.028	***0.015***	415.0	415.0	27666.7
FEIS (BLM 1997a)	***0.0005***	0.018	0.018	***0.015***	355.0	355.0	23666.7
FEIS (BLM 1997a)	***0.0005***	0.022	0.022	***0.015***	395.0	395.0	26333.3
FEIS (BLM 1997a)	***0.0005***	0.032	0.032	***0.015***	560.0	560.0	37333.3
FEIS (BLM 1997a)	0.110	0.270	0.380	3.44	47.2	43.8	13.7
FEIS (BLM 1997a)	0.190	0.150	0.340	5.94	84	78.1	14.1
FEIS (BLM 1997a)	0.020	0.110	0.130	0.63	120	119.4	190.5
FEIS (BLM 1997a)	0.020	0.190	0.210	0.62	490	489.4	790.3
FEIS (BLM 1997a)	***0.0005***	0.120	0.120	***0.015***	530	530.0	35333.3
FEIS (BLM 1997a)	0.040	0.150	0.190	1.25	360	358.8	288.0

ARCADIS

Acid-base Accounting Summary
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Data Source	Sulfide Sulfur wt. %	Sulfate Sulfur wt. %	Total Sulfur wt. %	AGP Sulfide-based t $CaCO_3$/kt	ANP t $CaCO_3$/kt	NNP Sulfide-based (ANP-AGP)	NPR Sulfide-based (ANP/AGP)
FEIS (BLM 1997a)	0.180	0.140	0.320	5.63	315.0	309.4	56.0
FEIS (BLM 1997a)	1.030	0.290	1.320	32.19	18.1	-14.1	0.56
FEIS (BLM 1997a)	0.220	0.120	0.340	6.88	14.0	7.12	2.03
FEIS (BLM 1997a)	0.590	0.190	0.780	18.44	185.0	166.6	10.0
FEIS (BLM 1997a)	***0.0005***	0.078	0.078	***0.015***	255.0	255.0	17000.0
FEIS (BLM 1997a)	***0.0005***	0.024	0.024	***0.015***	245	245.0	16333.3
FEIS (BLM 1997a)	***0.0005***	0.020	0.020	***0.015***	295	295.0	19666.7
FEIS (BLM 1997a)	0.050	0.160	0.210	1.56	245	243.4	157.1
FEIS (BLM 1997a)	0.260	0.110	0.37	8.13	33.7	25.6	4.15
FEIS (BLM 1997a)	0.012	0.060	0.072	0.38	25.5	25.1	67.1
FEIS (BLM 1997a)	***0.0005***	0.044	0.044	***0.015***	21.1	21.1	1406.7
FEIS (BLM 1997a)	0.002	0.082	0.084	0.06	8.3	8.24	138.3
FEIS (BLM 1997a)	***0.0005***	0.034	0.034	***0.015***	5	4.99	333.3
FEIS (BLM 1997a)	***0.0005***	0.020	0.020	***0.015***	9.6	9.59	640.0
FEIS (BLM 1997a)	0.050	0.110	0.160	1.56	12.3	10.7	7.88
FEIS (BLM 1997a)	***0.0005***	0.026	0.026	***0.015***	***0.25***	0.24	16.7
FEIS (BLM 1997a)	***0.0005***	0.016	0.016	***0.015***	***0.25***	0.24	16.7
FEIS (BLM 1997a)	0.002	0.010	0.012	0.06	***0.25***	0.19	4.2
FEIS (BLM 1997a)	***0.0005***	0.024	0.024	***0.015***	***0.25***	0.24	16.7
FEIS (BLM 1997a)	0.070	0.160	0.230	2.19	115	112.8	52.5
FEIS (BLM 1997a)	0.530	0.190	0.720	16.56	9.0	-7.56	0.54
FEIS (BLM 1997a)	0.280	0.150	0.043	8.75	58.7	50.0	6.71
FEIS (BLM 1997a)	0.200	0.054	0.074	0.63	1.4	0.77	2.22
FEIS (BLM 1997a)	0.025	0.085	0.110	0.78	***0.25***	-0.53	0.32
FEIS (BLM 1997a)	0.380	0.140	0.520	11.88	13.9	2.02	1.17
FEIS (BLM 1997a)	0.280	0.170	0.450	8.75	22.7	14.0	2.59
FEIS (BLM 1997a)	0.340	0.200	0.540	10.63	17.6	6.97	1.66
FEIS (BLM 1997a)	1.410	0.150	1.560	44.06	23.4	-20.7	0.53
Operational Data	0.039	--	0.05	1.21	345.7	344.4	285.8
Operational Data	0.061	--	0.10	1.90	279.2	277.3	147.2
Operational Data	0.029	--	0.04	0.90	173.6	172.7	193.6
Operational Data	0.118	--	0.14	3.69	6.2	2.5	1.69
Operational Data	0.340	--	0.37	10.63	157.6	146.9	14.8
Operational Data	0.189	--	0.25	5.91	38.6	32.7	6.53
Operational Data	0.160	--	0.19	5.00	35.0	30.0	7.01

ARCADIS

Acid-base Accounting Summary
Updated Centennial Pit Backfill Evaluation
Lisbon Valley Mine, Utah

Data Source	Sulfide Sulfur wt. %	Sulfate Sulfur wt. %	Total Sulfur wt. %	AGP Sulfide-based t $CaCO_3$/kt	ANP t $CaCO_3$/kt	NNP Sulfide-based (ANP-AGP)	NPR Sulfide-based (ANP/AGP)
Operational Data	0.071	--	0.08	2.22	207.9	205.7	93.7
Operational Data	0.379	--	0.40	11.84	14.4	2.55	1.22
Operational Data	0.140	--	0.18	4.38	230.9	226.5	52.8
Operational Data	0.337	--	0.38	10.53	94.2	83.6	8.9
Operational Data	0.042	--	0.06	1.32	166.2	164.8	126.3
Operational Data	0.039	--	0.05	1.21	346.4	345.2	287.2
Operational Data	0.107	--	0.13	3.34	40.2	36.9	12.0
Operational Data	0.119	--	0.16	3.72	316.4	312.6	85.1
Operational Data	0.110	--	0.18	3.44	20.9	17.5	6.09
Operational Data	0.095	--	0.10	2.97	319.3	316.4	107.5
Operational Data	0.023	--	0.03	0.72	39.3	38.6	54.4
Operational Data	0.144	--	0.17	4.50	19.2	14.7	4.27
Operational Data	0.144	--	0.212	4.50	13.4	8.94	2.99
Operational Data	0.089	--	0.109	2.79	16.7	13.9	5.98
Operational Data	0.347	--	0.40	10.83	10.7	-0.12	0.99
Operational Data	0.047	--	0.06	1.47	201.8	200.4	137.3
Operational Data	0.023	--	0.03	0.72	8.74	8.02	12.2
Operational Data	0.022	--	0.03	0.68	201.9	201.3	299.1
Operational Data	0.158	--	0.18	4.94	89.2	84.2	18.1
Operational Data	0.038	--	0.05	1.20	97.1	95.9	81.1
Operational Data	0.024	--	0.04	0.74	9.08	8.34	12.2
Operational Data	0.032	--	0.03	1.00	220.6	219.6	219.5
Operational Data	0.48	--	0.55	15.09	10.5	-4.54	0.70
Operational Data	0.03	--	***0.005***	0.94	473.0	472.1	504.5
Operational Data	0.05	--	0.005	1.56	378.0	376.4	241.9
Column Testing Program	0.060	***0.005***	0.04	1.88	220.0	218.1	117.3
Column Testing Program	0.050	***0.005***	0.04	1.56	191.0	189.4	122.2
Column Testing Program	***0.005***	***0.005***	***0.005***	0.16	654.0	653.8	4185.6
Column Testing Program	0.030	***0.005***	0.03	0.94	1.00	0.06	1.07
Column Testing Program	***0.005***	***0.005***	***0.005***	0.16	5.00	4.844	32.0

Notes

-- Not determined

Column testing program included a Bed 14 field duplicate

Red bold italic text is 1/2 detection limit

ARCADIS

ARCADIS

Appendix A-3

Meteoric Water Mobility Procedure
Laboratory Reports - Operational
Characterization Program

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

Analytical Report

May 03, 2006

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Chuck Bauer, Susan Wyman

Project ID:
ACZ Project ID: L56113

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 18, 2006. This project has been assigned to ACZ's project number, L56113. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L56113. 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 June 03, 2006. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber 03/May/06

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6420 BED 14(A)

ACZ Sample ID: ***L56113-01***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	05/02/06 9:06	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:10	jjc
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/03/06 1:10	jjc
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:10	jjc
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	05/03/06 1:10	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:10	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0009	B	*	mg/L	0.0002	0.001	05/02/06 15:14	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:10	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4220			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		48			hrs			04/27/06 0:00	as/srs
Leachate pH		7.5			units			04/27/06 0:00	as/srs
Leachate Volume		3660			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		60.7			%			04/27/06 0:00	as/srs
Retained Moisture		5.5			%			04/27/06 0:00	as/srs

** Please refer to Extended Qualifier Report for detail.*

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6420 9-10(B)

ACZ Sample ID: ***L56113-02***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0010	B	*	mg/L	0.0008	0.004	05/02/06 9:20	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:27	jjc
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/03/06 1:27	jjc
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:27	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	05/03/06 1:27	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:27	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0002	0.001	05/02/06 15:28	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:27	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5310			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		30			hrs			04/27/06 0:00	as/srs
Leachate pH		7.1			units			04/27/06 0:00	as/srs
Leachate Volume		5170			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		68.8			%			04/27/06 0:00	as/srs
Retained Moisture		9.7			%			04/27/06 0:00	as/srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6420 11-13(C)

ACZ Sample ID: ***L56113-03***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	05/02/06 9:30	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:31	jjc
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/03/06 1:31	jjc
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:31	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	05/03/06 1:31	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:31	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0002	0.001	05/02/06 15:37	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:31	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4980			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		30			hrs			04/27/06 0:00	as/srs
Leachate pH		7.1			units			04/27/06 0:00	as/srs
Leachate Volume		4980			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		63.1			%			04/27/06 0:00	as/srs
Retained Moisture		8.9			%			04/27/06 0:00	as/srs

** Please refer to Extended Qualifier Report for detail.*

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6429 6-8(D)

ACZ Sample ID: ***L56113-04***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	05/02/06 9:44	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:44	jjc
Cadmium (MWMT)	M6010B ICP	0.104		*	mg/L	0.005	0.02	05/03/06 1:44	jjc
Copper (MWMT)	M6010B ICP	18.80		*	mg/L	0.01	0.05	05/03/06 1:44	jjc
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:44	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:44	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B	*	mg/L	0.0002	0.001	05/02/06 15:51	jjr
Zinc (MWMT)	M6010B ICP	0.68		*	mg/L	0.01	0.05	05/03/06 1:44	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		30			hrs			04/27/06 0:00	as/srs
Leachate pH		4.8			units			04/27/06 0:00	as/srs
Leachate Volume		5110			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		58.7			%			04/27/06 0:00	as/srs
Retained Moisture		12.9			%			04/27/06 0:00	as/srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT W (E)

ACZ Sample ID: ***L56113-05***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	05/02/06 9:48	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:48	jjc
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/03/06 1:48	jjc
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:48	jjc
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:48	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:48	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0011		*	mg/L	0.0002	0.001	05/02/06 15:56	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:48	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5060			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		35.8			hrs			04/27/06 0:00	as/srs
Leachate pH		7			units			04/27/06 0:00	as/srs
Leachate Volume		5250			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		73.7			%			04/27/06 0:00	as/srs
Retained Moisture		5.6			%			04/27/06 0:00	as/srs

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT E (F)

ACZ Sample ID: ***L56113-06***
Date Sampled: *01/01/06 00:00*
Date Received: *04/18/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	05/02/06 9:53	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:52	jjc
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/03/06 1:52	jjc
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:52	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	05/03/06 1:52	jjc
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/03/06 1:52	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0008	B	*	mg/L	0.0002	0.001	05/02/06 16:01	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/03/06 1:52	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5260			g			04/27/06 0:00	as/srs
Extraction pH		5.6			units			04/27/06 0:00	as/srs
Extraction Time		35.8			hrs			04/27/06 0:00	as/srs
Leachate pH		7.3			units			04/27/06 0:00	as/srs
Leachate Volume		5570			mL			04/27/06 0:00	as/srs
Particle Size over 5 cm		53.5			%			04/27/06 0:00	as/srs
Retained Moisture		7.7			%			04/27/06 0:00	as/srs

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L56113***

Project ID:

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205640													
WG205640ICV	ICV	05/02/06 8:38	MS060215-2	.02008		.02092	mg/L	104.2	90	110			
WG205640ICB	ICB	05/02/06 8:43				.00043	mg/L		-0.0012	0.0012			
WG205152PBS	PBS	05/02/06 9:02				U	mg/L		-0.0024	0.0024			
L56113-01AS	AS	05/02/06 9:11	MS060417-3	.0125	U	.01064	mg/L	85.1	75	125			
L56113-01ASD	ASD	05/02/06 9:16	MS060417-3	.0125	U	.01147	mg/L	91.8	75	125	7.51	20	
L56113-06DUP	DUP	05/02/06 9:58			U	U	mg/L				0	20	RA

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	4		4.052	mg/L	101.3	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.12	0.12			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.12	0.12			
L56113-01AS	AS	05/03/06 1:18	II060501-2	1	U	1.034	mg/L	103.4	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	1	U	1.042	mg/L	104.2	75	125	0.77	20	
L56113-06DUP	DUP	05/03/06 1:56			U	.00045	mg/L				0	20	RA

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	2		1.9537	mg/L	97.7	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.015	0.015			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.015	0.015			
L56113-01AS	AS	05/03/06 1:18	II060501-2	.5	U	.5006	mg/L	100.1	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	.5	U	.495	mg/L	99	75	125	1.12	20	
L56113-06DUP	DUP	05/03/06 1:56			U	.00024	mg/L				0	20	RA

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	2		1.947	mg/L	97.4	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.03	0.03			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.03	0.03			
L56113-01AS	AS	05/03/06 1:18	II060501-2	.5	U	.493	mg/L	98.6	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	.5	U	.489	mg/L	97.8	75	125	0.81	20	
L56113-06DUP	DUP	05/03/06 1:56			U	.0021	mg/L				0	20	RA

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	2		1.998	mg/L	99.9	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.03	0.03			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.03	0.03			
L56113-01AS	AS	05/03/06 1:18	II060501-2	.5	.01	.496	mg/L	97.2	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	.5	.01	.485	mg/L	95	75	125	2.24	20	
L56113-06DUP	DUP	05/03/06 1:56			.02	.037	mg/L				59.6	20	RA

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L56113***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	4		4.002	mg/L	100.1	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.12	0.12			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.12	0.12			
L56113-01AS	AS	05/03/06 1:18	II060501-2	1	U	1.034	mg/L	103.4	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	1	U	1.025	mg/L	102.5	75	125	0.87	20	
L56113-06DUP	DUP	05/03/06 1:56			U	.0011	mg/L				0	20	RA

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205562													
WG205562ICV	ICV	05/02/06 14:45	MS060215-2	.05		.05092	mg/L	101.8	90	110			
WG205562ICB	ICB	05/02/06 14:50				U	mg/L		-0.0003	0.0003			
WG205152PBS	PBS	05/02/06 15:09				U	mg/L		-0.0006	0.0006			
L56113-01AS	AS	05/02/06 15:18	MS060417-3	.05	.0009	.04938	mg/L	97	75	125			
L56113-01ASD	ASD	05/02/06 15:23	MS060417-3	.05	.0009	.05002	mg/L	98.2	75	125	1.29	20	
L56113-06DUP	DUP	05/02/06 16:05			.0008	.001	mg/L				22.2	20	RA

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG205634													
WG205634ICV	ICV	05/03/06 0:45	II060428-1	2		1.933	mg/L	96.7	90	110			
WG205634ICB	ICB	05/03/06 0:49				U	mg/L		-0.03	0.03			
WG205152PBS	PBS	05/03/06 1:06				U	mg/L		-0.03	0.03			
L56113-01AS	AS	05/03/06 1:18	II060501-2	.5	U	.503	mg/L	100.6	75	125			
L56113-01ASD	ASD	05/03/06 1:23	II060501-2	.5	U	.498	mg/L	99.6	75	125	1	20	
L56113-06DUP	DUP	05/03/06 1:56			U	.0022	mg/L				0	20	RA

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L56113***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L56113-01	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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).
L56113-02	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L56113***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L56113-03	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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).
L56113-04	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L56113***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L56113-05	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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).
L56113-06	WG205640	Antimony (MWMT)	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).
	WG205634	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG205562	Uranium (MWMT)	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).
	WG205634	Zinc (MWMT)	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

Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L56113***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L56113
Date Received: 4/18/2006
Received By:
Date Printed: 4/18/2006

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
BOX		19.2	15
BOX		22	15
BOX		19.8	16
BOX		20	15

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L56113
Date Received: 4/18/2006
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L56113-01	CENT 6420 BED 14(A)									X		☐
L56113-02	CENT 6420 9-10(B)									X		☐
L56113-03	CENT 6420 11-13(C)									X		☐
L56113-04	CENT 6429 6-8(D)									X		☐
L56113-05	SENT W (E)									X		☐
L56113-06	SENT E (F)									X		☐

Sample Container Preservative Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L56113

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 **920 S. County Rd. 313** **La Sal, Utah 84530** **Phone: (435) 686-9950**	**Send report with laboratory QA to:** **920 S County Rd 313** **La Sal, Utah 84530**

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE NUMBER	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
Cent 6420 14 (A)	Jan 06		x							1	Composite w/Feb&Mar samples per suffix (A-G)
~~Cent 6420 10 (B)~~	Jan 06		x							1	As Above
Cent 6420 11-13 (C)	Jan 06		x							1	As Above
~~Cent 6429 6-8 (D)~~	Jan 06		x							1	As Above
Sent W 6440 14 (E)	Jan 06		x							1	As Above
Sent W 6460 14 (E)	Jan 06		x							1	As Above
~~Sent E 6460 14 (F)~~	Jan 06		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers
Sampler's Signature	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard	Received By: Date / Time: 4/18/06
Method of Shipment: UPS	

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 **920 S. County Rd. 313** **La Sal, Utah 84530** **Phone: (435) 686-9950**	**Send report with laboratory QA to:** **920 S County Rd 313** **La Sal, Utah 84530**

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
~~Sent E 6440 14 (F)~~	Feb 06		x							1	Composite w/Jan&Mar samples per suffix (A-G)
~~Cent 6420 6-8 (D)~~	Feb 06		x							1	As Above
Cent 6420 14 (A)	Feb 06		x							1	As Above
Cent 6420 11-13 (C)	Feb 06		x							1	As Above
Sent W 6440 14 (E)	Feb 06		x							1	As Above
[redacted]	Feb 06		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers
Sampler's Signature	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard	Received By: Date / Time: 4/18/11
Method of Shipment: UPS	

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 **920 S. County Rd. 313** **La Sal, Utah 84530** **Phone: (435) 686-9950**	**Send report with laboratory QA to:** **920 S County Rd 313** **La Sal, Utah 84530**

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
Sent W 6420 Bed 14 (E)	Mar 06		x							1	Composite w/Jan&Feb samples per suffix (A-G)
Cent 6420 11-13 (C)	Mar 06		x							1	As Above
~~Sent East Bed 14 (F)~~	Mar 06		x							1	As Above
Cent 6420 Bed 14 (A)	Mar 06		x							1	As Above
Sent E Bed 13 6420 (G)	Mar 06		x							1	As Above
[redacted]	Mar 06		x							1	As Above
6420 Sent East Bed 13 (G)	Mar 06		x							1	As Above
~~Cent 6420 Beds 6-8 (D)~~	Mar 06		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers
Sampler's Signature	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard	Received By: Date / Time: 4/12/06
Method of Shipment: UPS	

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

Analytical Report

August 09, 2006

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L57662

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on July 13, 2006. This project has been assigned to ACZ's project number, L57662. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L57662. 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 September 09, 2006. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber 09/Aug/06

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Case Narrative

Lisbon Valley Mining Company, LLC

August 09, 2006

Project ID:
ACZ Project ID: L57662

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 soil samples from Lisbon Valley Mining Company, LLC on July 13, 2006. 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 L57662. 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 parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following anomaly required further explanation not provided by the Extended Qualifier Report:

1. For Zinc values flagged with an "B1", Zinc was detected in the PBS at 0.048 mg/L. The results may be biased slightly high.

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT W 14 6380-6400

ACZ Sample ID: ***L57662-01***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 21:58	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:26	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 4:26	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 4:26	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 4:26	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:26	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0026			mg/L	0.0002	0.001	07/27/06 21:58	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/08/06 4:26	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5190			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		29			hrs			07/21/06 0:00	srs
Leachate pH		7.1			units			07/21/06 0:00	srs
Leachate Volume		4860			mL			07/21/06 0:00	srs
Particle Size over 5 cm		53.1			%			07/21/06 0:00	srs
Retained Moisture		8.8			%			07/21/06 0:00	srs

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT E9-10 6380-6400

ACZ Sample ID: ***L57662-02***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 22:19	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:42	jjc
Cadmium (MWMT)	M6010B ICP	0.028			mg/L	0.005	0.02	08/08/06 4:42	jjc
Copper (MWMT)	M6010B ICP	0.10			mg/L	0.01	0.05	08/08/06 4:42	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 4:42	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:42	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0021			mg/L	0.0002	0.001	07/27/06 22:19	scp
Zinc (MWMT)	M6010B ICP	2.03		*	mg/L	0.01	0.05	08/08/06 4:42	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5040			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		33			hrs			07/21/06 0:00	srs
Leachate pH		3.7			units			07/21/06 0:00	srs
Leachate Volume		4780			mL			07/21/06 0:00	srs
Particle Size over 5 cm		46.8			%			07/21/06 0:00	srs
Retained Moisture		14.9			%			07/21/06 0:00	srs

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT BED 14 6420

ACZ Sample ID: ***L57662-03***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 22:32	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:46	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 4:46	jjc
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	08/08/06 4:46	jjc
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	08/08/06 4:46	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:46	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0002	0.001	07/27/06 22:32	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/08/06 4:46	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1980			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		23			hrs			07/21/06 0:00	srs
Leachate pH		7.2			units			07/21/06 0:00	srs
Leachate Volume		2130			mL			07/21/06 0:00	srs
Particle Size over 5 cm		53.7			%			07/21/06 0:00	srs
Retained Moisture		9.1			%			07/21/06 0:00	srs

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT E 6-8 6380-6420

ACZ Sample ID: ***L57662-04***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 22:39	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 4:59	jjc
Cadmium (MWMT)	M6010B ICP	0.014	B		mg/L	0.005	0.02	08/08/06 4:59	jjc
Copper (MWMT)	M6010B ICP	12.50			mg/L	0.01	0.05	08/08/06 4:59	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 4:59	jjc
Selenium (MWMT)	M6010B ICP	0.05	B		mg/L	0.04	0.2	08/08/06 4:59	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0011			mg/L	0.0002	0.001	07/27/06 22:39	scp
Zinc (MWMT)	M6010B ICP	0.77		*	mg/L	0.01	0.05	08/08/06 4:59	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3940			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		26			hrs			07/21/06 0:00	srs
Leachate pH		4.6			units			07/21/06 0:00	srs
Leachate Volume		3860			mL			07/21/06 0:00	srs
Particle Size over 5 cm		34.3			%			07/21/06 0:00	srs
Retained Moisture		20.8			%			07/21/06 0:00	srs

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT E11-13 6380-640

ACZ Sample ID: ***L57662-05***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 22:59	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:03	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 5:03	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:03	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	08/08/06 5:03	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:03	jjc
Uranium (MWMT)	M6020 ICP-MS		U		mg/L	0.0002	0.001	07/27/06 22:59	scp
Zinc (MWMT)	M6010B ICP	0.09		*	mg/L	0.01	0.05	08/08/06 5:03	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5220			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		33			hrs			07/21/06 0:00	srs
Leachate pH		7.2			units			07/21/06 0:00	srs
Leachate Volume		5150			mL			07/21/06 0:00	srs
Particle Size over 5 cm		44.3			%			07/21/06 0:00	srs
Retained Moisture		9.4			%			07/21/06 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT BED 9-10 6420

ACZ Sample ID: ***L57662-06***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 23:06	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:07	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 5:07	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:07	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:07	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:07	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0002	0.001	07/27/06 23:06	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/08/06 5:07	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2060			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		33			hrs			07/21/06 0:00	srs
Leachate pH		7.9			units			07/21/06 0:00	srs
Leachate Volume		1910			mL			07/21/06 0:00	srs
Particle Size over 5 cm		51.4			%			07/21/06 0:00	srs
Retained Moisture		7.3			%			07/21/06 0:00	srs

** Please refer to Qualifier Reports for detail.*

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT E 14 6380-6400

ACZ Sample ID: ***L57662-07***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0008	0.004	07/27/06 23:13	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:11	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 5:11	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:11	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:11	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:11	jjc
Uranium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0002	0.001	07/27/06 23:13	scp
Zinc (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	08/08/06 5:11	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5160			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		30			hrs			07/21/06 0:00	srs
Leachate pH		7.4			units			07/21/06 0:00	srs
Leachate Volume		4840			mL			07/21/06 0:00	srs
Particle Size over 5 cm		73.1			%			07/21/06 0:00	srs
Retained Moisture		4.8			%			07/21/06 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT BED 11-13 6420

ACZ Sample ID: ***L57662-08***
Date Sampled: *05/01/06 00:00*
Date Received: *07/13/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0008	0.004	07/27/06 23:20	scp
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:15	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	08/08/06 5:15	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:15	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	08/08/06 5:15	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	08/08/06 5:15	jjc
Uranium (MWMT)	M6020 ICP-MS		U		mg/L	0.0002	0.001	07/27/06 23:20	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/08/06 5:15	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2110			g			07/21/06 0:00	srs
Extraction pH		7.3			units			07/21/06 0:00	srs
Extraction Time		29			hrs			07/21/06 0:00	srs
Leachate pH		7.3			units			07/21/06 0:00	srs
Leachate Volume		1960			mL			07/21/06 0:00	srs
Particle Size over 5 cm		63.4			%			07/21/06 0:00	srs
Retained Moisture		12.5			%			07/21/06 0:00	srs

** Please refer to Qualifier Reports for detail.*

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L57662***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210165													
WG210165ICV	ICV	07/27/06 21:17	MS060621-1	.02008		.02011	mg/L	100.1	90	110			
WG210165ICB	ICB	07/27/06 21:24				U	mg/L		-0.0012	0.0012			
WG209856PBS	PBS	07/27/06 21:51				U	mg/L		-0.0024	0.0024			
L57662-01AS	AS	07/27/06 22:05	MS060606-3	.0125	U	.01227	mg/L	98.2	75	125			
L57662-01ASD	ASD	07/27/06 22:12	MS060606-3	.0125	U	.01232	mg/L	98.6	75	125	0.41	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	4		4.156	mg/L	103.9	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.12	0.12			
WG209856PBS	PBS	08/08/06 4:22				U	mg/L		-0.12	0.12			
L57662-01AS	AS	08/08/06 4:34	II060731-7	1	U	.954	mg/L	95.4	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	1	U	.959	mg/L	95.9	75	125	0.52	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	2		1.942	mg/L	97.1	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.015	0.015			
WG209856PBS	PBS	08/08/06 4:22				U	mg/L		-0.015	0.015			
L57662-01AS	AS	08/08/06 4:34	II060731-7	.5	U	.4751	mg/L	95	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	.5	U	.4854	mg/L	97.1	75	125	2.14	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	2		1.931	mg/L	96.6	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.03	0.03			
WG209856PBS	PBS	08/08/06 4:22				U	mg/L		-0.03	0.03			
L57662-01AS	AS	08/08/06 4:34	II060731-7	.5	U	.485	mg/L	97	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	.5	U	.48	mg/L	96	75	125	1.04	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	2		1.993	mg/L	99.7	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.03	0.03			
WG209856PBS	PBS	08/08/06 4:22				U	mg/L		-0.03	0.03			
L57662-01AS	AS	08/08/06 4:34	II060731-7	.5	U	.383	mg/L	76.6	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	.5	U	.401	mg/L	80.2	75	125	4.59	20	

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L57662***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	4		4.015	mg/L	100.4	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.12	0.12			
WG209856PBS	PBS	08/08/06 4:22				U	mg/L		-0.12	0.12			
L57662-01AS	AS	08/08/06 4:34	II060731-7	1	U	.89	mg/L	89	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	1	U	.915	mg/L	91.5	75	125	2.77	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210165													
WG210165ICV	ICV	07/27/06 21:17	MS060621-1	.05		.05506	mg/L	110.1	90	110			
WG210165ICB	ICB	07/27/06 21:24				U	mg/L		-0.0003	0.0003			
WG209856PBS	PBS	07/27/06 21:51				U	mg/L		-0.0006	0.0006			
L57662-01AS	AS	07/27/06 22:05	MS060606-3	.05	.0026	.04908	mg/L	93	75	125			
L57662-01ASD	ASD	07/27/06 22:12	MS060606-3	.05	.0026	.04918	mg/L	93.2	75	125	0.2	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG210706													
WG210706ICV	ICV	08/08/06 4:02	II060731-3	2		1.958	mg/L	97.9	90	110			
WG210706ICB	ICB	08/08/06 4:06				U	mg/L		-0.03	0.03			
WG209856PBS	PBS	08/08/06 4:22				.048	mg/L		-0.03	0.03			B1
L57662-01AS	AS	08/08/06 4:34	II060731-7	.5	U	.495	mg/L	99	75	125			
L57662-01ASD	ASD	08/08/06 4:38	II060731-7	.5	U	.523	mg/L	104.6	75	125	5.5	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L57662***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L57662-01	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-02	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-03	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-04	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-05	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-06	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-07	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.
L57662-08	WG210706	Zinc (MWMT)	M6010B ICP	B1	Target analyte detected in prep / method blank at or above the method reporting limit. See Case Narrative.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L57662***

Metals Analysis

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

Antimony (MWMT)	M6020 ICP-MS
Uranium (MWMT)	M6020 ICP-MS

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L57662
Date Received: 7/13/2006
Received By:
Date Printed: 7/13/2006

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
1197		23.4	20

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L57662
Date Received: 7/13/2006
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L57662-01	SENT W 14 6380-6400									X		☐
L57662-02	SENT E9-10 6380-6400									X		☐
L57662-03	CENT BED 14 6420									X		☐
L57662-04	SENT E BEDS 6-8 6380									X		☐
L57662-05	SENT E11-13 6380-640									X		☐
L57662-06	CENT BED 9-10 6420									X		☐
L57662-07	SENT E 14 6380-6400									X		☐
L57662-08	CENT BED 11-13 6420									X		☐
L57662-09	CENT BED 6-8 6420									X		☐

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L57662

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
Sent W 6380 Bed 14 (A)	May 06		x							1	Composite w/April&June samples per suffix (ie. A-G)
Sent East Bed 9-10 6380 (B)	May 06		x							1	As Above
Cent Bed 14 6420 (E)	May 06		x							1	As Above
Sent E Beds 6-8 6380 (F)	May 06		x							1	As Above
Sent E Beds 11-13 6380 ©	May 06		x							1	As Above
Cent Bed 9-10 6420 (G)	May 06		x							1	As Above
Sent E Bed 14 6380 (D)	May 06		x							1	As Above
Cent Bed 11-13 6420 (H)	May 06		x							1	As Above
Cent Bed 6-8 6420 (F)	May 06		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers
Sampler's Signature C J Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time:	Received By: Date / Time:
Lantz Indergard 7-11-06	
Method of Shipment: UPS	

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
Sent W 6400 Bed 14 (A)	April 06		x							1	Composite w/May&June samples per suffix (ie. A-G)
Sent East Bed 9-10 6400 (B)	April 06		x							1	As Above
Sent E Bed 11-13 6400 ©	April 06		x							1	As Above
Sent E Bed 14 6400 (D)	April 06		x							1	As Above

Sampled By: Charles Bauer CJ Bauer	Total Number of Containers
Sampler's Signature	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Lantz Indergard Date / Time: 7-11-06	Received By: Date / Time:
Method of Shipment: UPS	

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

Analytical Report

December 21, 2006

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: COPPER PROJECT
ACZ Project ID: L60119

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 27, 2006. This project has been assigned to ACZ's project number, L60119. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L60119. 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 21, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber 21/Dec/06

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Case Narrative

Lisbon Valley Mining Company, LLC

December 21, 2006

Project ID: COPPER PROJECT
ACZ Project ID: L60119

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 12 soil samples from Lisbon Valley Mining Company, LLC on November 27, 2006. 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 L60119. 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 not performed within EPA recommended holding times.

The hold time for metal's analysis is 6 months. The date used for the samples was the date of the initial samples that were to be compiled with samples taken at later dates. Not all of the sample dates can be entered.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

Sample L60119-12 (Sent East Bed 2) was not analyzed due to insufficient sample volume.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT W 6380 BED 14 A

ACZ Sample ID: ***L60119-01***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0009	BH	*	mg/L	0.0004	0.002	12/19/06 3:02	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:11	gme
Cadmium (MWMT)	M6010B ICP		UH	*	mg/L	0.005	0.02	12/20/06 3:11	gme
Copper (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:11	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:11	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:11	gme
Uranium (MWMT)	M6020 ICP-MS	0.0007	H	*	mg/L	0.0001	0.0005	12/19/06 3:02	jjr
Zinc (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:11	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4980			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		29			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.7			units			12/12/06 0:00	srs/lwt
Leachate Volume		4910			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		64			%			12/12/06 0:00	srs/lwt
Retained Moisture		10.2			%			12/12/06 0:00	srs/lwt

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT E 6340 B 3-5 B

ACZ Sample ID: ***L60119-02***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:16	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:27	gme
Cadmium (MWMT)	M6010B ICP	0.008	BH	*	mg/L	0.005	0.02	12/20/06 3:27	gme
Copper (MWMT)	M6010B ICP	0.23	H	*	mg/L	0.01	0.05	12/20/06 3:27	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:27	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:27	gme
Uranium (MWMT)	M6020 ICP-MS	0.0028	H	*	mg/L	0.0001	0.0005	12/19/06 3:16	jjr
Zinc (MWMT)	M6010B ICP	0.04	BH	*	mg/L	0.01	0.05	12/20/06 3:27	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4980			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		30			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.56			units			12/12/06 0:00	srs/lwt
Leachate Volume		4910			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		78			%			12/12/06 0:00	srs/lwt
Retained Moisture		13.8			%			12/12/06 0:00	srs/lwt

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT E 6340 B 11-13C

ACZ Sample ID: ***L60119-03***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:25	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:31	gme
Cadmium (MWMT)	M6010B ICP		UH	*	mg/L	0.005	0.02	12/20/06 3:31	gme
Copper (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:31	gme
Molybdenum (MWMT)	M6010B ICP	0.06	H	*	mg/L	0.01	0.05	12/20/06 3:31	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:31	gme
Uranium (MWMT)	M6020 ICP-MS	0.0003	BH	*	mg/L	0.0001	0.0005	12/19/06 3:25	jjr
Zinc (MWMT)	M6010B ICP	0.02	BH	*	mg/L	0.01	0.05	12/20/06 3:31	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4980			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		31			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.88			units			12/12/06 0:00	srs/lwt
Leachate Volume		4790			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		77			%			12/12/06 0:00	srs/lwt
Retained Moisture		13.5			%			12/12/06 0:00	srs/lwt

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT E 6340 BED 14 D

ACZ Sample ID: ***L60119-04***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:39	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:43	gme
Cadmium (MWMT)	M6010B ICP		UH	*	mg/L	0.005	0.02	12/20/06 3:43	gme
Copper (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:43	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:43	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:43	gme
Uranium (MWMT)	M6020 ICP-MS	0.0012	H	*	mg/L	0.0001	0.0005	12/19/06 3:39	jjr
Zinc (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:43	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4990			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		31			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.71			units			12/12/06 0:00	srs/lwt
Leachate Volume		5020			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		64			%			12/12/06 0:00	srs/lwt
Retained Moisture		11.6			%			12/12/06 0:00	srs/lwt

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT E 6340 B 9-10 E

ACZ Sample ID: ***L60119-05***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:44	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:47	gme
Cadmium (MWMT)	M6010B ICP	0.008	BH	*	mg/L	0.005	0.02	12/20/06 3:47	gme
Copper (MWMT)	M6010B ICP	0.11	H	*	mg/L	0.01	0.05	12/20/06 3:47	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:47	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:47	gme
Uranium (MWMT)	M6020 ICP-MS	0.0018	H	*	mg/L	0.0001	0.0005	12/19/06 3:44	jjr
Zinc (MWMT)	M6010B ICP	1.13	H	*	mg/L	0.01	0.05	12/20/06 3:47	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5000			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		36.5			hrs			12/12/06 0:00	srs/lwt
Leachate pH		4.85			units			12/12/06 0:00	srs/lwt
Leachate Volume		4920			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		71			%			12/12/06 0:00	srs/lwt
Retained Moisture		21.2			%			12/12/06 0:00	srs/lwt

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: SENT E 6340 B 6-8 F

ACZ Sample ID: ***L60119-06***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:48	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:51	gme
Cadmium (MWMT)	M6010B ICP	0.026	H	*	mg/L	0.005	0.02	12/20/06 3:51	gme
Copper (MWMT)	M6010B ICP	0.07	H	*	mg/L	0.01	0.05	12/20/06 3:51	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:51	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:51	gme
Uranium (MWMT)	M6020 ICP-MS	0.0482	H	*	mg/L	0.0001	0.0005	12/19/06 3:48	jjr
Zinc (MWMT)	M6010B ICP	3.95	H	*	mg/L	0.01	0.05	12/20/06 3:51	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3970			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		27			hrs			12/12/06 0:00	srs/lwt
Leachate pH		3.44			units			12/12/06 0:00	srs/lwt
Leachate Volume		3970			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		52			%			12/12/06 0:00	srs/lwt
Retained Moisture		17.6			%			12/12/06 0:00	srs/lwt

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: CENT 6400 BED 6-8 G

ACZ Sample ID: ***L60119-07***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:53	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:55	gme
Cadmium (MWMT)	M6010B ICP	4.670	H	*	mg/L	0.005	0.02	12/20/06 3:55	gme
Copper (MWMT)	M6010B ICP	9.47	H	*	mg/L	0.01	0.05	12/20/06 3:55	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:55	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:55	gme
Uranium (MWMT)	M6020 ICP-MS	0.0400	H	*	mg/L	0.0001	0.0005	12/19/06 3:53	jjr
Zinc (MWMT)	M6010B ICP	10.90	H	*	mg/L	0.01	0.05	12/20/06 3:55	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4940			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		31.8			hrs			12/12/06 0:00	srs/lwt
Leachate pH		3.47			units			12/12/06 0:00	srs/lwt
Leachate Volume		4980			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		75			%			12/12/06 0:00	srs/lwt
Retained Moisture		19.9			%			12/12/06 0:00	srs/lwt

** Please refer to Qualifier Reports for detail.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: CENT 6400 BED 14 H

ACZ Sample ID: ***L60119-08***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 3:57	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:59	gme
Cadmium (MWMT)	M6010B ICP		UH	*	mg/L	0.005	0.02	12/20/06 3:59	gme
Copper (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:59	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:59	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 3:59	gme
Uranium (MWMT)	M6020 ICP-MS	0.0007	H	*	mg/L	0.0001	0.0005	12/19/06 3:57	jjr
Zinc (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 3:59	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5010			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		36.5			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.73			units			12/12/06 0:00	srs/lwt
Leachate Volume		4850			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		76			%			12/12/06 0:00	srs/lwt
Retained Moisture		13.8			%			12/12/06 0:00	srs/lwt

** Please refer to Qualifier Reports for detail.*

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: CENT 6400 B 11-13 I

ACZ Sample ID: ***L60119-09***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 4:02	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:03	gme
Cadmium (MWMT)	M6010B ICP	0.006	BH	*	mg/L	0.005	0.02	12/20/06 4:03	gme
Copper (MWMT)	M6010B ICP	0.01	BH	*	mg/L	0.01	0.05	12/20/06 4:03	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 4:03	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:03	gme
Uranium (MWMT)	M6020 ICP-MS	0.0016	H	*	mg/L	0.0001	0.0005	12/19/06 4:02	jjr
Zinc (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 4:03	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5020			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		29			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.95			units			12/12/06 0:00	srs/lwt
Leachate Volume		5010			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		60			%			12/12/06 0:00	srs/lwt
Retained Moisture		12.2			%			12/12/06 0:00	srs/lwt

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: CENT 6400 B 9-10 J

ACZ Sample ID: ***L60119-10***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 4:06	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:07	gme
Cadmium (MWMT)	M6010B ICP	2.110	H	*	mg/L	0.005	0.02	12/20/06 4:07	gme
Copper (MWMT)	M6010B ICP	3.08	H	*	mg/L	0.01	0.05	12/20/06 4:07	gme
Molybdenum (MWMT)	M6010B ICP	0.01	BH	*	mg/L	0.01	0.05	12/20/06 4:07	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:07	gme
Uranium (MWMT)	M6020 ICP-MS	0.0013	H	*	mg/L	0.0001	0.0005	12/19/06 4:06	jjr
Zinc (MWMT)	M6010B ICP	1.62	H	*	mg/L	0.01	0.05	12/20/06 4:07	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5060			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		31			hrs			12/12/06 0:00	srs/lwt
Leachate pH		4.42			units			12/12/06 0:00	srs/lwt
Leachate Volume		4910			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		57			%			12/12/06 0:00	srs/lwt
Retained Moisture		16.1			%			12/12/06 0:00	srs/lwt

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT
Sample ID: CENT 6400 B 3-5 K

ACZ Sample ID: ***L60119-11***
Date Sampled: *06/01/06 00:00*
Date Received: *11/27/06*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0004	0.002	12/19/06 4:11	jjr
Arsenic (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:11	gme
Cadmium (MWMT)	M6010B ICP	0.095	H	*	mg/L	0.005	0.02	12/20/06 4:11	gme
Copper (MWMT)	M6010B ICP	0.10	H	*	mg/L	0.01	0.05	12/20/06 4:11	gme
Molybdenum (MWMT)	M6010B ICP		UH	*	mg/L	0.01	0.05	12/20/06 4:11	gme
Selenium (MWMT)	M6010B ICP		UH	*	mg/L	0.04	0.2	12/20/06 4:11	gme
Uranium (MWMT)	M6020 ICP-MS		UH	*	mg/L	0.0001	0.0005	12/19/06 4:11	jjr
Zinc (MWMT)	M6010B ICP	0.11	H	*	mg/L	0.01	0.05	12/20/06 4:11	gme

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4000			g			12/12/06 0:00	srs/lwt
Extraction pH		6.46			units			12/12/06 0:00	srs/lwt
Extraction Time		27			hrs			12/12/06 0:00	srs/lwt
Leachate pH		6.21			units			12/12/06 0:00	srs/lwt
Leachate Volume		4090			mL			12/12/06 0:00	srs/lwt
Particle Size over 5 cm		53			%			12/12/06 0:00	srs/lwt
Retained Moisture		11.4			%			12/12/06 0:00	srs/lwt

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT

ACZ Project ID: ***L60119***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218322													
WG218322ICV	ICV	12/19/06 2:34	MS061106-2	.02008		.01891	mg/L	94.2	90	110			
WG218322ICB	ICB	12/19/06 2:39				.00045	mg/L		-0.0012	0.0012			
WG218017PBS	PBS	12/19/06 2:58				U	mg/L		-0.0012	0.0012			
L60119-01AS	AS	12/19/06 3:07	MS061218-3	.00625	.0009	.00505	mg/L	66.4	75	125			M2
L60119-01ASD	ASD	12/19/06 3:11	MS061218-3	.00625	.0009	.00514	mg/L	67.8	75	125	1.77	20	M2

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	4		3.975	mg/L	99.4	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.12	0.12			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.12	0.12			
L60119-01AS	AS	12/20/06 3:19	II061219-2	1	U	1.204	mg/L	120.4	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	1	U	1.196	mg/L	119.6	75	125	0.67	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	2		1.9127	mg/L	95.6	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.015	0.015			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.015	0.015			
L60119-01AS	AS	12/20/06 3:19	II061219-2	.5	U	.5918	mg/L	118.4	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	.5	U	.5779	mg/L	115.6	75	125	2.38	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	2		1.949	mg/L	97.5	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.03	0.03			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.03	0.03			
L60119-01AS	AS	12/20/06 3:19	II061219-2	.5	U	.608	mg/L	121.6	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	.5	U	.585	mg/L	117	75	125	3.86	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	2		1.988	mg/L	99.4	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.03	0.03			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.03	0.03			
L60119-01AS	AS	12/20/06 3:19	II061219-2	.5	U	.593	mg/L	118.6	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	.5	U	.568	mg/L	113.6	75	125	4.31	20	

Lisbon Valley Mining Company, LLC
Project ID: COPPER PROJECT

ACZ Project ID: ***L60119***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	4		3.993	mg/L	99.8	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.12	0.12			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.12	0.12			
L60119-01AS	AS	12/20/06 3:19	II061219-2	1	U	1.137	mg/L	113.7	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	1	U	1.057	mg/L	105.7	75	125	7.29	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218322													
WG218322ICV	ICV	12/19/06 2:34	MS061106-2	.05		.05292	mg/L	105.8	90	110			
WG218322ICB	ICB	12/19/06 2:39				U	mg/L		-0.0003	0.0003			
WG218017PBS	PBS	12/19/06 2:58				U	mg/L		-0.0003	0.0003			
L60119-01AS	AS	12/19/06 3:07	MS061218-3	.025	.0007	.02455	mg/L	95.4	75	125			
L60119-01ASD	ASD	12/19/06 3:11	MS061218-3	.025	.0007	.02479	mg/L	96.4	75	125	0.97	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG218314													
WG218314ICV	ICV	12/20/06 2:48	II061209-1	2		1.967	mg/L	98.4	90	110			
WG218314ICB	ICB	12/20/06 2:52				U	mg/L		-0.03	0.03			
WG218017PBS	PBS	12/20/06 3:07				U	mg/L		-0.03	0.03			
L60119-01AS	AS	12/20/06 3:19	II061219-2	.5	U	.619	mg/L	123.8	75	125			
L60119-01ASD	ASD	12/20/06 3:23	II061219-2	.5	U	.559	mg/L	111.8	75	125	10.19	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L60119***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L60119-01	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-02	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-03	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-04	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-05	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-06	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L60119***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L60119-07	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-08	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-09	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-10	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
L60119-11	WG218322	Antimony (MWMT)	M6020 ICP-MS	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG218314	Arsenic (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Cadmium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Copper (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Molybdenum (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Selenium (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.
		Zinc (MWMT)	M6010B ICP	H1	Sample analysis performed past holding time.

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

Certification Qualifiers

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L60119***

Metals Analysis

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

Uranium (MWMT)	M6020 ICP-MS

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

Sample Receipt

Lisbon Valley Mining Company, LLC
COPPER PROJECT

ACZ Project ID: L60119
Date Received: 11/27/2006
Received By:
Date Printed: 11/27/2006

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
1309		14.2	18
1341		15.1	17
1694		14.8	19
536		23.9	17

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
COPPER PROJECT

ACZ Project ID: L60119
Date Received: 11/27/2006
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L60119-01	SENT W 6380 BED 14 A									X		☐
L60119-02	SENT E 6340 B 3-5 B									X		☐
L60119-03	SENT E 6340 B 11-13C									X		☐
L60119-04	SENT E 6340 BED 14 D									X		☐
L60119-05	SENT E 6340 B 9-10 E									X		☐
L60119-06	SENT E 6340 B 6-8 F									X		☐
L60119-07	CENT 6400 BED 6-8 G									X		☐
L60119-08	CENT 6400 BED 14 H									X		☐
L60119-09	CENT 6400 B 11-13 I									X		☐
L60119-10	CENT 6400 B 9-10 J									X		☐
L60119-11	CENT 6400 B 3-5 K									X		☐
L60119-12	SENT EAST BED 2									X		☐

Sample Container Preservation Codes

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L60119 ~~L59384~~ 10-12-06

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	**Chain of Custody Record** Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
1.	Sentinel West 6380 Bed 14 (A)	July 06		x							1	Composite w/August&September samples per suffix (ie. A-G)
2.	Sent East 6340 Beds 3-5 (B)	July 06		x							1	As Above
3.	Sent East 6340 Beds 11-13 ©	July 06		x							1	As Above
4.	Sent East 6340 Bed 14 (D)	July 06		x							1	As Above
5.	Sent East 6340 Beds 9-10 (E)	July 06		x							1	As Above
6.	Sent E 6340 Beds 6-8 (F)	July 06		x							1	As Above
7.	Cent 6400 Beds 6-8 (G)	July 06		x							1	As Above
8.	Cent 6400 Bed 14 (H)	July 06		x							1	As Above
9.	Cent 6400 Beds 11-13 (I)	July 06		x							1	As Above
10.	Cent 6400 Beds 9-10 (J)	July 06		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers
Sampler's Signature C Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 10-10-06 / 9:30 AM	Received By: Rebecca Erickson Date / Time: 10-12-06 / 10:34
Method of Shipment: UPS	Comments: These samples are to be composited with forthcoming samples in August and September 2006.

L60119

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
12.	Sent East Bed 2	June 06		x	1	Composite w/April&May samplesamples per suffix (ie. A-G)
2.	Sent East Bed 3-5 (B)	June 06		x	1	As Above
6.	Sent E Beds 6-8 6360 (F)	June 06		x	1	As Above
3.	Sent E Beds 11-13 6360 ©	June 06		x	1	As Above
4.	Sent E Bed 14 6360 (D)	June 06		x	1	As Above
5.	Sent E 6360 Beds 9-10 (E)	June 06		x	1	As Above
8.	Cent Bed 14 6420 (H)	June 06		x	1	As Above
10.	Cent 6420 Bed 9-10 (J)	June 06		x	1	As Above
9.	Cent 6420 Bed 11-13 (I)	June 06		x	1	As Above
1.	Sent W 6380 Bed 14 (A)	June 06		x	1	As Above

Sampled By:
Charles Bauer

Total Number of Containers

Sampler's Signature

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223

Relinquished By:	Date / Time:	Received By:	Date / Time:
Lantz Indergard			8-24-06 11:35

Method of Shipment:
UPS

L60119

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP							Number of Containers	Remarks / Comments
9.	Cent 6400 Beds 11-13 (I)	Sept 06		x							1	Composite w/July & August samples per suffix (ie. A-K)
7.	Cent 6400 Beds 6-8 (G)	Sept 06		x							1	As Above
11.	Cent 6400 Bed 3-5 (K)	Sept 06		x							1	As Above
10.	Cent 6400 Beds 9-10 (J)	Sept 06		x							1	As Above
4.	Sent East 6300 Bed 14 (D)	Sept 06		x							1	As Above
1.	Sentinel West 6360 Bed 14 (A)	Sept 06		x							1	As Above
8.	Cent 6400 Bed 14 (H)	Sept 06		x							1	As Above

Sampled By:
Charles Bauer

Total Number of Containers: 7

Sampler's Signature
C Bauer

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard 11-15-06 9:57 AM

Received By: Date / Time:
LBO 11.17.06 13:24

Method of Shipment:
UPS

Comments:
These samples are to be composited with July & August 06 samples.

L60119

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
5.	Sent East 6320 Beds 9-10 (E)	Aug 06		x	1	Composite w/July&September samples per suffix (ie. A-K)
3.	Sent East 6320 Beds 11-13 ©	Aug 06		x	1	As Above
4.	Sent East 6320 Bed 14 (D)	Aug 06		x	1	As Above
1.	Sentinel West 6360 Bed 14 (A)	Aug 06		x	1	As Above
10.	Cent 6400 Beds 9-10 (J)	Aug 06		x	1	As Above
7.	Cent 6400 Beds 6-8 (G)	Aug 06		x	1	As Above
9.	Cent 6400 Beds 11-13 (I)	Aug 06		x	1	As Above
8.	Cent 6400 Bed 14 (H)	Aug 06		x	1	As Above
11.	Cent 6400 Beds 3-5 (K)	Aug 06		x	1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 9
Sampler's Signature C J Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 11-15-06 5:12 P.M.	Received By: Date / Time: LBB 11-17-06 13:23
Method of Shipment: UPS	Comments: *These samples are to be composited with July and September 06 samples.*

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

Analytical Report

January 13, 2006

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L54653

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 20, 2005. This project has been assigned to ACZ's project number, L54653. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L54653. 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 February 13, 2006. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

13/Jan/06

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT. 6-8

ACZ Sample ID: ***L54653-01***
Date Sampled: *12/16/05 00:00*
Date Received: *12/20/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/12/06 7:09	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 10:56	jjc
Cadmium (MWMT)	M6010B ICP	0.011	B		mg/L	0.005	0.02	01/12/06 10:56	jjc
Copper (MWMT)	M6010B ICP	0.20			mg/L	0.01	0.05	01/12/06 10:56	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 10:56	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 10:56	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0021			mg/L	0.0001	0.0005	01/12/06 7:09	jag
Zinc (MWMT)	M6010B ICP	0.46			mg/L	0.01	0.05	01/12/06 10:56	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4520		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		31		*	hrs			01/03/06 0:00	gme
Leachate pH		3.54		*	units			01/03/06 0:00	gme
Leachate Volume		5980		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		19		*	%			01/03/06 0:00	gme
Retained Moisture		16		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT. 6-10

ACZ Sample ID: ***L54653-02***
Date Sampled: *12/16/05 00:00*
Date Received: *12/20/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	01/12/06 7:16	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:03	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/12/06 11:03	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:03	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:03	jjc
Selenium (MWMT)	M6010B ICP	0.04	B		mg/L	0.04	0.2	01/12/06 11:03	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0008			mg/L	0.0001	0.0005	01/12/06 7:16	jag
Zinc (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	01/12/06 11:03	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5220		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		31		*	hrs			01/03/06 0:00	gme
Leachate pH		6.59		*	units			01/03/06 0:00	gme
Leachate Volume		4230		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		30		*	%			01/03/06 0:00	gme
Retained Moisture		20.8		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT. WEST

ACZ Sample ID: ***L54653-03***
Date Sampled: *12/16/05 00:00*
Date Received: *12/20/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/12/06 7:35	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:23	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/12/06 11:23	jjc
Copper (MWMT)	M6010B ICP	0.05	B		mg/L	0.01	0.05	01/12/06 11:23	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:23	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:23	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	01/12/06 7:35	jag
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	01/12/06 11:23	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3800		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		27		*	hrs			01/03/06 0:00	gme
Leachate pH		6.71		*	units			01/03/06 0:00	gme
Leachate Volume		3500		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		97		*	%			01/03/06 0:00	gme
Retained Moisture		12		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT. EAST

ACZ Sample ID: ***L54653-04***
Date Sampled: *12/16/05 00:00*
Date Received: *12/20/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/12/06 7:48	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:26	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/12/06 11:26	jjc
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/12/06 11:26	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:26	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:26	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0021			mg/L	0.0001	0.0005	01/12/06 7:48	jag
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:26	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2890		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		24		*	hrs			01/03/06 0:00	gme
Leachate pH		6.71		*	units			01/03/06 0:00	gme
Leachate Volume		2750		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		89		*	%			01/03/06 0:00	gme
Retained Moisture		14.9		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L54653***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201389													
WG201389ICV	ICV	01/12/06 6:29	MS051114-2	.02004		.0198	mg/L	98.8	90	110			
WG201389ICB	ICB	01/12/06 6:36				U	mg/L		-0.0012	0.0012			
WG201123PBS	PBS	01/12/06 7:02				U	mg/L		-0.0012	0.0012			
L54653-02AS	AS	01/12/06 7:22	MS051031-6	.00625	.0006	.007	mg/L	102.4	75	125			
L54653-02ASD	ASD	01/12/06 7:29	MS051031-6	.00625	.0006	.00702	mg/L	102.7	75	125	0.29	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	4		3.969	mg/L	99.2	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.12	0.12			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.12	0.12			
L54653-02AS	AS	01/12/06 11:09	II060109-4	1	U	1.048	mg/L	104.8	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	1	U	1.054	mg/L	105.4	75	125	0.57	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.8909	mg/L	94.5	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.015	0.015			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.015	0.015			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.5022	mg/L	100.4	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.4982	mg/L	99.6	75	125	0.8	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.906	mg/L	95.3	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.518	mg/L	103.6	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.519	mg/L	103.8	75	125	0.19	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.983	mg/L	99.2	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.533	mg/L	106.6	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.521	mg/L	104.2	75	125	2.28	20	

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L54653***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	4		3.911	mg/L	97.8	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.12	0.12			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.12	0.12			
L54653-02AS	AS	01/12/06 11:09	II060109-4	1	.04	1.129	mg/L	108.9	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	1	.04	1.106	mg/L	106.6	75	125	2.06	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201389													
WG201389ICV	ICV	01/12/06 6:29	MS051114-2	.05		.05284	mg/L	105.7	90	110			
WG201389ICB	ICB	01/12/06 6:36				U	mg/L		-0.0003	0.0003			
WG201123PBS	PBS	01/12/06 7:02				U	mg/L		-0.0003	0.0003			
L54653-02AS	AS	01/12/06 7:22	MS051031-6	.025	.0008	.02481	mg/L	96	75	125			
L54653-02ASD	ASD	01/12/06 7:29	MS051031-6	.025	.0008	.02487	mg/L	96.3	75	125	0.24	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.906	mg/L	95.3	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	.04	.561	mg/L	104.2	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	.04	.543	mg/L	100.6	75	125	3.26	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L54653***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L54653-01	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
L54653-02	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
L54653-03	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
L54653-04	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.

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

Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L54653***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L54653
Date Received: 12/20/2005
Received By:
Date Printed: 12/20/2005

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
BOX		11.9	14

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L54653
Date Received: 12/20/2005
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG< 2	B < 2	BL< 2	O < 2	T >12	P >12	N/A	RAD	ID
L54653-01	CENT. 6-8										X		☐
L54653-02	CENT. 6-10										X		☐
L54653-03	SENT. WEST										X		☐
L54653-04	SENT. EAST										X		☐

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BL	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

Sample IDs Reviewed By: _____

L54653

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 **920 S. County Rd. 313** **La Sal, Utah 84530** **Phone: (435) 686-9950**	**Send report with laboratory QA to:** **P.O. Box 248** **La Sal, Utah 84530**

Lisbon Valley Copper Project

ANALYSES

SAMPLE NUMBER	DATE	TIME	MWMP	Dissolved metals	Ammonia as N	Total uranium	Total alkalinity & TSS	Radiochemistry [2]	pH & conductivity [3]	Number of Containers
Cent.6-8	12/16/2005	AM	x							
Cent.6-10	12/16/2005	AM	x							
Sent. West	12/16/2005	AM	x							
Sent.East	12/16/2005	AM	x							
				- See attached note SW 12/20/05						

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

Remarks / Comments

SW 12-20-05

Matrix: Water

Samples Stored on Ice

1) Dissolved alkalinity, chloride, hardness, sulfate, nitrate, nitrite, nitrate/nitrite, TDS, fluoride
2) Gross alpha, gross beta, radium $^{226/228}$, thorium $^{230/232}$
3) Centrifuge tube for pH & conductivity

Note:

- Follow standard analytical suite for project and required detection limits

Sampled By: Lantx M Indergard	Total Number of Containers: 1
Sampler's Signature: Lantz M Indergard	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: [signature] Date / Time: 12-16-05/11:25	Received By: RJE Date / Time: 12/20/05 12:00
Method of Shipment: Federal Express	

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

Analytical Quote

Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

12/16/2005

Quote Number: MWMP

Matrix: Soil Analysis of Waste Rock for MWMP Metals

Parameter	Method	Detection Limit	Cost/Sample
Metals Analysis			
Antimony (MWMT)	M6020 ICP-MS	0.0004 mg/L	$16.20
Arsenic (MWMT)	M6010B ICP	0.04 mg/L	$8.10
Cadmium (MWMT)	M6010B ICP	0.005 mg/L	$8.10
Copper (MWMT)	M6010B ICP	0.01 mg/L	$8.10
Molybdenum (MWMT)	M6010B ICP	0.01 mg/L	$8.10
Selenium (MWMT)	M6010B ICP	0.04 mg/L	$8.10
Uranium (MWMT)	M6020 ICP-MS	0.0001 mg/L	$16.20
Zinc (MWMT)	M6010B ICP	0.01 mg/L	$8.10
Misc.			
Quality Control Summary			$0.00
Setup Charge for ICPMS			$16.20
Sample Preparation			
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990		$139.50
		Cost/Sample:	**$236.70**

Prices are based on a standard turnaround time of 3 weeks or 15 working days.

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

Analytical Quote

Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

12/16/2005

Quote Number: MWMP

Pricing includes shipment of all standard sample containers and related paperwork by UPS Ground Service. Please allow three to five days for delivery when ordering containers. ACZ must be notified prior to receiving samples of all special requests such as electronic data deliverables or special reporting reqirements. The client will be charged for special sample containers or express shipping and additional charges may apply for non-standard requests.

This quotation is valid for six months from the bid date and must be signed and returned to ACZ before project(s) is received. The authorized signature represents acceptance of the pricing as well as the general terms and conditions of ACZ Laboratories, Inc. Our general terms and conditions can be downloaded from our web site at http://www.acz.com/eservices/download.html.

All orders are subject to a minimum charge of $100.00 and may incur a $10.00/sample disposal fee for any samples deemed to be hazardous.

ACZ Representative (Authorized signature and date) _____

Client Representative (Authorized signature and date) _____

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

Analytical Report

January 13, 2006

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L54689

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 22, 2005. This project has been assigned to ACZ's project number, L54689. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L54689. 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 February 13, 2006. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber 13/Jan/06

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT. 11-13

ACZ Sample ID: ***L54689-01***
Date Sampled: *12/16/05 00:00*
Date Received: *12/22/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/12/06 8:08	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:30	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/12/06 11:30	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:30	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:30	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:30	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	01/12/06 8:08	jag
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:30	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4630		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		26		*	hrs			01/03/06 0:00	gme
Leachate pH		7.11		*	units			01/03/06 0:00	gme
Leachate Volume		4310		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		46		*	%			01/03/06 0:00	gme
Retained Moisture		17.5		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT. 14

ACZ Sample ID: ***L54689-02***
Date Sampled: *12/16/05 00:00*
Date Received: *12/22/05*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/12/06 8:15	jag
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:33	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/12/06 11:33	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:33	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:33	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.04	0.2	01/12/06 11:33	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0022			mg/L	0.0001	0.0005	01/12/06 8:15	jag
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/12/06 11:33	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4650		*	g			01/03/06 0:00	gme
Extraction pH		6.7		*	units			01/03/06 0:00	gme
Extraction Time		26		*	hrs			01/03/06 0:00	gme
Leachate pH		7.62		*	units			01/03/06 0:00	gme
Leachate Volume		4380		*	mL			01/03/06 0:00	gme
Particle Size over 5 cm		55		*	%			01/03/06 0:00	gme
Retained Moisture		10.8		*	%			01/03/06 0:00	gme

** Please refer to Extended Qualifier Report for detail.*

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L54689***

Project ID:

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201389													
WG201389ICV	ICV	01/12/06 6:29	MS051114-2	.02004		.0198	mg/L	98.8	90	110			
WG201389ICB	ICB	01/12/06 6:36				U	mg/L		-0.0012	0.0012			
WG201123PBS	PBS	01/12/06 7:02				U	mg/L		-0.0012	0.0012			
L54653-02AS	AS	01/12/06 7:22	MS051031-6	.00625	.0006	.007	mg/L	102.4	75	125			
L54653-02ASD	ASD	01/12/06 7:29	MS051031-6	.00625	.0006	.00702	mg/L	102.7	75	125	0.29	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	4		3.969	mg/L	99.2	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.12	0.12			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.12	0.12			
L54653-02AS	AS	01/12/06 11:09	II060109-4	1	U	1.048	mg/L	104.8	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	1	U	1.054	mg/L	105.4	75	125	0.57	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.8909	mg/L	94.5	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.015	0.015			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.015	0.015			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.5022	mg/L	100.4	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.4982	mg/L	99.6	75	125	0.8	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.906	mg/L	95.3	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.518	mg/L	103.6	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.519	mg/L	103.8	75	125	0.19	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.983	mg/L	99.2	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	U	.533	mg/L	106.6	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	U	.521	mg/L	104.2	75	125	2.28	20	

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L54689***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	4		3.911	mg/L	97.8	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.12	0.12			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.12	0.12			
L54653-02AS	AS	01/12/06 11:09	II060109-4	1	.04	1.129	mg/L	108.9	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	1	.04	1.106	mg/L	106.6	75	125	2.06	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201389													
WG201389ICV	ICV	01/12/06 6:29	MS051114-2	.05		.05284	mg/L	105.7	90	110			
WG201389ICB	ICB	01/12/06 6:36				U	mg/L		-0.0003	0.0003			
WG201123PBS	PBS	01/12/06 7:02				U	mg/L		-0.0003	0.0003			
L54653-02AS	AS	01/12/06 7:22	MS051031-6	.025	.0008	.02481	mg/L	96	75	125			
L54653-02ASD	ASD	01/12/06 7:29	MS051031-6	.025	.0008	.02487	mg/L	96.3	75	125	0.24	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG201384													
WG201384ICV	ICV	01/12/06 10:36	II060104-7	2		1.906	mg/L	95.3	90	110			
WG201384ICB	ICB	01/12/06 10:39				U	mg/L		-0.03	0.03			
WG201123PBS	PBS	01/12/06 10:53				U	mg/L		-0.03	0.03			
L54653-02AS	AS	01/12/06 11:09	II060109-4	.5	.04	.561	mg/L	104.2	75	125			
L54653-02ASD	ASD	01/12/06 11:13	II060109-4	.5	.04	.543	mg/L	100.6	75	125	3.26	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L54689***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L54689-01	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
L54689-02	WG201123	Dry Weight	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT, Sept. 19, 1990	Q9	Insufficient sample received to meet method QC requirements.

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Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L54689***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L54689
Date Received: 12/22/2005
Received By:
Date Printed: 12/22/2005

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
BOX		16.5	15

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L54689
Date Received: 12/22/2005
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG< 2	B < 2	BL< 2	O < 2	T >12	P >12	N/A	RAD	ID
L54689-01	CENT. 11-13										X		☐
L54689-02	CENT. 14										X		☐

Sample Container/Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BL	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

Sample IDs Reviewed By: _____

L54689

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 **920 S. County Rd. 313** **La Sal, Utah 84530** **Phone: (435) 686-9950**	**Send report with laboratory QA to:** **P.O. Box 248** **La Sal, Utah 84530**

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Dissolved metals	Ammonia as N	Total uranium	Total alkalinity & TSS	Radiochemistry [2]	pH & conductivity [3]	Number of Containers
Cent.11-13	12/16/2005	AM	x							
Cent.14	12/16/2005	AM	x							

Remarks / Comments

Sampled By:
Lantz M Indergard

Total Number of Containers: 1

Sampler's Signature: Lantz Indergard

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223

Relinquished By: Date / Time:
12-19-05 9:00

Received By: RJE Date / Time:
12-22-05 / 13100

Method of Shipment:
UPS

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

Analytical Report

May 31, 2007

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L62424

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 04, 2007. This project has been assigned to ACZ's project number, L62424. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L62424. 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 June 30, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

31/May/07

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 8048: (800) 334-5493

Case Narrative

Lisbon Valley Mining Company, LLC

May 31, 2007

Project ID:
ACZ Project ID: L62424

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 9 soil samples from Lisbon Valley Mining Company, LLC on May 4, 2007. 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 L62424. 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 parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following anomaly required further explanation not provided by the Extended Qualifier Report:

1. For Antimony values flagged with an "N1", the ICSA QC sample recovered high. Antimony was not detected on the samples so no further action was taken. All other QC was within control limits.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT W 6320BED6-8(A)

ACZ Sample ID: ***L62424-01***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/24/07 23:59	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:36	msh
Cadmium (MWMT)	M6010B ICP	0.123		*	mg/L	0.005	0.02	05/25/07 14:36	msh
Copper (MWMT)	M6010B ICP	0.26		*	mg/L	0.01	0.05	05/25/07 14:36	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 7:24	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:36	msh
Uranium (MWMT)	M6020 ICP-MS	0.3430		*	mg/L	0.0005	0.003	05/29/07 18:12	jjr
Zinc (MWMT)	M6010B ICP	2.27		*	mg/L	0.01	0.05	05/25/07 14:36	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			05/21/07 0:00	srs/brg
Extraction pH		6.24			units			05/21/07 0:00	srs/brg
Extraction Time		30.2			hrs			05/21/07 0:00	srs/brg
Leachate pH		4.06			units			05/21/07 0:00	srs/brg
Leachate Volume		5050			mL			05/21/07 0:00	srs/brg
Particle Size over 5 cm		44			%			05/21/07 0:00	srs/brg
Retained Moisture		15.1			%			05/21/07 0:00	srs/brg

** Please refer to Qualifier Reports for detail.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6380 BED9-10(B)

ACZ Sample ID: ***L62424-02***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:12	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:39	msh
Cadmium (MWMT)	M6010B ICP	0.887		*	mg/L	0.005	0.02	05/25/07 14:39	msh
Copper (MWMT)	M6010B ICP	1.52		*	mg/L	0.01	0.05	05/25/07 14:39	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 7:41	djt
Selenium (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.04	0.2	05/25/07 14:39	msh
Uranium (MWMT)	M6020 ICP-MS	0.0404		*	mg/L	0.0001	0.0005	05/25/07 0:12	jjr
Zinc (MWMT)	M6010B ICP	17.70		*	mg/L	0.01	0.05	05/25/07 14:39	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5040			g			05/21/07 0:00	srs/brg
Extraction pH		6.24			units			05/21/07 0:00	srs/brg
Extraction Time		31			hrs			05/21/07 0:00	srs/brg
Leachate pH		3.84			units			05/21/07 0:00	srs/brg
Leachate Volume		4830			mL			05/21/07 0:00	srs/brg
Particle Size over 5 cm		46			%			05/21/07 0:00	srs/brg
Retained Moisture		21.1			%			05/21/07 0:00	srs/brg

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT W 6320 BED14(C)

ACZ Sample ID: ***L62424-03***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:20	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:42	msh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/25/07 14:42	msh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/25/07 14:42	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 7:46	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:42	msh
Uranium (MWMT)	M6020 ICP-MS	0.0038		*	mg/L	0.0001	0.0005	05/25/07 0:20	jjr
Zinc (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	05/25/07 14:42	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5100			g			05/21/07 0:00	srs/brg
Extraction pH		6.24			units			05/21/07 0:00	srs/brg
Extraction Time		29			hrs			05/21/07 0:00	srs/brg
Leachate pH		6.89			units			05/21/07 0:00	srs/brg
Leachate Volume		5110			mL			05/21/07 0:00	srs/brg
Particle Size over 5 cm		70			%			05/21/07 0:00	srs/brg
Retained Moisture		12.5			%			05/21/07 0:00	srs/brg

** Please refer to Qualifier Reports for detail.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6380 BED6-8(D)

ACZ Sample ID: ***L62424-04***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0023		*	mg/L	0.0004	0.002	05/29/07 17:43	jjr
Arsenic (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.04	0.2	05/25/07 14:49	msh
Cadmium (MWMT)	M6010B ICP	1.550		*	mg/L	0.005	0.02	05/25/07 14:49	msh
Copper (MWMT)	M6010B ICP	0.25		*	mg/L	0.01	0.05	05/25/07 14:49	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 8:02	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:49	msh
Uranium (MWMT)	M6020 ICP-MS	0.0596		*	mg/L	0.0001	0.0005	05/25/07 0:37	jjr
Zinc (MWMT)	M6010B ICP	12.00		*	mg/L	0.01	0.05	05/25/07 14:49	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5090			g			05/22/07 0:00	srs/brg
Extraction pH		6.24			units			05/22/07 0:00	srs/brg
Extraction Time		32			hrs			05/22/07 0:00	srs/brg
Leachate pH		3.25			units			05/22/07 0:00	srs/brg
Leachate Volume		4810			mL			05/22/07 0:00	srs/brg
Particle Size over 5 cm		55			%			05/22/07 0:00	srs/brg
Retained Moisture		14.7			%			05/22/07 0:00	srs/brg

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6380 BED14(E)

ACZ Sample ID: ***L62424-05***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:41	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:53	msh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/25/07 14:53	msh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/25/07 14:53	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 8:07	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 14:53	msh
Uranium (MWMT)	M6020 ICP-MS	0.0007		*	mg/L	0.0001	0.0005	05/25/07 0:41	jjr
Zinc (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	05/25/07 14:53	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5120			g			05/22/07 0:00	srs/brg
Extraction pH		6.24			units			05/22/07 0:00	srs/brg
Extraction Time		31			hrs			05/22/07 0:00	srs/brg
Leachate pH		6.97			units			05/22/07 0:00	srs/brg
Leachate Volume		4990			mL			05/22/07 0:00	srs/brg
Particle Size over 5 cm		83			%			05/22/07 0:00	srs/brg
Retained Moisture		3.5			%			05/22/07 0:00	srs/brg

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6400 BED3-5(F)

ACZ Sample ID: ***L62424-06***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:45	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:13	msh
Cadmium (MWMT)	M6010B ICP	0.712		*	mg/L	0.005	0.02	05/25/07 15:13	msh
Copper (MWMT)	M6010B ICP	19.20		*	mg/L	0.01	0.05	05/25/07 15:13	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 8:11	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:13	msh
Uranium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	05/25/07 0:45	jjr
Zinc (MWMT)	M6010B ICP	2.27		*	mg/L	0.01	0.05	05/25/07 15:13	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5140			g			05/22/07 0:00	srs/brg
Extraction pH		6.24			units			05/22/07 0:00	srs/brg
Extraction Time		41.6			hrs			05/22/07 0:00	srs/brg
Leachate pH		5.6			units			05/22/07 0:00	srs/brg
Leachate Volume		6120			mL			05/22/07 0:00	srs/brg
Particle Size over 5 cm		67			%			05/22/07 0:00	srs/brg
Retained Moisture		11.9			%			05/22/07 0:00	srs/brg

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6380 BED2(G)

ACZ Sample ID: ***L62424-07***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0037		*	mg/L	0.0004	0.002	05/29/07 17:55	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:16	msh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/25/07 15:16	msh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/25/07 15:16	msh
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	05/30/07 8:15	djt
Selenium (MWMT)	M6010B ICP	0.06	B	*	mg/L	0.04	0.2	05/25/07 15:16	msh
Uranium (MWMT)	M6020 ICP-MS	0.0065		*	mg/L	0.0001	0.0005	05/25/07 0:49	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/25/07 15:16	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5130			g			05/23/07 0:00	srs/brg
Extraction pH		6.24			units			05/23/07 0:00	srs/brg
Extraction Time		32			hrs			05/23/07 0:00	srs/brg
Leachate pH		6.5			units			05/23/07 0:00	srs/brg
Leachate Volume		4960			mL			05/23/07 0:00	srs/brg
Particle Size over 5 cm		44			%			05/23/07 0:00	srs/brg
Retained Moisture		10.7			%			05/23/07 0:00	srs/brg

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENT W 6320 BED3-5(H

ACZ Sample ID: ***L62424-08***
Date Sampled: *02/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:54	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:20	msh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/25/07 15:20	msh
Copper (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	05/25/07 15:20	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 8:19	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:20	msh
Uranium (MWMT)	M6020 ICP-MS	0.0010		*	mg/L	0.0001	0.0005	05/25/07 0:54	jjr
Zinc (MWMT)	M6010B ICP	0.11		*	mg/L	0.01	0.05	05/25/07 15:20	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2940			g			05/23/07 0:00	srs/brg
Extraction pH		6.24			units			05/23/07 0:00	srs/brg
Extraction Time		25.5			hrs			05/23/07 0:00	srs/brg
Leachate pH		5.65			units			05/23/07 0:00	srs/brg
Leachate Volume		3000			mL			05/23/07 0:00	srs/brg
Particle Size over 5 cm		86			%			05/23/07 0:00	srs/brg
Retained Moisture		10.5			%			05/23/07 0:00	srs/brg

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6380 BED11-13(I

ACZ Sample ID: ***L62424-09***
Date Sampled: *01/01/07 00:00*
Date Received: *05/04/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	05/25/07 0:58	jjr
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:23	msh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	05/25/07 15:23	msh
Copper (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	05/25/07 15:23	msh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/30/07 8:23	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	05/25/07 15:23	msh
Uranium (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0001	0.0005	05/25/07 0:58	jjr
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	05/25/07 15:23	msh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5060			g			05/23/07 0:00	srs/brg
Extraction pH		6.24			units			05/23/07 0:00	srs/brg
Extraction Time		31			hrs			05/23/07 0:00	srs/brg
Leachate pH		6.58			units			05/23/07 0:00	srs/brg
Leachate Volume		5020			mL			05/23/07 0:00	srs/brg
Particle Size over 5 cm		79			%			05/23/07 0:00	srs/brg
Retained Moisture		11.5			%			05/23/07 0:00	srs/brg

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L62424***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225321													
WG225321ICV	ICV	05/24/07 23:34	MS070518-1	.02		.02184	mg/L	109.2	90	110			
WG225321ICB	ICB	05/24/07 23:38				.00093	mg/L		-0.0012	0.0012			
WG224448PBS	PBS	05/24/07 23:55				U	mg/L		-0.0012	0.0012			
L62424-01AS	AS	05/25/07 0:03	MS070425-3	.00625	U	.00606	mg/L	97	75	125			
L62424-01ASD	ASD	05/25/07 0:07	MS070425-3	.00625	U	.00626	mg/L	100.2	75	125	3.25	20	
L62424-03DUP	DUP	05/25/07 0:33			U	U	mg/L				0	20	RA
WG225538													
WG225538ICV	ICV	05/29/07 17:10	MS070518-1	.02		.02134	mg/L	106.7	90	110			
WG225538ICB	ICB	05/29/07 17:14				U	mg/L		-0.0012	0.0012			
WG224448PBS	PBS	05/29/07 17:30				U	mg/L		-0.0012	0.0012			
L62424-03DUP	DUP	05/29/07 17:39			U	U	mg/L				0	20	RA
L62424-04AS	AS	05/29/07 17:47	MS070425-3	.00625	.0023	.00858	mg/L	100.5	75	125			
L62424-04ASD	ASD	05/29/07 17:51	MS070425-3	.00625	.0023	.00903	mg/L	107.7	75	125	5.11	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225335													
WG225335ICV	ICV	05/25/07 14:15	II070518-6	4		4.045	mg/L	101.1	90	110			
WG225335ICB	ICB	05/25/07 14:19				U	mg/L		-0.12	0.12			
WG224448PBS	PBS	05/25/07 14:32				U	mg/L		-0.12	0.12			
L62424-03DUP	DUP	05/25/07 14:46			U	U	mg/L				0	20	RA
L62424-05AS	AS	05/25/07 15:06	II070516-3	1	U	1.094	mg/L	109.4	75	125			
L62424-05ASD	ASD	05/25/07 15:09	II070516-3	1	U	1.041	mg/L	104.1	75	125	4.96	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225335													
WG225335ICV	ICV	05/25/07 14:15	II070518-6	2		1.9284	mg/L	96.4	90	110			
WG225335ICB	ICB	05/25/07 14:19				U	mg/L		-0.015	0.015			
WG224448PBS	PBS	05/25/07 14:32				U	mg/L		-0.015	0.015			
L62424-03DUP	DUP	05/25/07 14:46			U	U	mg/L				0	20	RA
L62424-05AS	AS	05/25/07 15:06	II070516-3	.5	U	.5265	mg/L	105.3	75	125			
L62424-05ASD	ASD	05/25/07 15:09	II070516-3	.5	U	.5096	mg/L	101.9	75	125	3.26	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225335													
WG225335ICV	ICV	05/25/07 14:15	II070518-6	2		2.021	mg/L	101.1	90	110			
WG225335ICB	ICB	05/25/07 14:19				U	mg/L		-0.03	0.03			
WG224448PBS	PBS	05/25/07 14:32				U	mg/L		-0.03	0.03			
L62424-03DUP	DUP	05/25/07 14:46			U	U	mg/L				0	20	RA
L62424-05AS	AS	05/25/07 15:06	II070516-3	.5	U	.545	mg/L	109	75	125			
L62424-05ASD	ASD	05/25/07 15:09	II070516-3	.5	U	.53	mg/L	106	75	125	2.79	20	

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L62424***

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225505													
WG225505ICV	ICV	05/30/07 6:59	II070518-6	2		2.032	mg/L	101.6	90	110			
WG225505ICB	ICB	05/30/07 7:04				U	mg/L		-0.03	0.03			
WG224448PBS	PBS	05/30/07 7:20				U	mg/L		-0.03	0.03			
L62424-01AS	AS	05/30/07 7:33	II070516-3	.5	U	.419	mg/L	83.8	75	125			
L62424-01ASD	ASD	05/30/07 7:37	II070516-3	.5	U	.409	mg/L	81.8	75	125	2.42	20	
L62424-03DUP	DUP	05/30/07 7:58			U	U	mg/L				0	20	RA

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225335													
WG225335ICV	ICV	05/25/07 14:15	II070518-6	4		4.013	mg/L	100.3	90	110			
WG225335ICB	ICB	05/25/07 14:19				U	mg/L		-0.12	0.12			
WG224448PBS	PBS	05/25/07 14:32				U	mg/L		-0.12	0.12			
L62424-03DUP	DUP	05/25/07 14:46			U	U	mg/L				0	20	RA
L62424-05AS	AS	05/25/07 15:06	II070516-3	1	U	.992	mg/L	99.2	75	125			
L62424-05ASD	ASD	05/25/07 15:09	II070516-3	1	U	1.014	mg/L	101.4	75	125	2.19	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225321													
WG225321ICV	ICV	05/24/07 23:34	MS070518-1	.05		.04968	mg/L	99.4	90	110			
WG225321ICB	ICB	05/24/07 23:38				U	mg/L		-0.0003	0.0003			
WG224448PBS	PBS	05/24/07 23:55				U	mg/L		-0.0003	0.0003			
L62424-01AS	AS	05/25/07 0:03	MS070425-3	.025	.305	.3283	mg/L	93.2	75	125			
L62424-01ASD	ASD	05/25/07 0:07	MS070425-3	.025	.305	.3315	mg/L	106	75	125	0.97	20	
L62424-03DUP	DUP	05/25/07 0:33			.0038	.00259	mg/L				37.9	20	RC
WG225538													
WG225538ICV	ICV	05/29/07 17:10	MS070518-1	.05		.05084	mg/L	101.7	90	110			
WG225538ICB	ICB	05/29/07 17:14				U	mg/L		-0.0003	0.0003			
WG224448PBS	PBS	05/29/07 17:30				U	mg/L		-0.0003	0.0003			
L62424-03DUP	DUP	05/29/07 17:39			.0041	.00283	mg/L				36.7	20	RC
L62424-04AS	AS	05/29/07 17:47	MS070425-3	.025	.0633	.09275	mg/L	117.8	75	125			
L62424-04ASD	ASD	05/29/07 17:51	MS070425-3	.025	.0633	.09498	mg/L	126.7	75	125	2.38	20	MA

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225335													
WG225335ICV	ICV	05/25/07 14:15	II070518-6	2		1.948	mg/L	97.4	90	110			
WG225335ICB	ICB	05/25/07 14:19				U	mg/L		-0.03	0.03			
WG224448PBS	PBS	05/25/07 14:32				U	mg/L		-0.03	0.03			
L62424-03DUP	DUP	05/25/07 14:46			.02	.011	mg/L				58.1	20	RA
L62424-05AS	AS	05/25/07 15:06	II070516-3	.5	.01	.53	mg/L	104	75	125			
L62424-05ASD	ASD	05/25/07 15:09	II070516-3	.5	.01	.51	mg/L	100	75	125	3.85	20	

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L62424***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62424-01	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225538	Uranium (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).
L62424-02	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L62424***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62424-03	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).
L62424-04	WG225538	Antimony (MWMT)	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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).

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Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L62424***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62424-05	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).
L62424-06	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).

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Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L62424***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62424-07	WG225538	Antimony (MWMT)	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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).
L62424-08	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L62424***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62424-09	WG225321	Antimony (MWMT)	M6020 ICP-MS	N1	See Case Narrative.
			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).
	WG225335	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
	WG225505	Molybdenum (MWMT)	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).
	WG225335	Selenium (MWMT)	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).
	WG225321	Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG225335	Zinc (MWMT)	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).

Metals Analysis

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

Uranium (MWMT)	M6020 ICP-MS

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L62424
Date Received: 5/4/2007
Received By:
Date Printed: 5/8/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
1559		16	16
1660		18.5	15

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

Notes

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L62424
Date Received: 5/4/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L62424-01	SENT W 6320BED6-8(A)									X		☐
L62424-02	CENT 6380 BED9-10(B)									X		☐
L62424-03	SENT W 6320 BED14(C)									X		☐
L62424-04	CENT 6380 BED6-8(D)									X		☐
L62424-05	CENT 6380 BED14(E)									X		☐
L62424-06	CENT 6400 BED3-5(F)									X		☐
L62424-07	CENT 6380 BED2(G)									X		☐
L62424-08	SENT W 6320 BED3-5(H									X		☐
L62424-09	CENT 6380 BED11-13(I									X		☐

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L62424

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Chain of Custody Record Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
9.	Cent 6380 Bed 11-13 (I)	Jan 07		x	1	Composite samples per suffix (ie. A-J)
1.	Sent W 6320 Bed 6-8 (A)	Jan 07		x	1	As Above
2.	Cent 6380 Bed 9-10 (B)	Jan 07		x	1	As Above
3.	Sent W 6320 Bed 14 ©	Jan 07		x	1	As Above
4.	Cent 6380 Bed 6-8 (D)	Jan 07		x	1	As Above
5.	Cent 6380 Bed 14 (E)	Jan 07		x	1	As Above
6.	Cent 6400 Bed 3-5 (F)	Jan 07		x	1	As Above
7.	~~Cent 6380 Bed 2 (G)~~	Jan 07		x	1	As Above
3.	Sent W 6320 Bed 14 (C)	Feb 07		x	1	As Above
11.	Cent 6380 Bed 2 (G)	Feb 07		x	1	As Above
2.	Cent 6380 Bed 9-10 (B)	Feb 07		x	1	As Above
17.	Cent 6360 Bed 2 (G)	Mar 07		x	1	As Above
8.	Sent W 6320 Bed 3-5 (H)	Feb 07		x	1	As Above
1.	Sent W 6320 Bed 6-8 (A)	Feb 07		x	1	As Above
6.	Cent 6380 Bed 3-5 (F)	Feb 07		x	1	As Above
4	Cent 6360 Bed 6-8 (D)	Mar 07		x	1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 16
Sampler's Signature C Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 5-1-07 12:24	Received By: Date / Time: 5.4.07 10:57
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 4th Qtr 2006* *The letter suffix identifies one analysis of up to 3 samples*

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

	Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
	SAMPLE NUMBER	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
9.	Cent 6380 Bed 11-13 (I)	Feb 07		x							1	Composite samples per suffix (ie. A-J)
5.	Cent 6380 Bed 14 (E)	Feb 07		x							1	As Above
6.	Cent 6380 Bed 3-5 (F)	Mar 07		x							1	As Above
4.	Cent 6380 Bed 6-8 (D)	Feb 07		x							1	As Above
3.	Sent West 6300 Bed 14 ©	Mar 07		x							1	As Above
2.	Cent 6360 Bed 9-10 (B)	Mar 07		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 6
Sampler's Signature C Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard Lantz Ind 5-1-07 12:24	Received By: Date / Time:
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 4th Qtr 2006* *The letter suffix identifies one analysis of up to 3 samples*

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

Analytical Report

September 04, 2007

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L64270

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 06, 2007. This project has been assigned to ACZ's project number, L64270. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64270. 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 October 04, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

31/May/07

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED6-8(A)

ACZ Sample ID: ***L64270-01***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0027		*	mg/L	0.0004	0.002	08/28/07 13:33	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:14	djt
Cadmium (MWMT)	M6010B ICP	5.000		*	mg/L	0.005	0.02	08/30/07 11:14	djt
Copper (MWMT)	M6010B ICP	99.40		*	mg/L	0.01	0.05	08/30/07 11:14	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.05	0.3	08/31/07 15:54	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.2	1	08/31/07 15:54	djt
Uranium (MWMT)	M6020 ICP-MS	0.0377		*	mg/L	0.0001	0.0005	08/25/07 9:30	scp
Zinc (MWMT)	M6010B ICP	15.70		*	mg/L	0.05	0.3	08/31/07 15:54	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4990			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		29			hrs			08/22/07 0:00	srs
Leachate pH		4.09			units			08/22/07 0:00	srs
Leachate Volume		4980			mL			08/22/07 0:00	srs
Particle Size over 5 cm		64			%			08/22/07 0:00	srs
Retained Moisture		9.56			%			08/22/07 0:00	srs

** Please refer to Qualifier Reports for details.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED14(B)

ACZ Sample ID: ***L64270-02***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B	*	mg/L	0.0004	0.002	08/28/07 13:37	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:28	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	08/30/07 11:28	djt
Copper (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.01	0.05	08/30/07 11:28	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:08	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:08	djt
Uranium (MWMT)	M6020 ICP-MS	0.0047		*	mg/L	0.0001	0.0005	08/25/07 9:43	scp
Zinc (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	08/31/07 16:08	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4970			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		29			hrs			08/22/07 0:00	srs
Leachate pH		6.73			units			08/22/07 0:00	srs
Leachate Volume		5010			mL			08/22/07 0:00	srs
Particle Size over 5 cm		74			%			08/22/07 0:00	srs
Retained Moisture		15.5			%			08/22/07 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED3-5(C)

ACZ Sample ID: ***L64270-03***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	08/28/07 13:46	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:42	djt
Cadmium (MWMT)	M6010B ICP	2.850		*	mg/L	0.005	0.02	08/30/07 11:42	djt
Copper (MWMT)	M6010B ICP	10.40		*	mg/L	0.01	0.05	08/30/07 11:42	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:22	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:22	djt
Uranium (MWMT)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	08/25/07 9:53	scp
Zinc (MWMT)	M6010B ICP	3.83		*	mg/L	0.01	0.05	08/31/07 16:22	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		32.3			hrs			08/22/07 0:00	srs
Leachate pH		5.59			units			08/22/07 0:00	srs
Leachate Volume		4970			mL			08/22/07 0:00	srs
Particle Size over 5 cm		21			%			08/22/07 0:00	srs
Retained Moisture		18.8			%			08/22/07 0:00	srs

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED2(D)

ACZ Sample ID: ***L64270-04***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0014	B		mg/L	0.0004	0.002	08/28/07 13:51	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:46	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	08/30/07 11:46	djt
Copper (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.01	0.05	08/30/07 11:46	djt
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	08/31/07 16:25	djt
Selenium (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.04	0.2	08/31/07 16:25	djt
Uranium (MWMT)	M6020 ICP-MS	0.0014		*	mg/L	0.0001	0.0005	08/25/07 10:02	scp
Zinc (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	08/31/07 16:25	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		32.3			hrs			08/22/07 0:00	srs
Leachate pH		6.4			units			08/22/07 0:00	srs
Leachate Volume		4840			mL			08/22/07 0:00	srs
Particle Size over 5 cm		34			%			08/22/07 0:00	srs
Retained Moisture		14.2			%			08/22/07 0:00	srs

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENTWEST6300BED6-8(E

ACZ Sample ID: ***L64270-05***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B	*	mg/L	0.0004	0.002	08/28/07 14:04	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:49	djt
Cadmium (MWMT)	M6010B ICP	0.061		*	mg/L	0.005	0.02	08/30/07 11:49	djt
Copper (MWMT)	M6010B ICP	0.35		*	mg/L	0.01	0.05	08/30/07 11:49	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:29	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:29	djt
Uranium (MWMT)	M6020 ICP-MS	0.0319		*	mg/L	0.0001	0.0005	08/25/07 10:07	scp
Zinc (MWMT)	M6010B ICP	1.74		*	mg/L	0.01	0.05	08/31/07 16:29	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2490			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		28			hrs			08/22/07 0:00	srs
Leachate pH		3.58			units			08/22/07 0:00	srs
Leachate Volume		2650			mL			08/22/07 0:00	srs
Particle Size over 5 cm		57			%			08/22/07 0:00	srs
Retained Moisture		14.1			%			08/22/07 0:00	srs

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENTWEST6300BED14(F)

ACZ Sample ID: ***L64270-06***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	08/28/07 14:21	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:53	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	08/30/07 11:53	djt
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/30/07 11:53	djt
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	08/31/07 16:32	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:32	djt
Uranium (MWMT)	M6020 ICP-MS	0.0155		*	mg/L	0.0001	0.0005	08/25/07 10:20	scp
Zinc (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	08/31/07 16:32	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4980			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		31.8			hrs			08/22/07 0:00	srs
Leachate pH		6.74			units			08/22/07 0:00	srs
Leachate Volume		4900			mL			08/22/07 0:00	srs
Particle Size over 5 cm		72			%			08/22/07 0:00	srs
Retained Moisture		11.4			%			08/22/07 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED11-13(G)

ACZ Sample ID: ***L64270-07***
Date Sampled: *04/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	08/28/07 14:26	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 11:56	djt
Cadmium (MWMT)	M6010B ICP	0.008	B	*	mg/L	0.005	0.02	08/30/07 11:56	djt
Copper (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	08/30/07 11:56	djt
Molybdenum (MWMT)	M6010B ICP	0.09		*	mg/L	0.01	0.05	08/31/07 16:36	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:36	djt
Uranium (MWMT)	M6020 ICP-MS	0.0047		*	mg/L	0.0001	0.0005	08/25/07 10:25	scp
Zinc (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	08/31/07 16:36	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		32.3			hrs			08/22/07 0:00	srs
Leachate pH		6.69			units			08/22/07 0:00	srs
Leachate Volume		4960			mL			08/22/07 0:00	srs
Particle Size over 5 cm		52			%			08/22/07 0:00	srs
Retained Moisture		15.3			%			08/22/07 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT6360BED9-10(H)

ACZ Sample ID: ***L64270-08***
Date Sampled: *05/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	08/28/07 14:30	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 12:00	djt
Cadmium (MWMT)	M6010B ICP	0.649		*	mg/L	0.005	0.02	08/30/07 12:00	djt
Copper (MWMT)	M6010B ICP	0.36		*	mg/L	0.01	0.05	08/30/07 12:00	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:40	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:40	djt
Uranium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	08/25/07 10:30	scp
Zinc (MWMT)	M6010B ICP	0.95		*	mg/L	0.01	0.05	08/31/07 16:40	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4970			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		34.8			hrs			08/22/07 0:00	srs
Leachate pH		6.72			units			08/22/07 0:00	srs
Leachate Volume		4860			mL			08/22/07 0:00	srs
Particle Size over 5 cm		59			%			08/22/07 0:00	srs
Retained Moisture		20			%			08/22/07 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENTW6260BED9-10(I)

ACZ Sample ID: ***L64270-09***
Date Sampled: *06/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0009	B	*	mg/L	0.0004	0.002	08/28/07 14:34	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 12:03	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	08/30/07 12:03	djt
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/30/07 12:03	djt
Molybdenum (MWMT)	M6010B ICP	0.07		*	mg/L	0.01	0.05	08/31/07 16:43	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:43	djt
Uranium (MWMT)	M6020 ICP-MS	0.0051		*	mg/L	0.0001	0.0005	08/25/07 10:34	scp
Zinc (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	08/31/07 16:43	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4970			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		29			hrs			08/22/07 0:00	srs
Leachate pH		6.51			units			08/22/07 0:00	srs
Leachate Volume		5070			mL			08/22/07 0:00	srs
Particle Size over 5 cm		58			%			08/22/07 0:00	srs
Retained Moisture		13.3			%			08/22/07 0:00	srs

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: GTO6440BED2(J)

ACZ Sample ID: ***L64270-10***
Date Sampled: *06/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	08/28/07 14:39	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 12:07	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	08/30/07 12:07	djt
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/30/07 12:07	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:47	djt
Selenium (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.04	0.2	08/31/07 16:47	djt
Uranium (MWMT)	M6020 ICP-MS	0.0037		*	mg/L	0.0001	0.0005	08/25/07 10:39	scp
Zinc (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	08/31/07 16:47	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2510			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		32.8			hrs			08/22/07 0:00	srs
Leachate pH		6.35			units			08/22/07 0:00	srs
Leachate Volume		2490			mL			08/22/07 0:00	srs
Particle Size over 5 cm		78			%			08/22/07 0:00	srs
Retained Moisture		21.3			%			08/22/07 0:00	srs

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: GTO6440BED6-8(K)

ACZ Sample ID: ***L64270-11***
Date Sampled: *06/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.004	0.02	08/28/07 14:43	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 12:10	djt
Cadmium (MWMT)	M6010B ICP	0.007	B	*	mg/L	0.005	0.02	08/30/07 12:10	djt
Copper (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.01	0.05	08/30/07 12:10	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:50	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:50	djt
Uranium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.001	0.005	08/25/07 10:48	scp
Zinc (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.01	0.05	08/31/07 16:50	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2450			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		37.1			hrs			08/22/07 0:00	srs
Leachate pH		4.91			units			08/22/07 0:00	srs
Leachate Volume		2640			mL			08/22/07 0:00	srs
Particle Size over 5 cm		9			%			08/22/07 0:00	srs
Retained Moisture		22.2			%			08/22/07 0:00	srs

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SENTWEST6320BED3-5(L

ACZ Sample ID: ***L64270-12***
Date Sampled: *06/01/07 00:00*
Date Received: *08/06/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	08/28/07 14:47	msh/scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/30/07 12:14	djt
Cadmium (MWMT)	M6010B ICP	0.005	B	*	mg/L	0.005	0.02	08/30/07 12:14	djt
Copper (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	08/30/07 12:14	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	08/31/07 16:54	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	08/31/07 16:54	djt
Uranium (MWMT)	M6020 ICP-MS	0.0007		*	mg/L	0.0001	0.0005	08/25/07 10:43	scp
Zinc (MWMT)	M6010B ICP	0.22		*	mg/L	0.01	0.05	08/31/07 16:54	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		2490			g			08/22/07 0:00	srs
Extraction pH		5.5			units			08/22/07 0:00	srs
Extraction Time		28			hrs			08/22/07 0:00	srs
Leachate pH		4.84			units			08/22/07 0:00	srs
Leachate Volume		3300			mL			08/22/07 0:00	srs
Particle Size over 5 cm		69			%			08/22/07 0:00	srs
Retained Moisture		10.8			%			08/22/07 0:00	srs

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L64270***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231105													
WG231105ICV	ICV	08/28/07 13:07	MS070731-2	.02		.01892	mg/L	94.6	90	110			
WG231105ICB	ICB	08/28/07 13:11				U	mg/L		-0.0012	0.0012			
WG230898PBS	PBS	08/28/07 13:29				U	mg/L		-0.0012	0.0012			
L64270-02DUP	DUP	08/28/07 13:42			.0006	.00047	mg/L				24.3	20	RA
L64270-04AS	AS	08/28/07 13:55	MS070712-3	.01	.0014	.01169	mg/L	102.9	75	125			
L64270-04ASD	ASD	08/28/07 13:59	MS070712-3	.01	.0014	.01171	mg/L	103.1	75	125	0.17	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231280													
WG231280ICV	ICV	08/30/07 10:53	II070821-3	4		3.944	mg/L	98.6	90	110			
WG231280ICB	ICB	08/30/07 10:56				U	mg/L		-0.12	0.12			
WG230898PBS	PBS	08/30/07 11:10				U	mg/L		-0.12	0.12			
L64270-01AS	AS	08/30/07 11:17	II070823-2	1	U	1.151	mg/L	115.1	75	125			
L64270-01ASD	ASD	08/30/07 11:21	II070823-2	1	U	1.087	mg/L	108.7	75	125	5.72	20	
L64270-02DUP	DUP	08/30/07 11:32			U	U	mg/L				0	20	RA

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231280													
WG231280ICV	ICV	08/30/07 10:53	II070821-3	2		1.9865	mg/L	99.3	90	110			
WG231280ICB	ICB	08/30/07 10:56				U	mg/L		-0.015	0.015			
WG230898PBS	PBS	08/30/07 11:10				U	mg/L		-0.015	0.015			
L64270-01AS	AS	08/30/07 11:17	II070823-2	.5	5	5.5839	mg/L	116.8	75	125			
L64270-01ASD	ASD	08/30/07 11:21	II070823-2	.5	5	5.5349	mg/L	107	75	125	0.88	20	
L64270-02DUP	DUP	08/30/07 11:32			U	U	mg/L				0	20	RA

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231280													
WG231280ICV	ICV	08/30/07 10:53	II070821-3	2		1.981	mg/L	99.1	90	110			
WG231280ICB	ICB	08/30/07 10:56				U	mg/L		-0.03	0.03			
WG230898PBS	PBS	08/30/07 11:10				U	mg/L		-0.03	0.03			
L64270-01AS	AS	08/30/07 11:17	II070823-2	.5	99.4	100.229	mg/L	165.8	75	125			M3
L64270-01ASD	ASD	08/30/07 11:21	II070823-2	.5	99.4	99.89	mg/L	98	75	125	0.34	20	
L64270-02DUP	DUP	08/30/07 11:32			.04	.01	mg/L				120	20	RA

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231395													
WG231395ICV	ICV	08/31/07 15:33	II070821-3	2		1.974	mg/L	98.7	90	110			
WG231395ICB	ICB	08/31/07 15:36				U	mg/L		-0.03	0.03			
WG230898PBS	PBS	08/31/07 15:50				U	mg/L		-0.03	0.03			
L64270-01AS	AS	08/31/07 15:57	II070829-11	2.5	U	2.207	mg/L	88.3	75	125			
L64270-01ASD	ASD	08/31/07 16:01	II070829-11	2.5	U	2.274	mg/L	91	75	125	2.99	20	
L64270-02DUP	DUP	08/31/07 16:11			U	U	mg/L				0	20	RA

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L64270***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231395													
WG231395ICV	ICV	08/31/07 15:33	II070821-3	4		3.993	mg/L	99.8	90	110			
WG231395ICB	ICB	08/31/07 15:36				U	mg/L		-0.12	0.12			
WG230898PBS	PBS	08/31/07 15:50				U	mg/L		-0.12	0.12			
L64270-01AS	AS	08/31/07 15:57	II070829-11	5	U	4.54	mg/L	90.8	75	125			
L64270-01ASD	ASD	08/31/07 16:01	II070829-11	5	U	4.75	mg/L	95	75	125	4.52	20	
L64270-02DUP	DUP	08/31/07 16:11			U	U	mg/L				0	20	RA

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231012													
WG231012ICV	ICV	08/25/07 9:03	MS070731-2	.05		.05276	mg/L	105.5	90	110			
WG231012ICB	ICB	08/25/07 9:07				U	mg/L		-0.0003	0.0003			
WG230898PBS	PBS	08/25/07 9:26				U	mg/L		-0.0003	0.0003			
L64270-01AS	AS	08/25/07 9:35	MS070712-3	.05	.0377	.0908	mg/L	106.2	75	125			
L64270-01ASD	ASD	08/25/07 9:39	MS070712-3	.05	.0377	.09143	mg/L	107.5	75	125	0.69	20	
L64270-02DUP	DUP	08/25/07 9:48			.0047	.00393	mg/L				17.8	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231395													
WG231395ICV	ICV	08/31/07 15:33	II070821-3	2		1.957	mg/L	97.9	90	110			
WG231395ICB	ICB	08/31/07 15:36				U	mg/L		-0.03	0.03			
WG230898PBS	PBS	08/31/07 15:50				.024	mg/L		-0.03	0.03			
L64270-01AS	AS	08/31/07 15:57	II070829-11	2.5	15.7	22.504	mg/L	272.2	75	125			M3
L64270-01ASD	ASD	08/31/07 16:01	II070829-11	2.5	15.7	22.942	mg/L	289.7	75	125	1.93	20	M3
L64270-02DUP	DUP	08/31/07 16:11			.02	.027	mg/L				29.8	20	RA

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-01	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-02	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-03	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-04	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-05	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-06	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-07	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-08	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-09	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-10	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64270-11	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.
L64270-12	WG231105	Antimony (MWMT)	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).
	WG231280	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
	WG231395	Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	M6010B ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
			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).
			M6010B ICP	ZH	Serial Dilution exceeded method limits. Matrix interference [physical or chemical] is suspected.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L64270***

Metals Analysis

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

Uranium (MWMT)	M6020 ICP-MS

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L64270
Date Received: 8/6/2007
Received By:
Date Printed: 8/6/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
1541		19.6	20
1849		20.8	16
1850		20.8	16

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L64270
Date Received: 8/6/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L64270-01	CENT6360BED6-8(A)									X		☐
L64270-02	CENT6360BED14(B)									X		☐
L64270-03	CENT6360BED3-5(C)									X		☐
L64270-04	CENT6360BED2(D)									X		☐
L64270-05	SENTWEST6300BED6-8(E									X		☐
L64270-06	SENTWEST6300BED14(F)									X		☐
L64270-07	CENT6360BED11-13(G)									X		☐
L64270-08	CENT6360BED9-10(H)									X		☐
L64270-09	SENTW6260BED9-10(I)									X		☐
L64270-10	GTO6440BED2(J)									X		☐
L64270-11	GTO6440BED6-8(K)									X		☐
L64270-12	SENTWEST6320BED3-5(L									X		☐

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L64270

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
1 Cent 6360 Bed 6-8 (A)	April 07		x							1	Composite samples per suffix (ie. A-J)
2 Cent 6360 Bed 14 (B)	April 07		x							1	As Above
3 Cent 6360 Bed 3-5 (C)	April 07		x							1	As Above
4 Cent 6360 Bed 2 (D)	April 07		x							1	As Above
5 Sent West 6300 Bed 6-8 (E)	April 07		x							1	As Above
6 Sent West 6300 Bed 14 (F)	April 07		x							1	As Above
7 Cent 6360 Bed 11-13 (G)	April 07		x							1	As Above
8 Cent 6360 Bed 3-5 (C)	May 07		x							1	As Above
9 Cent 6360 Bed 2 (D)	May 07		x							1	As Above
12 Cent 6360 Bed 14 (B)	May 07		x							1	As Above
11 Cent 6360 Bed 6-8 (A)	May 07		x							1	As Above
17 Cent 6360 Bed 11-13 (G)	May 07		x							1	As Above
18 Cent 6360 Bed 9-10 (H)	May 07		x							1	As Above
19 Sent W 6260 Bed 9-10 (I)	June 07		x							1	As Above
20 Cent 6360 Bed 14 (B)	June 07		x							1	As Above
10 GTO 6440 Bed 2 (J)	June 07		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 16
Sampler's Signature CBauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 8-2-07 9:30 AM	Received By: Date / Time: RU 8/3 10:47
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007.* *The letter suffix identifies one analysis of up to 3 samples*

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	**Chain of Custody Record** Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
4/7 Cent 6360 Bed 2 (D)	June 07		x							1	Composite samples per suffix (ie. A-J)
7 Cent 6360 Bed 11-13 (G)	June 07		x							1	As Above
1 Cent 6360 Bed 6-8 (A)	June 07		x							1	As Above
6 Sent West 6260 Bed 14 (F)	June 07		x							1	As Above
8 Cent 6360 Bed 9-10 (H)	June 07		x							1	As Above
3 Cent 6360 Bed 3-5 (C)	June 07		x							1	As Above
9 Sent W 6280 Bed 9-10 (I)	June 07		x							1	As Above
6 X Sent West 6280 Bed 14 (F)	May 07		x							1	As Above
11 GTO 6440 Bed 6-8 (K)	June 07		x							1	As Above
12 Sent West 6320 Bed 3-5 (L)	May 07		x							1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 10
Sampler's Signature C J Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard	Received By: Date / Time:
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007* *The letter suffix identifies one analysis of up to 3 samples*

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

Analytical Report

December 13, 2007

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Chuck Bauer, Susan Wyman

Project ID:
ACZ Project ID: L66277

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 13, 2007. This project has been assigned to ACZ's project number, L66277. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L66277. 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 13, 2008. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

31/May/07

Sue Webber, Project Manager, has reviewed and approved this report in its entirety.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 11-13(A)

ACZ Sample ID: ***L66277-01***
Date Sampled: *07/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0018	B	*	mg/L	0.0004	0.002	12/05/07 8:03	scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 13:57	djt
Cadmium (MWMT)	M6010B ICP	0.006	B	*	mg/L	0.005	0.02	12/06/07 13:57	djt
Copper (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.01	0.05	12/06/07 13:57	djt
Molybdenum (MWMT)	M6010B ICP	0.38		*	mg/L	0.01	0.05	12/06/07 13:57	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 13:57	djt
Uranium (MWMT)	M6020 ICP-MS	0.0150		*	mg/L	0.0001	0.0005	12/05/07 8:03	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 13:57	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4990			g			11/28/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/28/07 0:00	lwt/bjl
Extraction Time		29			hrs			11/28/07 0:00	lwt/bjl
Leachate pH		7.6			units			11/28/07 0:00	lwt/bjl
Leachate Volume		4930			mL			11/28/07 0:00	lwt/bjl
Particle Size over 5 cm		44			%			11/28/07 0:00	lwt/bjl
Retained Moisture		16.3			%			11/28/07 0:00	lwt/bjl

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 14(B)

ACZ Sample ID: ***L66277-02***
Date Sampled: *07/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	12/05/07 8:12	scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:13	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	12/06/07 14:13	djt
Copper (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	12/06/07 14:13	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:13	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:13	djt
Uranium (MWMT)	M6020 ICP-MS	0.0013		*	mg/L	0.0001	0.0005	12/05/07 8:12	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:13	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4990			g			11/28/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/28/07 0:00	lwt/bjl
Extraction Time		33.5			hrs			11/28/07 0:00	lwt/bjl
Leachate pH		8.1			units			11/28/07 0:00	lwt/bjl
Leachate Volume		4900			mL			11/28/07 0:00	lwt/bjl
Particle Size over 5 cm		70			%			11/28/07 0:00	lwt/bjl
Retained Moisture		12.6			%			11/28/07 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 3-5(C)

ACZ Sample ID: ***L66277-03***
Date Sampled: *08/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	12/05/07 8:25	scp
Arsenic (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.04	0.2	12/06/07 14:23	djt
Cadmium (MWMT)	M6010B ICP	12.900		*	mg/L	0.005	0.02	12/06/07 14:23	djt
Copper (MWMT)	M6010B ICP	394		*	mg/L	0.1	0.5	12/11/07 21:38	erf
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:23	djt
Selenium (MWMT)	M6010B ICP	0.11	B	*	mg/L	0.04	0.2	12/06/07 14:23	djt
Uranium (MWMT)	M6020 ICP-MS	0.0073		*	mg/L	0.0001	0.0005	12/05/07 8:25	scp
Zinc (MWMT)	M6010B ICP	76.00		*	mg/L	0.01	0.05	12/06/07 14:23	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5000			g			11/29/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/29/07 0:00	lwt/bjl
Extraction Time		32.5			hrs			11/29/07 0:00	lwt/bjl
Leachate pH		5.2			units			11/29/07 0:00	lwt/bjl
Leachate Volume		4860			mL			11/29/07 0:00	lwt/bjl
Particle Size over 5 cm		70			%			11/29/07 0:00	lwt/bjl
Retained Moisture		17.4			%			11/29/07 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 6-8(D)

ACZ Sample ID: ***L66277-04***
Date Sampled: *08/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	12/05/07 8:38	scp
Arsenic (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.04	0.2	12/06/07 14:26	djt
Cadmium (MWMT)	M6010B ICP	3.540		*	mg/L	0.005	0.02	12/06/07 14:26	djt
Copper (MWMT)	M6010B ICP	14.30		*	mg/L	0.01	0.05	12/06/07 14:26	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:26	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:26	djt
Uranium (MWMT)	M6020 ICP-MS	0.0011		*	mg/L	0.0001	0.0005	12/05/07 8:38	scp
Zinc (MWMT)	M6010B ICP	20.50		*	mg/L	0.01	0.05	12/06/07 14:26	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4950			g			11/29/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/29/07 0:00	lwt/bjl
Extraction Time		29			hrs			11/29/07 0:00	lwt/bjl
Leachate pH		6			units			11/29/07 0:00	lwt/bjl
Leachate Volume		5380			mL			11/29/07 0:00	lwt/bjl
Particle Size over 5 cm		55			%			11/29/07 0:00	lwt/bjl
Retained Moisture		14.9			%			11/29/07 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 9-10(E)

ACZ Sample ID: ***L66277-05***
Date Sampled: *08/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0046		*	mg/L	0.0004	0.002	12/05/07 8:42	scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:30	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	12/06/07 14:30	djt
Copper (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	12/06/07 14:30	djt
Molybdenum (MWMT)	M6010B ICP	1.68		*	mg/L	0.01	0.05	12/06/07 14:30	djt
Selenium (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.04	0.2	12/06/07 14:30	djt
Uranium (MWMT)	M6020 ICP-MS	0.0073		*	mg/L	0.0001	0.0005	12/05/07 8:42	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:30	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			11/29/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/29/07 0:00	lwt/bjl
Extraction Time		33.5			hrs			11/29/07 0:00	lwt/bjl
Leachate pH		8			units			11/29/07 0:00	lwt/bjl
Leachate Volume		4880			mL			11/29/07 0:00	lwt/bjl
Particle Size over 5 cm		44			%			11/29/07 0:00	lwt/bjl
Retained Moisture		15.9			%			11/29/07 0:00	lwt/bjl

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: C 6340 B 2(F)

ACZ Sample ID: ***L66277-06***
Date Sampled: *08/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0048		*	mg/L	0.0004	0.002	12/05/07 8:47	scp
Arsenic (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.04	0.2	12/06/07 14:33	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	12/06/07 14:33	djt
Copper (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	12/06/07 14:33	djt
Molybdenum (MWMT)	M6010B ICP	0.12		*	mg/L	0.01	0.05	12/06/07 14:33	djt
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:33	djt
Uranium (MWMT)	M6020 ICP-MS	0.0029		*	mg/L	0.0001	0.0005	12/05/07 8:47	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:33	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3950			g			11/30/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/30/07 0:00	lwt/bjl
Extraction Time		27.5			hrs			11/30/07 0:00	lwt/bjl
Leachate pH		8.1			units			11/30/07 0:00	lwt/bjl
Leachate Volume		4030			mL			11/30/07 0:00	lwt/bjl
Particle Size over 5 cm		46			%			11/30/07 0:00	lwt/bjl
Retained Moisture		23.1			%			11/30/07 0:00	lwt/bjl

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: SW B 9-10(G)

ACZ Sample ID: ***L66277-07***
Date Sampled: *07/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0024		*	mg/L	0.0004	0.002	12/05/07 8:56	scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:36	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	12/06/07 14:36	djt
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:36	djt
Molybdenum (MWMT)	M6010B ICP	0.83		*	mg/L	0.01	0.05	12/06/07 14:36	djt
Selenium (MWMT)	M6010B ICP	0.08	B	*	mg/L	0.04	0.2	12/06/07 14:36	djt
Uranium (MWMT)	M6020 ICP-MS	0.0114		*	mg/L	0.0001	0.0005	12/05/07 8:56	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:36	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3970			g			11/30/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/30/07 0:00	lwt/bjl
Extraction Time		27.5			hrs			11/30/07 0:00	lwt/bjl
Leachate pH		8			units			11/30/07 0:00	lwt/bjl
Leachate Volume		3970			mL			11/30/07 0:00	lwt/bjl
Particle Size over 5 cm		70			%			11/30/07 0:00	lwt/bjl
Retained Moisture		22.1			%			11/30/07 0:00	lwt/bjl

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: GTO 6440 B 6-8(H)

ACZ Sample ID: ***L66277-08***
Date Sampled: *08/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0008	B	*	mg/L	0.0004	0.002	12/05/07 9:00	scp
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	12/06/07 14:40	djt
Cadmium (MWMT)	M6010B ICP	0.020		*	mg/L	0.005	0.02	12/06/07 14:40	djt
Copper (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	12/06/07 14:40	djt
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:40	djt
Selenium (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.04	0.2	12/06/07 14:40	djt
Uranium (MWMT)	M6020 ICP-MS	0.0025		*	mg/L	0.0001	0.0005	12/05/07 9:00	scp
Zinc (MWMT)	M6010B ICP	2.98		*	mg/L	0.01	0.05	12/06/07 14:40	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		3250			g			11/30/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/30/07 0:00	lwt/bjl
Extraction Time		30.5			hrs			11/30/07 0:00	lwt/bjl
Leachate pH		3.4			units			11/30/07 0:00	lwt/bjl
Leachate Volume		3210			mL			11/30/07 0:00	lwt/bjl
Particle Size over 5 cm		70			%			11/30/07 0:00	lwt/bjl
Retained Moisture		17.9			%			11/30/07 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: GTO 6440 B 2(I)

ACZ Sample ID: ***L66277-09***
Date Sampled: *07/01/07 00:00*
Date Received: *11/13/07*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0004	0.002	12/05/07 9:04	scp
Arsenic (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.04	0.2	12/06/07 14:43	djt
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	12/06/07 14:43	djt
Copper (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	12/06/07 14:43	djt
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	12/06/07 14:43	djt
Selenium (MWMT)	M6010B ICP	0.10	B	*	mg/L	0.04	0.2	12/06/07 14:43	djt
Uranium (MWMT)	M6020 ICP-MS	0.0080		*	mg/L	0.0001	0.0005	12/05/07 9:04	scp
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	12/06/07 14:43	djt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4950			g			11/30/07 0:00	lwt/bjl
Extraction pH		5.7			units			11/30/07 0:00	lwt/bjl
Extraction Time		33.5			hrs			11/30/07 0:00	lwt/bjl
Leachate pH		7.7			units			11/30/07 0:00	lwt/bjl
Leachate Volume		4760			mL			11/30/07 0:00	lwt/bjl
Particle Size over 5 cm		55			%			11/30/07 0:00	lwt/bjl
Retained Moisture		19.8			%			11/30/07 0:00	lwt/bjl

** Please refer to Qualifier Reports for details.*

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L66277***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237301													
WG237301ICV	ICV	12/05/07 7:36	MS071120-2	.02006		.02011	mg/L	100.2	90	110			
WG237301ICB	ICB	12/05/07 7:41				U	mg/L		-0.0012	0.0012			
WG236912PBS	PBS	12/05/07 7:58				U	mg/L		-0.0012	0.0012			
L66277-01DUP	DUP	12/05/07 8:07			.0018	.00288	mg/L				46.2	20	RA
L66277-02AS	AS	12/05/07 8:16	MS071113-5	.01	U	.00994	mg/L	99.4	75	125			
L66277-02ASD	ASD	12/05/07 8:20	MS071113-5	.01	U	.01012	mg/L	101.2	75	125	1.79	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	4		3.976	mg/L	99.4	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.12	0.12			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.12	0.12			
L66277-01AS	AS	12/06/07 14:03	II071128-2	1	U	1.088	mg/L	108.8	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	1	U	1.062	mg/L	106.2	75	125	2.42	20	
L66277-01DUP	DUP	12/06/07 14:10			U	U	mg/L				0	20	RA

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	2		1.9668	mg/L	98.3	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.015	0.015			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.015	0.015			
L66277-01AS	AS	12/06/07 14:03	II071128-2	.5	.006	.507	mg/L	100.2	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	.5	.006	.5124	mg/L	101.3	75	125	1.06	20	
L66277-01DUP	DUP	12/06/07 14:10			.006	U	mg/L				200	20	RA

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	2		2.015	mg/L	100.8	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.03	0.03			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.03	0.03			
L66277-01AS	AS	12/06/07 14:03	II071128-2	.5	.04	.567	mg/L	105.4	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	.5	.04	.567	mg/L	105.4	75	125	0	20	
L66277-01DUP	DUP	12/06/07 14:10			.04	.053	mg/L				28	20	RA
WG237526													
WG237526ICV	ICV	12/11/07 21:05	II071009-7	2		1.904	mg/L	95.2	90	110			
WG237526ICB	ICB	12/11/07 21:09				U	mg/L		-0.03	0.03			
WG236912PBS	PBS	12/11/07 21:23				U	mg/L		-0.03	0.03			
L66277-01DUP	DUP	12/11/07 21:34			.04	.05	mg/L				22.2	20	RA
L66528-01AS	AS	12/11/07 22:07	II071128-2	.5	206	191.429	mg/L	-2914.2	75	125			M3
L66528-01ASD	ASD	12/11/07 22:11	II071128-2	.5	206	203.926	mg/L	-414.8	75	125	6.32	20	M3

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

Project ID:

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	2		2.013	mg/L	100.7	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.03	0.03			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.03	0.03			
L66277-01AS	AS	12/06/07 14:03	II071128-2	.5	.38	.873	mg/L	98.6	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	.5	.38	.875	mg/L	99	75	125	0.23	20	
L66277-01DUP	DUP	12/06/07 14:10			.38	.49	mg/L				25.3	20	RC

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	4		4.015	mg/L	100.4	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.12	0.12			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.12	0.12			
L66277-01AS	AS	12/06/07 14:03	II071128-2	1	U	1.027	mg/L	102.7	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	1	U	1.037	mg/L	103.7	75	125	0.97	20	
L66277-01DUP	DUP	12/06/07 14:10			U	U	mg/L				0	20	RA

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237301													
WG237301ICV	ICV	12/05/07 7:36	MS071120-2	.05		.04908	mg/L	98.2	90	110			
WG237301ICB	ICB	12/05/07 7:41				U	mg/L		-0.0003	0.0003			
WG236912PBS	PBS	12/05/07 7:58				U	mg/L		-0.0003	0.0003			
L66277-01DUP	DUP	12/05/07 8:07			.015	.01336	mg/L				11.6	20	
L66277-02AS	AS	12/05/07 8:16	MS071113-5	.05	.0013	.04875	mg/L	94.9	75	125			
L66277-02ASD	ASD	12/05/07 8:20	MS071113-5	.05	.0013	.04739	mg/L	92.2	75	125	2.83	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG237387													
WG237387ICV	ICV	12/06/07 13:37	II071009-7	2		1.93	mg/L	96.5	90	110			
WG237387ICB	ICB	12/06/07 13:40				U	mg/L		-0.03	0.03			
WG236912PBS	PBS	12/06/07 13:54				U	mg/L		-0.03	0.03			
L66277-01AS	AS	12/06/07 14:03	II071128-2	.5	U	.53	mg/L	106	75	125			
L66277-01ASD	ASD	12/06/07 14:07	II071128-2	.5	U	.534	mg/L	106.8	75	125	0.75	20	
L66277-01DUP	DUP	12/06/07 14:10			U	U	mg/L				0	20	RA

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L66277-01	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L66277-02	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L66277-03	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
	WG237526	Copper (MWMT)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG237387	Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L66277-04	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L66277-05	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L66277-06	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L66277-07	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L66277-08	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L66277-09	WG237301	Antimony (MWMT)	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).
	WG237387	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	M6010B ICP	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
		Selenium (MWMT)	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).
		Zinc (MWMT)	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

Certification Qualifiers

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L66277***

Metals Analysis

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

Uranium (MWMT)	M6020 ICP-MS

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L66277
Date Received: 11/13/2007
Received By:
Date Printed: 11/13/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
1652	12.1	17
1621	17.6	15
1837	18.6	16

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L66277
Date Received: 11/13/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L66277-01	C 6340 B 11-13(A)									X		☐
L66277-02	C 6340 B 14(B)									X		☐
L66277-03	C 6340 B 3-5(C)									X		☐
L66277-04	C 6340 B 6-8(D)									X		☐
L66277-05	C 6340 B 9-10(E)									X		☐
L66277-06	C 6340 B 2(F)									X		☐
L66277-07	SW B 9-10(G)									X		☐
L66277-08	GTO 6440 B 6-8(H)									X		☐
L66277-09	GTO 6440 B 2(I)									X		☐

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L66277

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Chain of Custody Record Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
1.	Cent 6340 Bed 11-13 (A)	July 07		x	1	Composite samples per suffix (ie. A-J)
2.	Cent 6340 Bed 14 (B)	July 07		x	1	As Above
3.	Cent 6340 Bed 3-5 (C)	Aug 07		x	1	As Above
1.	Cent 6320 Bed 11-13 (A)	Aug 07		x	1	As Above
4.	Cent 6340 Bed 6-8 (D)	Aug 07		x	1	As Above
2.	Cent 6320 Bed 14 (B)	Aug 07		x	1	As Above
5.	Cent 6340 Bed 9-10 (E)	Aug 07		x	1	As Above
6.	Cent 6340 Bed 2 (F)	Aug 07		x	1	As Above
7.	Sent West Bed 9-10 (G)	July 07		x	1	As Above
8.	GTO 6440 Bed 6-8 (H)	Aug 07		x	1	As Above
9.	GTO 6440 Bed 2 (I)	July 07		x	1	As Above
9.	GTO 6440 Bed 2 (I)	Aug 07		x	1	As Above
5.	Cent 6320 Bed 9-10 (E)	Sept 07		x	1	As Above
3.	Cent 6320 Bed 3-5 (C)	Sept 07		x	1	As Above
1.	Cent 6320 Bed 11-13 (A)	Sept 07		x	1	As Above
4.	Cent 6340 Bed 6-8 (D)	Sept 07		x	1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 16
Sampler's Signature C Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 11-8-07 3:15	Received By: Date / Time: 11-13-07 10:17
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007.* *The letter suffix identifies one analysis of up to 3 samples*

L66277

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	**Chain of Custody Record** Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
9.	GTO 6440 Bed 2 (I) *	Sept 07		x	1	Composite samples per suffix (ie. A-J)
2.	Cent 6320 Bed 14 (B) *	Sept 07		x	1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 2
Sampler's Signature C Bauer	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 11-8-07 3:15	Received By: Date / Time:
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007* *The letter suffix identifies one analysis of up to 3 samples*

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

Analytical Report

March 18, 2008

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID:
ACZ Project ID: L67895

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on February 28, 2008. This project has been assigned to ACZ's project number, L67895. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L67895. 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 April 18, 2008. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6280 BED 14(A)

ACZ Sample ID: ***L67895-01***
Date Sampled: *10/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	03/18/08 4:35	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.08	0.4	03/17/08 13:53	aeh/erf
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	03/13/08 10:40	aeh/erf
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	03/13/08 10:40	aeh/erf
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	03/13/08 10:40	aeh/erf
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 10:40	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0052		*	mg/L	0.0001	0.0005	03/18/08 4:35	gme
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	03/13/08 10:40	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5070			g			03/10/08 0:00	lwt/bjl
Extraction pH		6			units			03/10/08 0:00	lwt/bjl
Extraction Time		27			hrs			03/10/08 0:00	lwt/bjl
Leachate pH		7.3			units			03/10/08 0:00	lwt/bjl
Leachate Volume		5120			mL			03/10/08 0:00	lwt/bjl
Particle Size over 5 cm		68.7			%			03/10/08 0:00	lwt/bjl
Retained Moisture		12.9			%			03/10/08 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6300 BED 6-8(B)

ACZ Sample ID: ***L67895-02***
Date Sampled: *10/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	03/18/08 4:49	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 10:56	aeh/erf
Cadmium (MWMT)	M6010B ICP	0.434		*	mg/L	0.005	0.02	03/13/08 10:56	aeh/erf
Copper (MWMT)	M6010B ICP	2.32		*	mg/L	0.01	0.05	03/13/08 10:56	aeh/erf
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	03/13/08 10:56	aeh/erf
Selenium (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.04	0.2	03/13/08 10:56	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0007		*	mg/L	0.0001	0.0005	03/18/08 4:49	gme
Zinc (MWMT)	M6010B ICP	2.35			mg/L	0.01	0.05	03/13/08 10:56	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5000			g			03/11/08 0:00	lwt/bjl
Extraction pH		6			units			03/11/08 0:00	lwt/bjl
Extraction Time		29			hrs			03/11/08 0:00	lwt/bjl
Leachate pH		4.68			units			03/11/08 0:00	lwt/bjl
Leachate Volume		4950			mL			03/11/08 0:00	lwt/bjl
Particle Size over 5 cm		59.5			%			03/11/08 0:00	lwt/bjl
Retained Moisture		20.9			%			03/11/08 0:00	lwt/bjl

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6300 BED 3-5(C)

ACZ Sample ID: ***L67895-03***
Date Sampled: *10/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	03/18/08 4:57	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 11:09	aeh/erf
Cadmium (MWMT)	M6010B ICP	0.325		*	mg/L	0.005	0.02	03/13/08 11:09	aeh/erf
Copper (MWMT)	M6010B ICP	0.07		*	mg/L	0.01	0.05	03/13/08 11:09	aeh/erf
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	03/13/08 11:09	aeh/erf
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 11:09	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0019		*	mg/L	0.0001	0.0005	03/18/08 4:57	gme
Zinc (MWMT)	M6010B ICP	0.31			mg/L	0.01	0.05	03/13/08 11:09	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5080			g			03/11/08 0:00	lwt/bjl
Extraction pH		6			units			03/11/08 0:00	lwt/bjl
Extraction Time		31.5			hrs			03/11/08 0:00	lwt/bjl
Leachate pH		6.7			units			03/11/08 0:00	lwt/bjl
Leachate Volume		5110			mL			03/11/08 0:00	lwt/bjl
Particle Size over 5 cm		60.5			%			03/11/08 0:00	lwt/bjl
Retained Moisture		12.9			%			03/11/08 0:00	lwt/bjl

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6300 BED 11-13D

ACZ Sample ID: ***L67895-04***
Date Sampled: *10/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	03/18/08 5:19	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.08	0.4	03/17/08 14:10	aeh/erf
Cadmium (MWMT)	M6010B ICP	0.012	B	*	mg/L	0.005	0.02	03/13/08 11:12	aeh/erf
Copper (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	03/13/08 11:12	aeh/erf
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	03/13/08 11:12	aeh/erf
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 11:12	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0048		*	mg/L	0.0001	0.0005	03/18/08 5:19	gme
Zinc (MWMT)	M6010B ICP	0.58			mg/L	0.01	0.05	03/13/08 11:12	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5060			g			03/12/08 0:00	lwt/bjl
Extraction pH		6			units			03/12/08 0:00	lwt/bjl
Extraction Time		29			hrs			03/12/08 0:00	lwt/bjl
Leachate pH		6.9			units			03/12/08 0:00	lwt/bjl
Leachate Volume		5020			mL			03/12/08 0:00	lwt/bjl
Particle Size over 5 cm		63.7			%			03/12/08 0:00	lwt/bjl
Retained Moisture		16.1			%			03/12/08 0:00	lwt/bjl

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6300 BED 9-10(E

ACZ Sample ID: ***L67895-05***
Date Sampled: *10/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0011	B	*	mg/L	0.0004	0.002	03/18/08 5:24	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.08	0.4	03/17/08 14:13	aeh/erf
Cadmium (MWMT)	M6010B ICP	0.126		*	mg/L	0.005	0.02	03/13/08 11:16	aeh/erf
Copper (MWMT)	M6010B ICP	0.27		*	mg/L	0.01	0.05	03/13/08 11:16	aeh/erf
Molybdenum (MWMT)	M6010B ICP	0.08		*	mg/L	0.01	0.05	03/13/08 11:16	aeh/erf
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 11:16	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0211		*	mg/L	0.0001	0.0005	03/18/08 5:24	gme
Zinc (MWMT)	M6010B ICP	0.40			mg/L	0.01	0.05	03/13/08 11:16	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5000			g			03/12/08 0:00	lwt/bjl
Extraction pH		6			units			03/12/08 0:00	lwt/bjl
Extraction Time		31.5			hrs			03/12/08 0:00	lwt/bjl
Leachate pH		6.7			units			03/12/08 0:00	lwt/bjl
Leachate Volume		5130			mL			03/12/08 0:00	lwt/bjl
Particle Size over 5 cm		62.3			%			03/12/08 0:00	lwt/bjl
Retained Moisture		20.8			%			03/12/08 0:00	lwt/bjl

Lisbon Valley Mining Company, LLC
Project ID:
Sample ID: CENT 6460 BED 2(F)

ACZ Sample ID: ***L67895-06***
Date Sampled: *11/01/07 00:00*
Date Received: *02/28/08*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	03/18/08 5:28	gme
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.04	0.2	03/13/08 11:19	aeh/erf
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	03/13/08 11:19	aeh/erf
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	03/13/08 11:19	aeh/erf
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	03/13/08 11:19	aeh/erf
Selenium (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.04	0.2	03/13/08 11:19	aeh/erf
Uranium (MWMT)	M6020 ICP-MS	0.0165		*	mg/L	0.0001	0.0005	03/18/08 5:28	gme
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/13/08 11:19	aeh/erf

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		5020			g			03/12/08 0:00	lwt/bjl
Extraction pH		6			units			03/12/08 0:00	lwt/bjl
Extraction Time		31.5			hrs			03/12/08 0:00	lwt/bjl
Leachate pH		7.1			units			03/12/08 0:00	lwt/bjl
Leachate Volume		4900			mL			03/12/08 0:00	lwt/bjl
Particle Size over 5 cm		63.4			%			03/12/08 0:00	lwt/bjl
Retained Moisture		22.4			%			03/12/08 0:00	lwt/bjl

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	Amount of the true value or spike added recovered, 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 Calivation 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.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

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.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L67895***

Project ID:

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241635													
WG241635ICV	ICV	03/18/08 4:09	MS080304-2	.02006		.01995	mg/L	99.5	90	110			
WG241635ICB	ICB	03/18/08 4:14				U	mg/L		-0.0012	0.0012			
L67895-01DUP	DUP	03/18/08 4:44			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/18/08 4:53			U	U	mg/L				0	20	RA
L67895-03AS	AS	03/18/08 5:10	MS080303-5	.01	U	.00978	mg/L	97.8	75	125			
L67895-03ASD	ASD	03/18/08 5:15	MS080303-5	.01	U	.00993	mg/L	99.3	75	125	1.52	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	4		4.004	mg/L	100.1	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.12	0.12			
L67895-01AS	AS	03/13/08 10:46	II080312-2	1		.951	mg/L	95.1	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	1		.961	mg/L	96.1	75	125	1.05	20	
L67895-01DUP	DUP	03/13/08 10:53				U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			U	U	mg/L				0	20	RA
WG241545													
WG241545ICV	ICV	03/17/08 13:37	II080115-3	4		4.123	mg/L	103.1	90	110			
WG241545ICB	ICB	03/17/08 13:40				U	mg/L		-0.12	0.12			
L67895-01AS	AS	03/17/08 14:00	II080312-2	2	U	2.285	mg/L	114.3	75	125			
L67895-01ASD	ASD	03/17/08 14:03	II080312-2	2	U	2.353	mg/L	117.7	75	125	2.93	20	
L67895-01DUP	DUP	03/17/08 14:06			U	U	mg/L				0	20	RA

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	2		1.9322	mg/L	96.6	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.015	0.015			
L67895-01AS	AS	03/13/08 10:46	II080312-2	.5	U	.4986	mg/L	99.7	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	.5	U	.4977	mg/L	99.5	75	125	0.18	20	
L67895-01DUP	DUP	03/13/08 10:53			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			.434	.64	mg/L				38.4	20	RD

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	2		1.946	mg/L	97.3	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.03	0.03			
L67895-01AS	AS	03/13/08 10:46	II080312-2	.5	U	.495	mg/L	99	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	.5	U	.494	mg/L	98.8	75	125	0.2	20	
L67895-01DUP	DUP	03/13/08 10:53			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			2.32	3.4	mg/L				37.8	20	RD

Lisbon Valley Mining Company, LLC
Project ID:

ACZ Project ID: ***L67895***

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	2		1.941	mg/L	97.1	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.03	0.03			
L67895-01AS	AS	03/13/08 10:46	II080312-2	.5	U	.494	mg/L	98.8	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	.5	U	.487	mg/L	97.4	75	125	1.43	20	
L67895-01DUP	DUP	03/13/08 10:53			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			U	U	mg/L				0	20	RA

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	4		3.984	mg/L	99.6	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.12	0.12			
L67895-01AS	AS	03/13/08 10:46	II080312-2	1	U	1.064	mg/L	106.4	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	1	U	1.079	mg/L	107.9	75	125	1.4	20	
L67895-01DUP	DUP	03/13/08 10:53			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			.04	U	mg/L				0	20	RA

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241635													
WG241635ICV	ICV	03/18/08 4:09	MS080304-2	.05		.04642	mg/L	92.8	90	110			
WG241635ICB	ICB	03/18/08 4:14				U	mg/L		-0.0003	0.0003			
L67895-01DUP	DUP	03/18/08 4:44			.0052	.00592	mg/L				12.9	20	
L67895-02DUP	DUP	03/18/08 4:53			.0007	.00152	mg/L				73.9	20	RA
L67895-03AS	AS	03/18/08 5:10	MS080303-5	.05	.0019	.05103	mg/L	98.3	75	125			
L67895-03ASD	ASD	03/18/08 5:15	MS080303-5	.05	.0019	.05011	mg/L	96.4	75	125	1.82	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG241482													
WG241482ICV	ICV	03/13/08 10:23	II080115-3	2		1.938	mg/L	96.9	90	110			
WG241482ICB	ICB	03/13/08 10:26				U	mg/L		-0.03	0.03			
L67895-01AS	AS	03/13/08 10:46	II080312-2	.5	U	.539	mg/L	107.8	75	125			
L67895-01ASD	ASD	03/13/08 10:49	II080312-2	.5	U	.539	mg/L	107.8	75	125	0	20	
L67895-01DUP	DUP	03/13/08 10:53			U	U	mg/L				0	20	RA
L67895-02DUP	DUP	03/13/08 10:59			2.35	2.8	mg/L				17.5	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L67895***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L67895-01	WG241635	Antimony (MWMT)	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).
	WG241545	Arsenic (MWMT)	M6010B ICP	DB	Sample required dilution due to low bias result.
			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).
	WG241482	Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
		Zinc (MWMT)	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).
L67895-02	WG241635	Antimony (MWMT)	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).
	WG241482	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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.
		Copper (MWMT)	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.
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG241635	Uranium (MWMT)	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).
L67895-03	WG241635	Antimony (MWMT)	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).
	WG241482	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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.
		Copper (MWMT)	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.
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG241635	Uranium (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L67895***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L67895-04	WG241635	Antimony (MWMT)	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).
	WG241545	Arsenic (MWMT)	M6010B ICP	DB	Sample required dilution due to low bias result.
			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).
	WG241482	Cadmium (MWMT)	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.
		Copper (MWMT)	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.
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG241635	Uranium (MWMT)	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).
L67895-05	WG241635	Antimony (MWMT)	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).
	WG241545	Arsenic (MWMT)	M6010B ICP	DB	Sample required dilution due to low bias result.
			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).
	WG241482	Cadmium (MWMT)	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.
		Copper (MWMT)	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.
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG241635	Uranium (MWMT)	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).

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L67895***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L67895-06	WG241635	Antimony (MWMT)	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).
	WG241482	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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.
		Copper (MWMT)	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.
		Molybdenum (MWMT)	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).
		Selenium (MWMT)	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).
	WG241635	Uranium (MWMT)	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 NELAC certificate #ACZ.

Uranium (MWMT)	M6020 ICP-MS

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L67895
Date Received: 2/28/2008
Received By:
Date Printed: 2/28/2008

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
2136	15.2	17
2139	14	17
2138	15.1	16

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC

ACZ Project ID: L67895
Date Received: 2/28/2008
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L67895-01	CENT 6280 BED 14(A)									X		
L67895-02	CENT 6300 BED 6-8(B)									X		
L67895-03	CENT 6300 BED 3-5(C)									X		
L67895-04	CENT 6300 BED 11-13D									X		
L67895-05	CENT 6300 BED 9-10(E									X		
L67895-06	CENT 6460 BED 2(F)									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L67895

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Chain of Custody Record Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

	SAMPLE NUMBER	DATE	TIME	MWMP	Number of Containers	Remarks / Comments
1.	Cent 6280 Bed 14 (A)	Oct 07		x	1	Composite samples per suffix (ie. A-F)
2.	Cent 6300 Bed 6-8 (B)	Oct 07		x	1	As Above
3.	Cent 6300 Bed 3-5 (C)	Oct 07		x	1	As Above
4.	Cent 6300 Bed 11-13 (D)	Oct 07		x	1	As Above
5.	Cent 6300 Bed 9-10 (E)	Oct 07		x	1	As Above
1.	Cent 6280 Bed 14 (A)	Nov 07		x	1	As Above
4.	Cent 6280 Bed 11-13 (D)	Nov 07		x	1	As Above
5.	Cent 6460 Bed 9-10 (E)	Nov 07		x	1	As Above
2.	Cent 6460 Bed 6-8 (B)	Nov 07		x	1	As Above
6.	Cent 6460 Bed 2 (F)	Nov 07		x	1	As Above
6.	Cent 6460 Bed 2 (F)	Dec 07		x	1	As Above
2.	Cent 6460 Bed 6-8 (B)	Dec 07		x	1	As Above
3.	Cent 6460 Bed 3-5 (C)	Dec 07		x	1	As Above
4.	Cent 6440 Bed 11-13 (D)	Dec 07		x	1	As Above
1.	Cent 6240 Bed 14 (A)	Dec 07		x	1	As Above
5.	Cent 6460 Bed 9-10 (E)	Dec 07		x	1	As Above

Sampled By: Charles Bauer	Total Number of Containers: 16
Sampler's Signature FOR CHARLES BAUER	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223
Relinquished By: Lantz Indergard Date / Time: 2/26/08	Received By: Date / Time: 2.28.08 11:11
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007.* *The letter suffix identifies one analysis of up to 3 samples*

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES		ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE NUMBER	**DATE**	**TIME**	MWMP	Number of Containers	Remarks / Comments
3. Cent 6420 Bed 3-5 ©	Jan 08		x	1	Composite samples per suffix (ie. A-F)
1. Cent 6240 Bed 14 (A)	Jan 08		x	1	As Above
2. Cent 6420 Bed 6-8 (B)	Jan 08		x		
6. Cent 6440 Bed 2 (F)	Jan 08		x		
5. Cent 6420 Bed 9-10 (E)	Jan 08		x		
4. Cent 6420 Bed 11-13 (D)	Jan 08		x		

Sampled By: Charles Bauer	Total Number of Containers	2
Sampler's Signature FOR CHARLES BAUER	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 226 Fax: (435) 686-2223	
Relinquished By: Date / Time: Lantz Indergard 2/26/08	Received By: Date / Time: 2-28-08 11:11	
Method of Shipment: UPS	Comments: *These samples are to be composited to represent 2nd Qtr 2007* *The letter suffix identifies one analysis of up to 3 samples*	

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

Analytical Report

February 15, 2010

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L80445

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 26, 2010. This project has been assigned to ACZ's project number, L80445. 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 L80445. 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 March 15, 2010. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT7 SEPT/OCT 2009

ACZ Sample ID: ***L80445-01***
Date Sampled: *10/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	02/10/10 22:13	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 17:53	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 17:53	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 17:53	aeh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 17:53	aeh
Selenium (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.06	0.3	02/11/10 12:41	ear
Uranium (MWMT)	M6020 ICP-MS	0.0014		*	mg/L	0.0001	0.0005	02/10/10 22:13	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 17:53	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			02/08/10 0:00	itk/brd
Extraction pH		5.8			units			02/08/10 0:00	itk/brd
Extraction Time		30			hrs			02/08/10 0:00	itk/brd
Leachate pH		7.47			units			02/08/10 0:00	itk/brd
Leachate Volume		5000			mL			02/08/10 0:00	itk/brd
Particle Size over 5 cm		37.1			%			02/08/10 0:00	itk/brd
Retained Moisture					%			02/08/10 0:00	itk/brd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT6 SEPT/OCT 2009

ACZ Sample ID: ***L80445-02***
Date Sampled: *10/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0036		*	mg/L	0.0004	0.002	02/10/10 22:18	erf
Arsenic (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.06	0.3	02/10/10 18:02	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:02	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:02	aeh
Molybdenum (MWMT)	M6010B ICP	0.07		*	mg/L	0.01	0.05	02/10/10 18:02	aeh
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/11/10 12:51	ear
Uranium (MWMT)	M6020 ICP-MS	0.6580		*	mg/L	0.0005	0.003	02/11/10 14:59	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:02	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4960			g			02/08/10 0:00	itk/brd
Extraction pH		5.8			units			02/08/10 0:00	itk/brd
Extraction Time		28.5			hrs			02/08/10 0:00	itk/brd
Leachate pH		7.28			units			02/08/10 0:00	itk/brd
Leachate Volume		5070			mL			02/08/10 0:00	itk/brd
Particle Size over 5 cm		53.7			%			02/08/10 0:00	itk/brd
Retained Moisture					%			02/08/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT5 SEPT/OCT 2009

ACZ Sample ID: ***L80445-03***
Date Sampled: *10/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0004	0.002	02/10/10 22:23	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.1	0.6	02/11/10 12:54	ear
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:05	aeh
Copper (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	02/10/10 18:05	aeh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:05	aeh
Selenium (MWMT)	M6010B ICP	0.1	B	*	mg/L	0.1	0.6	02/11/10 12:54	ear
Uranium (MWMT)	M6020 ICP-MS	0.0040		*	mg/L	0.0001	0.0005	02/10/10 22:23	erf
Zinc (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	02/10/10 18:05	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4530			g			02/09/10 0:00	itk/brd
Extraction pH		5.8			units			02/09/10 0:00	itk/brd
Extraction Time		29.5			hrs			02/09/10 0:00	itk/brd
Leachate pH		7.7			units			02/09/10 0:00	itk/brd
Leachate Volume		4550			mL			02/09/10 0:00	itk/brd
Particle Size over 5 cm		63			%			02/09/10 0:00	itk/brd
Retained Moisture					%			02/09/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT4 SEPT/OCT 2009

ACZ Sample ID: ***L80445-04***
Date Sampled: *10/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	02/10/10 22:39	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 18:08	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:08	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:08	aeh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:08	aeh
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/11/10 12:58	ear
Uranium (MWMT)	M6020 ICP-MS	0.0008		*	mg/L	0.0001	0.0005	02/10/10 22:39	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:08	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4950			g			02/09/10 0:00	itk/brd
Extraction pH		5.8			units			02/09/10 0:00	itk/brd
Extraction Time		27.5			hrs			02/09/10 0:00	itk/brd
Leachate pH		7.17			units			02/09/10 0:00	itk/brd
Leachate Volume		5000			mL			02/09/10 0:00	itk/brd
Particle Size over 5 cm		9.6			%			02/09/10 0:00	itk/brd
Retained Moisture					%			02/09/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT4 4TH QTR 09

ACZ Sample ID: ***L80445-05***
Date Sampled: *12/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	02/10/10 22:55	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 18:14	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:14	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:14	aeh
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	02/10/10 18:14	aeh
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.1	0.6	02/11/10 13:11	ear
Uranium (MWMT)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	02/10/10 22:55	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:14	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4930			g			02/09/10 0:00	itk/brd
Extraction pH		5.8			units			02/09/10 0:00	itk/brd
Extraction Time		27			hrs			02/09/10 0:00	itk/brd
Leachate pH		7.73			units			02/09/10 0:00	itk/brd
Leachate Volume		5100			mL			02/09/10 0:00	itk/brd
Particle Size over 5 cm		4.1			%			02/09/10 0:00	itk/brd
Retained Moisture					%			02/09/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT5 4TH QTR 09

ACZ Sample ID: ***L80445-06***
Date Sampled: *12/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0075		*	mg/L	0.0004	0.002	02/10/10 23:00	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 18:17	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:17	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:17	aeh
Molybdenum (MWMT)	M6010B ICP	0.30		*	mg/L	0.01	0.05	02/10/10 18:17	aeh
Selenium (MWMT)	M6010B ICP	0.10	B	*	mg/L	0.06	0.3	02/11/10 13:14	ear
Uranium (MWMT)	M6020 ICP-MS	0.0076		*	mg/L	0.0001	0.0005	02/10/10 23:00	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:17	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4950			g			02/09/10 0:00	itk/brd
Extraction pH		5.8			units			02/09/10 0:00	itk/brd
Extraction Time		30			hrs			02/09/10 0:00	itk/brd
Leachate pH		7.63			units			02/09/10 0:00	itk/brd
Leachate Volume		4890			mL			02/09/10 0:00	itk/brd
Particle Size over 5 cm		45.8			%			02/09/10 0:00	itk/brd
Retained Moisture					%			02/09/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT6 4TH QTR 09

ACZ Sample ID: ***L80445-07***
Date Sampled: *12/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0004	0.002	02/10/10 23:05	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 18:27	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:27	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:27	aeh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:27	aeh
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/11/10 13:17	ear
Uranium (MWMT)	M6020 ICP-MS	0.0003	B	*	mg/L	0.0001	0.0005	02/10/10 23:05	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:27	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4940			g			02/10/10 0:00	itk/brd
Extraction pH		5.8			units			02/10/10 0:00	itk/brd
Extraction Time		28			hrs			02/10/10 0:00	itk/brd
Leachate pH		7.76			units			02/10/10 0:00	itk/brd
Leachate Volume		4900			mL			02/10/10 0:00	itk/brd
Particle Size over 5 cm		30.7			%			02/10/10 0:00	itk/brd
Retained Moisture					%			02/10/10 0:00	itk/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT7 4TH QTR 09

ACZ Sample ID: ***L80445-08***
Date Sampled: *12/01/09 00:00*
Date Received: *01/26/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	02/10/10 23:16	erf
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/10/10 18:30	aeh
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	02/10/10 18:30	aeh
Copper (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:30	aeh
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:30	aeh
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/11/10 13:21	ear
Uranium (MWMT)	M6020 ICP-MS	0.0003	B	*	mg/L	0.0001	0.0005	02/10/10 23:16	erf
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	02/10/10 18:30	aeh

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		4330			g			02/10/10 0:00	itk/brd
Extraction pH		5.8			units			02/10/10 0:00	itk/brd
Extraction Time		24			hrs			02/10/10 0:00	itk/brd
Leachate pH		8.17			units			02/10/10 0:00	itk/brd
Leachate Volume		4440			mL			02/10/10 0:00	itk/brd
Particle Size over 5 cm		46			%			02/10/10 0:00	itk/brd
Retained Moisture					%			02/10/10 0:00	itk/brd

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	Amount of the true value or spike added recovered, 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.
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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277875													
WG277875ICV	ICV	02/10/10 21:41	MS100114-9	.02		.01976	mg/L	98.8	90	110			
WG277875ICB	ICB	02/10/10 21:46				U	mg/L		-0.0012	0.0012			
WG277730PBS	PBS	02/10/10 22:07				U	mg/L		-0.0012	0.0012			
L80445-03AS	AS	02/10/10 22:28	MS100114-5	.01	.0004	.00961	mg/L	92.1	75	125			
L80445-03ASD	ASD	02/10/10 22:34	MS100114-5	.01	.0004	.00973	mg/L	93.3	75	125	1.24	20	
L80445-08DUP	DUP	02/10/10 23:21			U	U	mg/L				0	20	RA

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277853													
WG277853ICV	ICV	02/10/10 17:35	II100202-1	4		3.932	mg/L	98.3	90	110			
WG277853ICB	ICB	02/10/10 17:38				.099	mg/L		-0.18	0.18			
WG277730PBS	PBS	02/10/10 17:50				U	mg/L		-0.18	0.18			
L80445-01AS	AS	02/10/10 17:56	II100127-2	1	U	1.025	mg/L	102.5	75	125			
L80445-01ASD	ASD	02/10/10 17:59	II100127-2	1	U	1.052	mg/L	105.2	75	125	2.6	20	
L80445-08DUP	DUP	02/10/10 18:33			U	U	mg/L				0	20	RA
WG277918													
WG277918ICV	ICV	02/11/10 12:22	II100202-1	4		3.908	mg/L	97.7	90	110			
WG277918ICB	ICB	02/11/10 12:25				U	mg/L		-0.18	0.18			
WG277730PBS	PBS	02/11/10 12:38				U	mg/L		-0.18	0.18			
L80445-01AS	AS	02/11/10 12:45	II100127-2	1	U	1.139	mg/L	113.9	75	125			
L80445-01ASD	ASD	02/11/10 12:48	II100127-2	1	U	1.122	mg/L	112.2	75	125	1.5	20	
L80445-08DUP	DUP	02/11/10 13:24			U	U	mg/L				0	20	RA

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277853													
WG277853ICV	ICV	02/10/10 17:35	II100202-1	2		1.9447	mg/L	97.2	90	110			
WG277853ICB	ICB	02/10/10 17:38				U	mg/L		-0.015	0.015			
WG277730PBS	PBS	02/10/10 17:50				U	mg/L		-0.015	0.015			
L80445-01AS	AS	02/10/10 17:56	II100127-2	.5	U	.5056	mg/L	101.1	75	125			
L80445-01ASD	ASD	02/10/10 17:59	II100127-2	.5	U	.5141	mg/L	102.8	75	125	1.67	20	
L80445-08DUP	DUP	02/10/10 18:33			U	U	mg/L				0	20	RA

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277853													
WG277853ICV	ICV	02/10/10 17:35	II100202-1	2		1.902	mg/L	95.1	90	110			
WG277853ICB	ICB	02/10/10 17:38				U	mg/L		-0.03	0.03			
WG277730PBS	PBS	02/10/10 17:50				U	mg/L		-0.03	0.03			
L80445-01AS	AS	02/10/10 17:56	II100127-2	.5	U	.505	mg/L	101	75	125			
L80445-01ASD	ASD	02/10/10 17:59	II100127-2	.5	U	.525	mg/L	105	75	125	3.88	20	
L80445-08DUP	DUP	02/10/10 18:33			U	U	mg/L				0	20	RA

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

Project ID: LISBON VALLEY COPPER

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277853													
WG277853ICV	ICV	02/10/10 17:35	II100202-1	2		1.979	mg/L	99	90	110			
WG277853ICB	ICB	02/10/10 17:38				U	mg/L		-0.03	0.03			
WG277730PBS	PBS	02/10/10 17:50				U	mg/L		-0.03	0.03			
L80445-01AS	AS	02/10/10 17:56	II100127-2	.5	U	.5	mg/L	100	75	125			
L80445-01ASD	ASD	02/10/10 17:59	II100127-2	.5	U	.514	mg/L	102.8	75	125	2.76	20	
L80445-08DUP	DUP	02/10/10 18:33			U	U	mg/L				0	20	RA

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277918													
WG277918ICV	ICV	02/11/10 12:22	II100202-1	4		3.897	mg/L	97.4	90	110			
WG277918ICB	ICB	02/11/10 12:25				U	mg/L		-0.18	0.18			
WG277730PBS	PBS	02/11/10 12:38				U	mg/L		-0.18	0.18			
L80445-01AS	AS	02/11/10 12:45	II100127-2	1	.07	1.116	mg/L	104.6	75	125			
L80445-01ASD	ASD	02/11/10 12:48	II100127-2	1	.07	1.133	mg/L	106.3	75	125	1.51	20	
L80445-08DUP	DUP	02/11/10 13:24			U	U	mg/L				0	20	RA

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277875													
WG277875ICV	ICV	02/10/10 21:41	MS100114-9	.05		.05376	mg/L	107.5	90	110			
WG277875ICB	ICB	02/10/10 21:46				U	mg/L		-0.0003	0.0003			
WG277730PBS	PBS	02/10/10 22:07				U	mg/L		-0.0003	0.0003			
L80445-03AS	AS	02/10/10 22:28	MS100114-5	.05	.004	.05948	mg/L	111	75	125			
L80445-03ASD	ASD	02/10/10 22:34	MS100114-5	.05	.004	.05943	mg/L	110.9	75	125	0.08	20	
L80445-08DUP	DUP	02/10/10 23:21			.0003	.00017	mg/L				55.3	20	RA
WG277927													
WG277927ICV	ICV	02/11/10 14:50	MS100114-9	.05		.05048	mg/L	101	90	110			
WG277927ICB	ICB	02/11/10 14:52				U	mg/L		-0.0003	0.0003			
WG277730PBS	PBS	02/11/10 14:58				U	mg/L		-0.0003	0.0003			
L80445-02AS	AS	02/11/10 15:01	MS100114-5	.25	.658	.9155	mg/L	103	75	125			
L80445-02ASD	ASD	02/11/10 15:03	MS100114-5	.25	.658	.8875	mg/L	91.8	75	125	3.11	20	
L80445-08DUP	DUP	02/11/10 15:06			.0004	.00019	mg/L				71.2	20	RA

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG277853													
WG277853ICV	ICV	02/10/10 17:35	II100202-1	2		1.946	mg/L	97.3	90	110			
WG277853ICB	ICB	02/10/10 17:38				U	mg/L		-0.03	0.03			
WG277730PBS	PBS	02/10/10 17:50				U	mg/L		-0.03	0.03			
L80445-01AS	AS	02/10/10 17:56	II100127-2	.5	U	.517	mg/L	103.4	75	125			
L80445-01ASD	ASD	02/10/10 17:59	II100127-2	.5	U	.525	mg/L	105	75	125	1.54	20	
L80445-08DUP	DUP	02/10/10 18:33			U	U	mg/L				0	20	RA

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L80445-01	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).
L80445-02	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277927	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L80445-03	WG277875	Antimony (MWMT)	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).
	WG277918	Arsenic (MWMT)	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).
	WG277853	Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).
L80445-04	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L80445-05	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).
L80445-06	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L80445***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L80445-07	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).
L80445-08	WG277875	Antimony (MWMT)	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).
	WG277853	Arsenic (MWMT)	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).
		Cadmium (MWMT)	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).
		Copper (MWMT)	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).
		Molybdenum (MWMT)	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).
	WG277918	Selenium (MWMT)	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).
	WG277875	Uranium (MWMT)	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).
	WG277853	Zinc (MWMT)	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).

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L80445
Date Received: 01/26/10 0:00
Received By: gac
Date Printed: 1/26/2010

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA10179		12.7	18

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L80445
Date Received: 01/26/10 0:00
Received By: gac

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L80445-01	RT7 SEPT/OCT 2009									X		
L80445-02	RT6 SEPT/OCT 2009									X		
L80445-03	RT5 SEPT/OCT 2009									X		
L80445-04	RT4 SEPT/OCT 2009									X		
L80445-05	RT4 4TH QTR 09									X		
L80445-06	RT5 4TH QTR 09									X		
L80445-07	RT6 4TH QTR 09									X		
L80445-08	RT7 4TH QTR 09									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: gac

(80445

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
RT7 SEPT/OCT 2009	Sept/Oct 2009		x	1	Composite samples from Sept & Oct
RT6 SEPT/OCT 2009	Sept/Oct 2009		x	1	Composite samples from Sept & Oct
RT5 SEPT/OCT 2009	Sept/Oct 2009		x	1	Composite samples from Sept & Oct
RT4 SEPT/OCT 2009	Sept/Oct 2009		x	1	Composite samples from Sept & Oct
RT4 4th Qtr 09	Nov/Dec 2009		x	1	Composite samples from Nov & Dec
RT5 4th Qtr 09	Nov/Dec 2009		x	1	Composite samples from Nov & Dec
RT6 4th Qtr 09	Nov/Dec 2009		x	1	Composite samples from Nov & Dec
RT7 4th Qtr 09	Nov/Dec 2009		x	1	Composite samples from Nov & Dec

Sampled By:
Justin Eatchel

Total Number of Containers: 8

Sampler's Signature
Justin Eatchel

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 106 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard 1-21-10

Received By: Date / Time:
1-26-10 10:50

Method of Shipment
UPS

Comments:
These samples are to be composited to represent 2nd Qtr 2007.
The letter suffix identifies one analysis of up to 3 samples

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

Analytical Report

January 19, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L85979

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 27, 2010. This project has been assigned to ACZ's project number, L85979. 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 L85979. 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 February 19, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q1-2010 RT5

ACZ Sample ID: ***L85979-01***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0010	B		mg/L	0.0004	0.002	01/17/11 17:35	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:39	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/15/11 9:39	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:39	aeb
Molybdenum (MWMT)	M6010B ICP	0.05	B	*	mg/L	0.01	0.05	01/15/11 9:39	aeb
Selenium (MWMT)	M6010B ICP	0.12	B		mg/L	0.06	0.3	01/15/11 9:39	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0055			mg/L	0.0001	0.0005	01/17/11 17:35	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:39	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5062.9		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		35.33		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		7.9		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5092.1		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		34.39		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		15.62		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT7 Q1-2010

ACZ Sample ID: ***L85979-02***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/17/11 17:39	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:42	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/15/11 9:42	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:42	aeb
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	01/15/11 9:42	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:42	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0019			mg/L	0.0001	0.0005	01/17/11 17:39	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:42	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5022.8		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		32.75		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		8.17		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5411		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		29.42		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		9.00		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q1-2010 RT6

ACZ Sample ID: ***L85979-03***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/17/11 17:40	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:53	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/15/11 9:53	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:53	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	01/15/11 9:53	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:53	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0087			mg/L	0.0001	0.0005	01/17/11 17:40	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:53	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5003.1		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		35.33		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		8.36		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5008.2		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		40.08		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		24.45		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT4 Q1-2010

ACZ Sample ID: ***L85979-04***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/17/11 17:42	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:56	aeb
Cadmium (MWMT)	M6010B ICP	0.023			mg/L	0.005	0.02	01/15/11 9:56	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:56	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	01/15/11 9:56	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:56	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0027			mg/L	0.0001	0.0005	01/17/11 17:42	msh
Zinc (MWMT)	M6010B ICP	3.29			mg/L	0.01	0.05	01/15/11 9:56	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5018.6		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		32.75		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		6.65		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5071.1		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		45.69		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		11.88		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT5 Q2-2010

ACZ Sample ID: ***L85979-05***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0032			mg/L	0.0004	0.002	01/17/11 17:44	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 9:59	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/15/11 9:59	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:59	aeb
Molybdenum (MWMT)	M6010B ICP	0.32		*	mg/L	0.01	0.05	01/15/11 9:59	aeb
Selenium (MWMT)	M6010B ICP	0.11	B		mg/L	0.06	0.3	01/15/11 9:59	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0079			mg/L	0.0001	0.0005	01/17/11 17:44	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 9:59	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5015		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		31.5		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		7.99		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5018		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		51.97		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		12.48		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT6 Q2-2010

ACZ Sample ID: ***L85979-06***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/17/11 17:45	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 10:03	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/15/11 10:03	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 10:03	aeb
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	01/15/11 10:03	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 10:03	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0055			mg/L	0.0001	0.0005	01/17/11 17:45	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 10:03	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4989.9		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		31.5		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		8.42		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		4986.3		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		21.63		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		19.10		*	%			01/11/11 0:00	brd/bsu

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT4 Q2-2010

ACZ Sample ID: ***L85979-07***
Date Sampled: *12/21/10 00:00*
Date Received: *12/27/10*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/17/11 17:47	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/15/11 10:17	aeb
Cadmium (MWMT)	M6010B ICP	0.009	B		mg/L	0.005	0.02	01/15/11 10:17	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/15/11 10:17	aeb
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	01/15/11 10:17	aeb
Selenium (MWMT)	M6010B ICP	0.12	B		mg/L	0.06	0.3	01/15/11 10:17	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0049			mg/L	0.0001	0.0005	01/17/11 17:47	msh
Zinc (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	01/15/11 10:17	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4997.5		*	g			01/11/11 0:00	brd/bsu
Extraction pH		5.7		*	units			01/11/11 0:00	brd/bsu
Extraction Time		32.75		*	hrs			01/11/11 0:00	brd/bsu
Leachate pH		5.9		*	units			01/11/11 0:00	brd/bsu
Leachate Volume		5081.9		*	mL			01/11/11 0:00	brd/bsu
Particle Size over 5 cm		2.31		*	%			01/11/11 0:00	brd/bsu
Retained Moisture		22.22		*	%			01/11/11 0:00	brd/bsu

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	Amount of the true value or spike added recovered, 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.
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.
(5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L85979***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296132													
WG296132ICV	ICV	01/17/11 17:25	MS101119-6	.02		.01918	mg/L	95.9	90	110			
WG296132ICB	ICB	01/17/11 17:27				U	mg/L		-0.0012	0.0012			
WG296064PBS	PBS	01/17/11 17:34				U	mg/L		-0.0012	0.0012			
L85979-07AS	AS	01/17/11 17:52	MS101124-3	.01	U	.01025	mg/L	102.5	75	125			
L85979-07ASD	ASD	01/17/11 17:54	MS101124-3	.01	U	.01052	mg/L	105.2	75	125	2.6	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	4		4.18	mg/L	104.5	90	110			
WG296084ICB	ICB	01/15/11 9:21				U	mg/L		-0.18	0.18			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.18	0.18			
L85979-02AS	AS	01/15/11 9:46	II110106-2	1	U	1.07	mg/L	107	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	1	U	1.106	mg/L	110.6	75	125	3.31	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	2		1.974	mg/L	98.7	90	110			
WG296084ICB	ICB	01/15/11 9:21				U	mg/L		-0.015	0.015			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.015	0.015			
L85979-02AS	AS	01/15/11 9:46	II110106-2	.5	U	.5407	mg/L	108.1	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	.5	U	.5408	mg/L	108.2	75	125	0.02	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	2		1.939	mg/L	97	90	110			
WG296084ICB	ICB	01/15/11 9:21				U	mg/L		-0.03	0.03			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.03	0.03			
L85979-02AS	AS	01/15/11 9:46	II110106-2	.5	U	.512	mg/L	102.4	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	.5	U	.51	mg/L	102	75	125	0.39	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	2		2.03	mg/L	101.5	90	110			
WG296084ICB	ICB	01/15/11 9:21				U	mg/L		-0.03	0.03			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.03	0.03			
L85979-02AS	AS	01/15/11 9:46	II110106-2	.5	.01	.549	mg/L	107.8	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	.5	.01	.544	mg/L	106.8	75	125	0.91	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L85979***

Project ID: LISBON VALLEY COPPER

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	4		4.19	mg/L	104.8	90	110			
WG296084ICB	ICB	01/15/11 9:21				.066	mg/L		-0.18	0.18			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.18	0.18			
L85979-02AS	AS	01/15/11 9:46	II110106-2	1	U	1.09	mg/L	109	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	1	U	1.112	mg/L	111.2	75	125	2	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296132													
WG296132ICV	ICV	01/17/11 17:25	MS101119-6	.05		.05146	mg/L	102.9	90	110			
WG296132ICB	ICB	01/17/11 17:27				U	mg/L		-0.0003	0.0003			
WG296064PBS	PBS	01/17/11 17:34				U	mg/L		-0.0003	0.0003			
L85979-07AS	AS	01/17/11 17:52	MS101124-3	.05	.0049	.05636	mg/L	102.9	75	125			
L85979-07ASD	ASD	01/17/11 17:54	MS101124-3	.05	.0049	.05976	mg/L	109.7	75	125	5.86	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296084													
WG296084ICV	ICV	01/15/11 9:18	II110104-1	2		1.963	mg/L	98.2	90	110			
WG296084ICB	ICB	01/15/11 9:21				U	mg/L		-0.03	0.03			
WG296064PBS	PBS	01/15/11 9:35				U	mg/L		-0.03	0.03			
L85979-02AS	AS	01/15/11 9:46	II110106-2	.5	U	.554	mg/L	110.8	75	125			
L85979-02ASD	ASD	01/15/11 9:49	II110106-2	.5	U	.549	mg/L	109.8	75	125	0.91	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L85979***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L85979-01	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
L85979-02	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
L85979-03	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L85979***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L85979-04	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
L85979-05	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
L85979-06	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L85979***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L85979-07	WG296084	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG296064	Dry Weight	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Extraction Time	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate pH	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Leachate Volume	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.
		Retained Moisture	NDEP - MWMT Column Method, 1996	Q9	Insufficient sample received to meet method QC requirements.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L85979***

No certification qualifiers associated with this analysis

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Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L85979
Date Received: 12/27/2010 10:13
Received By: gac
Date Printed: 12/27/2010

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

The sample date was not present on the sample containers or on the chain of custody. The "Relinquished by" date was used to enter the samples.

Contact (For any discrepancies, the client must be contacted)

The client was not contacted.

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na12210		16.2	30

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L85979
Date Received: 12/27/2010 10:13
Received By: gac
Date Printed: 12/27/2010

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L85979-01	Q1-2010 RT5									X		
L85979-02	RT7 Q1-2010									X		
L85979-03	Q1-2010 RT6									X		
L85979-04	RT4 Q1-2010									X		
L85979-05	RT5 Q2-2010									X		
L85979-06	RT6 Q2-2010									X		
L85979-07	RT4 Q2-2010									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: gac

L85979

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
Q1-2010 RT5			x	1	Centennial Pit 2010
RT7 Q1-2010			x	1	Centennial Pit 2010
Q1-2010 RT6			x	1	Centennial Pit 2010
RT4 Q1-2010			x	1	Centennial Pit 2010
RT5 Q2-2010			x	1	Centennial Pit 2010
RT6 Q2-2010			x	1	Centennial Pit 2010
RT4 Q2-2010			x	1	Centennial Pit 2010
			x	1	Centennial Pit 2010

Sampled By:
Justin Eatchel

Total Number of Containers: 8

Sampler's Signature: Justin Eatchel

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1107 Fax: (435) 686-2223

Relinquished By:	Date / Time:	Received By:	Date / Time:
Lantz Indergard	12-21-10 12:43 PM		12-27-10 10:00

Method of Shipment:
UPS

Comments:

L85979 Chain of Custod

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

Analytical Report

February 11, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L86254

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 19, 2011. This project has been assigned to ACZ's project number, L86254. 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 L86254. 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 March 11, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT4 Q3 2010

ACZ Sample ID: ***L86254-01***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 19:51	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:23	aeb
Cadmium (MWMT)	M6010B ICP	0.017	B		mg/L	0.005	0.02	02/07/11 22:23	aeb
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	02/07/11 22:23	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/08/11 14:09	jjc
Selenium (MWMT)	M6010B ICP	0.12	B		mg/L	0.06	0.3	02/08/11 14:09	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	02/10/11 19:51	pmc
Zinc (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	02/07/11 22:23	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		3769			g			02/02/11 0:00	meg/brd
Extraction pH		5.7			units			02/02/11 0:00	meg/brd
Extraction Time		32.25			hrs			02/02/11 0:00	meg/brd
Leachate pH		5.61			units			02/02/11 0:00	meg/brd
Leachate Volume		4195.8			mL			02/02/11 0:00	meg/brd
Particle Size over 5 cm		34.597			%			02/02/11 0:00	meg/brd
Retained Moisture		25.78			%			02/02/11 0:00	meg/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT3 Q3 2010

ACZ Sample ID: ***L86254-02***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 19:55	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:27	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:27	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:27	aeb
Molybdenum (MWMT)	M6010B ICP	0.05	B		mg/L	0.01	0.05	02/08/11 14:12	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	02/08/11 14:12	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0009			mg/L	0.0001	0.0005	02/10/11 19:55	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:27	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4508			g			02/03/11 0:00	meg/brd
Extraction pH		5.7			units			02/03/11 0:00	meg/brd
Extraction Time		32.25			hrs			02/03/11 0:00	meg/brd
Leachate pH		7.41			units			02/03/11 0:00	meg/brd
Leachate Volume		5009.8			mL			02/03/11 0:00	meg/brd
Particle Size over 5 cm		87.791			%			02/03/11 0:00	meg/brd
Retained Moisture		10.7			%			02/03/11 0:00	meg/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT3 Q2 2010

ACZ Sample ID: ***L86254-03***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 19:58	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:30	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:30	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:30	aeb
Molybdenum (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	02/08/11 14:16	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	02/08/11 14:16	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0009			mg/L	0.0001	0.0005	02/10/11 19:58	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:30	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4493			g			02/03/11 0:00	meg/brd
Extraction pH		5.7			units			02/03/11 0:00	meg/brd
Extraction Time		31			hrs			02/03/11 0:00	meg/brd
Leachate pH		7.36			units			02/03/11 0:00	meg/brd
Leachate Volume		5024.9			mL			02/03/11 0:00	meg/brd
Particle Size over 5 cm		72.996			%			02/03/11 0:00	meg/brd
Retained Moisture		11.8			%			02/03/11 0:00	meg/brd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT7 Q2 2010

ACZ Sample ID: ***L86254-04***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 20:02	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:37	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:37	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:37	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/08/11 14:22	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	02/08/11 14:22	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0011			mg/L	0.0001	0.0005	02/10/11 20:02	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:37	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4628			g			02/03/11 0:00	meg/brd
Extraction pH		5.7			units			02/03/11 0:00	meg/brd
Extraction Time		29			hrs			02/03/11 0:00	meg/brd
Leachate pH		8.24			units			02/03/11 0:00	meg/brd
Leachate Volume		5101.3			mL			02/03/11 0:00	meg/brd
Particle Size over 5 cm		61.144			%			02/03/11 0:00	meg/brd
Retained Moisture		8.922			%			02/03/11 0:00	meg/brd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT7 Q3 2010

ACZ Sample ID: ***L86254-05***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 20:09	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:40	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:40	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:40	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/08/11 14:26	jjc
Selenium (MWMT)	M6010B ICP	0.08	B		mg/L	0.06	0.3	02/08/11 14:26	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0027			mg/L	0.0001	0.0005	02/10/11 20:09	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:40	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4594			g			02/03/11 0:00	meg/brd
Extraction pH		5.7			units			02/03/11 0:00	meg/brd
Extraction Time		28			hrs			02/03/11 0:00	meg/brd
Leachate pH		8.18			units			02/03/11 0:00	meg/brd
Leachate Volume		5116.6			mL			02/03/11 0:00	meg/brd
Particle Size over 5 cm		63.849			%			02/03/11 0:00	meg/brd
Retained Moisture		9.324			%			02/03/11 0:00	meg/brd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT6 Q3 2010

ACZ Sample ID: ***L86254-06***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	02/10/11 20:20	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:44	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:44	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:44	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/08/11 14:29	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	02/08/11 14:29	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0018			mg/L	0.0001	0.0005	02/10/11 20:20	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:44	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4213			g			02/04/11 0:00	meg/brd
Extraction pH		5.7			units			02/04/11 0:00	meg/brd
Extraction Time		32.25			hrs			02/04/11 0:00	meg/brd
Leachate pH		8.26			units			02/04/11 0:00	meg/brd
Leachate Volume		4127.6			mL			02/04/11 0:00	meg/brd
Particle Size over 5 cm		19.826			%			02/04/11 0:00	meg/brd
Retained Moisture		17.35			%			02/04/11 0:00	meg/brd

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: RT5 Q3 2010

ACZ Sample ID: ***L86254-07***
Date Sampled: *01/14/11 00:00*
Date Received: *01/19/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0077			mg/L	0.0004	0.002	02/10/11 20:30	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	02/07/11 22:47	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	02/07/11 22:47	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:47	aeb
Molybdenum (MWMT)	M6010B ICP	0.45			mg/L	0.01	0.05	02/08/11 14:33	jjc
Selenium (MWMT)	M6010B ICP	0.06	B		mg/L	0.06	0.3	02/08/11 14:33	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0042			mg/L	0.0001	0.0005	02/10/11 20:30	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	02/07/11 22:47	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4088			g			02/04/11 0:00	meg/brd
Extraction pH		5.7			units			02/04/11 0:00	meg/brd
Extraction Time		31			hrs			02/04/11 0:00	meg/brd
Leachate pH		8.28			units			02/04/11 0:00	meg/brd
Leachate Volume		5007.3			mL			02/04/11 0:00	meg/brd
Particle Size over 5 cm		44.436			%			02/04/11 0:00	meg/brd
Retained Moisture		19.11			%			02/04/11 0:00	meg/brd

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	Amount of the true value or spike added recovered, 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.
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.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L86254***

Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG297107													
WG297107ICV	ICV	02/10/11 19:29	MS110128-1	.02		.01936	mg/L	96.8	90	110			
WG297107ICB	ICB	02/10/11 19:33				U	mg/L		-0.0012	0.0012			
WG296714PBS	PBS	02/10/11 19:47				U	mg/L		-0.0012	0.0012			
L86254-06AS	AS	02/10/11 20:23	MS110128-3	.01	U	.00981	mg/L	98.1	75	125			
L86254-06ASD	ASD	02/10/11 20:27	MS110128-3	.01	U	.01059	mg/L	105.9	75	125	7.65	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296915													
WG296915ICV	ICV	02/07/11 22:03	II110104-1	4		4.388	mg/L	109.7	90	110			
WG296915ICB	ICB	02/07/11 22:06				U	mg/L		-0.18	0.18			
WG296714PBS	PBS	02/07/11 22:20				U	mg/L		-0.18	0.18			
L86346-01AS	AS	02/07/11 23:01	II110121-4	1	U	1.258	mg/L	125.8	75	125			M1
L86346-01ASD	ASD	02/07/11 23:04	II110121-4	1	U	1.29	mg/L	129	75	125	2.51	20	M1

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296915													
WG296915ICV	ICV	02/07/11 22:03	II110104-1	2		2.0078	mg/L	100.4	90	110			
WG296915ICB	ICB	02/07/11 22:06				.0057	mg/L		-0.015	0.015			
WG296714PBS	PBS	02/07/11 22:20				.007	mg/L		-0.015	0.015			
L86346-01AS	AS	02/07/11 23:01	II110121-4	.5	U	.5849	mg/L	117	75	125			
L86346-01ASD	ASD	02/07/11 23:04	II110121-4	.5	U	.5892	mg/L	117.8	75	125	0.73	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296915													
WG296915ICV	ICV	02/07/11 22:03	II110104-1	2		1.941	mg/L	97.1	90	110			
WG296915ICB	ICB	02/07/11 22:06				U	mg/L		-0.03	0.03			
WG296714PBS	PBS	02/07/11 22:20				U	mg/L		-0.03	0.03			
L86346-01AS	AS	02/07/11 23:01	II110121-4	.5	.01	.585	mg/L	115	75	125			
L86346-01ASD	ASD	02/07/11 23:04	II110121-4	.5	.01	.593	mg/L	116.6	75	125	1.36	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG297002													
WG297002ICV	ICV	02/08/11 13:49	II110104-1	2		2.024	mg/L	101.2	90	110			
WG297002ICB	ICB	02/08/11 13:52				U	mg/L		-0.03	0.03			
WG296714PBS	PBS	02/08/11 14:06				U	mg/L		-0.03	0.03			
L86346-01AS	AS	02/08/11 14:46	II110121-4	2.5	U	2.678	mg/L	107.1	75	125			
L86346-01ASD	ASD	02/08/11 14:50	II110121-4	2.5	U	2.652	mg/L	106.1	75	125	0.98	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L86254***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG297002													
WG297002ICV	ICV	02/08/11 13:49	II110104-1	4		4.281	mg/L	107	90	110			
WG297002ICB	ICB	02/08/11 13:52				U	mg/L		-0.18	0.18			
WG296714PBS	PBS	02/08/11 14:06				U	mg/L		-0.18	0.18			
L86346-01AS	AS	02/08/11 14:46	II110121-4	5	U	5.28	mg/L	105.6	75	125			
L86346-01ASD	ASD	02/08/11 14:50	II110121-4	5	U	5.88	mg/L	117.6	75	125	10.75	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG297107													
WG297107ICV	ICV	02/10/11 19:29	MS110128-1	.05		.05042	mg/L	100.8	90	110			
WG297107ICB	ICB	02/10/11 19:33				U	mg/L		-0.0003	0.0003			
WG296714PBS	PBS	02/10/11 19:47				U	mg/L		-0.0003	0.0003			
L86254-06AS	AS	02/10/11 20:23	MS110128-3	.05	.0018	.05797	mg/L	112.3	75	125			
L86254-06ASD	ASD	02/10/11 20:27	MS110128-3	.05	.0018	.05761	mg/L	111.6	75	125	0.62	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG296915													
WG296915ICV	ICV	02/07/11 22:03	II110104-1	2		1.944	mg/L	97.2	90	110			
WG296915ICB	ICB	02/07/11 22:06				U	mg/L		-0.03	0.03			
WG296714PBS	PBS	02/07/11 22:20				U	mg/L		-0.03	0.03			
L86346-01AS	AS	02/07/11 23:01	II110121-4	.5	U	.604	mg/L	120.8	75	125			
L86346-01ASD	ASD	02/07/11 23:04	II110121-4	.5	U	.604	mg/L	120.8	75	125	0	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L86254***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L86254-01	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-02	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-03	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-04	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-05	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-06	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
L86254-07	WG296915	Arsenic (MWMT)	M6010B ICP	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.

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Certification Qualifiers

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L86254***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L86254
Date Received: 01/19/2011 11:23
Received By: gac
Date Printed: 1/20/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

The date on an emial received from the client was used as the sample date to enter the samples.

Contact (For any discrepancies, the client must be contacted)

The client was not contacted.

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
2684		9	17
2826		9.2	19
Na12325		7.5	17

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L86254
Date Received: 01/19/2011 11:23
Received By: gac
Date Printed: 1/20/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L86254-01	RT4 Q3 2010									X		
L86254-02	RT3 Q3 2010									X		
L86254-03	RT3 Q2 2010									X		
L86254-04	RT7 Q2 2010									X		
L86254-05	RT7 Q3 2010									X		
L86254-06	RT6 Q3 2010									X		
L86254-07	RT5 Q3 2010									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: gac

L86254

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE LABEL	**DATE**	**TIME**	MWMP							Number of Containers	Remarks / Comments
RT4 Q3 2010			x							1	Centennial Pit 2010
RT3 Q3 2010			x							1	Centennial Pit 2010
RT3 Q2 2010			x							1	Centennial Pit 2010
RT7 Q2 2010			x							1	Centennial Pit 2010
RT7 Q3 2010			x							1	Centennial Pit 2010
RT6 Q3 2010			x							1	Centennial Pit 2010
RT5 Q3 2010			x							1	Centennial Pit 2010
											Centennial Pit 2010

Sampled By: Justin Eatchel	Total Number of Containers: 7
Sampler's Signature: Justin Eatchel	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 1(107 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard	Received By: Date / Time: OEO 1-19-11 11:22
Method of Shipment: UPS	Comments:

L86254 Chain of Custody

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

Analytical Report

March 14, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L86672

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on February 22, 2011. This project has been assigned to ACZ's project number, L86672. 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 L86672. 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 April 14, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q4 2010 RT7

ACZ Sample ID: ***L86672-01***
Date Sampled: *02/18/11 00:00*
Date Received: *02/22/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0013	B		mg/L	0.0004	0.002	03/11/11 15:58	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:06	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/11/11 12:06	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:06	aeb
Molybdenum (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	03/11/11 12:06	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:06	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0027			mg/L	0.0001	0.0005	03/11/11 15:58	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:06	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5072			g			03/08/11 0:00	meg/brd
Extraction pH		7.5			units			03/08/11 0:00	meg/brd
Extraction Time		28			hrs			03/08/11 0:00	meg/brd
Leachate pH		7.3			units			03/08/11 0:00	meg/brd
Leachate Volume		5071			mL			03/08/11 0:00	meg/brd
Particle Size over 5 cm		71.428			%			03/08/11 0:00	meg/brd
Retained Moisture		12.16			%			03/08/11 0:00	meg/brd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q4 2010 RT5

ACZ Sample ID: ***L86672-02***
Date Sampled: *02/18/11 00:00*
Date Received: *02/22/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0022			mg/L	0.0004	0.002	03/11/11 15:59	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:09	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/11/11 12:09	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:09	aeb
Molybdenum (MWMT)	M6010B ICP	0.09			mg/L	0.01	0.05	03/11/11 12:09	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:09	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0021			mg/L	0.0001	0.0005	03/11/11 15:59	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:09	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5090			g			03/08/11 0:00	meg/brd
Extraction pH		7.28			units			03/08/11 0:00	meg/brd
Extraction Time		29.5			hrs			03/08/11 0:00	meg/brd
Leachate pH		7.2			units			03/08/11 0:00	meg/brd
Leachate Volume		5096			mL			03/08/11 0:00	meg/brd
Particle Size over 5 cm		44.312			%			03/08/11 0:00	meg/brd
Retained Moisture		15.11			%			03/08/11 0:00	meg/brd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q4 2010 RT4

ACZ Sample ID: ***L86672-03***
Date Sampled: *02/18/11 00:00*
Date Received: *02/22/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	03/11/11 16:03	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:19	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/11/11 12:19	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:19	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:19	aeb
Selenium (MWMT)	M6010B ICP	0.07	B		mg/L	0.06	0.3	03/11/11 12:19	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0010			mg/L	0.0001	0.0005	03/11/11 16:03	msh
Zinc (MWMT)	M6010B ICP	0.11			mg/L	0.01	0.05	03/11/11 12:19	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5026			g			03/08/11 0:00	meg/brd
Extraction pH		4.53			units			03/08/11 0:00	meg/brd
Extraction Time		31			hrs			03/08/11 0:00	meg/brd
Leachate pH		4.55			units			03/08/11 0:00	meg/brd
Leachate Volume		5045			mL			03/08/11 0:00	meg/brd
Particle Size over 5 cm		9.016			%			03/08/11 0:00	meg/brd
Retained Moisture		22.88			%			03/08/11 0:00	meg/brd

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: Q4 2010 RT6

ACZ Sample ID: ***L86672-04***
Date Sampled: *02/18/11 00:00*
Date Received: *02/22/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0030			mg/L	0.0004	0.002	03/11/11 16:04	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:22	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/11/11 12:22	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:22	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:22	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/11/11 12:22	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0040			mg/L	0.0001	0.0005	03/11/11 16:04	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/11/11 12:22	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5093			g			03/09/11 0:00	meg/brd
Extraction pH		7.54			units			03/09/11 0:00	meg/brd
Extraction Time		29.5			hrs			03/09/11 0:00	meg/brd
Leachate pH		7.49			units			03/09/11 0:00	meg/brd
Leachate Volume		5088			mL			03/09/11 0:00	meg/brd
Particle Size over 5 cm		10.37			%			03/09/11 0:00	meg/brd
Retained Moisture		15.08			%			03/09/11 0:00	meg/brd

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	Amount of the true value or spike added recovered, 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.
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.
(5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L86672***

Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298407													
WG298407ICV	ICV	03/11/11 15:47	MS110128-1	.02		.01984	mg/L	99.2	90	110			
WG298407ICB	ICB	03/11/11 15:49				U	mg/L		-0.0012	0.0012			
WG298201PBS	PBS	03/11/11 15:56				U	mg/L		-0.0012	0.0012			
L86672-04AS	AS	03/11/11 16:06	MS110128-3	.01	.003	.01301	mg/L	100.1	75	125			
L86672-04ASD	ASD	03/11/11 16:08	MS110128-3	.01	.003	.01317	mg/L	101.7	75	125	1.22	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	4		4.156	mg/L	103.9	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.18	0.18			
WG298201PBS	PBS	03/11/11 12:00				.063	mg/L		-0.18	0.18			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	1		1.024	mg/L	102.4	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	1	U	1.081	mg/L	108.1	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	1	U	1.114	mg/L	111.4	75	125	3.01	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	2		1.9545	mg/L	97.7	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.015	0.015			
WG298201PBS	PBS	03/11/11 12:00				U	mg/L		-0.015	0.015			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	.5		.4959	mg/L	99.2	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	.5	U	.514	mg/L	102.8	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	.5	U	.5106	mg/L	102.1	75	125	0.66	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	2		1.947	mg/L	97.4	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.03	0.03			
WG298201PBS	PBS	03/11/11 12:00				U	mg/L		-0.03	0.03			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	.5		.495	mg/L	99	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	.5	U	.501	mg/L	100.2	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	.5	U	.5	mg/L	100	75	125	0.2	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	2		2.028	mg/L	101.4	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.03	0.03			
WG298201PBS	PBS	03/11/11 12:00				U	mg/L		-0.03	0.03			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	.5		.521	mg/L	104.2	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	.5	.09	.624	mg/L	106.8	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	.5	.09	.629	mg/L	107.8	75	125	0.8	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L86672***

Project ID: LISBON VALLEY COPPER

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	4		4.178	mg/L	104.5	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.18	0.18			
WG298201PBS	PBS	03/11/11 12:00				U	mg/L		-0.18	0.18			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	1		1.027	mg/L	102.7	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	1	U	1.014	mg/L	101.4	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	1	U	1.076	mg/L	107.6	75	125	5.93	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298407													
WG298407ICV	ICV	03/11/11 15:47	MS110128-1	.05		.05283	mg/L	105.7	90	110			
WG298407ICB	ICB	03/11/11 15:49				U	mg/L		-0.0003	0.0003			
WG298201PBS	PBS	03/11/11 15:56				U	mg/L		-0.0003	0.0003			
L86672-04AS	AS	03/11/11 16:06	MS110128-3	.05	.004	.05866	mg/L	109.3	75	125			
L86672-04ASD	ASD	03/11/11 16:08	MS110128-3	.05	.004	.05887	mg/L	109.7	75	125	0.36	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG298381													
WG298381ICV	ICV	03/11/11 11:44	II110104-1	2		1.983	mg/L	99.2	90	110			
WG298381ICB	ICB	03/11/11 11:48				U	mg/L		-0.03	0.03			
WG298201PBS	PBS	03/11/11 12:00				U	mg/L		-0.03	0.03			
WG298201LFB	LFB	03/11/11 12:03	II110302-3	.5		.525	mg/L	105	85	115			
L86672-02AS	AS	03/11/11 12:12	II110302-3	.5	U	.532	mg/L	106.4	75	125			
L86672-02ASD	ASD	03/11/11 12:16	II110302-3	.5	U	.539	mg/L	107.8	75	125	1.31	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L86672***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

ACZ Laboratories, Inc.
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Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L86672***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L86672
Date Received: 02/22/2011 10:27
Received By: ksj
Date Printed: 2/22/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

The relinquished by date was used to enter the samples as a date was not present on the sample containers or chain of custody.

Contact (For any discrepancies, the client must be contacted)

The client was not contacted.

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na12471		12.8	18

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L86672
Date Received: 02/22/2011 10:27
Received By: ksj
Date Printed: 2/22/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L86672-01	Q4 2010 RT7									X		
L86672-02	Q4 2010 RT5									X		
L86672-03	Q4 2010 RT4									X		
L86672-04	Q4 2010 RT6									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L86672

Lisbon Valley Mining Co.
P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
Q4 2010 RT7			x	1	Centennial Pit 2010
Q4 2010 RT5			x	1	Centennial Pit 2010
Q4 2010 RT4			x	1	Centennial Pit 2010
Q4 2010 RT6			x	1	Centennial Pit 2010

Sampled By:
Justin Eatchel

Total Number of Containers: 4

Sampler's Signature: Justin Eatchel 2/18/11 10:00 am

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 11 107 Fax: (435) 686-2223

Relinquished By: Lantz Indergard Date / Time: 2/18/11 10:15

Received By: [signature] Date / Time: 2-22-11 10:12

Method of Shipment: UPS

Comments:

L86672 Chain of Custody

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

Analytical Report

September 16, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Susan Wyman

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L90128

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 27, 2011. This project has been assigned to ACZ's project number, L90128. 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 L90128. 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 October 16, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Tony Antalek has reviewed and approved this report.

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

Case Narrative

Lisbon Valley Mining Company, LLC

September 16, 2011

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L90128

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 1 ground water sample from Lisbon Valley Mining Company, LLC on August 27, 2011. The sample was received in good condition. Upon receipt, the sample custodian removed the sample from the cooler, inspected the contents, and logged the sample into ACZ's computerized Laboratory Information Management System (LIMS). The sample was assigned ACZ LIMS project number L90128. 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 except those qualified with an ACZ 'H' flag were performed within EPA recommended holding times.

Sample Analysis

This sample was analyzed for inorganic and radiochemistry parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNYPIT-110825

ACZ Sample ID: ***L90128-01***
Date Sampled: *08/25/11 13:50*
Date Received: *08/27/11*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							09/08/11 9:24	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.2	0.8	09/12/11 16:23	aeb
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.002	0.01	09/13/11 6:04	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.003	0.01	09/13/11 6:04	pmc
Barium, dissolved	M200.7 ICP	0.03	B		mg/L	0.02	0.08	09/08/11 22:25	aeb
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	09/13/11 6:04	pmc
Cadmium, dissolved	M200.8 ICP-MS	0.0009	B		mg/L	0.0005	0.003	09/13/11 6:04	pmc
Calcium, dissolved	M200.7 ICP	591			mg/L	1	5	09/08/11 22:25	aeb
Chromium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.02	09/14/11 3:11	pmc
Copper, dissolved	M200.7 ICP	0.11	B		mg/L	0.05	0.3	09/08/11 22:25	aeb
Iron, dissolved	M200.7 ICP		U		mg/L	0.1	0.3	09/08/11 22:25	aeb
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	09/13/11 6:04	pmc
Magnesium, dissolved	M200.7 ICP	380			mg/L	1	5	09/08/11 22:25	aeb
Manganese, dissolved	M200.7 ICP	0.35			mg/L	0.03	0.1	09/08/11 22:25	aeb
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	09/14/11 16:11	erf
Molybdenum, dissolved	M200.7 ICP	0.13	B		mg/L	0.05	0.3	09/08/11 22:25	aeb
Nickel, dissolved	M200.7 ICP		U		mg/L	0.05	0.3	09/08/11 22:25	aeb
Potassium, dissolved	M200.7 ICP	78			mg/L	2	8	09/08/11 22:25	aeb
Selenium, dissolved	SM 3114 B, AA-Hydride	0.011			mg/L	0.001	0.005	09/14/11 16:56	erf
Silica, dissolved	M200.7 ICP	12			mg/L	2	10	09/08/11 22:25	aeb
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.0003	0.001	09/15/11 8:29	pmc
Sodium, dissolved	M200.7 ICP	206			mg/L	2	8	09/08/11 22:25	aeb
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	09/13/11 6:04	pmc
Uranium, total	M200.8 ICP-MS	0.8585			mg/L	0.0005	0.003	09/12/11 14:50	msh
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.03	0.1	09/08/11 22:25	aeb
Zinc, dissolved	M200.7 ICP		U		mg/L	0.05	0.3	09/09/11 16:10	aeb

** Please refer to Qualifier Reports for details.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNYPIT-110825

ACZ Sample ID: ***L90128-01***
Date Sampled: *08/25/11 13:50*
Date Received: *08/27/11*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		210			mg/L	2	20	08/30/11 0:00	cra
Carbonate as CaCO3			U		mg/L	2	20	08/30/11 0:00	cra
Hydroxide as CaCO3			U		mg/L	2	20	08/30/11 0:00	cra
Total Alkalinity		210			mg/L	2	20	08/30/11 0:00	cra
Cation-Anion Balance	Calculation								
Cation-Anion Balance		3.1			%			09/16/11 0:00	calc
Sum of Anions		67.7			meq/L	0.1	0.5	09/16/11 0:00	calc
Sum of Cations		72.1			meq/L	0.1	0.5	09/16/11 0:00	calc
Chloride	SM4500Cl-E	104		*	mg/L	5	30	09/13/11 14:46	mpb
Conductivity @25C	SM2510B	4800			umhos/cm	1	10	08/30/11 6:10	cra
Fluoride	SM4500F-C	1.0		*	mg/L	0.1	0.5	09/07/11 16:53	las
Hardness as CaCO3	SM2340B - Calculation	3040			mg/L	1	7	09/16/11 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	22.1	H		mg/L	0.4	2	09/16/11 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	24.6	H	*	mg/L	0.4	2	09/01/11 19:34	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	2.5	H	*	mg/L	0.2	1	09/01/11 22:37	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	3.69		*	mg/L	0.05	0.5	09/12/11 14:36	lhb
pH (lab)	SM4500H+ B								
pH		8.2	H		units	0.1	0.1	08/30/11 0:00	cra
pH measured at		20.0			C	0.1	0.1	08/30/11 0:00	cra
Residue, Filterable (TDS) @180C	SM2540C	4880		*	mg/L	10	20	08/30/11 10:24	ndm
Residue, Non-Filterable (TSS) @105C	SM2540D	6	B	*	mg/L	5	20	08/30/11 12:45	ndm
Sulfate	SM4500 SO4-D	2800			mg/L	100	500	09/01/11 11:30	ndm
TDS (calculated)	Calculation	4410			mg/L	10	50	09/16/11 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.11						09/16/11 0:00	calc

** Please refer to Qualifier Reports for details.*

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 qr the amount added to the Spike
Rec	Amount of the true value or spike added recovered, 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.
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.

(5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.

(6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90128***

Project ID: LISBON VALLEY COPPER

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308416													
WG308416PBW1	PBW	08/29/11 16:12				U	mg/L		-20	20			
WG308416LCSW2	LCSW	08/29/11 16:25	WC110829-1	820.0001		773.5	mg/L	94.3	90	110			
WG308416PBW2	PBW	08/29/11 19:05				U	mg/L		-20	20			
WG308416LCSW5	LCSW	08/29/11 19:18	WC110829-1	820.0001		762.6	mg/L	93	90	110			
WG308416PBW3	PBW	08/29/11 22:39				U	mg/L		-20	20			
WG308416LCSW8	LCSW	08/29/11 22:51	WC110829-1	820.0001		771.9	mg/L	94.1	90	110			
WG308416PBW4	PBW	08/30/11 2:20				U	mg/L		-20	20			
WG308416LCSW11	LCSW	08/30/11 2:33	WC110829-1	820.0001		783.9	mg/L	95.6	90	110			
L90128-01DUP	DUP	08/30/11 6:19			210	210.5	mg/L				0.2	20	
WG308416LCSW14	LCSW	08/30/11 6:32	WC110829-1	820.0001		784.7	mg/L	95.7	90	110			

Aluminum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309166													
WG309166ICV	ICV	09/12/11 16:04	II110816-1	2		1.92	mg/L	96	95	105			
WG309166ICB	ICB	09/12/11 16:08				U	mg/L		-0.09	0.09			
WG309166LFB	LFB	09/12/11 16:20	II110912-2	1		1.054	mg/L	105.4	85	115			
L90138-01AS	AS	09/12/11 16:29	II110912-2	1	U	1.031	mg/L	103.1	85	115			
L90138-01ASD	ASD	09/12/11 16:32	II110912-2	1	U	1.006	mg/L	100.6	85	115	2.45	20	

Antimony, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.02		.02169	mg/L	108.5	90	110			
WG309236ICB	ICB	09/13/11 5:58				.00052	mg/L		-0.00088	0.00088			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.01		.00994	mg/L	99.4	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.01	U	.00981	mg/L	98.1	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.01	U	.00999	mg/L	99.9	70	130	1.82	20	

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.05		.05146	mg/L	102.9	90	110			
WG309236ICB	ICB	09/13/11 5:58				.00081	mg/L		-0.0011	0.0011			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.05005		.05229	mg/L	104.5	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.05005	.0122	.06418	mg/L	103.9	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.05005	.0122	.06477	mg/L	105	70	130	0.92	20	

Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		2.0027	mg/L	100.1	95	105			
WG309022ICB	ICB	09/08/11 22:09				.0038	mg/L		-0.009	0.009			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.5147	mg/L	102.9	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	.011	.5186	mg/L	101.5	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	.011	.5248	mg/L	102.8	85	115	1.19	20	

Lisbon Valley Mining Company, LLC
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Beryllium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.05		.04832	mg/L	96.6	90	110			
WG309236ICB	ICB	09/13/11 5:58				U	mg/L		-0.00022	0.00022			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.05005		.05056	mg/L	101	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.05005	U	.05157	mg/L	103	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.05005	U	.05124	mg/L	102.4	70	130	0.64	20	

Cadmium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.05		.04944	mg/L	98.9	90	110			
WG309236ICB	ICB	09/13/11 5:58				U	mg/L		-0.00022	0.00022			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.0501		.05108	mg/L	102	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.0501	.0002	.05092	mg/L	101.2	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.0501	.0002	.05168	mg/L	102.8	70	130	1.48	20	

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	100		98.43	mg/L	98.4	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.6	0.6			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	67.98644		72.11	mg/L	106.1	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	67.98644	48	116.4	mg/L	100.6	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	67.98644	48	117.3	mg/L	101.9	85	115	0.77	20	

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309297													
WG309297ICB	ICB	09/13/11 13:54				U	mg/L		-3	3			
WG309297ICV	ICV	09/13/11 13:54	WI101005-3	55.165		58.8	mg/L	106.6	90	110			
WG309297LFB1	LFB	09/13/11 14:46	WI110802-1	30		32.6	mg/L	108.7	90	110			
L90128-01AS	AS	09/13/11 14:46	WI110802-1	150	104	258.4	mg/L	102.9	90	110			
L90275-02DUP	DUP	09/13/11 14:46			8	8.4	mg/L				4.9	20	RA
WG309297LFB2	LFB	09/13/11 14:50	WI110802-1	30		32.7	mg/L	109	90	110			

Chromium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309324													
WG309324ICV	ICV	09/14/11 3:02	MS110912-5	.05		.05066	mg/L	101.3	90	110			
WG309324ICB	ICB	09/14/11 3:05				U	mg/L		-0.0011	0.0011			
WG309324LFB	LFB	09/14/11 3:08	MS110913-2	.05005		.04667	mg/L	93.2	85	115			
L90129-01AS	AS	09/14/11 3:16	MS110913-2	.1001	U	.1141	mg/L	114	70	130			
L90129-01ASD	ASD	09/14/11 3:19	MS110913-2	.1001	U	.1072	mg/L	107.1	70	130	6.24	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90128***

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Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308416													
WG308416LCSW1	LCSW	08/29/11 16:14	PCN37243	1408.8		1457	umhos/cm	103.4	90	110			
WG308416LCSW4	LCSW	08/29/11 19:07	PCN37243	1408.8		1441	umhos/cm	102.3	90	110			
WG308416LCSW7	LCSW	08/29/11 22:40	PCN37243	1408.8		1434	umhos/cm	101.8	90	110			
WG308416LCSW10	LCSW	08/30/11 2:22	PCN37243	1408.8		1420	umhos/cm	100.8	90	110			
L90128-01DUP	DUP	08/30/11 6:19			4800	4790	umhos/cm				0.2	20	
WG308416LCSW13	LCSW	08/30/11 6:20	PCN37243	1408.8		1415	umhos/cm	100.4	90	110			

Copper, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		1.963	mg/L	98.2	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.03	0.03			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.516	mg/L	103.2	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	U	.512	mg/L	102.4	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	U	.513	mg/L	102.6	85	115	0.2	20	

Fluoride SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308865													
WG308865ICV	ICV	09/07/11 12:57	WC110825-2	2		1.93	mg/L	96.5	95	105			
WG308865ICB	ICB	09/07/11 13:04				U	mg/L		-0.3	0.3			
WG308864													
WG308864ICV	ICV	09/07/11 15:12	WC110825-2	2		1.95	mg/L	97.5	95	105			
WG308864ICB	ICB	09/07/11 15:19				U	mg/L		-0.3	0.3			
WG308864LFB1	LFB	09/07/11 15:30	WC110818-4	5.005		4.71	mg/L	94.1	90	110			
L90114-03AS	AS	09/07/11 16:41	WC110818-4	5.005	.5	5.27	mg/L	95.3	90	110			
L90114-03DUP	DUP	09/07/11 16:44			.5	.51	mg/L				2	20	RA
WG308864LFB2	LFB	09/07/11 17:46	WC110818-4	5.005		4.73	mg/L	94.5	90	110			

Iron, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		1.97	mg/L	98.5	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.06	0.06			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	1		1.053	mg/L	105.3	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	1	.14	1.162	mg/L	102.2	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	1	.14	1.168	mg/L	102.8	85	115	0.52	20	

Lead, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.05		.04956	mg/L	99.1	90	110			
WG309236ICB	ICB	09/13/11 5:58				U	mg/L		-0.00022	0.00022			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.05005		.05051	mg/L	100.9	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.05005	U	.0497	mg/L	99.3	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.05005	U	.05032	mg/L	100.5	70	130	1.24	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90128***

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	100		99.1	mg/L	99.1	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.6	0.6			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	49.99752		52.55	mg/L	105.1	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	49.99752	34.9	84.46	mg/L	99.1	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	49.99752	34.9	84.94	mg/L	100.1	85	115	0.57	20	

Manganese, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		1.9548	mg/L	97.7	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.015	0.015			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.5305	mg/L	106.1	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	.193	.7021	mg/L	101.8	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	.193	.7086	mg/L	103.1	85	115	0.92	20	

Mercury, dissolved M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309187													
WG309187ICV	ICV	09/14/11 16:03	II110914-1	.005015		.00501	mg/L	99.9	95	105			
WG309187ICB	ICB	09/14/11 16:05				U	mg/L		-0.0002	0.0002			
WG309187LRB	LRB	09/14/11 16:07				U	mg/L		-0.00044	0.00044			
WG309187LFB	LFB	09/14/11 16:09	II110908-3	.002002		.00192	mg/L	95.9	85	115			
L90250-02LFM	LFM	09/14/11 16:20	II110908-3	.002002	U	.00197	mg/L	98.4	85	115			
L90250-02LFMD	LFMD	09/14/11 16:22	II110908-3	.002002	U	.00199	mg/L	99.4	85	115	1.01	20	

Molybdenum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		2.012	mg/L	100.6	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.03	0.03			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.543	mg/L	108.6	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	U	.53	mg/L	106	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	U	.541	mg/L	108.2	85	115	2.05	20	

Nickel, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2.002		2.016	mg/L	100.7	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.03	0.03			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.518	mg/L	103.6	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	U	.512	mg/L	102.4	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	U	.517	mg/L	103.4	85	115	0.97	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90128***

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308691													
WG308691ICV	ICV	09/01/11 18:56	WI110701-1	2.416		2.279	mg/L	94.3	90	110			
WG308691ICB	ICB	09/01/11 18:57				U	mg/L		-0.06	0.06			
WG308691LFB	LFB	09/01/11 19:02	WI110813-3	2		2.03	mg/L	101.5	90	110			
L90137-01DUP	DUP	09/01/11 19:07			U	U	mg/L				0	20	RA
L90128-01AS	AS	09/01/11 19:35	WI110813-3	40	24.6	64.94	mg/L	100.9	90	110			

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308691													
WG308691ICV	ICV	09/01/11 18:56	WI110701-1	.609		.587	mg/L	96.4	90	110			
WG308691ICB	ICB	09/01/11 18:57				U	mg/L		-0.03	0.03			
WG308691LFB	LFB	09/01/11 19:02	WI110813-3	1		1.02	mg/L	102	90	110			
L90137-01DUP	DUP	09/01/11 19:07			U	U	mg/L				0	20	RA
L90128-01AS	AS	09/01/11 22:38	WI110813-3	20	2.5	23.11	mg/L	103.1	90	110			

Nitrogen, ammonia M350.1 - Automated Phenate

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309194													
WG309194ICV	ICV	09/12/11 12:13	WI101121-1	1.004		1.001	mg/L	99.7	90	110			
WG309194ICB	ICB	09/12/11 12:14				U	mg/L		-0.15	0.15			
WG309206													
WG309206LFB1	LFB	09/12/11 14:30	WI110211-5	1		.991	mg/L	99.1	90	110			
L90116-02DUP	DUP	09/12/11 14:35			12.9	12.841	mg/L				0.5	20	
WG309206LFB2	LFB	09/12/11 15:04	WI110211-5	1		.993	mg/L	99.3	90	110			
L90116-02DUP	DUP	09/12/11 15:26			19.9	19.81	mg/L				0.5	20	
L90116-01AS	AS	09/12/11 15:34	5XNH3	1	15.8	16.67	mg/L	87	90	110			M3

pH (lab) SM4500H+ B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308416													
WG308416LCSW3	LCSW	08/29/11 16:28	PCN36734	6		6	units	100	98	102			
WG308416LCSW6	LCSW	08/29/11 19:21	PCN36734	6		6.03	units	100.5	98	102			
WG308416LCSW9	LCSW	08/29/11 22:55	PCN36734	6		6.01	units	100.2	98	102			
WG308416LCSW12	LCSW	08/30/11 2:36	PCN36734	6		6.03	units	100.5	98	102			
L90128-01DUP	DUP	08/30/11 6:19			8.2	8.21	units				0.1	20	
WG308416LCSW15	LCSW	08/30/11 6:35	PCN36734	6		5.99	units	99.8	98	102			

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	20		19.87	mg/L	99.4	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.9	0.9			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	99.95064		105.1	mg/L	105.2	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	99.95064	1.9	106.1	mg/L	104.3	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	99.95064	1.9	107.2	mg/L	105.4	85	115	1.03	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90128***

Project ID: LISBON VALLEY COPPER

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308451													
WG308451PBW	PBW	08/30/11 9:55				U	mg/L		-20	20			
WG308451LCSW	LCSW	08/30/11 9:56	PCN37643	260		250	mg/L	96.2	80	120			
L90142-03DUP	DUP	08/30/11 10:34			590	588	mg/L				0.3	20	

Residue, Non-Filterable (TSS) @105C SM2540D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308475													
WG308475PBW	PBW	08/30/11 12:06				U	mg/L		-15	15			
WG308475LCSW	LCSW	08/30/11 12:08	PCN37643	160		153	mg/L	95.6	80	120			
L90147-04DUP	DUP	08/30/11 12:55			U	U	mg/L				0	20	RA

Selenium, dissolved SM 3114 B, AA-Hydride

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309183													
WG309183ICV	ICV	09/14/11 16:47	II110706-2	.025		.0245	mg/L	98	90	110			
WG309183ICB	ICB	09/14/11 16:49				U	mg/L		-0.003	0.003			
WG309183LRB	LRB	09/14/11 16:50				U	mg/L		-0.003	0.003			
WG309183LFB	LFB	09/14/11 16:51	II110822-4	.02		.0211	mg/L	105.5	85	115			
L90197-04LFM	LFM	09/14/11 16:59	II110822-4	.02	U	.021	mg/L	105	85	115			
L90197-04LFMD	LFMD	09/14/11 17:00	II110822-4	.02	U	.0207	mg/L	103.5	85	115	1.44	20	

Silica, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	42.8		41.65	mg/L	97.3	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-1.2	1.2			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	21.4		21.85	mg/L	102.1	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	21.4	12.4	33.51	mg/L	98.6	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	21.4	12.4	33.75	mg/L	99.8	85	115	0.71	20	

Silver, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309404													
WG309404ICV	ICV	09/15/11 8:20	MS110912-5	.01996		.01836	mg/L	92	90	110			
WG309404ICB	ICB	09/15/11 8:23				U	mg/L		-0.00011	0.00011			
WG309404LFB	LFB	09/15/11 8:26	MS110913-2	.01002		.009688	mg/L	96.7	85	115			
L90129-01AS	AS	09/15/11 8:35	MS110913-2	.01002	U	.009841	mg/L	98.2	70	130			
L90129-01ASD	ASD	09/15/11 8:38	MS110913-2	.01002	U	.009807	mg/L	97.9	70	130	0.35	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90128***

Project ID: LISBON VALLEY COPPER

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	100		100.04	mg/L	100	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.9	0.9			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	100.0023		105.2	mg/L	105.2	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	100.0023	15.9	119.1	mg/L	103.2	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	100.0023	15.9	120.3	mg/L	104.4	85	115	1	20	

Sulfate SM4500 SO4-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG308626													
WG308626PBW	PBW	09/01/11 10:13				U	mg/L		-30	30			
WG308626LCSW	LCSW	09/01/11 10:18	WC110510-2	100		101	mg/L	101	80	120			
L90128-01DUP	DUP	09/01/11 11:35			2800	2860	mg/L				2.1	20	

Thallium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309236													
WG309236ICV	ICV	09/13/11 5:55	MS110912-5	.05		.05349	mg/L	107	90	110			
WG309236ICB	ICB	09/13/11 5:58				U	mg/L		-0.00022	0.00022			
WG309236LFB	LFB	09/13/11 6:01	MS110912-3	.0501		.05294	mg/L	105.7	85	115			
L90129-01AS	AS	09/13/11 6:10	MS110912-3	.0501	U	.05213	mg/L	104.1	70	130			
L90129-01ASD	ASD	09/13/11 6:12	MS110912-3	.0501	U	.05271	mg/L	105.2	70	130	1.11	20	

Uranium, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309170													
WG309170ICV	ICV	09/12/11 13:42	MS110712-1	.05		.04716	mg/L	94.3	90	110			
WG309170ICB	ICB	09/12/11 13:46				U	mg/L		-0.0003	0.0003			
WG308885LRB	LRB	09/12/11 13:49				U	mg/L		-0.00022	0.00022			
WG308885LFB	LFB	09/12/11 13:53	MS110810-3	.05		.04411	mg/L	88.2	85	115			
WG308962LRB	LRB	09/12/11 14:33				U	mg/L		-0.00022	0.00022			
WG308962LFB	LFB	09/12/11 14:36	MS110810-3	.05		.04535	mg/L	90.7	85	115			
L90227-01LFM	LFM	09/12/11 15:24	MS10XW	.5	.014	.457	mg/L	88.6	70	130			
L90227-01LFMD	LFMD	09/12/11 15:27	MS10XW	.5	.014	.4636	mg/L	89.9	70	130	1.43	20	

Vanadium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309022													
WG309022ICV	ICV	09/08/11 22:03	II110816-1	2		2.0042	mg/L	100.2	95	105			
WG309022ICB	ICB	09/08/11 22:09				U	mg/L		-0.015	0.015			
WG309022LFB	LFB	09/08/11 22:22	II110811-3	.5		.5362	mg/L	107.2	85	115			
L90129-03AS	AS	09/08/11 22:31	II110811-3	.5	U	.5281	mg/L	105.6	85	115			
L90129-03ASD	ASD	09/08/11 22:34	II110811-3	.5	U	.5314	mg/L	106.3	85	115	0.62	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90128***

Zinc, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG309082													
WG309082ICV	ICV	09/09/11 15:51	II110816-1	2		1.971	mg/L	98.6	95	105			
WG309082ICB	ICB	09/09/11 15:55				U	mg/L		-0.03	0.03			
WG309082LFB	LFB	09/09/11 16:07	II110811-3	.5		.542	mg/L	108.4	85	115			
L90129-03AS	AS	09/09/11 16:16	II110811-3	.5	U	.547	mg/L	109.4	85	115			
L90129-03ASD	ASD	09/09/11 16:19	II110811-3	.5	U	.551	mg/L	110.2	85	115	0.73	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90128***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L90128-01	WG309324	Chromium, dissolved	M200.8 ICP-MS	DB	Sample required dilution due to low bias result.
	WG309297	Chloride	SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG308864	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG308691	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG309206	Nitrogen, ammonia	M350.1 - Automated Phenate	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG308451	Residue, Filterable (TDS) @180C	SM2540C	ZO	Concentration is based on a final residue greater than 200 mg.
	WG308475	Residue, Non-Filterable (TSS) @105C	SM2540D	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.
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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNYPIT-110825
Locator:

ACZ Sample ID: ***L90128-01***
Date Sampled: *08/25/11 13:50*
Date Received: *08/27/11*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	09/07/11 11:07		610	71	15	pCi/L		thf
Gross Beta	09/07/11 11:07		160	28	29	pCi/L		thf

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.
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.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Replicate Error Ratio (RER) accepted because sample concentrations are less than 10x the MDL.
U	No nuclides detected above the Lower Limit of Detection (LLD)
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
X	QC is out of control. See Case Narrative.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) & 20th edition (1998).
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

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90128***

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
WG308984																
WG308446PBW	PBW	09/07/11						.95	1.1	0.93			1.86			
WG308446LCSW	LCSW	09/07/11	RC110304-1	81.06				68	7.4	1.5	83.9	81	138			
L90055-07DUP	DUP-RE	09/07/11			14	5.4	2.8	4.8	3.6	2.9				1.42	2	
L90114-01DUP	DUP-RE	09/07/11			3.1	3	2.4	3.1	3	2.4				0	2	
L90094-02MS	MS	09/07/11	RC110304-1	162.12	0	4.6	4.8	160	20	4.8	98.7	81	138			

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
WG308984																
WG308446PBW	PBW	09/07/11						0	1.9	2.7			5.4			
WG308446LCSW	LCSW	09/07/11	RC110517-11	100				99	6.7	4.2	99	65	117			
L90114-01DUP	DUP-RE	09/07/11			2.4	3.1	4.3	1.2	2.7	4.3				0.29	2	
L90128-01MS	MS	09/07/11	RC110517-11	666.67	160	28	29	620	43	28	69	65	117			

ACZ Laboratories, Inc.
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RadChem Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L90128***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L90128
Date Received: 08/27/2011 10:31
Received By: ksj
Date Printed: 8/29/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3504		0.4	18

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L90128
Date Received: 08/27/2011 10:31
Received By: ksj
Date Printed: 8/29/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L90128-01	PENNYPIT-110825	Y	Y		Y							

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L 90128

Chain of Custody Record

LISBON VALLEY MINING CO

P.O. Box 248
La Sal, Utah 84530

Send report with laboratory QA to:
lindergard@lisbonvalley.com
swyman@whetstone-associates.com

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE NUMBER	DATE	TIME	ANALYSES: Diss. Wet Chemistry [1]	Dissolved metals [2]	Ammonia, NO2, NO3	Total uranium	Total alkalinity & TSS	Radiochemistry [3]	pH & conductivity [4]	Number of Containers
PennyPit-110825	8/25/11	13:50	1	1	1	1	1	1		6

(3504)

Remarks / Comments

Matrix: Water

Samples Stored on Ice

1) Chloride, hardness, sulfate, TDS, fluoride (Field Filtered 0.45 um)
2) Field Filtered 0.45 um
3) Gross alpha, gross beta
4) Centrifuge tube for pH, E.C., alkalinity

Note:

- Follow standard analytical suite for project and required detection limits

Sampled By: Nick Cocina

Total Number of Containers: 6

Sampler's Signature: Nick C

Contact Person:
Susan Wyman
Phone: (970) 641-7471 Fax: (970) 641-7431

Relinquished By:	Date / Time:	Received By:	Date / Time:
Nick C	8/26/11 14:15		
		WBS	8/27/11 10:31

Method of Shipment:
Fedex Priority Overnight (Gunnison Ship Center)

L90128 Chain of Custody

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

Analytical Report

November 11, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L90759

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 21, 2011. This project has been assigned to ACZ's project number, L90759. 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 L90759. 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 11, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED6-8 2 QTR 2011

ACZ Sample ID: ***L90759-01***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:14	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:32	aeb
Cadmium (MWMT)	M6010B ICP	0.094			mg/L	0.005	0.02	10/28/11 18:32	aeb
Copper (MWMT)	M6010B ICP	0.13			mg/L	0.01	0.05	10/28/11 18:32	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:32	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:32	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0236			mg/L	0.0001	0.0005	10/29/11 0:14	pmc
Zinc (MWMT)	M6010B ICP	8.03			mg/L	0.01	0.05	10/28/11 18:32	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4954.4			g			10/25/11 0:00	ndj
Extraction pH		5.7			units			10/25/11 0:00	ndj
Extraction Time		25.5			hrs			10/25/11 0:00	ndj
Leachate pH		4.08			units			10/25/11 0:00	ndj
Leachate Volume		4958.5			mL			10/25/11 0:00	ndj
Particle Size over 5 cm		11.6			%			10/25/11 0:00	ndj
Retained Moisture		16.5			%			10/25/11 0:00	ndj

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 2 QTR 2011

ACZ Sample ID: ***L90759-02***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	10/29/11 0:16	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:35	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 18:35	aeb
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	10/28/11 18:35	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	10/28/11 18:35	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:35	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	10/29/11 0:16	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:35	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4998.7			g			10/25/11 0:00	ndj
Extraction pH		5.7			units			10/25/11 0:00	ndj
Extraction Time		25.5			hrs			10/25/11 0:00	ndj
Leachate pH		7.23			units			10/25/11 0:00	ndj
Leachate Volume		5387.1			mL			10/25/11 0:00	ndj
Particle Size over 5 cm		3.2			%			10/25/11 0:00	ndj
Retained Moisture		17.7			%			10/25/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 3 QTR 2011

ACZ Sample ID: ***L90759-03***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	11/04/11 9:12	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 11:39	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 11:39	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:39	aeb
Molybdenum (MWMT)	M6010B ICP	0.04	B	*	mg/L	0.01	0.05	11/03/11 11:39	aeb
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	11/03/11 11:39	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0065			mg/L	0.0001	0.0005	11/04/11 9:12	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:39	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4999.6			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		25			hrs			10/31/11 0:00	ndj
Leachate pH		7.26			units			10/31/11 0:00	ndj
Leachate Volume		5009.8			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		52.3			%			10/31/11 0:00	ndj
Retained Moisture		12.5			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 3 QTR 2011

ACZ Sample ID: ***L90759-04***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/04/11 9:19	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 11:43	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 11:43	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:43	aeb
Molybdenum (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	11/03/11 11:43	aeb
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	11/03/11 11:43	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0008			mg/L	0.0001	0.0005	11/04/11 9:19	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:43	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4977.2			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		24.5			hrs			10/31/11 0:00	ndj
Leachate pH		7.98			units			10/31/11 0:00	ndj
Leachate Volume		5099.7			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		0			%			10/31/11 0:00	ndj
Retained Moisture		17.3			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 3 QTR 2011

ACZ Sample ID: ***L90759-05***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/04/11 9:23	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 11:46	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 11:46	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:46	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	11/03/11 11:46	aeb
Selenium (MWMT)	M6010B ICP	0.07	B	*	mg/L	0.06	0.3	11/03/11 11:46	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0008			mg/L	0.0001	0.0005	11/04/11 9:23	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:46	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4992.9			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		25.5			hrs			10/31/11 0:00	ndj
Leachate pH		7.87			units			10/31/11 0:00	ndj
Leachate Volume		4994.8			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		18.1			%			10/31/11 0:00	ndj
Retained Moisture		14.7			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 3 QTR 2011

ACZ Sample ID: ***L90759-06***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0015	B		mg/L	0.0004	0.002	11/04/11 9:41	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 11:55	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 11:55	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:55	aeb
Molybdenum (MWMT)	M6010B ICP	0.12		*	mg/L	0.01	0.05	11/03/11 11:55	aeb
Selenium (MWMT)	M6010B ICP	0.06	B	*	mg/L	0.06	0.3	11/03/11 11:55	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0030			mg/L	0.0001	0.0005	11/04/11 9:41	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 11:55	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4987.2			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		26.75			hrs			10/31/11 0:00	ndj
Leachate pH		7.66			units			10/31/11 0:00	ndj
Leachate Volume		4991.6			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		10.3			%			10/31/11 0:00	ndj
Retained Moisture		20.2			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 3 QTR 2011

ACZ Sample ID: ***L90759-07***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/04/11 9:44	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 11:58	aeb
Cadmium (MWMT)	M6010B ICP	0.310			mg/L	0.005	0.02	11/03/11 11:58	aeb
Copper (MWMT)	M6010B ICP	0.18			mg/L	0.01	0.05	11/03/11 11:58	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	11/03/11 11:58	aeb
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.06	0.3	11/03/11 11:58	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0360			mg/L	0.0001	0.0005	11/04/11 9:44	msh
Zinc (MWMT)	M6010B ICP	14.50			mg/L	0.01	0.05	11/03/11 11:58	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4983.2			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		26.5			hrs			10/31/11 0:00	ndj
Leachate pH		3.7			units			10/31/11 0:00	ndj
Leachate Volume		4984.7			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		6			%			10/31/11 0:00	ndj
Retained Moisture		19.7			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 3 QTR 2011

ACZ Sample ID: ***L90759-08***
Date Sampled: *09/12/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0004	0.002	11/04/11 9:48	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 12:01	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 12:01	aeb
Copper (MWMT)	M6010B ICP	0.11			mg/L	0.01	0.05	11/03/11 12:01	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	11/03/11 12:01	aeb
Selenium (MWMT)	M6010B ICP	0.15	B	*	mg/L	0.06	0.3	11/03/11 12:01	aeb
Uranium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	11/04/11 9:48	msh
Zinc (MWMT)	M6010B ICP	0.06			mg/L	0.01	0.05	11/03/11 12:01	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5000.2			g			10/31/11 0:00	ndj
Extraction pH		7			units			10/31/11 0:00	ndj
Extraction Time		28			hrs			10/31/11 0:00	ndj
Leachate pH		7.02			units			10/31/11 0:00	ndj
Leachate Volume		5156.2			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		0			%			10/31/11 0:00	ndj
Retained Moisture		14.8			%			10/31/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 1 QTR 2011

ACZ Sample ID: ***L90759-09***
Date Sampled: *03/22/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:18	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:44	aeb
Cadmium (MWMT)	M6010B ICP	0.371			mg/L	0.005	0.02	10/28/11 18:44	aeb
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	10/28/11 18:44	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:44	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:44	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0025			mg/L	0.0001	0.0005	10/29/11 0:18	pmc
Zinc (MWMT)	M6010B ICP	0.52			mg/L	0.01	0.05	10/28/11 18:44	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4938.6		*	g			10/25/11 0:00	ndj
Extraction pH		5.7		*	units			10/25/11 0:00	ndj
Extraction Time		32		*	hrs			10/25/11 0:00	ndj
Leachate pH		3.08		*	units			10/25/11 0:00	ndj
Leachate Volume		4939.3		*	mL			10/25/11 0:00	ndj
Particle Size over 5 cm		41		*	%			10/25/11 0:00	ndj
Retained Moisture		21.9		*	%			10/25/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 1 QTR 2011

ACZ Sample ID: ***L90759-10***
Date Sampled: *03/22/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:19	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:47	aeb
Cadmium (MWMT)	M6010B ICP	9.530			mg/L	0.005	0.02	10/28/11 18:47	aeb
Copper (MWMT)	M6010B ICP	2.28			mg/L	0.01	0.05	10/28/11 18:47	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:47	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:47	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0203			mg/L	0.0001	0.0005	10/29/11 0:19	pmc
Zinc (MWMT)	M6010B ICP	13.60			mg/L	0.01	0.05	10/28/11 18:47	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4986.3		*	g			10/25/11 0:00	ndj
Extraction pH		5.7		*	units			10/25/11 0:00	ndj
Extraction Time		29.25		*	hrs			10/25/11 0:00	ndj
Leachate pH		3.31		*	units			10/25/11 0:00	ndj
Leachate Volume		4987.3		*	mL			10/25/11 0:00	ndj
Particle Size over 5 cm		83.9		*	%			10/25/11 0:00	ndj
Retained Moisture		23.9		*	%			10/25/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 1 QTR 2011

ACZ Sample ID: ***L90759-11***
Date Sampled: *03/22/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:21	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:50	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 18:50	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:50	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:50	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:50	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0011			mg/L	0.0001	0.0005	10/29/11 0:21	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	10/28/11 18:50	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4973.8		*	g			10/25/11 0:00	ndj
Extraction pH		5.7		*	units			10/25/11 0:00	ndj
Extraction Time		25.5		*	hrs			10/25/11 0:00	ndj
Leachate pH		7.91		*	units			10/25/11 0:00	ndj
Leachate Volume		5114.8		*	mL			10/25/11 0:00	ndj
Particle Size over 5 cm		0		*	%			10/25/11 0:00	ndj
Retained Moisture		17.2		*	%			10/25/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 1 QTR 2011

ACZ Sample ID: ***L90759-12***
Date Sampled: *03/22/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0004	0.002	10/29/11 0:26	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:53	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 18:53	aeb
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	10/28/11 18:53	aeb
Molybdenum (MWMT)	M6010B ICP	0.06			mg/L	0.01	0.05	10/28/11 18:53	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:53	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0077			mg/L	0.0001	0.0005	10/29/11 0:26	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:53	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4998.1		*	g			10/25/11 0:00	ndj
Extraction pH		5.7		*	units			10/25/11 0:00	ndj
Extraction Time		25.5		*	hrs			10/25/11 0:00	ndj
Leachate pH		8		*	units			10/25/11 0:00	ndj
Leachate Volume		5265.4		*	mL			10/25/11 0:00	ndj
Particle Size over 5 cm		66		*	%			10/25/11 0:00	ndj
Retained Moisture		12.3		*	%			10/25/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 2 QTR 2011

ACZ Sample ID: ***L90759-13***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:31	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:56	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 18:56	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:56	aeb
Molybdenum (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	10/28/11 18:56	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 18:56	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0025			mg/L	0.0001	0.0005	10/29/11 0:31	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 18:56	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4990.8			g			10/25/11 0:00	ndj
Extraction pH		5.7			units			10/25/11 0:00	ndj
Extraction Time		26.25			hrs			10/25/11 0:00	ndj
Leachate pH		7.33			units			10/25/11 0:00	ndj
Leachate Volume		5056.4			mL			10/25/11 0:00	ndj
Particle Size over 5 cm		45.7			%			10/25/11 0:00	ndj
Retained Moisture		8.9			%			10/25/11 0:00	ndj

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 2 QTR 2011

ACZ Sample ID: ***L90759-14***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:33	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 19:08	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 19:08	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 19:08	aeb
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	10/28/11 19:08	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 19:08	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0054			mg/L	0.0001	0.0005	10/29/11 0:33	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 19:08	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.8			g			10/25/11 0:00	ndj
Extraction pH		5.7			units			10/25/11 0:00	ndj
Extraction Time		25.5			hrs			10/25/11 0:00	ndj
Leachate pH		7.59			units			10/25/11 0:00	ndj
Leachate Volume		5438.7			mL			10/25/11 0:00	ndj
Particle Size over 5 cm		22.2			%			10/25/11 0:00	ndj
Retained Moisture		15.8			%			10/25/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 2 QTR 2011

ACZ Sample ID: ***L90759-15***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	10/29/11 0:36	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 19:11	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	10/28/11 19:11	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 19:11	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 19:11	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	10/28/11 19:11	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0023			mg/L	0.0001	0.0005	10/29/11 0:36	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	10/28/11 19:11	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4997.6			g			10/25/11 0:00	ndj
Extraction pH		5.7			units			10/25/11 0:00	ndj
Extraction Time		25.5			hrs			10/25/11 0:00	ndj
Leachate pH		7.82			units			10/25/11 0:00	ndj
Leachate Volume		5165.6			mL			10/25/11 0:00	ndj
Particle Size over 5 cm		22.9			%			10/25/11 0:00	ndj
Retained Moisture		7.3			%			10/25/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 2 QTR 2011

ACZ Sample ID: ***L90759-16***
Date Sampled: *06/21/11 00:00*
Date Received: *09/21/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0016	B		mg/L	0.0004	0.002	11/04/11 9:55	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/03/11 12:42	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/03/11 12:42	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/03/11 12:42	aeb
Molybdenum (MWMT)	M6010B ICP	0.17		*	mg/L	0.01	0.05	11/03/11 12:42	aeb
Selenium (MWMT)	M6010B ICP	0.09	B	*	mg/L	0.06	0.3	11/03/11 12:42	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0090			mg/L	0.0001	0.0005	11/04/11 9:55	msh
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	11/03/11 12:42	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4991.4			g			10/31/11 0:00	ndj
Extraction pH		5.7			units			10/31/11 0:00	ndj
Extraction Time		29			hrs			10/31/11 0:00	ndj
Leachate pH		7.6			units			10/31/11 0:00	ndj
Leachate Volume		4991.8			mL			10/31/11 0:00	ndj
Particle Size over 5 cm		6.7			%			10/31/11 0:00	ndj
Retained Moisture		23.0			%			10/31/11 0:00	ndj

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90759***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312560													
WG312216ICV	ICV	10/29/11 0:04	MS111007-2	.02		.01988	mg/L	99.4	90	110			
WG312560ICB	ICB	10/29/11 0:05				U	mg/L		-0.0012	0.0012			
WG312216PBS	PBS	10/29/11 0:12				U	mg/L		-0.0012	0.0012			
L90759-11AS	AS	10/29/11 0:23	MS111006-3	.01	U	.01032	mg/L	103.2	75	125			
L90759-11ASD	ASD	10/29/11 0:24	MS111006-3	.01	U	.01068	mg/L	106.8	75	125	3.43	20	
WG312926													
WG312926ICV	ICV	11/04/11 8:50	MS111007-2	.02		.02118	mg/L	105.9	90	110			
WG312926ICB	ICB	11/04/11 8:53				.00058	mg/L		-0.0012	0.0012			
WG312598PBS	PBS	11/04/11 9:08				U	mg/L		-0.0012	0.0012			
L90759-05AS	AS	11/04/11 9:26	MS111006-3	.01	U	.00848	mg/L	84.8	75	125			
L90759-05ASD	ASD	11/04/11 9:30	MS111006-3	.01	U	.00891	mg/L	89.1	75	125	4.95	20	
WG312606PBS	PBS	11/04/11 9:52				U	mg/L		-0.0012	0.0012			

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	4		4.028	mg/L	100.7	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.18	0.18			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.18	0.18			
L90759-02AS	AS	10/28/11 18:38	II111024-2	1	U	1.047	mg/L	104.7	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	1	U	1.065	mg/L	106.5	75	125	1.7	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	4		4.115	mg/L	102.9	90	110			
WG312864ICB	ICB	11/03/11 11:24				U	mg/L		-0.18	0.18			
WG312598PBS	PBS	11/03/11 11:36				U	mg/L		-0.18	0.18			
L90759-05AS	AS	11/03/11 11:49	II111024-2	1	U	1.072	mg/L	107.2	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	1	U	1.059	mg/L	105.9	75	125	1.22	20	
WG312606PBS	PBS	11/03/11 12:39				U	mg/L		-0.18	0.18			

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	2		1.952	mg/L	97.6	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.015	0.015			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.015	0.015			
L90759-02AS	AS	10/28/11 18:38	II111024-2	.5	U	.4987	mg/L	99.7	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	.5	U	.5032	mg/L	100.6	75	125	0.9	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	2		1.9392	mg/L	97	90	110			
WG312864ICB	ICB	11/03/11 11:24				U	mg/L		-0.015	0.015			
WG312598PBS	PBS	11/03/11 11:36				U	mg/L		-0.015	0.015			
L90759-05AS	AS	11/03/11 11:49	II111024-2	.5	U	.5115	mg/L	102.3	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	.5	U	.5046	mg/L	100.9	75	125	1.36	20	
WG312606PBS	PBS	11/03/11 12:39				U	mg/L		-0.015	0.015			

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90759***

Project ID: LISBON VALLEY COPPER

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	2		1.954	mg/L	97.7	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.03	0.03			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.03	0.03			
L90759-02AS	AS	10/28/11 18:38	II111024-2	.5	.02	.518	mg/L	99.6	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	.5	.02	.526	mg/L	101.2	75	125	1.53	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	2		1.938	mg/L	96.9	90	110			
WG312864ICB	ICB	11/03/11 11:24				U	mg/L		-0.03	0.03			
WG312598PBS	PBS	11/03/11 11:36				U	mg/L		-0.03	0.03			
L90759-05AS	AS	11/03/11 11:49	II111024-2	.5	U	.506	mg/L	101.2	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	.5	U	.508	mg/L	101.6	75	125	0.39	20	
WG312606PBS	PBS	11/03/11 12:39				U	mg/L		-0.03	0.03			

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	2		1.998	mg/L	99.9	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.03	0.03			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.03	0.03			
L90759-02AS	AS	10/28/11 18:38	II111024-2	.5	.02	.542	mg/L	104.4	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	.5	.02	.541	mg/L	104.2	75	125	0.18	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	2		2.005	mg/L	100.3	90	110			
WG312864ICB	ICB	11/03/11 11:24				.016	mg/L		-0.03	0.03			
WG312598PBS	PBS	11/03/11 11:36				U	mg/L		-0.03	0.03			
L90759-05AS	AS	11/03/11 11:49	II111024-2	.5	.02	.521	mg/L	100.2	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	.5	.02	.528	mg/L	101.6	75	125	1.33	20	
WG312606PBS	PBS	11/03/11 12:39				.019	mg/L		-0.03	0.03			

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	4		4.104	mg/L	102.6	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.18	0.18			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.18	0.18			
L90759-02AS	AS	10/28/11 18:38	II111024-2	1	U	1.062	mg/L	106.2	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	1	U	1.028	mg/L	102.8	75	125	3.25	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	4		4.114	mg/L	102.9	90	110			
WG312864ICB	ICB	11/03/11 11:24				.07	mg/L		-0.18	0.18			
WG312598PBS	PBS	11/03/11 11:36				.075	mg/L		-0.18	0.18			
L90759-05AS	AS	11/03/11 11:49	II111024-2	1	.07	1.055	mg/L	98.5	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	1	.07	1.037	mg/L	96.7	75	125	1.72	20	
WG312606PBS	PBS	11/03/11 12:39				.062	mg/L		-0.18	0.18			

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L90759***

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312560													
WG312216ICV	ICV	10/29/11 0:04	MS111007-2	.05		.05135	mg/L	102.7	90	110			
WG312560ICB	ICB	10/29/11 0:05				U	mg/L		-0.0003	0.0003			
WG312216PBS	PBS	10/29/11 0:12				U	mg/L		-0.0003	0.0003			
L90759-11AS	AS	10/29/11 0:23	MS111006-3	.05	.0011	.05147	mg/L	100.7	75	125			
L90759-11ASD	ASD	10/29/11 0:24	MS111006-3	.05	.0011	.05481	mg/L	107.4	75	125	6.29	20	
WG312926													
WG312926ICV	ICV	11/04/11 8:50	MS111007-2	.05		.05348	mg/L	107	90	110			
WG312926ICB	ICB	11/04/11 8:53				U	mg/L		-0.0003	0.0003			
WG312598PBS	PBS	11/04/11 9:08				U	mg/L		-0.0003	0.0003			
L90759-05AS	AS	11/04/11 9:26	MS111006-3	.05	.0008	.05246	mg/L	103.3	75	125			
L90759-05ASD	ASD	11/04/11 9:30	MS111006-3	.05	.0008	.05459	mg/L	107.6	75	125	3.98	20	
WG312606PBS	PBS	11/04/11 9:52				U	mg/L		-0.0003	0.0003			

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG312530													
WG312530ICV	ICV	10/28/11 18:13	II111025-1	2		1.944	mg/L	97.2	90	110			
WG312530ICB	ICB	10/28/11 18:16				U	mg/L		-0.03	0.03			
WG312216PBS	PBS	10/28/11 18:29				U	mg/L		-0.03	0.03			
L90759-02AS	AS	10/28/11 18:38	II111024-2	.5	U	.522	mg/L	104.4	75	125			
L90759-02ASD	ASD	10/28/11 18:41	II111024-2	.5	U	.524	mg/L	104.8	75	125	0.38	20	
WG312864													
WG312864ICV	ICV	11/03/11 11:21	II111025-1	2		1.967	mg/L	98.4	90	110			
WG312864ICB	ICB	11/03/11 11:24				U	mg/L		-0.03	0.03			
WG312598PBS	PBS	11/03/11 11:36				U	mg/L		-0.03	0.03			
L90759-05AS	AS	11/03/11 11:49	II111024-2	.5	U	.513	mg/L	102.6	75	125			
L90759-05ASD	ASD	11/03/11 11:52	II111024-2	.5	U	.515	mg/L	103	75	125	0.39	20	
WG312606PBS	PBS	11/03/11 12:39				U	mg/L		-0.03	0.03			

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90759***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L90759-03	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-04	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-05	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-06	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-07	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-08	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L90759-09	WG312216	Dry Weight	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction Time	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate Volume	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Retained Moisture	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90759***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L90759-10	WG312216	Dry Weight	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction Time	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate Volume	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Retained Moisture	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
L90759-11	WG312216	Dry Weight	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction Time	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate Volume	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Retained Moisture	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
L90759-12	WG312216	Dry Weight	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Extraction Time	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate pH	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Leachate Volume	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
		Retained Moisture	NDEP - MWMT Column Method, 1996	H3	Sample was received and analyzed past holding time.
L90759-16	WG312864	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Selenium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L90759***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L90759
Date Received: 09/21/2011 15:37
Received By: ksj
Date Printed: 9/23/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na13930		19.4	18
Na13931		17.1	23
Na13932		19.8	21

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L90759
Date Received: 09/21/2011 15:37
Received By: ksj
Date Printed: 9/23/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L90759-01	BED6-8 2 QTR 2011									X		
L90759-02	BED 13 2 QTR 2011									X		
L90759-03	BED 11 3 QTR 2011									X		
L90759-04	BED 12 3 QTR 2011									X		
L90759-05	BED 14 3 QTR 2011									X		
L90759-06	BED 9-10 3 QTR 2011									X		
L90759-07	BED 6-8 3 QTR 2011									X		
L90759-08	BED 13 3 QTR 2011									X		
L90759-09	BED 6-8 1 QTR 2011									X		
L90759-10	BED 9-10 1 QTR 2011									X		
L90759-11	BED 14 1 QTR 2011									X		
L90759-12	BED 12 1 QTR 2011									X		
L90759-13	BED 11 2 QTR 2011									X		
L90759-14	BED 12 2 QTR 2011									X		
L90759-15	BED 14 2 QTR 2011									X		
L90759-16	BED 9-10 2 QTR 2011									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L90759

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	MWMP	Number of Containers	Remarks / Comments
Bed 6-8 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011
Bed 13 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011

L90759 Chain of Custody

Sampled By:
Justin Eatchel

Sampler's Signature:

Total Number of Containers: 2

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 11 107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard 9-19-11

Received By: Date / Time:
9-22-11

Method of Shipment:
~~UPS~~

Comments:
15.30

L90759

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP Modified Neutral Ph	Number of Containers	Remarks / Comments
Bed 11 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011
Bed 12 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011
Bed 14 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011
Bed 9-10 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011
Bed 6-8 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011
Bed 13 3 Qtr 2011	9/12/11		x	1	Centennial Pit 2011

Sampled By:
Justin Eatchel

Total Number of Containers: 6

Sampler's Signature:

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard 9-19-11

Received By: Date / Time:
9-21-11 15:30

Method of Shipment:
~~UPS~~ CLJ DOMINION

Comments:
This is a modified analysis using neutral pH leachate

WILL CALL TO VERIFY PROCEDURE

2

L90759

Lisbon Valley Mining Co.	**Chain of Custody Record**
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
Bed 6-8 1 Qtr 2011	3/22/11		x	1	Centennial Pit 2011
Bed 9-10 1 Qtr 2011	3/22/11		x	1	Centennial Pit 2011
Bed 14 1 Qtr 2011	3/22/11		x	1	Centennial Pit 2011
Bed 12 1 Qtr 2011	3/22/11		x	1	Centennial Pit 2011
Bed 11 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011
Bed 12 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011
Bed 14 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011
Bed 9-10 2 Qtr 2011	6/21/11		x	1	Centennial Pit 2011

Sampled By:
Justin Eatchel

Sampler's Signature: Justin Eatchel

Total Number of Containers: 8

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 11 107 Fax: (435) 686-2223

Relinquished By: Lantz Indergard — Date / Time: 9-15-11

Received By: [illegible] — Date / Time: 9-21-11 15:30

Method of Shipment: ~~UPS~~ Chris Dominick

Comments:

LL 9-15-11

3

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

Analytical Report

November 21, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L91422

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 20, 2011. This project has been assigned to ACZ's project number, L91422. 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 L91422. 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 21, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five 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

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 3 QTR 2011

ACZ Sample ID: ***L91422-01***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/11/11 21:43	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:05	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/09/11 16:05	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:05	jjc
Molybdenum (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	11/09/11 16:05	jjc
Selenium (MWMT)	M6010B ICP	0.11	B		mg/L	0.06	0.3	11/09/11 16:05	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0015		*	mg/L	0.0001	0.0005	11/11/11 21:43	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:05	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4993.8			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		28			hrs			11/04/11 0:00	ndj
Leachate pH		7.47			units			11/04/11 0:00	ndj
Leachate Volume		5129.9			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		65.2			%			11/04/11 0:00	ndj
Retained Moisture		14.7			%			11/04/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 3 QTR 2011

ACZ Sample ID: ***L91422-02***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/11/11 21:45	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:11	jjc
Cadmium (MWMT)	M6010B ICP	0.073			mg/L	0.005	0.02	11/09/11 16:11	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:11	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.01	0.05	11/09/11 16:11	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:11	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0069		*	mg/L	0.0001	0.0005	11/11/11 21:45	pmc
Zinc (MWMT)	M6010B ICP	0.12			mg/L	0.01	0.05	11/09/11 16:11	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4901.3			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		26.5			hrs			11/04/11 0:00	ndj
Leachate pH		7.77			units			11/04/11 0:00	ndj
Leachate Volume		4914.6			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		0			%			11/04/11 0:00	ndj
Retained Moisture		18.0			%			11/04/11 0:00	ndj

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 3 QTR 2011

ACZ Sample ID: ***L91422-03***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0004	0.002	11/11/11 21:48	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:14	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/09/11 16:14	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:14	jjc
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	11/09/11 16:14	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:14	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0173		*	mg/L	0.0001	0.0005	11/11/11 21:48	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:14	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4964.1			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		30			hrs			11/04/11 0:00	ndj
Leachate pH		8.18			units			11/04/11 0:00	ndj
Leachate Volume		4964.4			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		11.7			%			11/04/11 0:00	ndj
Retained Moisture		16.2			%			11/04/11 0:00	ndj

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 3 QTR 2011

ACZ Sample ID: ***L91422-04***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0004	0.002	11/11/11 21:50	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:23	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/09/11 16:23	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:23	jjc
Molybdenum (MWMT)	M6010B ICP	0.06		*	mg/L	0.01	0.05	11/09/11 16:23	jjc
Selenium (MWMT)	M6010B ICP	0.11	B		mg/L	0.06	0.3	11/09/11 16:23	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0030		*	mg/L	0.0001	0.0005	11/11/11 21:50	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	11/09/11 16:23	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4955.9			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		30.5			hrs			11/04/11 0:00	ndj
Leachate pH		7.35			units			11/04/11 0:00	ndj
Leachate Volume		4959.6			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		11.4			%			11/04/11 0:00	ndj
Retained Moisture		20.6			%			11/04/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 3 QTR 2011

ACZ Sample ID: ***L91422-05***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/11/11 21:53	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:26	jjc
Cadmium (MWMT)	M6010B ICP	0.024			mg/L	0.005	0.02	11/09/11 16:26	jjc
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	11/09/11 16:26	jjc
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/09/11 16:26	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:26	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0177		*	mg/L	0.0001	0.0005	11/11/11 21:53	pmc
Zinc (MWMT)	M6010B ICP	9.88			mg/L	0.01	0.05	11/09/11 16:26	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4955.8			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		28			hrs			11/04/11 0:00	ndj
Leachate pH		4.51			units			11/04/11 0:00	ndj
Leachate Volume		5008			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		16.7			%			11/04/11 0:00	ndj
Retained Moisture		15.4			%			11/04/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 3 QTR 2011

ACZ Sample ID: ***L91422-06***
Date Sampled: *10/05/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/11/11 21:55	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:29	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	11/09/11 16:29	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:29	jjc
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	11/09/11 16:29	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/09/11 16:29	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0007		*	mg/L	0.0001	0.0005	11/11/11 21:55	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/09/11 16:29	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4998.3			g			11/04/11 0:00	ndj
Extraction pH		5.7			units			11/04/11 0:00	ndj
Extraction Time		32.5			hrs			11/04/11 0:00	ndj
Leachate pH		7.87			units			11/04/11 0:00	ndj
Leachate Volume		4999.1			mL			11/04/11 0:00	ndj
Particle Size over 5 cm		38.3			%			11/04/11 0:00	ndj
Retained Moisture		9.1			%			11/04/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 4 QTR 2011

ACZ Sample ID: ***L91422-07***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/17/11 1:29	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:46	aeb
Cadmium (MWMT)	M6010B ICP	0.011	B	*	mg/L	0.005	0.02	11/16/11 12:46	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 12:46	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 12:46	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:46	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0156			mg/L	0.0001	0.0005	11/17/11 1:29	pmc
Zinc (MWMT)	M6010B ICP	0.24		*	mg/L	0.01	0.05	11/16/11 12:46	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.7			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		27			hrs			11/11/11 0:00	ndj
Leachate pH		6.17			units			11/11/11 0:00	ndj
Leachate Volume		4986.7			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		41.5			%			11/11/11 0:00	ndj
Retained Moisture		13.2			%			11/11/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 4 QTR 2011

ACZ Sample ID: ***L91422-08***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0004	0.002	11/17/11 1:33	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:49	aeb
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	11/16/11 12:49	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 12:49	aeb
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	11/16/11 12:49	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:49	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0079			mg/L	0.0001	0.0005	11/17/11 1:33	pmc
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/16/11 12:49	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4933.6			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		30			hrs			11/11/11 0:00	ndj
Leachate pH		8.02			units			11/11/11 0:00	ndj
Leachate Volume		4948.4			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		11.2			%			11/11/11 0:00	ndj
Retained Moisture		19.1			%			11/11/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011

ACZ Sample ID: ***L91422-09***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/17/11 1:34	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:52	aeb
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	11/16/11 12:52	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 12:52	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 12:52	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 12:52	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0006			mg/L	0.0001	0.0005	11/17/11 1:34	pmc
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/16/11 12:52	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4991.7			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		31.5			hrs			11/11/11 0:00	ndj
Leachate pH		8.52			units			11/11/11 0:00	ndj
Leachate Volume		4991.7			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		48.4			%			11/11/11 0:00	ndj
Retained Moisture		14.1			%			11/11/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 4 QTR 2011

ACZ Sample ID: ***L91422-10***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0014	B		mg/L	0.0004	0.002	11/17/11 1:36	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 13:01	aeb
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	11/16/11 13:01	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 13:01	aeb
Molybdenum (MWMT)	M6010B ICP	0.07			mg/L	0.01	0.05	11/16/11 13:01	aeb
Selenium (MWMT)	M6010B ICP	0.06	B		mg/L	0.06	0.3	11/16/11 13:01	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0020			mg/L	0.0001	0.0005	11/17/11 1:36	pmc
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/16/11 13:01	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4981.9			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		28			hrs			11/11/11 0:00	ndj
Leachate pH		7.5			units			11/11/11 0:00	ndj
Leachate Volume		5051.8			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		8.6			%			11/11/11 0:00	ndj
Retained Moisture		18.4			%			11/11/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 4 QTR 2011

ACZ Sample ID: ***L91422-11***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	11/17/11 1:41	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 13:04	aeb
Cadmium (MWMT)	M6010B ICP	0.358		*	mg/L	0.005	0.02	11/16/11 13:04	aeb
Copper (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	11/16/11 13:04	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 13:04	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 13:04	aeb
Uranium (MWMT)	M6020 ICP-MS	0.996			mg/L	0.001	0.005	11/17/11 21:30	pmc
Zinc (MWMT)	M6010B ICP	33.30		*	mg/L	0.01	0.05	11/16/11 13:04	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4959.5			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		28			hrs			11/11/11 0:00	ndj
Leachate pH		3.6			units			11/11/11 0:00	ndj
Leachate Volume		5034.2			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		20.8			%			11/11/11 0:00	ndj
Retained Moisture		17.7			%			11/11/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 4 QTR 2011

ACZ Sample ID: ***L91422-12***
Date Sampled: *10/12/11 00:00*
Date Received: *10/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	11/17/11 1:46	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 13:10	aeb
Cadmium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.02	11/16/11 13:10	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	11/16/11 13:10	aeb
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	11/16/11 13:10	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	11/16/11 13:10	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0008			mg/L	0.0001	0.0005	11/17/11 1:46	pmc
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/16/11 13:10	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4993.8			g			11/11/11 0:00	ndj
Extraction pH		5.7			units			11/11/11 0:00	ndj
Extraction Time		29			hrs			11/11/11 0:00	ndj
Leachate pH		7.43			units			11/11/11 0:00	ndj
Leachate Volume		4993.8			mL			11/11/11 0:00	ndj
Particle Size over 5 cm		18.6			%			11/11/11 0:00	ndj
Retained Moisture		13.0			%			11/11/11 0:00	ndj

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91422***
Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313464													
WG313464ICV	ICV	11/11/11 20:56	MS111007-2	.02		.02059	mg/L	103	90	110			
WG313464ICB	ICB	11/11/11 20:59				U	mg/L		-0.0012	0.0012			
L91597-05AS	AS	11/11/11 21:30	MS111006-3	.02	.0217	.04422	mg/L	112.6	75	125			
L91597-05ASD	ASD	11/11/11 21:38	MS111006-3	.02	.0217	.04436	mg/L	113.3	75	125	0.32	20	
WG312949PBS	PBS	11/11/11 21:40				U	mg/L		-0.0012	0.0012			
WG313754													
WG313328ICV	ICV	11/17/11 1:19	MS111007-2	.02		.02056	mg/L	102.8	90	110			
WG313754ICB	ICB	11/17/11 1:20				U	mg/L		-0.0012	0.0012			
WG313328PBS	PBS	11/17/11 1:27				U	mg/L		-0.0012	0.0012			
L91422-10AS	AS	11/17/11 1:38	MS111006-3	.01	.0014	.01148	mg/L	100.8	75	125			
L91422-10ASD	ASD	11/17/11 1:39	MS111006-3	.01	.0014	.01193	mg/L	105.3	75	125	3.84	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	4		4.045	mg/L	101.1	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.18	0.18			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.18	0.18			
L91422-03AS	AS	11/09/11 16:17	II111104-3	1	U	1.032	mg/L	103.2	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	1	U	1.027	mg/L	102.7	75	125	0.49	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	4		4.064	mg/L	101.6	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.18	0.18			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.18	0.18			
L91422-09AS	AS	11/16/11 12:55	II111115-2	1	U	1.014	mg/L	101.4	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	1	U	1.029	mg/L	102.9	75	125	1.47	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	2		1.956	mg/L	97.8	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.015	0.015			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.015	0.015			
L91422-03AS	AS	11/09/11 16:17	II111104-3	.5	U	.4894	mg/L	97.9	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	.5	U	.492	mg/L	98.4	75	125	0.53	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	2		1.943	mg/L	97.2	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.015	0.015			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.015	0.015			
L91422-09AS	AS	11/16/11 12:55	II111115-2	.5	U	.4863	mg/L	97.3	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	.5	U	.4887	mg/L	97.7	75	125	0.49	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91422***

Project ID: LISBON VALLEY COPPER

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	2		1.953	mg/L	97.7	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.03	0.03			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.03	0.03			
L91422-03AS	AS	11/09/11 16:17	II111104-3	.5	U	.5	mg/L	100	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	.5	U	.5	mg/L	100	75	125	0	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	2		1.956	mg/L	97.8	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.03	0.03			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.03	0.03			
L91422-09AS	AS	11/16/11 12:55	II111115-2	.5	U	.492	mg/L	98.4	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	.5	U	.49	mg/L	98	75	125	0.41	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	2		2.008	mg/L	100.4	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.03	0.03			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.03	0.03			
L91422-03AS	AS	11/09/11 16:17	II111104-3	.5	.03	.519	mg/L	97.8	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	.5	.03	.522	mg/L	98.4	75	125	0.58	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	2		2.02	mg/L	101	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.03	0.03			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.03	0.03			
L91422-09AS	AS	11/16/11 12:55	II111115-2	.5	U	.519	mg/L	103.8	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	.5	U	.521	mg/L	104.2	75	125	0.38	20	

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	4		4.142	mg/L	103.6	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.18	0.18			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.18	0.18			
L91422-03AS	AS	11/09/11 16:17	II111104-3	1	U	1.004	mg/L	100.4	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	1	U	1.034	mg/L	103.4	75	125	2.94	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	4		4.106	mg/L	102.7	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.18	0.18			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.18	0.18			
L91422-09AS	AS	11/16/11 12:55	II111115-2	1	U	1.07	mg/L	107	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	1	U	1.06	mg/L	106	75	125	0.94	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91422***

Project ID: LISBON VALLEY COPPER

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313464													
WG313464ICV	ICV	11/11/11 20:56	MS111007-2	.05		.05198	mg/L	104	90	110			
WG313464ICB	ICB	11/11/11 20:59				U	mg/L		-0.0003	0.0003			
L91597-01DUP	DUP	11/11/11 21:14			.0064	.00659	mg/L				2.9	20	
L91597-05AS	AS	11/11/11 21:30	MS111006-3	.1	.0254	.13558	mg/L	110.2	75	125			
L91597-05ASD	ASD	11/11/11 21:38	MS111006-3	.1	.0254	.13264	mg/L	107.2	75	125	2.19	20	
WG312949PBS	PBS	11/11/11 21:40				U	mg/L		-0.0003	0.0003			
WG313754													
WG313328ICV	ICV	11/17/11 1:19	MS111007-2	.05		.05182	mg/L	103.6	90	110			
WG313754ICB	ICB	11/17/11 1:20				U	mg/L		-0.0003	0.0003			
WG313328PBS	PBS	11/17/11 1:27				U	mg/L		-0.0003	0.0003			
L91422-10AS	AS	11/17/11 1:38	MS111006-3	.05	.002	.05586	mg/L	107.7	75	125			
L91422-10ASD	ASD	11/17/11 1:39	MS111006-3	.05	.002	.05651	mg/L	109	75	125	1.16	20	
WG313849													
WG313849ICV	ICV	11/17/11 21:20	MS111007-2	.05		.05165	mg/L	103.3	90	110			
WG313849ICB	ICB	11/17/11 21:21				U	mg/L		-0.0003	0.0003			
WG313328PBS	PBS	11/17/11 21:28				U	mg/L		-0.0003	0.0003			
L91422-11AS	AS	11/17/11 21:33	MS111006-3	.5	.996	1.498	mg/L	100.4	75	125			
L91422-11ASD	ASD	11/17/11 21:35	MS111006-3	.5	.996	1.534	mg/L	107.6	75	125	2.37	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313238													
WG313238ICV	ICV	11/09/11 15:46	II111025-1	2		1.961	mg/L	98.1	90	110			
WG313238ICB	ICB	11/09/11 15:49				U	mg/L		-0.03	0.03			
WG312949PBS	PBS	11/09/11 16:02				U	mg/L		-0.03	0.03			
L91422-03AS	AS	11/09/11 16:17	II111104-3	.5	U	.491	mg/L	98.2	75	125			
L91422-03ASD	ASD	11/09/11 16:20	II111104-3	.5	U	.497	mg/L	99.4	75	125	1.21	20	
WG313699													
WG313699ICV	ICV	11/16/11 12:27	II111025-1	2		1.941	mg/L	97.1	90	110			
WG313699ICB	ICB	11/16/11 12:30				U	mg/L		-0.03	0.03			
WG313328PBS	PBS	11/16/11 12:42				U	mg/L		-0.03	0.03			
L91422-09AS	AS	11/16/11 12:55	II111115-2	.5	U	.508	mg/L	101.6	75	125			
L91422-09ASD	ASD	11/16/11 12:58	II111115-2	.5	U	.507	mg/L	101.4	75	125	0.2	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91422***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91422-01	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-02	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-03	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-04	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-05	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-06	WG313238	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG313464	Uranium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
L91422-07	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91422-08	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91422-09	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91422-10	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91422-11	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L91422***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91422-12	WG313699	Cadmium (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Zinc (MWMT)	M6010B ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.

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

Certification Qualifiers

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91422***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L91422
Date Received: 10/20/2011 09:05
Received By: ksj
Date Printed: 10/21/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na14163		9.6	19
Na14162		10.7	19

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L91422
Date Received: 10/20/2011 09:05
Received By: ksj
Date Printed: 10/21/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91422-01	BED 11 3 QTR 2011									X		
L91422-02	BED 12 3 QTR 2011									X		
L91422-03	BED 14 3 QTR 2011									X		
L91422-04	BED 9-10 3 QTR 2011									X		
L91422-05	BED 6-8 3 QTR 2011									X		
L91422-06	BED 13 3 QTR 2011									X		
L91422-07	BED 11 4 QTR 2011									X		
L91422-08	BED 12 4 QTR 2011									X		
L91422-09	BED 14 4 QTR 2011									X		
L91422-10	BED 9-10 4 QTR 2011									X		
L91422-11	BED 6-8 4 QTR 2011									X		
L91422-12	BED 13 4 QTR 2011									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L91422

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
Bed 11 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011
Bed 12 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011
Bed 14 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011
Bed 9-10 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011
Bed 6-8 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011
Bed 13 3 Qtr 2011	10/5/11		x							1	Centennial Pit 2011

Sampled By:
Justin Eatchel

Sampler's Signature

Total Number of Containers: 6

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard
10-12-11

Received By: Date / Time:
10/20/11 0950

Method of Shipment:
UPS

Comments:

L91422 Chain of Custody

L91422

Lisbon Valley Mining Co.

P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	MODIFIED MWMP	Number of Containers	Remarks / Comments
[redacted] 2011	10/12/11		x	1	Centennial Pit 2011
[redacted] 2011	10/12/11		x	1	Centennial Pit 2011
[redacted] 2011	10/12/11		x	1	Centennial Pit 2011
[redacted]	10/12/11		x	1	Centennial Pit 2011
[redacted]	10/12/11		x	1	Centennial Pit 2011
[redacted]	10/12/11		x	1	Centennial Pit 2011

Sampled By:
Justin Eatchel

Sampler's Signature: [signature]

Total Number of Containers: 6

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard
10-12-11

Received By: Date / Time:
WGS 10/20/11 09:05

Method of Shipment:
UPS

Comments:
MODIFIED ANALYSIS INCLUDES
TO. PIT LEACHATE

[signature]

2

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

Analytical Report

December 06, 2011

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L91854

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 11, 2011. This project has been assigned to ACZ's project number, L91854. 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 L91854. 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 06, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 4 QTR 2011

ACZ Sample ID: ***L91854-01***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	12/05/11 12:31	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:33	jjc
Cadmium (MWMT)	M6010B ICP	0.010	B		mg/L	0.005	0.02	12/02/11 16:33	jjc
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	12/02/11 16:33	jjc
Molybdenum (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	12/02/11 16:33	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:16	mfm
Uranium (MWMT)	M6020 ICP-MS	0.0254		*	mg/L	0.0001	0.0005	12/05/11 12:31	msh
Zinc (MWMT)	M6010B ICP	0.46			mg/L	0.01	0.05	12/02/11 16:33	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4996.2			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		31.75			hrs			11/29/11 0:00	ndj
Leachate pH		4.94			units			11/29/11 0:00	ndj
Leachate Volume		5048.1			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		56.9			%			11/29/11 0:00	ndj
Retained Moisture		14.97			%			11/29/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 4 QTR 2011

ACZ Sample ID: ***L91854-02***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0008	B		mg/L	0.0004	0.002	12/05/11 12:39	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:39	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	12/02/11 16:39	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:39	jjc
Molybdenum (MWMT)	M6010B ICP	0.05	B		mg/L	0.01	0.05	12/02/11 16:39	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:19	mfm
Uranium (MWMT)	M6020 ICP-MS	0.0268		*	mg/L	0.0001	0.0005	12/05/11 12:39	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:39	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4953.4			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		32.5			hrs			11/29/11 0:00	ndj
Leachate pH		7.99			units			11/29/11 0:00	ndj
Leachate Volume		4963.2			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		0			%			11/29/11 0:00	ndj
Retained Moisture		17.37			%			11/29/11 0:00	ndj

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011

ACZ Sample ID: ***L91854-03***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	12/05/11 12:42	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:48	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	12/02/11 16:48	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:48	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:48	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:26	mfm
Uranium (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0001	0.0005	12/05/11 12:42	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:48	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4995.4			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		29.5			hrs			11/29/11 0:00	ndj
Leachate pH		8.44			units			11/29/11 0:00	ndj
Leachate Volume		5005.3			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		5.3			%			11/29/11 0:00	ndj
Retained Moisture		14.90			%			11/29/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 4 QTR 2011

ACZ Sample ID: ***L91854-04***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0025			mg/L	0.0004	0.002	12/05/11 13:00	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:51	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	12/02/11 16:51	jjc
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	12/02/11 16:51	jjc
Molybdenum (MWMT)	M6010B ICP	0.15			mg/L	0.01	0.05	12/02/11 16:51	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:29	mfm
Uranium (MWMT)	M6020 ICP-MS	0.0023		*	mg/L	0.0001	0.0005	12/05/11 13:00	msh
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/02/11 16:51	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4973.2			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		29			hrs			11/29/11 0:00	ndj
Leachate pH		7.74			units			11/29/11 0:00	ndj
Leachate Volume		4977.7			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		0			%			11/29/11 0:00	ndj
Retained Moisture		14.34			%			11/29/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 4 QTR 2011

ACZ Sample ID: ***L91854-05***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.002	0.01	12/05/11 13:04	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:54	jjc
Cadmium (MWMT)	M6010B ICP	0.783			mg/L	0.005	0.02	12/02/11 16:54	jjc
Copper (MWMT)	M6010B ICP	0.21			mg/L	0.01	0.05	12/02/11 16:54	jjc
Molybdenum (MWMT)	M6010B ICP	0.08			mg/L	0.01	0.05	12/02/11 16:54	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:39	mfm
Uranium (MWMT)	M6020 ICP-MS	0.5130		*	mg/L	0.0005	0.003	12/05/11 13:04	msh
Zinc (MWMT)	M6010B ICP	25.60			mg/L	0.01	0.05	12/02/11 16:54	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4987.7			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		32			hrs			11/29/11 0:00	ndj
Leachate pH		3.74			units			11/29/11 0:00	ndj
Leachate Volume		5000			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		9.2			%			11/29/11 0:00	ndj
Retained Moisture		13.78			%			11/29/11 0:00	ndj

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 4 QTR 2011

ACZ Sample ID: ***L91854-06***
Date Sampled: *11/09/11 00:00*
Date Received: *11/11/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0010	B		mg/L	0.0004	0.002	12/05/11 13:08	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/02/11 16:58	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	12/02/11 16:58	jjc
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	12/02/11 16:58	jjc
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	12/02/11 16:58	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	12/05/11 12:42	mfm
Uranium (MWMT)	M6020 ICP-MS	0.0010		*	mg/L	0.0001	0.0005	12/05/11 13:08	msh
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	12/02/11 16:58	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4995.9			g			11/29/11 0:00	ndj
Extraction pH		7			units			11/29/11 0:00	ndj
Extraction Time		31.75			hrs			11/29/11 0:00	ndj
Leachate pH		8.42			units			11/29/11 0:00	ndj
Leachate Volume		5050.7			mL			11/29/11 0:00	ndj
Particle Size over 5 cm		0			%			11/29/11 0:00	ndj
Retained Moisture		15.35			%			11/29/11 0:00	ndj

** Please refer to Qualifier Reports for details.*

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91854***

Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314626													
WG314626ICV	ICV	12/05/11 12:09	MS111130-1	.02		.02175	mg/L	108.8	90	110			
WG314626ICB	ICB	12/05/11 12:13				.00054	mg/L		-0.0012	0.0012			
WG314312PBS	PBS	12/05/11 12:28				U	mg/L		-0.0012	0.0012			
L91854-03AS	AS	12/05/11 12:46	MS111130-3	.01	.0006	.00967	mg/L	90.7	75	125			
L91854-03ASD	ASD	12/05/11 12:50	MS111130-3	.01	.0006	.00991	mg/L	93.1	75	125	2.45	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314616													
WG314616ICV	ICV	12/02/11 16:15	II111025-1	4		4.24	mg/L	106	90	110			
WG314616ICB	ICB	12/02/11 16:18				U	mg/L		-0.18	0.18			
WG314312PBS	PBS	12/02/11 16:30				U	mg/L		-0.18	0.18			
L91854-02AS	AS	12/02/11 16:42	II111122-2	1	U	1.093	mg/L	109.3	75	125			
L91854-02ASD	ASD	12/02/11 16:45	II111122-2	1	U	1.086	mg/L	108.6	75	125	0.64	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314616													
WG314616ICV	ICV	12/02/11 16:15	II111025-1	2		2.0431	mg/L	102.2	90	110			
WG314616ICB	ICB	12/02/11 16:18				U	mg/L		-0.015	0.015			
WG314312PBS	PBS	12/02/11 16:30				U	mg/L		-0.015	0.015			
L91854-02AS	AS	12/02/11 16:42	II111122-2	.5	U	.535	mg/L	107	75	125			
L91854-02ASD	ASD	12/02/11 16:45	II111122-2	.5	U	.538	mg/L	107.6	75	125	0.56	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314616													
WG314616ICV	ICV	12/02/11 16:15	II111025-1	2		1.899	mg/L	95	90	110			
WG314616ICB	ICB	12/02/11 16:18				U	mg/L		-0.03	0.03			
WG314312PBS	PBS	12/02/11 16:30				U	mg/L		-0.03	0.03			
L91854-02AS	AS	12/02/11 16:42	II111122-2	.5	U	.47	mg/L	94	75	125			
L91854-02ASD	ASD	12/02/11 16:45	II111122-2	.5	U	.473	mg/L	94.6	75	125	0.64	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314616													
WG314616ICV	ICV	12/02/11 16:15	II111025-1	2		2.019	mg/L	101	90	110			
WG314616ICB	ICB	12/02/11 16:18				U	mg/L		-0.03	0.03			
WG314312PBS	PBS	12/02/11 16:30				U	mg/L		-0.03	0.03			
L91854-02AS	AS	12/02/11 16:42	II111122-2	.5	.05	.534	mg/L	96.8	75	125			
L91854-02ASD	ASD	12/02/11 16:45	II111122-2	.5	.05	.546	mg/L	99.2	75	125	2.22	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L91854***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314677													
WG314677ICV	ICV	12/05/11 11:56	II111025-1	4		4.135	mg/L	103.4	90	110			
WG314677ICB	ICB	12/05/11 11:59				U	mg/L		-0.18	0.18			
WG314312PBS	PBS	12/05/11 12:13				U	mg/L		-0.18	0.18			
L91854-04AS	AS	12/05/11 12:32	II111205-2	1	U	1.012	mg/L	101.2	75	125			
L91854-04ASD	ASD	12/05/11 12:35	II111205-2	1	U	1.04	mg/L	104	75	125	2.73	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314626													
WG314626ICV	ICV	12/05/11 12:09	MS111130-1	.05		.05353	mg/L	107.1	90	110			
WG314626ICB	ICB	12/05/11 12:13				U	mg/L		-0.0003	0.0003			
WG314312PBS	PBS	12/05/11 12:28				U	mg/L		-0.0003	0.0003			
L91854-03AS	AS	12/05/11 12:46	MS111130-3	.05	.0005	.05449	mg/L	108	75	125			
L91854-03ASD	ASD	12/05/11 12:50	MS111130-3	.05	.0005	.05605	mg/L	111.1	75	125	2.82	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314616													
WG314616ICV	ICV	12/02/11 16:15	II111025-1	2		1.961	mg/L	98.1	90	110			
WG314616ICB	ICB	12/02/11 16:18				U	mg/L		-0.03	0.03			
WG314312PBS	PBS	12/02/11 16:30				U	mg/L		-0.03	0.03			
L91854-02AS	AS	12/02/11 16:42	II111122-2	.5	U	.497	mg/L	99.4	75	125			
L91854-02ASD	ASD	12/02/11 16:45	II111122-2	.5	U	.5	mg/L	100	75	125	0.6	20	

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91854***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91854-01	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91854-02	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91854-03	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91854-04	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91854-05	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
L91854-06	WG314626	Uranium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.

Certification Qualifiers

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L91854***

No certification qualifiers associated with this analysis

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L91854
Date Received: 11/11/2011 14:49
Received By: ksj
Date Printed: 11/14/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA14320		2.6	17

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L91854
Date Received: 11/11/2011 14:49
Received By: ksj
Date Printed: 11/14/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91854-01	BED 11 4 QTR 2011									X		
L91854-02	BED 12 4 QTR 2011									X		
L91854-03	BED 14 4 QTR 2011									X		
L91854-04	BED 9-10 4 QTR 2011									X		
L91854-05	BED 6-8 4 QTR 2011									X		
L91854-06	BED 13 4 QTR 2011									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

1

Lisbon Valley Mining Co.	Chain of Custody Record
P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	L 91854 Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE LABEL	DATE	TIME	Modified MWMP							Number of Containers	Remarks / Comments
Bed 11 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011
Bed 12 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011
Bed 14 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011
Bed 9-10 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011
Bed 6-8 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011
Bed 13 4 Qtr 2011	11/9/11		x							1	Centennial Pit 2011

Sampled By: Justin Eatchel	Total Number of Containers: 6
Sampler's Signature: Justin Eatchel	Contact Person: Lantz M Indergard Phone: (435) 686-9950 ext. 107 Fax: (435) 686-2223
Relinquished By: Date / Time: Lantz Indergard 11-9-11	Received By: Date / Time: WGS 11/11/11 16:49
Method of Shipment: UPS OLD DOMINION	Comments: *Mofied Analysis uses pH neutral leach*

L91854 Chain of Custody

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

Analytical Report

February 02, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L92639

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 06, 2012. This project has been assigned to ACZ's project number, L92639. 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 L92639. 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 March 02, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Case Narrative

Lisbon Valley Mining Company, LLC

February 02, 2012

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L92639

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 5 soil samples from Lisbon Valley Mining Company, LLC on January 6, 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 L92639. 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 except for Mercury values flagged with an "H1", which were received from the soil's prep department with too little time remaining of the hold time.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 4QTR 2011

ACZ Sample ID: ***L92639-01***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/19/12 12:02	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/24/12 20:46	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/19/12 12:02	mfm
Barium (MWMT)	M6010B ICP	0.019	B		mg/L	0.003	0.02	01/19/12 12:02	mfm
Beryllium (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:02	mfm
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/19/12 12:02	mfm
Calcium (MWMT)	M6010B ICP	96.1			mg/L	0.2	1	01/19/12 12:02	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/24/12 20:46	pmc
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/19/12 12:02	mfm
Iron (MWMT)	M6010B ICP	0.09			mg/L	0.02	0.05	01/19/12 12:02	mfm
Lead (MWMT)	M6020 ICP-MS	0.0005			mg/L	0.0001	0.0005	01/24/12 20:46	pmc
Magnesium (MWMT)	M6010B ICP	58.6			mg/L	0.2	1	01/19/12 12:02	mfm
Manganese (MWMT)	M6010B ICP	0.611			mg/L	0.005	0.03	01/19/12 12:02	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:49	erf
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	01/19/12 12:02	mfm
Nickel (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/19/12 12:02	mfm
Potassium (MWMT)	M6010B ICP	7.9			mg/L	0.3	2	01/19/12 12:02	mfm
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/25/12 14:27	mfm
Silica (MWMT)	M6010B ICP	1.8	B		mg/L	0.4	2	01/19/12 12:02	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	01/24/12 20:46	pmc
Sodium (MWMT)	M6010B ICP	8.6			mg/L	0.3	2	01/19/12 12:02	mfm
Thallium (MWMT)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	01/24/12 20:46	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0143			mg/L	0.0001	0.0005	01/24/12 20:46	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/19/12 12:02	mfm
Zinc (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	01/19/12 12:02	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		6.2			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		22.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4995.92			g			01/17/12 0:00	mss2
Extraction pH		7			units			01/17/12 0:00	mss2
Extraction Time		25			hrs			01/17/12 0:00	mss2
Leachate pH		6.17			units			01/17/12 0:00	mss2
Leachate Volume		5007.2			mL			01/17/12 0:00	mss2
Particle Size over 5 cm		71.8			%			01/17/12 0:00	mss2
Retained Moisture		7.68			%			01/17/12 0:00	mss2

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 11 4QTR 2011

ACZ Sample ID: ***L92639-01***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		15	B	*	mg/L	2	20	01/20/12 0:00	las
Carbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Hydroxide as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Total Alkalinity		15	B	*	mg/L	2	20	01/20/12 0:00	las
Chloride (MWMT)	SM4500Cl-E	13		*	mg/L	1	5	01/24/12 12:01	lhb
Fluoride (MWMT)	SM4500F-C	0.1	B	*	mg/L	0.1	0.5	01/20/12 12:23	las
Sulfate (MWMT)	D516-02 - Turbidimetric	460		*	mg/L	20	100	01/23/12 16:12	tcd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 4QTR 2011

ACZ Sample ID: ***L92639-02***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/19/12 12:05	mfm
Antimony (MWMT)	M6020 ICP-MS	0.0017	B		mg/L	0.0004	0.002	01/24/12 20:48	pmc
Arsenic (MWMT)	M6010B ICP		U	*	mg/L	0.1	0.6	01/25/12 14:30	mfm
Barium (MWMT)	M6010B ICP	0.010	B		mg/L	0.003	0.02	01/19/12 12:05	mfm
Beryllium (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:05	mfm
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/19/12 12:05	mfm
Calcium (MWMT)	M6010B ICP	144			mg/L	0.2	1	01/19/12 12:05	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/24/12 20:48	pmc
Copper (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	01/19/12 12:05	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/19/12 12:05	mfm
Lead (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	01/24/12 20:48	pmc
Magnesium (MWMT)	M6010B ICP	53.7			mg/L	0.2	1	01/19/12 12:05	mfm
Manganese (MWMT)	M6010B ICP	0.042			mg/L	0.005	0.03	01/19/12 12:05	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:51	erf
Molybdenum (MWMT)	M6010B ICP	0.12		*	mg/L	0.01	0.05	01/19/12 12:05	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:05	mfm
Potassium (MWMT)	M6010B ICP	42.5			mg/L	0.3	2	01/19/12 12:05	mfm
Selenium (MWMT)	M6010B ICP		U	*	mg/L	0.1	0.6	01/25/12 14:30	mfm
Silica (MWMT)	M6010B ICP	6.6			mg/L	0.4	2	01/19/12 12:05	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	01/24/12 20:48	pmc
Sodium (MWMT)	M6010B ICP	75.3			mg/L	0.3	2	01/19/12 12:05	mfm
Thallium (MWMT)	M6020 ICP-MS	0.0007		*	mg/L	0.0001	0.0005	01/24/12 20:48	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0673			mg/L	0.0001	0.0005	01/24/12 20:48	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/19/12 12:05	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:05	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.3			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		22.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4915.17			g			01/17/12 0:00	mss2
Extraction pH		7			units			01/17/12 0:00	mss2
Extraction Time		26.25			hrs			01/17/12 0:00	mss2
Leachate pH		7.3			units			01/17/12 0:00	mss2
Leachate Volume		4993.7			mL			01/17/12 0:00	mss2
Particle Size over 5 cm		0			%			01/17/12 0:00	mss2
Retained Moisture		23.70			%			01/17/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 12 4QTR 2011

ACZ Sample ID: ***L92639-02***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		124		*	mg/L	2	20	01/20/12 0:00	las
Carbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Hydroxide as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Total Alkalinity		124		*	mg/L	2	20	01/20/12 0:00	las
Chloride (MWMT)	SM4500Cl-E	130		*	mg/L	10	50	01/24/12 12:09	lhb
Fluoride (MWMT)	SM4500F-C	2.2		*	mg/L	0.1	0.5	01/20/12 12:26	las
Sulfate (MWMT)	D516-02 - Turbidimetric	410		*	mg/L	50	300	01/23/12 16:08	tcd

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 4QTR 2011

ACZ Sample ID: ***L92639-04***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/19/12 12:11	mfm
Antimony (MWMT)	M6020 ICP-MS	0.0023			mg/L	0.0004	0.002	01/24/12 20:53	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/19/12 12:11	mfm
Barium (MWMT)	M6010B ICP	0.021			mg/L	0.003	0.02	01/19/12 12:11	mfm
Beryllium (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:11	mfm
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/19/12 12:11	mfm
Calcium (MWMT)	M6010B ICP	275			mg/L	0.2	1	01/19/12 12:11	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/24/12 20:53	pmc
Copper (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/19/12 12:11	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/19/12 12:11	mfm
Lead (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	01/24/12 20:53	pmc
Magnesium (MWMT)	M6010B ICP	103			mg/L	0.2	1	01/19/12 12:11	mfm
Manganese (MWMT)	M6010B ICP	0.089			mg/L	0.005	0.03	01/19/12 12:11	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:53	erf
Molybdenum (MWMT)	M6010B ICP	0.19		*	mg/L	0.01	0.05	01/19/12 12:11	mfm
Nickel (MWMT)	M6010B ICP	0.09			mg/L	0.01	0.05	01/19/12 12:11	mfm
Potassium (MWMT)	M6010B ICP	32.7			mg/L	0.3	2	01/19/12 12:11	mfm
Selenium (MWMT)	M6010B ICP	0.08	B		mg/L	0.06	0.3	01/25/12 14:33	mfm
Silica (MWMT)	M6010B ICP	5.2			mg/L	0.4	2	01/19/12 12:11	mfm
Silver (MWMT)	M6020 ICP-MS	0.00017	B		mg/L	0.00005	0.0003	01/24/12 20:53	pmc
Sodium (MWMT)	M6010B ICP	26.4			mg/L	0.3	2	01/19/12 12:11	mfm
Thallium (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0001	0.0005	01/24/12 20:53	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0253			mg/L	0.0001	0.0005	01/24/12 20:53	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/19/12 12:11	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:11	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.0			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		22.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4760.01			g			01/17/12 0:00	mss2
Extraction pH		7			units			01/17/12 0:00	mss2
Extraction Time		25			hrs			01/17/12 0:00	mss2
Leachate pH		7			units			01/17/12 0:00	mss2
Leachate Volume		4833.3			mL			01/17/12 0:00	mss2
Particle Size over 5 cm		9.39			%			01/17/12 0:00	mss2
Retained Moisture		19.24			%			01/17/12 0:00	mss2

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 9-10 4QTR 2011

ACZ Sample ID: ***L92639-04***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		62		*	mg/L	2	20	01/20/12 0:00	las
Carbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Hydroxide as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Total Alkalinity		62		*	mg/L	2	20	01/20/12 0:00	las
Chloride (MWMT)	SM4500Cl-E	55		*	mg/L	1	5	01/24/12 12:01	lhb
Fluoride (MWMT)	SM4500F-C	0.8		*	mg/L	0.1	0.5	01/20/12 12:40	las
Sulfate (MWMT)	D516-02 - Turbidimetric	950		*	mg/L	50	300	01/23/12 16:08	tcd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 4QTR 2011

ACZ Sample ID: ***L92639-05***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	18.20			mg/L	0.03	0.2	01/19/12 12:20	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/24/12 21:01	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/19/12 12:20	mfm
Barium (MWMT)	M6010B ICP	0.018	B		mg/L	0.003	0.02	01/19/12 12:20	mfm
Beryllium (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/19/12 12:20	mfm
Cadmium (MWMT)	M6010B ICP	1.070			mg/L	0.005	0.02	01/19/12 12:20	mfm
Calcium (MWMT)	M6010B ICP	117			mg/L	0.2	1	01/19/12 12:20	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/24/12 21:01	pmc
Copper (MWMT)	M6010B ICP	0.34			mg/L	0.01	0.05	01/19/12 12:20	mfm
Iron (MWMT)	M6010B ICP	8.05			mg/L	0.02	0.05	01/19/12 12:20	mfm
Lead (MWMT)	M6020 ICP-MS	0.0456			mg/L	0.0001	0.0005	01/24/12 21:01	pmc
Magnesium (MWMT)	M6010B ICP	32.6			mg/L	0.2	1	01/19/12 12:20	mfm
Manganese (MWMT)	M6010B ICP	1.210			mg/L	0.005	0.03	01/19/12 12:20	mfm
Mercury (MWMT)	M7470 CVAA		UH	*	mg/L	0.0002	0.001	01/25/12 22:56	erf
Molybdenum (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	01/19/12 12:20	mfm
Nickel (MWMT)	M6010B ICP	0.24			mg/L	0.01	0.05	01/19/12 12:20	mfm
Potassium (MWMT)	M6010B ICP	10.0			mg/L	0.3	2	01/19/12 12:20	mfm
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/25/12 14:40	mfm
Silica (MWMT)	M6010B ICP	8.7			mg/L	0.4	2	01/19/12 12:20	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	01/24/12 21:01	pmc
Sodium (MWMT)	M6010B ICP	9.5			mg/L	0.3	2	01/19/12 12:20	mfm
Thallium (MWMT)	M6020 ICP-MS	0.0024		*	mg/L	0.0001	0.0005	01/24/12 21:01	pmc
Uranium (MWMT)	M6020 ICP-MS	0.726			mg/L	0.001	0.005	01/31/12 0:29	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/19/12 12:20	mfm
Zinc (MWMT)	M6010B ICP	14.20			mg/L	0.01	0.05	01/19/12 12:20	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		4.1			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		22.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4986.65			g			01/18/12 0:00	mss2
Extraction pH		7			units			01/18/12 0:00	mss2
Extraction Time		25.5			hrs			01/18/12 0:00	mss2
Leachate pH		4.06			units			01/18/12 0:00	mss2
Leachate Volume		5040.9			mL			01/18/12 0:00	mss2
Particle Size over 5 cm		41.39			%			01/18/12 0:00	mss2
Retained Moisture		9.69			%			01/18/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 6-8 4QTR 2011

ACZ Sample ID: ***L92639-05***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Carbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Hydroxide as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Total Alkalinity			U	*	mg/L	2	20	01/20/12 0:00	las
Chloride (MWMT)	SM4500Cl-E	4	B	*	mg/L	1	5	01/24/12 12:01	lhb
Fluoride (MWMT)	SM4500F-C	0.5		*	mg/L	0.1	0.5	01/20/12 13:01	las
Sulfate (MWMT)	D516-02 - Turbidimetric	560		*	mg/L	20	100	01/23/12 16:12	tcd

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 4QTR 2011

ACZ Sample ID: ***L92639-06***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.09	B		mg/L	0.03	0.2	01/19/12 12:23	mfm
Antimony (MWMT)	M6020 ICP-MS	0.0012	B		mg/L	0.0004	0.002	01/24/12 21:03	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/19/12 12:23	mfm
Barium (MWMT)	M6010B ICP	0.021			mg/L	0.003	0.02	01/19/12 12:23	mfm
Beryllium (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:23	mfm
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/19/12 12:23	mfm
Calcium (MWMT)	M6010B ICP	20.3			mg/L	0.2	1	01/19/12 12:23	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/24/12 21:03	pmc
Copper (MWMT)	M6010B ICP	0.17			mg/L	0.01	0.05	01/19/12 12:23	mfm
Iron (MWMT)	M6010B ICP	0.02	B		mg/L	0.02	0.05	01/19/12 12:23	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/24/12 21:03	pmc
Magnesium (MWMT)	M6010B ICP	5.2			mg/L	0.2	1	01/19/12 12:23	mfm
Manganese (MWMT)	M6010B ICP	0.006	B		mg/L	0.005	0.03	01/19/12 12:23	mfm
Mercury (MWMT)	M7470 CVAA		UH	*	mg/L	0.0002	0.001	01/25/12 22:58	erf
Molybdenum (MWMT)	M6010B ICP	0.03	B	*	mg/L	0.01	0.05	01/19/12 12:23	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:23	mfm
Potassium (MWMT)	M6010B ICP	13.2			mg/L	0.3	2	01/19/12 12:23	mfm
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	01/25/12 14:50	mfm
Silica (MWMT)	M6010B ICP	9.2			mg/L	0.4	2	01/19/12 12:23	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	01/24/12 21:03	pmc
Sodium (MWMT)	M6010B ICP	13.2			mg/L	0.3	2	01/19/12 12:23	mfm
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	01/24/12 21:03	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0081			mg/L	0.0001	0.0005	01/24/12 21:03	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/19/12 12:23	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/19/12 12:23	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.0			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		22.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5000.37			g			01/18/12 0:00	mss2
Extraction pH		7			units			01/18/12 0:00	mss2
Extraction Time		25.5			hrs			01/18/12 0:00	mss2
Leachate pH		6.95			units			01/18/12 0:00	mss2
Leachate Volume		5152			mL			01/18/12 0:00	mss2
Particle Size over 5 cm		24.19			%			01/18/12 0:00	mss2
Retained Moisture		12.10			%			01/18/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 4QTR 2011

ACZ Sample ID: ***L92639-06***
Date Sampled: *12/20/11 00:00*
Date Received: *01/06/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		57		*	mg/L	2	20	01/20/12 0:00	las
Carbonate as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Hydroxide as CaCO3			U	*	mg/L	2	20	01/20/12 0:00	las
Total Alkalinity		57		*	mg/L	2	20	01/20/12 0:00	las
Chloride (MWMT)	SM4500Cl-E	15		*	mg/L	1	5	01/24/12 12:01	lhb
Fluoride (MWMT)	SM4500F-C	0.6		*	mg/L	0.1	0.5	01/20/12 13:06	las
Sulfate (MWMT)	D516-02 - Turbidimetric	50		*	mg/L	10	50	01/23/12 16:02	tcd

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***
Project ID: LISBON VALLEY COPPER

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317073													
WG317073PBW	PBW	01/20/12 11:10				2.6	mg/L		-20	20			
WG317073LCSW1	LCSW	01/20/12 11:21	WC120109-	820.0001		769.1	mg/L	93.8	90	110			
L92639-06DUP	DUP	01/20/12 12:00			57	52.9	mg/L				7.5	20	
WG317073LCSW2	LCSW	01/20/12 12:10	WC120109-	820.0001		766.9	mg/L	93.5	90	110			

Aluminum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		2.029	mg/L	101.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.09	0.09			
L92639-04AS	AS	01/19/12 12:14	II120104-2	1	U	1.025	mg/L	102.5	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	1	U	.997	mg/L	99.7	75	125	2.77	20	

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.02		.02066	mg/L	103.3	90	110			
WG317276ICB	ICB	01/24/12 20:32				.00048	mg/L		-0.0012	0.0012			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.0012	0.0012			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.01	.0023	.01236	mg/L	100.6	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.01	.0023	.01276	mg/L	104.6	75	125	3.18	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	4		3.983	mg/L	99.6	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.18	0.18			
L92639-04AS	AS	01/19/12 12:14	II120104-2	1	U	1.147	mg/L	114.7	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	1	U	1.212	mg/L	121.2	75	125	5.51	20	
WG317299													
WG317299ICV	ICV	01/25/12 14:11	II120112-3	4		4.087	mg/L	102.2	90	110			
WG317299ICB	ICB	01/25/12 14:14				U	mg/L		-0.18	0.18			
L92639-05AS	AS	01/25/12 14:43	II120125-2	1	U	1.038	mg/L	103.8	75	125			
L92639-05ASD	ASD	01/25/12 14:46	II120125-2	1	U	1.058	mg/L	105.8	75	125	1.91	20	

Barium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		2.0302	mg/L	101.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.009	0.009			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	.021	.5254	mg/L	100.9	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	.021	.5172	mg/L	99.2	75	125	1.57	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***
Project ID: LISBON VALLEY COPPER

Beryllium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.987	mg/L	99.4	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.03	0.03			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	U	.525	mg/L	105	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	U	.519	mg/L	103.8	75	125	1.15	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.8161	mg/L	90.8	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.015	0.015			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	U	.5309	mg/L	106.2	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	U	.5403	mg/L	108.1	75	125	1.76	20	

Calcium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	100		94.5	mg/L	94.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.6	0.6			
L92639-04AS	AS	01/19/12 12:14	II120104-2	67.99734	275	341.52	mg/L	97.8	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	67.99734	275	347.85	mg/L	107.1	75	125	1.84	20	

Chloride (MWMT) SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317238													
WG317238ICB	ICB	01/24/12 9:50				U	mg/L		-3	3			
WG317238ICV	ICV	01/24/12 9:50	WI111110-3	55.11		59.9	mg/L	108.7	90	110			
WG317238LFB	LFB	01/24/12 12:00	WI111130-1	30.03		32.6	mg/L	108.6	90	110			
WG316817PBS	PBS	01/24/12 12:01				U	mg/L		-3	3			
L92639-01AS	AS	01/24/12 12:01	WI111130-1	30.03	13	44.6	mg/L	105.2	90	110			

Chromium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.05		.05065	mg/L	101.3	90	110			
WG317276ICB	ICB	01/24/12 20:32				U	mg/L		-0.0015	0.0015			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.0015	0.0015			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.05005	U	.04828	mg/L	96.5	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.05005	U	.0501	mg/L	100.1	75	125	3.7	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.933	mg/L	96.7	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.03	0.03			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	.02	.53	mg/L	102	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	.02	.522	mg/L	100.4	75	125	1.52	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***
Project ID: LISBON VALLEY COPPER

Fluoride (MWMT) SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317074													
WG317074ICV	ICV	01/20/12 11:50	WC120119-	2.002		1.92	mg/L	95.9	95	105			
WG317074ICB	ICB	01/20/12 11:57				U	mg/L		-0.3	0.3			
WG317074LFB	LFB	01/20/12 12:09	WC110818-	5.005		4.89	mg/L	97.7	90	110			
WG316817PBS	PBS	01/20/12 12:15				U	mg/L		-0.3	0.3			
L92639-02AS	AS	01/20/12 12:30	WC110818-	5.005	2.2	7.05	mg/L	96.9	90	110			
L92639-02DUP	DUP	01/20/12 12:33			2.2	2.16	mg/L				1.8	20	

Iron (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.962	mg/L	98.1	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.06	0.06			
L92639-04AS	AS	01/19/12 12:14	II120104-2	1	U	1.042	mg/L	104.2	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	1	U	1.034	mg/L	103.4	75	125	0.77	20	

Lead (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.05		.05082	mg/L	101.6	90	110			
WG317276ICB	ICB	01/24/12 20:32				U	mg/L		-0.0003	0.0003			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.0003	0.0003			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.05005	.0001	.05105	mg/L	101.8	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.05005	.0001	.0528	mg/L	105.3	75	125	3.37	20	

Magnesium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	100		98.66	mg/L	98.7	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.6	0.6			
L92639-04AS	AS	01/19/12 12:14	II120104-2	50.0051	103	158.18	mg/L	110.3	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	50.0051	103	161.57	mg/L	117.1	75	125	2.12	20	

Manganese (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.9309	mg/L	96.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.015	0.015			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	.089	.5925	mg/L	100.7	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	.089	.5898	mg/L	100.2	75	125	0.46	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***

Project ID: LISBON VALLEY COPPER

Mercury (MWMT) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317189													
WG317189ICV	ICV	01/25/12 16:38	II120112-6	.005015		.00497	mg/L	99.1	95	105			
WG317189ICB	ICB	01/25/12 16:41				U	mg/L		-0.0002	0.0002			
WG317349													
WG317349PBW	PBW	01/25/12 22:17				U	mg/L		-0.00044	0.00044			
WG317349LCSW	LCSW	01/25/12 22:19	II120112-6	.005015		.0059	mg/L	117.6	85	115			LA
WG316817PBS	PBS	01/25/12 22:47				U	mg/Kg		-0.0006	0.0006			
L92639-06MS	MS	01/25/12 23:00	II111230-2	.002002	U	.00221	mg/L	110.4	85	115			
L92639-06MSD	MSD	01/25/12 23:03	II111230-2	.002002	U	.00206	mg/L	102.9	85	115	7.03	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.997	mg/L	99.9	90	110			
WG317009ICB	ICB	01/19/12 11:50				.013	mg/L		-0.03	0.03			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	.19	.738	mg/L	109.6	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	.19	.734	mg/L	108.8	75	125	0.54	20	

Nickel (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2.002		1.93	mg/L	96.4	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.03	0.03			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	.09	.588	mg/L	99.6	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	.09	.584	mg/L	98.8	75	125	0.68	20	

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317084													
WG317084ICV	ICV	01/20/12 10:18	PCN37501	4		4.01	units	100.3	97	103			
L92639-01DUP	DUP	01/20/12 10:36			6.2	6.17	units				0.5	20	

Potassium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	20		19.61	mg/L	98.1	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.9	0.9			
L92639-04AS	AS	01/19/12 12:14	II120104-2	99.97161	32.7	133.63	mg/L	101	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	99.97161	32.7	132.27	mg/L	99.6	75	125	1.02	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***
Project ID: LISBON VALLEY COPPER

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317299													
WG317299ICV	ICV	01/25/12 14:11	II120112-3	4		4.065	mg/L	101.6	90	110			
WG317299ICB	ICB	01/25/12 14:14				U	mg/L		-0.18	0.18			
L92639-05AS	AS	01/25/12 14:43	II120125-2	1	U	1.03	mg/L	103	75	125			
L92639-05ASD	ASD	01/25/12 14:46	II120125-2	1	U	.985	mg/L	98.5	75	125	4.47	20	

Silica (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	42.8		40.76	mg/L	95.2	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-1.2	1.2			
L92639-04AS	AS	01/19/12 12:14	II120104-2	21.4	5.2	27.01	mg/L	101.9	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	21.4	5.2	26.73	mg/L	100.6	75	125	1.04	20	

Silver (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.01996		.01952	mg/L	97.8	90	110			
WG317276ICB	ICB	01/24/12 20:32				U	mg/L		-0.00015	0.00015			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.00015	0.00015			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.01002	.00017	.008788	mg/L	86	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.01002	.00017	.008917	mg/L	87.3	75	125	1.46	20	

Sodium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	100		99.54	mg/L	99.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.9	0.9			
L92639-04AS	AS	01/19/12 12:14	II120104-2	100.018	26.4	126.71	mg/L	100.3	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	100.018	26.4	125.18	mg/L	98.8	75	125	1.21	20	

Sulfate (MWMT) D516-02 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317174													
WG317174ICB	ICB	01/23/12 15:37				U	mg/L		-3	3			
WG317174ICV	ICV	01/23/12 15:37	WI120112-1	20		19.8	mg/L	99	90	110			
WG317174LFB	LFB	01/23/12 16:02	WI111111-3	10.03		9.8	mg/L	97.7	90	110			
WG316817PBS	PBS	01/23/12 16:02				U	mg/L		-3	3			
L92639-02AS	AS	01/23/12 16:08	SO4TURB5	100	410	518	mg/L	108	90	110			
L92639-01DUP	DUP	01/23/12 16:12			460	465	mg/L				1.1	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***

Project ID: LISBON VALLEY COPPER

Thallium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.05		.05273	mg/L	105.5	90	110			
WG317276ICB	ICB	01/24/12 20:32				U	mg/L		-0.0003	0.0003			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.0003	0.0003			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.05005	.0004	.05314	mg/L	105.4	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.05005	.0004	.05556	mg/L	110.2	75	125	4.45	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317276													
WG317276ICV	ICV	01/24/12 20:30	MS120109-1	.05		.05207	mg/L	104.1	90	110			
WG317276ICB	ICB	01/24/12 20:32				U	mg/L		-0.0003	0.0003			
WG316817PBS	PBS	01/24/12 20:43				U	mg/L		-0.0003	0.0003			
L92639-04AS	AS	01/24/12 20:56	MS120109-3	.05	.0253	.07761	mg/L	104.6	75	125			
L92639-04ASD	ASD	01/24/12 20:58	MS120109-3	.05	.0253	.08042	mg/L	110.2	75	125	3.56	20	
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.05		.05321	mg/L	106.4	90	110			
WG317584ICB	ICB	01/30/12 23:40				U	mg/L		-0.0003	0.0003			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.05	.0036	.0576	mg/L	108	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.05	.0036	.05705	mg/L	106.9	75	125	0.96	20	
WG316817PBS	PBS	01/31/12 0:27				U	mg/L		-0.0003	0.0003			

Vanadium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		2.0641	mg/L	103.2	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.015	0.015			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	U	.5282	mg/L	105.6	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	U	.525	mg/L	105	75	125	0.61	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317009													
WG317009ICV	ICV	01/19/12 11:47	II120112-3	2		1.91	mg/L	95.5	90	110			
WG317009ICB	ICB	01/19/12 11:50				U	mg/L		-0.03	0.03			
L92639-04AS	AS	01/19/12 12:14	II120104-2	.5	U	.516	mg/L	103.2	75	125			
L92639-04ASD	ASD	01/19/12 12:17	II120104-2	.5	U	.511	mg/L	102.2	75	125	0.97	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92639-01	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317009	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317276	Thallium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG317238	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
	WG317174	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
L92639-02	WG317299	Arsenic (MWMT)	M6010B ICP	DB	Sample required dilution due to low bias result.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317009	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317299	Selenium (MWMT)	M6010B ICP	DB	Sample required dilution due to low bias result.
	WG317276	Thallium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG317238	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
	WG317174	Sulfate (MWMT)	D516-02 - Turbidimetric	D1	Sample required dilution due to matrix.
			D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
L92639-04	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317009	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317276	Thallium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG317238	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
	WG317174	Sulfate (MWMT)	D516-02 - Turbidimetric	D1	Sample required dilution due to matrix.
			D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92639***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92639-05	WG317349	Mercury (MWMT)	M7470 CVAA	H1	Sample prep or analysis performed past holding time. See case narrative.
			M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317009	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317276	Thallium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG317238	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
	WG317174	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
L92639-06	WG317349	Mercury (MWMT)	M7470 CVAA	H1	Sample prep or analysis performed past holding time. See case narrative.
			M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317009	Molybdenum (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317276	Thallium (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG317238	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
	WG317174	Sulfate (MWMT)	D516-02 - Turbidimetric	D1	Sample required dilution due to matrix.
			D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

Wet Chemistry

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

Bicarbonate as CaCO3	SM2320B - Titration
Carbonate as CaCO3	SM2320B - Titration
Chloride (MWMT)	SM4500Cl-E
Fluoride (MWMT)	SM4500F-C
Hydroxide as CaCO3	SM2320B - Titration
Sulfate (MWMT)	D516-02 - Turbidimetric
Total Alkalinity	SM2320B - Titration

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L92639
Date Received: 01/06/2012 10:26
Received By: gac
Date Printed: 1/6/2012

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na14622		12.6	17

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L92639
Date Received: 01/06/2012 10:26
Received By: gac
Date Printed: 1/6/2012

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L92639-01	BED 11 4QTR 2011									X		
L92639-02	BED 12 4QTR 2011									X		
L92639-03	BED 14 4QTR 2011									X		
L92639-04	BED 9-10 4QTR 2011									X		
L92639-05	BED 6-8 4QTR 2011									X		
L92639-06	BED 13 4QTR 2011									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: gac

L92639

Lisbon Valley Mining Co.
P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:
920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	Modified MWMP							Number of Containers	Remarks / Comments
Bed 11 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011
Bed 12 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011
Bed 14 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011
Bed 9-10 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011
Bed 6-8 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011
Bed 13 4 Qtr 2011	12/20/11		x							1	Centennial Pit 2011

Sampled By:
Justin Eatchel

Total Number of Containers: 6

Sampler's Signature

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1 107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard

Received By: Date / Time:
1-6-12 10:26

Method of Shipment:
Old Dominion
1-5-12

Comments:
Extended Analysis uses pH neutral leach and expanded analytical s
Call Lantz Indergard 435 686 9950 #107 to discuss.

L92639 Chain of Custody

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

Revised Analytical Report

February 16, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L92731

Lantz Indergard:

Enclosed are revised analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on January 11, 2012 and originally reported on February 03, 2012. Refer to the case narrative for an explanation of the changes. This project was assigned to ACZ's project number, L92731. 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 L92731. 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 March 03, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC

February 16, 2012

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L92731

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 8 soil samples from Lisbon Valley Mining Company, LLC on January 11, 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 L92731. 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 parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following anomaly required further explanation not provided by the Extended Qualifier Report:

1. For Extraction data flagged with an "N1", the extraction fluid and column method were modified per the client. A pH of 7 was used on all samples. Samples -02, -03 and -04 were the 2nd, 3rd and 4th flushes through the sample column as sample -01. Samples -06, -07 and -08 were the 2nd, 3rd and 4th flushes through the sample column as sample -05.

This report was revised on 02/16/12 to report Arsenic, Beryllium and Selenium by ICPMS instead of ICP. No other changes were made.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012

ACZ Sample ID: ***L92731-01***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/25/12 20:52	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/30/12 23:53	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 20:50	pmc
Barium (MWMT)	M6010B ICP	0.023		*	mg/L	0.003	0.02	01/25/12 15:46	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 20:50	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 15:46	mfm
Calcium (MWMT)	M6010B ICP	121			mg/L	0.2	1	01/25/12 15:46	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/30/12 23:53	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:46	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/25/12 15:46	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/30/12 23:53	pmc
Magnesium (MWMT)	M6010B ICP	29.0			mg/L	0.2	1	01/25/12 15:46	mfm
Manganese (MWMT)	M6010B ICP	0.427			mg/L	0.005	0.03	01/25/12 15:46	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:23	erf
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:46	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:46	mfm
Potassium (MWMT)	M6010B ICP	5.5		*	mg/L	0.3	2	01/25/12 15:46	mfm
Selenium (MWMT)	M6020 ICP-MS	0.0033			mg/L	0.0001	0.0003	02/14/12 20:50	pmc
Silica (MWMT)	M6010B ICP	3.7			mg/L	0.4	2	01/25/12 15:46	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:07	pmc
Sodium (MWMT)	M6010B ICP	3.0			mg/L	0.3	2	01/25/12 15:46	mfm
Thallium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	01/30/12 23:53	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0036			mg/L	0.0001	0.0005	01/30/12 23:53	pmc
Vanadium (MWMT)	M6010B ICP	0.007	B		mg/L	0.005	0.03	01/25/12 15:46	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:46	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		6.7			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.9		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		6.71		*	units			01/16/12 0:00	mss2
Leachate Volume		5011.2		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		97.1		*	%			01/16/12 0:00	mss2
Retained Moisture		5.72		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012

ACZ Sample ID: ***L92731-01***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		24		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		24		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C	0.2	B	*	mg/L	0.1	0.5	01/27/12 13:07	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	420		*	mg/L	20	100	01/30/12 16:49	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-2

ACZ Sample ID: ***L92731-02***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/25/12 20:55	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:01	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 20:53	pmc
Barium (MWMT)	M6010B ICP	0.028		*	mg/L	0.003	0.02	01/25/12 15:49	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 20:53	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 15:49	mfm
Calcium (MWMT)	M6010B ICP	73.4			mg/L	0.2	1	01/25/12 15:49	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:01	pmc
Copper (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	01/25/12 15:49	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/25/12 15:49	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:01	pmc
Magnesium (MWMT)	M6010B ICP	8.9			mg/L	0.2	1	01/25/12 15:49	mfm
Manganese (MWMT)	M6010B ICP	0.216			mg/L	0.005	0.03	01/25/12 15:49	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:27	erf
Molybdenum (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	01/25/12 15:49	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:49	mfm
Potassium (MWMT)	M6010B ICP	1.9	B	*	mg/L	0.3	2	01/25/12 15:49	mfm
Selenium (MWMT)	M6020 ICP-MS	0.0010			mg/L	0.0001	0.0003	02/14/12 20:53	pmc
Silica (MWMT)	M6010B ICP	1.9	B		mg/L	0.4	2	01/25/12 15:49	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:09	pmc
Sodium (MWMT)	M6010B ICP	0.8	B		mg/L	0.3	2	01/25/12 15:49	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:01	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0001	0.0005	01/31/12 0:01	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 15:49	mfm
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/25/12 15:49	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		6.6			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.9		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		6.63		*	units			01/16/12 0:00	mss2
Leachate Volume		5114.9		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		97.1		*	%			01/16/12 0:00	mss2
Retained Moisture		5.72		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-2

ACZ Sample ID: ***L92731-02***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		21		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		21		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C		U	*	mg/L	0.1	0.5	01/27/12 13:12	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	210		*	mg/L	20	80	01/30/12 16:49	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-3

ACZ Sample ID: ***L92731-03***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP		U		mg/L	0.03	0.2	01/25/12 21:01	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:03	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 20:59	pmc
Barium (MWMT)	M6010B ICP	0.039		*	mg/L	0.003	0.02	01/25/12 15:56	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 20:59	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 15:56	mfm
Calcium (MWMT)	M6010B ICP	52.9			mg/L	0.2	1	01/25/12 15:56	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:03	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:56	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/25/12 15:56	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:03	pmc
Magnesium (MWMT)	M6010B ICP	4.0			mg/L	0.2	1	01/25/12 15:56	mfm
Manganese (MWMT)	M6010B ICP	0.109			mg/L	0.005	0.03	01/25/12 15:56	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:29	erf
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:56	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:56	mfm
Potassium (MWMT)	M6010B ICP	1.1	B	*	mg/L	0.3	2	01/25/12 15:56	mfm
Selenium (MWMT)	M6020 ICP-MS	0.0006			mg/L	0.0001	0.0003	02/14/12 20:59	pmc
Silica (MWMT)	M6010B ICP	1.5	B		mg/L	0.4	2	01/25/12 15:56	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:12	pmc
Sodium (MWMT)	M6010B ICP	0.5	B		mg/L	0.3	2	01/25/12 15:56	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:03	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	01/31/12 0:03	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 15:56	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:56	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.0			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.9		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7		*	units			01/16/12 0:00	mss2
Leachate Volume		5031		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		97.1		*	%			01/16/12 0:00	mss2
Retained Moisture		5.72		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-3

ACZ Sample ID: ***L92731-03***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		19	B	*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		19	B	*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C		U	*	mg/L	0.1	0.5	01/27/12 13:22	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	140		*	mg/L	20	80	01/30/12 16:49	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-4

ACZ Sample ID: ***L92731-04***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.25			mg/L	0.03	0.2	01/25/12 21:04	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:06	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 21:03	pmc
Barium (MWMT)	M6010B ICP	0.037		*	mg/L	0.003	0.02	01/25/12 15:59	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 21:03	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 15:59	mfm
Calcium (MWMT)	M6010B ICP	8.7			mg/L	0.2	1	01/25/12 15:59	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:06	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:59	mfm
Iron (MWMT)	M6010B ICP	0.10			mg/L	0.02	0.05	01/25/12 15:59	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:06	pmc
Magnesium (MWMT)	M6010B ICP	2.1			mg/L	0.2	1	01/25/12 15:59	mfm
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 15:59	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:32	erf
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:59	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:59	mfm
Potassium (MWMT)	M6010B ICP	5.0		*	mg/L	0.3	2	01/25/12 15:59	mfm
Selenium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0003	02/14/12 21:03	pmc
Silica (MWMT)	M6010B ICP	10.2			mg/L	0.4	2	01/25/12 15:59	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:14	pmc
Sodium (MWMT)	M6010B ICP	1.6	B		mg/L	0.3	2	01/25/12 15:59	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:06	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0005			mg/L	0.0001	0.0005	01/31/12 0:06	pmc
Vanadium (MWMT)	M6010B ICP	0.009	B		mg/L	0.005	0.03	01/25/12 15:59	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 15:59	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.5			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4985.9		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7.45		*	units			01/16/12 0:00	mss2
Leachate Volume		5079.5		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		97.1		*	%			01/16/12 0:00	mss2
Retained Moisture		5.72		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 1 QTR 2012-4

ACZ Sample ID: ***L92731-04***
Date Sampled: *01/06/12 00:00*
Date Received: *01/11/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		26		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		26		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C		U	*	mg/L	0.1	0.5	01/27/12 13:33	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	138		*	mg/L	5	30	01/30/12 16:45	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011

ACZ Sample ID: ***L92731-05***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.04	B		mg/L	0.03	0.2	01/25/12 21:13	mfm
Antimony (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0004	0.002	01/31/12 0:09	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 21:06	pmc
Barium (MWMT)	M6010B ICP	0.016	B	*	mg/L	0.003	0.02	01/25/12 16:09	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 21:06	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 16:09	mfm
Calcium (MWMT)	M6010B ICP	20.9			mg/L	0.2	1	01/25/12 16:09	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:09	pmc
Copper (MWMT)	M6010B ICP	0.04	B		mg/L	0.01	0.05	01/25/12 16:09	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/25/12 16:09	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:09	pmc
Magnesium (MWMT)	M6010B ICP	5.7			mg/L	0.2	1	01/25/12 16:09	mfm
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 16:09	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:34	erf
Molybdenum (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	01/25/12 16:09	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:09	mfm
Potassium (MWMT)	M6010B ICP	9.7		*	mg/L	0.3	2	01/25/12 16:09	mfm
Selenium (MWMT)	M6020 ICP-MS	0.0004			mg/L	0.0001	0.0003	02/14/12 21:06	pmc
Silica (MWMT)	M6010B ICP	11.4			mg/L	0.4	2	01/25/12 16:09	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:16	pmc
Sodium (MWMT)	M6010B ICP	9.4			mg/L	0.3	2	01/25/12 16:09	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:09	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0053			mg/L	0.0001	0.0005	01/31/12 0:09	pmc
Vanadium (MWMT)	M6010B ICP	0.006	B		mg/L	0.005	0.03	01/25/12 16:09	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:09	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.2			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4977.8		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7.18		*	units			01/16/12 0:00	mss2
Leachate Volume		5023.9		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		33.7		*	%			01/16/12 0:00	mss2
Retained Moisture		12.27		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011

ACZ Sample ID: ***L92731-05***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		78		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		78		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E	5		*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C	1.8		*	mg/L	0.1	0.5	01/27/12 13:39	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	21		*	mg/L	1	5	01/30/12 16:40	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-2

ACZ Sample ID: ***L92731-06***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.04	B		mg/L	0.03	0.2	01/25/12 21:16	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:11	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 21:09	pmc
Barium (MWMT)	M6010B ICP	0.022		*	mg/L	0.003	0.02	01/25/12 16:12	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 21:09	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 16:12	mfm
Calcium (MWMT)	M6010B ICP	10.8			mg/L	0.2	1	01/25/12 16:12	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:11	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:12	mfm
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	01/25/12 16:12	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:11	pmc
Magnesium (MWMT)	M6010B ICP	2.8			mg/L	0.2	1	01/25/12 16:12	mfm
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 16:12	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:36	erf
Molybdenum (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	01/25/12 16:12	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:12	mfm
Potassium (MWMT)	M6010B ICP	6.2		*	mg/L	0.3	2	01/25/12 16:12	mfm
Selenium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0003	02/14/12 21:09	pmc
Silica (MWMT)	M6010B ICP	9.2			mg/L	0.4	2	01/25/12 16:12	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:18	pmc
Sodium (MWMT)	M6010B ICP	2.3			mg/L	0.3	2	01/25/12 16:12	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:11	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	01/31/12 0:11	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 16:12	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:12	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.1			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4977.8		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7.08		*	units			01/16/12 0:00	mss2
Leachate Volume		5231.5		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		33.7		*	%			01/16/12 0:00	mss2
Retained Moisture		12.27		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-2

ACZ Sample ID: ***L92731-06***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		47		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		47		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C	1.0		*	mg/L	0.1	0.5	01/27/12 13:44	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	5		*	mg/L	1	5	01/30/12 16:40	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-3

ACZ Sample ID: ***L92731-07***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.06	B		mg/L	0.03	0.2	01/25/12 21:26	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:19	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 21:12	pmc
Barium (MWMT)	M6010B ICP	0.023		*	mg/L	0.003	0.02	01/25/12 16:22	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 21:12	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 16:22	mfm
Calcium (MWMT)	M6010B ICP	8.1			mg/L	0.2	1	01/25/12 16:22	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:19	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:22	mfm
Iron (MWMT)	M6010B ICP	0.03	B		mg/L	0.02	0.05	01/25/12 16:22	mfm
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:19	pmc
Magnesium (MWMT)	M6010B ICP	2.0			mg/L	0.2	1	01/25/12 16:22	mfm
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 16:22	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:38	erf
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:22	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:22	mfm
Potassium (MWMT)	M6010B ICP	5.1		*	mg/L	0.3	2	01/25/12 16:22	mfm
Selenium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0003	02/14/12 21:12	pmc
Silica (MWMT)	M6010B ICP	8.0			mg/L	0.4	2	01/25/12 16:22	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:26	pmc
Sodium (MWMT)	M6010B ICP	1.3	B		mg/L	0.3	2	01/25/12 16:22	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:19	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	01/31/12 0:19	pmc
Vanadium (MWMT)	M6010B ICP	0.008	B		mg/L	0.005	0.03	01/25/12 16:22	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:22	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.4			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4977.8		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7.44		*	units			01/16/12 0:00	mss2
Leachate Volume		5199.2		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		33.7		*	%			01/16/12 0:00	mss2
Retained Moisture		12.27		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-3

ACZ Sample ID: ***L92731-07***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		38		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		38		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:09	tcd
Fluoride (MWMT)	SM4500F-C	0.5		*	mg/L	0.1	0.5	01/27/12 13:59	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	3	B	*	mg/L	1	5	01/30/12 16:40	lhb

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-4

ACZ Sample ID: ***L92731-08***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	0.24			mg/L	0.03	0.2	01/25/12 21:29	mfm
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	01/31/12 0:24	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	02/14/12 21:27	pmc
Barium (MWMT)	M6010B ICP	0.036		*	mg/L	0.003	0.02	01/25/12 16:26	mfm
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	02/14/12 21:27	pmc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	01/25/12 16:26	mfm
Calcium (MWMT)	M6010B ICP	8.6			mg/L	0.2	1	01/25/12 16:26	mfm
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	01/31/12 0:24	pmc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:26	mfm
Iron (MWMT)	M6010B ICP	0.09			mg/L	0.02	0.05	01/25/12 16:26	mfm
Lead (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	01/31/12 0:24	pmc
Magnesium (MWMT)	M6010B ICP	2.1			mg/L	0.2	1	01/25/12 16:26	mfm
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	01/25/12 16:26	mfm
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	01/25/12 22:45	erf
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:26	mfm
Nickel (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:26	mfm
Potassium (MWMT)	M6010B ICP	4.9		*	mg/L	0.3	2	01/25/12 16:26	mfm
Selenium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	02/14/12 21:27	pmc
Silica (MWMT)	M6010B ICP	10.2			mg/L	0.4	2	01/25/12 16:26	mfm
Silver (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	02/01/12 18:28	pmc
Sodium (MWMT)	M6010B ICP	1.6	B		mg/L	0.3	2	01/25/12 16:26	mfm
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	01/31/12 0:24	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0005			mg/L	0.0001	0.0005	01/31/12 0:24	pmc
Vanadium (MWMT)	M6010B ICP	0.008	B		mg/L	0.005	0.03	01/25/12 16:26	mfm
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	01/25/12 16:26	mfm

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C								
pH		7.7			units	0.1	0.1	01/20/12 0:00	mss2
pH measured at		23.0			C	0.1	0.1	01/20/12 0:00	mss2

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4977.8		*	g			01/16/12 0:00	mss2
Extraction pH		7		*	units			01/16/12 0:00	mss2
Extraction Time		25		*	hrs			01/16/12 0:00	mss2
Leachate pH		7.69		*	units			01/16/12 0:00	mss2
Leachate Volume		5125.3		*	mL			01/16/12 0:00	mss2
Particle Size over 5 cm		33.7		*	%			01/16/12 0:00	mss2
Retained Moisture		12.27		*	%			01/16/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 4 QTR 2011-4

ACZ Sample ID: ***L92731-08***
Date Sampled: *12/20/11 00:00*
Date Received: *01/12/12*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration								
Bicarbonate as CaCO3		32		*	mg/L	2	20	01/27/12 0:00	abm
Carbonate as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Hydroxide as CaCO3			U	*	mg/L	2	20	01/27/12 0:00	abm
Total Alkalinity		32		*	mg/L	2	20	01/27/12 0:00	abm
Chloride (MWMT)	SM4500Cl-E		U	*	mg/L	1	5	01/27/12 16:10	tcd
Fluoride (MWMT)	SM4500F-C	0.3	B	*	mg/L	0.1	0.5	01/27/12 14:06	abm
Sulfate (MWMT)	D516-02 - Turbidimetric	75		*	mg/L	5	30	01/30/12 16:46	lhb

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L92731***

Project ID: LISBON VALLEY COPPER

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317477													
WG317477PBW	PBW	01/27/12 14:41				3.5	mg/L		-20	20			
WG317477LCSW1	LCSW	01/27/12 14:53	WC120109-	820.0001		800.8	mg/L	97.7	90	110			
L92731-01DUP	DUP	01/27/12 15:05			24	25.9	mg/L				7.6	20	
WG317477LCSW2	LCSW	01/27/12 16:05	WC120109-	820.0001		804.5	mg/L	98.1	90	110			

Aluminum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317354													
WG317354ICV	ICV	01/25/12 20:33	II120112-3	2		2.019	mg/L	101	90	110			
WG317354ICB	ICB	01/25/12 20:36				U	mg/L		-0.09	0.09			
WG316814PBS	PBS	01/25/12 20:48				U	mg/L		-0.09	0.09			
L92731-04AS	AS	01/25/12 21:07	II120125-2	1	.25	1.292	mg/L	104.2	75	125			
L92731-04ASD	ASD	01/25/12 21:10	II120125-2	1	.25	1.299	mg/L	104.9	75	125	0.54	20	

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.02		.02077	mg/L	103.9	90	110			
WG317584ICB	ICB	01/30/12 23:40				.00045	mg/L		-0.0012	0.0012			
WG316814PBS	PBS	01/30/12 23:50				U	mg/L		-0.0012	0.0012			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.01	U	.00995	mg/L	99.5	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.01	U	.01028	mg/L	102.8	75	125	3.26	20	

Arsenic (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318277													
WG318277ICV	ICV	02/14/12 20:31	MS120109-1	.05		.05223	mg/L	104.5	90	110			
WG318277ICB	ICB	02/14/12 20:34				U	mg/L		-0.0015	0.0015			
WG316814PBS	PBS	02/14/12 20:47				U	mg/L		-0.0015	0.0015			
L92731-07AS	AS	02/14/12 21:21	MS120109-3	.05005	U	.04992	mg/L	99.7	75	125			
L92731-07ASD	ASD	02/14/12 21:24	MS120109-3	.05005	U	.05217	mg/L	104.2	75	125	4.41	20	

Barium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		2.0121	mg/L	100.6	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.009	0.009			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.009	0.009			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	.037	.5289	mg/L	98.4	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	.037	.5287	mg/L	98.3	75	125	0.04	20	

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Beryllium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318277													
WG318277ICV	ICV	02/14/12 20:31	MS120109-1	.05		.0488	mg/L	97.6	90	110			
WG318277ICB	ICB	02/14/12 20:34				U	mg/L		-0.0003	0.0003			
WG316814PBS	PBS	02/14/12 20:47				U	mg/L		-0.0003	0.0003			
L92731-07AS	AS	02/14/12 21:21	MS120109-3	.0501	U	.04937	mg/L	98.5	75	125			
L92731-07ASD	ASD	02/14/12 21:24	MS120109-3	.0501	U	.049	mg/L	97.8	75	125	0.75	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.8747	mg/L	93.7	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.015	0.015			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.015	0.015			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.5095	mg/L	101.9	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.5155	mg/L	103.1	75	125	1.17	20	

Calcium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	100		94.45	mg/L	94.5	90	110			
WG317325ICB	ICB	01/25/12 15:30				.28	mg/L		-0.6	0.6			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.6	0.6			
L92731-04AS	AS	01/25/12 16:03	II120125-2	67.99734	8.7	76.7	mg/L	100	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	67.99734	8.7	77.83	mg/L	101.7	75	125	1.46	20	

Chloride (MWMT) SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317496													
WG317496ICB	ICB	01/27/12 14:29				U	mg/L		-3	3			
WG317496ICV	ICV	01/27/12 14:29	WI111110-3	55.11		60.2	mg/L	109.2	90	110			
WG316814PBS	PBS	01/27/12 16:09				U	mg/L		-3	3			
WG317496LFB	LFB	01/27/12 16:09	WI111130-1	30.03		32.6	mg/L	108.6	90	110			
L92731-01AS	AS	01/27/12 16:09	WI111130-1	30.03	U	33.4	mg/L	111.2	90	110			M1
L92731-08DUP	DUP	01/27/12 16:23			U	U	mg/L				0	20	RA

Chromium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.05		.04943	mg/L	98.9	90	110			
WG317584ICB	ICB	01/30/12 23:40				U	mg/L		-0.0015	0.0015			
WG316814PBS	PBS	01/30/12 23:50				U	mg/L		-0.0015	0.0015			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.05005	U	.04846	mg/L	96.8	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.05005	U	.04782	mg/L	95.5	75	125	1.33	20	

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Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.939	mg/L	97	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.03	0.03			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.03	0.03			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.494	mg/L	98.8	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.496	mg/L	99.2	75	125	0.4	20	

Fluoride (MWMT) SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317478													
WG317478ICV	ICV	01/27/12 12:47	WC120125-	2.002		1.89	mg/L	94.4	95	105			
WG317478ICB	ICB	01/27/12 12:51				U	mg/L		-0.3	0.3			
WG317478LFB	LFB	01/27/12 12:59	WC120124-	5		5.26	mg/L	105.2	90	110			
WG316814PBS	PBS	01/27/12 13:04				U	mg/L		-0.3	0.3			
L92731-02DUP	DUP	01/27/12 13:16			U	U	mg/L				0	20	RA
L92731-03AS	AS	01/27/12 13:27	WC120124-	5	U	4.85	mg/L	97	90	110			

Iron (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.986	mg/L	99.3	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.06	0.06			
WG316814PBS	PBS	01/25/12 15:43				.033	mg/L		-0.06	0.06			
L92731-04AS	AS	01/25/12 16:03	II120125-2	1	.1	1.104	mg/L	100.4	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	1	.1	1.105	mg/L	100.5	75	125	0.09	20	

Lead (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.05		.05242	mg/L	104.8	90	110			
WG317584ICB	ICB	01/30/12 23:40				U	mg/L		-0.0003	0.0003			
WG316814PBS	PBS	01/30/12 23:50				U	mg/L		-0.0003	0.0003			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.05005	U	.05192	mg/L	103.7	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.05005	U	.05136	mg/L	102.6	75	125	1.08	20	

Magnesium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	100		97.62	mg/L	97.6	90	110			
WG317325ICB	ICB	01/25/12 15:30				.21	mg/L		-0.6	0.6			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.6	0.6			
L92731-04AS	AS	01/25/12 16:03	II120125-2	50.0051	2.1	51.91	mg/L	99.6	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	50.0051	2.1	52.81	mg/L	101.4	75	125	1.72	20	

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Manganese (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.9354	mg/L	96.8	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.015	0.015			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.015	0.015			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.478	mg/L	95.6	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.4786	mg/L	95.7	75	125	0.13	20	

Mercury (MWMT) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317189													
WG317189ICV	ICV	01/25/12 16:38	II120112-6	.005015		.00497	mg/L	99.1	95	105			
WG317189ICB	ICB	01/25/12 16:41				U	mg/L		-0.0002	0.0002			
WG317349													
WG317349PBW	PBW	01/25/12 22:17				U	mg/L		-0.00044	0.00044			
WG317349LCSW	LCSW	01/25/12 22:19	II120112-6	.005015		.0059	mg/L	117.6	85	115			LA
WG316814PBS	PBS	01/25/12 22:21				U	mg/Kg		-0.0006	0.0006			
L92639-06MS	MS	01/25/12 23:00	II111230-2	.002002	U	.00221	mg/L	110.4	85	115			
L92639-06MSD	MSD	01/25/12 23:03	II111230-2	.002002	U	.00206	mg/L	102.9	85	115	7.03	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.986	mg/L	99.3	90	110			
WG317325ICB	ICB	01/25/12 15:30				.013	mg/L		-0.03	0.03			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.03	0.03			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.517	mg/L	103.4	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.512	mg/L	102.4	75	125	0.97	20	

Nickel (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2.002		1.926	mg/L	96.2	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.03	0.03			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.03	0.03			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.496	mg/L	99.2	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.506	mg/L	101.2	75	125	2	20	

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317381													
L92731-01DUP	DUP	01/20/12 8:00			6.7	6.71	units				0.1	20	
WG317381ICV	ICV	01/20/12 8:00	PCN37501	4		4.01	units	100.3	97	103			

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Potassium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	20		19.91	mg/L	99.6	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.9	0.9			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.9	0.9			
L92731-04AS	AS	01/25/12 16:03	II120125-2	99.97161	5	102.84	mg/L	97.9	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	99.97161	5	102.81	mg/L	97.8	75	125	0.03	20	

Selenium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318277													
WG318277ICV	ICV	02/14/12 20:31	MS120109-1	.05		.04954	mg/L	99.1	90	110			
WG318277ICB	ICB	02/14/12 20:34				.0001	mg/L		-0.0003	0.0003			
WG316814PBS	PBS	02/14/12 20:47				U	mg/L		-0.0003	0.0003			
L92731-07AS	AS	02/14/12 21:21	MS120109-3	.05005	U	.05609	mg/L	112.1	75	125			
L92731-07ASD	ASD	02/14/12 21:24	MS120109-3	.05005	U	.05729	mg/L	114.5	75	125	2.12	20	

Silica (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	42.8		40.84	mg/L	95.4	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-1.2	1.2			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-1.2	1.2			
L92731-04AS	AS	01/25/12 16:03	II120125-2	21.4	10.2	31.17	mg/L	98	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	21.4	10.2	31.26	mg/L	98.4	75	125	0.29	20	

Silver (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317640													
WG317640ICV	ICV	02/01/12 17:56	MS120109-1	.01996		.02023	mg/L	101.4	90	110			
WG317640ICB	ICB	02/01/12 17:58				U	mg/L		-0.00015	0.00015			
WG316814PBS	PBS	02/01/12 18:05				U	mg/L		-0.00015	0.00015			
L92731-06AS	AS	02/01/12 18:19	MS120109-3	.01002	U	.009284	mg/L	92.7	75	125			
L92731-06ASD	ASD	02/01/12 18:24	MS120109-3	.01002	U	.009197	mg/L	91.8	75	125	0.94	20	

Sodium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	100		100.09	mg/L	100.1	90	110			
WG317325ICB	ICB	01/25/12 15:30				.36	mg/L		-0.9	0.9			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.9	0.9			
L92731-04AS	AS	01/25/12 16:03	II120125-2	100.018	1.6	100.71	mg/L	99.1	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	100.018	1.6	100.87	mg/L	99.3	75	125	0.16	20	

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Sulfate (MWMT) D516-02 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317564													
WG317564ICB	ICB	01/30/12 13:03				U	mg/L		-3	3			
WG317564ICV	ICV	01/30/12 13:03	WI120130-4	20		20.1	mg/L	100.5	90	110			
WG317564LFB	LFB	01/30/12 16:39	WI111111-3	10.03		10.8	mg/L	107.7	90	110			
WG316814PBS	PBS	01/30/12 16:39				U	mg/L		-3	3			
L92731-01DUP	DUP	01/30/12 16:49			420	421	mg/L				0.2	20	
L92731-02AS	AS	01/30/12 16:49	SO4TURB15	10.0000005	210	220	mg/L	100	90	110			

Thallium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.05		.0546	mg/L	109.2	90	110			
WG317584ICB	ICB	01/30/12 23:40				U	mg/L		-0.0003	0.0003			
WG316814PBS	PBS	01/30/12 23:50				U	mg/L		-0.0003	0.0003			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.05005	.0001	.05442	mg/L	108.5	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.05005	.0001	.05367	mg/L	107	75	125	1.39	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317584													
WG317584ICV	ICV	01/30/12 23:37	MS120109-1	.05		.05321	mg/L	106.4	90	110			
WG317584ICB	ICB	01/30/12 23:40				U	mg/L		-0.0003	0.0003			
WG316814PBS	PBS	01/30/12 23:50				U	mg/L		-0.0003	0.0003			
L92731-01AS	AS	01/30/12 23:56	MS120109-3	.05	.0036	.0576	mg/L	108	75	125			
L92731-01ASD	ASD	01/30/12 23:58	MS120109-3	.05	.0036	.05705	mg/L	106.9	75	125	0.96	20	

Vanadium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		2.0915	mg/L	104.6	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.015	0.015			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.015	0.015			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	.009	.5291	mg/L	104	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	.009	.5311	mg/L	104.4	75	125	0.38	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG317325													
WG317325ICV	ICV	01/25/12 15:27	II120112-3	2		1.947	mg/L	97.4	90	110			
WG317325ICB	ICB	01/25/12 15:30				U	mg/L		-0.03	0.03			
WG316814PBS	PBS	01/25/12 15:43				U	mg/L		-0.03	0.03			
L92731-04AS	AS	01/25/12 16:03	II120125-2	.5	U	.515	mg/L	103	75	125			
L92731-04ASD	ASD	01/25/12 16:06	II120125-2	.5	U	.515	mg/L	103	75	125	0	20	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-01	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-02	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-03	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-04	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-05	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-06	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-07	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92731-08	WG317325	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG317349	Mercury (MWMT)	M7470 CVAA	LA	Recovery for target analyte in the control sample (LCS or LFB) exceeded the acceptance criteria. Target analyte was not detected in the sample [< MDL].
	WG317325	Potassium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG316814	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
	WG317496	Chloride (MWMT)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317478	Fluoride (MWMT)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG317564	Sulfate (MWMT)	D516-02 - Turbidimetric	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.

Wet Chemistry

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

Bicarbonate as CaCO3	SM2320B - Titration
Carbonate as CaCO3	SM2320B - Titration
Chloride (MWMT)	SM4500Cl-E
Fluoride (MWMT)	SM4500F-C
Hydroxide as CaCO3	SM2320B - Titration
Sulfate (MWMT)	D516-02 - Turbidimetric
Total Alkalinity	SM2320B - Titration

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Sample Receipt

Lisbon Valley Mining Company, LLC
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ACZ Project ID: L92731
Date Received: 01/11/2012 10:47
Received By: gac
Date Printed: 1/13/2012

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na14644		10.9	15

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L92731
Date Received: 01/11/2012 10:47
Received By: gac
Date Printed: 1/13/2012

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L92731-01	BED 15 1 QTR 2012									X		
L92731-02	BED 15 1 QTR 2012-2									X		
L92731-03	BED 15 1 QTR 2012-3									X		
L92731-04	BED 15 1 QTR 2012-4									X		
L92731-05	BED 14 4 QTR 2011									X		
L92731-06	BED 14 4 QTR 2011-2									X		
L92731-07	BED 14 4 QTR 2011-3									X		
L92731-08	BED 14 4 QTR 2011-4									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: gac

L92731

Lisbon Valley Mining Co.
P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:

920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	Modified MVMP							Number of Containers	Remarks / Comments
1,2,3,4 Bed 15 1 Qtr 2012	1/6/2012		x							1	Centennial Pit 2012

Sampled By:
Justin Eatchel

Total Number of Containers: 1

Sampler's Signature:

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1 107 Fax: (435) 686-2223

Relinquished By:	Date / Time:	Received By:	Date / Time:
Lantz Indergard	1/6/2012 2:30 PM		1-11-12 10:47

Method of Shipment:
UPS

Comments:
Modified Analysis uses pH neutral leach and expanded analytical suite
Call Lantz Indergard 435 686 9950 #107 to discuss.

BED 15!

L92731 Chain of Custody

L92731
L92639
L3501.12.12

Lisbon Valley Mining Co.
P.O. Box 248
929 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:
929 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: Modified MWMP	Number of Containers	Remarks / Comments
Bed 11 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011
Bed 12 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011
Bed 14 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011
Bed 9-10 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011
Bed 6-8 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011
Bed 13 4 Qtr 2011	12/20/11		x	1	Centennial Pit 2011

5 6 7 8

Sampled By:
Justin Eatchel

Total Number of Containers: 6

Sampler's Signature

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1 107 Fax: (435) 686-2223

Relinquished By: Date / Time:
Lantz Indergard

Received By: Date / Time:
WPL 1-6-12 10:20

Method of Shipment:
Old Dominion
1-3-12

Comments:
Extended Analysis uses pH neutral leach and expanded analytical s
Call Lantz Indergard 435 686 9950 #107 to discuss.

L92639 Chain of Custody
L3501.12.12

sample -1

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

Analytical Quote

Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

1/11/2012

Quote Number: MWMP-EXTENDED

Matrix: Soil — Analysis of Waste Rock for MWMP Metals - Extended List

Parameter	Method	Detection Limit	Cost/Sample
Metals Analysis			
Aluminum (MWMT)	M6010B ICP	0.03 mg/L	$9.00
Antimony (MWMT)	M6020 ICP-MS	0.0004 mg/L	$17.10
Arsenic (MWMT)	M6010B ICP	0.06 mg/L	$9.00
Barium (MWMT)	M6010B ICP	0.003 mg/L	$9.00
Beryllium (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Cadmium (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Calcium (MWMT)	M6010B ICP	0.2 mg/L	$9.00
Chromium (MWMT)	M6020 ICP-MS	0.0005 mg/L	$17.10
Copper (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Iron (MWMT)	M6010B ICP	0.02 mg/L	$9.00
Lead (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Magnesium (MWMT)	M6010B ICP	0.2 mg/L	$9.00
Manganese (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Mercury (MWMT)	M7470 CVAA	0.0002 mg/L	$23.40
Molybdenum (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Nickel (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Potassium (MWMT)	M6010B ICP	0.3 mg/L	$9.00
Selenium (MWMT)	M6010B ICP	0.06 mg/L	$9.00
Silica (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Silver (MWMT)	M6020 ICP-MS	0.00005 mg/L	$17.10
Sodium (MWMT)	M6010B ICP	0.3 mg/L	$9.00
Thallium (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Uranium (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Vanadium (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Zinc (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Misc.			
Electronic Data Deliverable			$0.00
Quality Control Summary			$0.00
Sample Preparation			
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 199		$157.50
Soil Analysis			
pH (MWMT)	M9045D/M9040C	0.1 C	$7.20
Sample Weight	Rad Disposal Compliance	g	$6.30

REPAD.09.06.05.01 S/ sb D/ P/

Neutral pH - 7 comments

-2, 3 & 4

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

Analytical Quote

Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

1/11/2012

Quote Number: MWMP-EXTENDED-2TO4

Matrix: Soil — Analysis of Waste Rock for MWMP Metals - Extended List for extractions 2 through 4

Parameter	Method	Detection Limit	Cost/Sample
Metals Analysis			
Aluminum (MWMT)	M6010B ICP	0.03 mg/L	$9.00
Antimony (MWMT)	M6020 ICP-MS	0.0004 mg/L	$17.10
Arsenic (MWMT)	M6010B ICP	0.06 mg/L	$9.00
Barium (MWMT)	M6010B ICP	0.003 mg/L	$9.00
Beryllium (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Cadmium (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Calcium (MWMT)	M6010B ICP	0.2 mg/L	$9.00
Chromium (MWMT)	M6020 ICP-MS	0.0005 mg/L	$17.10
Copper (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Iron (MWMT)	M6010B ICP	0.02 mg/L	$9.00
Lead (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Magnesium (MWMT)	M6010B ICP	0.2 mg/L	$9.00
Manganese (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Mercury (MWMT)	M7470 CVAA	0.0002 mg/L	$23.40
Molybdenum (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Nickel (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Potassium (MWMT)	M6010B ICP	0.3 mg/L	$9.00
Selenium (MWMT)	M6010B ICP	0.06 mg/L	$9.00
Silica (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Silver (MWMT)	M6020 ICP-MS	0.00005 mg/L	$17.10
Sodium (MWMT)	M6010B ICP	0.3 mg/L	$9.00
Thallium (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Uranium (MWMT)	M6020 ICP-MS	0.0001 mg/L	$17.10
Vanadium (MWMT)	M6010B ICP	0.005 mg/L	$9.00
Zinc (MWMT)	M6010B ICP	0.01 mg/L	$9.00
Misc.			
Electronic Data Deliverable			$0.00
Labor Charge			$20.00
Quality Control Summary			$0.00
Sample Preparation			
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 199		$0.00
Soil Analysis			
pH (MWMT)	M9045D/M9040C	0.1 C	$7.20

REPAD.09.06.05.01 S/ sw D/ P/

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

Analytical Report

March 20, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Susan Wyman

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L93313

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on February 24, 2012. This project has been assigned to ACZ's project number, L93313. 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 L93313. 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 April 20, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-3-12-1

ACZ Sample ID: ***L93313-01***
Date Sampled: *02/20/12 12:20*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 10:39	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	02/28/12 19:31	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:02	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.0005	B		mg/L	0.0005	0.002	03/08/12 0:02	pmc
Barium, dissolved	M200.7 ICP	0.009	B		mg/L	0.003	0.02	02/28/12 19:31	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:02	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:02	pmc
Calcium, dissolved	M200.7 ICP	227			mg/L	0.2	1	02/28/12 19:31	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:02	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:31	jjc
Iron, dissolved	M200.7 ICP	1.20			mg/L	0.02	0.05	02/28/12 19:31	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:02	pmc
Magnesium, dissolved	M200.7 ICP	82.6			mg/L	0.2	1	02/28/12 19:31	jjc
Manganese, dissolved	M200.7 ICP	0.162			mg/L	0.005	0.03	02/28/12 19:31	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:26	erf
Molybdenum, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	02/28/12 19:31	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:31	jjc
Potassium, dissolved	M200.7 ICP	12.3			mg/L	0.3	2	02/28/12 19:31	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 17:54	erf
Silica, dissolved	M200.7 ICP	10.5			mg/L	0.4	2	02/28/12 19:31	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:33	pmc
Sodium, dissolved	M200.7 ICP	52.0			mg/L	0.3	2	02/28/12 19:31	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:02	pmc
Uranium, total	M200.8 ICP-MS	0.0150			mg/L	0.0001	0.0005	02/29/12 18:07	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	02/28/12 19:31	jjc
Zinc, dissolved	M200.7 ICP	0.05			mg/L	0.01	0.05	02/28/12 19:31	jjc

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-3-12-1

ACZ Sample ID: ***L93313-01***
Date Sampled: *02/20/12 12:20*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		321			mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		321			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.7			%			03/20/12 0:00	calc
Sum of Anions		20.5			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		20.8			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	21			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	1610			umhos/cm	1	10	02/27/12 23:04	abm
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	03/01/12 20:24	las
Hardness as CaCO3	SM2340B - Calculation	907			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		UH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.02	0.1	02/24/12 21:49	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/24/12 21:49	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.19	B		mg/L	0.05	0.5	02/28/12 18:16	tcd
pH (lab)	SM4500H+ B								
pH		8.0	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		20.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	1300			mg/L	10	20	02/24/12 15:05	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	5	B	*	mg/L	5	20	02/24/12 13:44	mla
Sulfate	SM4500 SO4-D	640			mg/L	10	50	03/05/12 8:39	abm
TDS (calculated)	Calculation	1240			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.05						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-6-12-1

ACZ Sample ID: ***L93313-02***
Date Sampled: *02/20/12 14:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 10:50	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	02/28/12 19:40	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:05	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:05	pmc
Barium, dissolved	M200.7 ICP	0.011	B		mg/L	0.003	0.02	02/28/12 19:40	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:05	pmc
Cadmium, dissolved	M200.8 ICP-MS	0.0128			mg/L	0.0001	0.0005	03/08/12 0:05	pmc
Calcium, dissolved	M200.7 ICP	129			mg/L	0.2	1	02/28/12 19:40	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:05	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:40	jjc
Iron, dissolved	M200.7 ICP	0.28			mg/L	0.02	0.05	02/28/12 19:40	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:05	pmc
Magnesium, dissolved	M200.7 ICP	50.0			mg/L	0.2	1	02/28/12 19:40	jjc
Manganese, dissolved	M200.7 ICP	0.030	B		mg/L	0.005	0.03	02/28/12 19:40	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:28	erf
Molybdenum, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	02/28/12 19:40	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:40	jjc
Potassium, dissolved	M200.7 ICP	8.8			mg/L	0.3	2	02/28/12 19:40	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 17:55	erf
Silica, dissolved	M200.7 ICP	13.3			mg/L	0.4	2	02/28/12 19:40	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:36	pmc
Sodium, dissolved	M200.7 ICP	135			mg/L	0.3	2	02/28/12 19:40	jjc
Thallium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	03/08/12 0:05	pmc
Uranium, total	M200.8 ICP-MS	0.0279			mg/L	0.0001	0.0005	02/29/12 18:17	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	02/28/12 19:40	jjc
Zinc, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	02/28/12 19:40	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-6-12-1

ACZ Sample ID: ***L93313-02***
Date Sampled: *02/20/12 14:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

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	02/27/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		256			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		1.2			%			03/20/12 0:00	calc
Sum of Anions		16.3			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		16.7			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	23			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	1390			umhos/cm	1	10	02/27/12 23:13	abm
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	03/01/12 20:36	las
Hardness as CaCO3	SM2340B - Calculation	528			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.35	H		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.35	H	*	mg/L	0.02	0.1	02/24/12 21:50	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/24/12 21:50	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/12/12 16:17	tcd
pH (lab)	SM4500H+ B								
pH		8.0	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		20.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	1030			mg/L	10	20	02/24/12 15:06	mla
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	02/24/12 13:46	mla
Sulfate	SM4500 SO4-D	500			mg/L	10	50	03/05/12 8:42	abm
TDS (calculated)	Calculation	1010			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.02						03/20/12 0:00	calc

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-1

ACZ Sample ID: ***L93313-03***
Date Sampled: *02/20/12 10:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 11:00	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	02/28/12 19:44	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:08	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:08	pmc
Barium, dissolved	M200.7 ICP	0.011	B		mg/L	0.003	0.02	02/28/12 19:44	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:08	pmc
Cadmium, dissolved	M200.8 ICP-MS	0.0128			mg/L	0.0001	0.0005	03/08/12 0:08	pmc
Calcium, dissolved	M200.7 ICP	127			mg/L	0.2	1	02/28/12 19:44	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:08	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:44	jjc
Iron, dissolved	M200.7 ICP	0.28			mg/L	0.02	0.05	02/28/12 19:44	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:08	pmc
Magnesium, dissolved	M200.7 ICP	49.3			mg/L	0.2	1	02/28/12 19:44	jjc
Manganese, dissolved	M200.7 ICP	0.029	B		mg/L	0.005	0.03	02/28/12 19:44	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:30	erf
Molybdenum, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	02/28/12 19:44	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:44	jjc
Potassium, dissolved	M200.7 ICP	8.8			mg/L	0.3	2	02/28/12 19:44	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride	0.0011	B		mg/L	0.001	0.005	03/19/12 17:56	erf
Silica, dissolved	M200.7 ICP	13.1			mg/L	0.4	2	02/28/12 19:44	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:39	pmc
Sodium, dissolved	M200.7 ICP	133			mg/L	0.3	2	02/28/12 19:44	jjc
Thallium, dissolved	M200.8 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	03/08/12 0:08	pmc
Uranium, total	M200.8 ICP-MS	0.0280			mg/L	0.0001	0.0005	02/29/12 18:21	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	02/28/12 19:44	jjc
Zinc, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	02/28/12 19:44	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-1

ACZ Sample ID: ***L93313-03***
Date Sampled: *02/20/12 10:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		260			mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		260			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-0.3			%			03/20/12 0:00	calc
Sum of Anions		16.6			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		16.5			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	23			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	1390			umhos/cm	1	10	02/27/12 23:22	abm
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	03/01/12 20:40	las
Hardness as CaCO3	SM2340B - Calculation	520			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.36	H		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.36	H	*	mg/L	0.02	0.1	02/24/12 21:51	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/24/12 21:51	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/12/12 16:19	tcd
pH (lab)	SM4500H+ B								
pH		7.9	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		21.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	1020			mg/L	10	20	02/24/12 15:07	mla
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	02/24/12 13:47	mla
Sulfate	SM4500 SO4-D	510			mg/L	10	50	03/05/12 8:44	abm
TDS (calculated)	Calculation	1020			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.00						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-1

ACZ Sample ID: ***L93313-04***
Date Sampled: *02/21/12 08:30*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 11:10	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.06	B		mg/L	0.03	0.2	02/28/12 19:47	jjc
Antimony, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	03/08/12 0:11	pmc
Arsenic, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	03/08/12 0:11	pmc
Barium, dissolved	M200.7 ICP	0.156			mg/L	0.003	0.02	02/28/12 19:47	jjc
Beryllium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:11	pmc
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:11	pmc
Calcium, dissolved	M200.7 ICP	4.1			mg/L	0.2	1	02/28/12 19:47	jjc
Chromium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	03/08/12 0:11	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:47	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	02/28/12 19:47	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:11	pmc
Magnesium, dissolved	M200.7 ICP	2.5			mg/L	0.2	1	02/28/12 19:47	jjc
Manganese, dissolved	M200.7 ICP	0.008	B		mg/L	0.005	0.03	02/28/12 19:47	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:41	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:47	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:47	jjc
Potassium, dissolved	M200.7 ICP	6.1			mg/L	0.3	2	02/28/12 19:47	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 18:00	erf
Silica, dissolved	M200.7 ICP	10.6			mg/L	0.4	2	02/28/12 19:47	jjc
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	03/13/12 0:58	pmc
Sodium, dissolved	M200.7 ICP	286			mg/L	0.3	2	02/28/12 19:47	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:11	pmc
Uranium, total	M200.8 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	02/29/12 18:25	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	02/28/12 19:47	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:47	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-1

ACZ Sample ID: ***L93313-04***
Date Sampled: *02/21/12 08:30*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		345			mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3		76			mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		420			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-3.6			%			03/20/12 0:00	calc
Sum of Anions		14.2			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		13.2			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	170			mg/L	10	50	03/13/12 11:29	tcd
Conductivity @25C	SM2510B	1270			umhos/cm	1	10	02/27/12 23:32	abm
Fluoride	SM4500F-C	2.5		*	mg/L	0.1	0.5	03/01/12 20:43	las
Hardness as CaCO3	SM2340B - Calculation	21			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.05	BH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.11	H	*	mg/L	0.02	0.1	02/29/12 0:41	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.06	H	*	mg/L	0.01	0.05	02/29/12 0:41	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.12	B	*	mg/L	0.05	0.5	03/12/12 16:21	tcd
pH (lab)	SM4500H+ B								
pH		9.1	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		20.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	750			mg/L	10	20	02/24/12 15:09	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	131		*	mg/L	5	20	02/24/12 13:49	mla
Sulfate	SM4500 SO4-D	40	B		mg/L	10	50	03/05/12 8:46	abm
TDS (calculated)	Calculation	774			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.97						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-1

ACZ Sample ID: ***L93313-05***
Date Sampled: *02/21/12 10:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 11:20	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	02/28/12 19:50	jjc
Antimony, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	03/08/12 0:20	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.02	B	*	mg/L	0.01	0.05	03/08/12 0:20	pmc
Barium, dissolved	M200.7 ICP	0.068			mg/L	0.003	0.02	02/28/12 19:50	jjc
Beryllium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:20	pmc
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:20	pmc
Calcium, dissolved	M200.7 ICP	12.0			mg/L	0.2	1	02/28/12 19:50	jjc
Chromium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	03/08/12 0:20	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:50	jjc
Iron, dissolved	M200.7 ICP	0.02	B		mg/L	0.02	0.05	02/28/12 19:50	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:20	pmc
Magnesium, dissolved	M200.7 ICP	13.1			mg/L	0.2	1	02/28/12 19:50	jjc
Manganese, dissolved	M200.7 ICP	0.016	B		mg/L	0.005	0.03	02/28/12 19:50	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:43	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:50	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:50	jjc
Potassium, dissolved	M200.7 ICP	7.3			mg/L	0.3	2	02/28/12 19:50	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 18:02	erf
Silica, dissolved	M200.7 ICP	10.4			mg/L	0.4	2	02/28/12 19:50	jjc
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.001	0.006	03/13/12 1:01	pmc
Sodium, dissolved	M200.7 ICP	131			mg/L	0.3	2	02/28/12 19:50	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	03/08/12 0:20	pmc
Uranium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	02/29/12 18:28	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	02/28/12 19:50	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	02/28/12 19:50	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-1

ACZ Sample ID: ***L93313-05***
Date Sampled: *02/21/12 10:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		214			mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3		37			mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		251			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.7			%			03/20/12 0:00	calc
Sum of Anions		7.5			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		7.6			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	13			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	710			umhos/cm	1	10	02/27/12 23:40	abm
Fluoride	SM4500F-C	0.5		*	mg/L	0.1	0.5	03/01/12 20:47	las
Hardness as CaCO3	SM2340B - Calculation	84			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		UH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.02	0.1	02/29/12 0:43	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.02	BH	*	mg/L	0.01	0.05	02/29/12 0:43	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.15	B	*	mg/L	0.05	0.5	03/12/12 16:22	tcd
pH (lab)	SM4500H+ B								
pH		8.9	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		20.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	430			mg/L	10	20	02/24/12 15:10	mla
Residue, Non-Filterable (TSS) @105C	SM2540D		U	*	mg/L	5	20	02/24/12 13:51	mla
Sulfate	SM4500 SO4-D	100			mg/L	10	50	03/05/12 8:49	abm
TDS (calculated)	Calculation	438			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.98						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-1

ACZ Sample ID: ***L93313-06***
Date Sampled: *02/21/12 10:40*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS			*				02/28/12 11:31	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/01/12 10:52	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:23	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.0015	B		mg/L	0.0005	0.002	03/08/12 0:23	pmc
Barium, dissolved	M200.7 ICP	0.014	B		mg/L	0.003	0.02	03/01/12 10:52	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:23	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:23	pmc
Calcium, dissolved	M200.7 ICP	203			mg/L	0.2	1	03/01/12 10:52	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:23	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:52	jjc
Iron, dissolved	M200.7 ICP	4.19			mg/L	0.02	0.05	03/01/12 10:52	jjc
Lead, dissolved	M200.8 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	03/08/12 0:23	pmc
Magnesium, dissolved	M200.7 ICP	94.7			mg/L	0.2	1	03/01/12 10:52	jjc
Manganese, dissolved	M200.7 ICP	0.272			mg/L	0.005	0.03	03/01/12 10:52	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:46	erf
Molybdenum, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/01/12 10:52	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:52	jjc
Potassium, dissolved	M200.7 ICP	13.5			mg/L	0.3	2	03/01/12 10:52	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 18:05	erf
Silica, dissolved	M200.7 ICP	8.4			mg/L	0.4	2	03/01/12 10:52	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:42	pmc
Sodium, dissolved	M200.7 ICP	88.8			mg/L	0.3	2	03/01/12 10:52	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:23	pmc
Uranium, total	M200.8 ICP-MS	0.0041			mg/L	0.0002	0.001	02/29/12 18:32	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/01/12 10:52	jjc
Zinc, dissolved	M200.7 ICP	0.03	B		mg/L	0.01	0.05	03/01/12 10:52	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-1

ACZ Sample ID: ***L93313-06***
Date Sampled: *02/21/12 10:40*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		287			mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		287			mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.7			%			03/20/12 0:00	calc
Sum of Anions		22.1			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		22.4			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	23			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	1860			umhos/cm	1	10	02/27/12 23:49	abm
Fluoride	SM4500F-C	0.3	B	*	mg/L	0.1	0.5	03/01/12 21:02	las
Hardness as CaCO3	SM2340B - Calculation	897			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		UH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.02	0.1	02/29/12 0:45	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/29/12 0:45	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.27	B	*	mg/L	0.05	0.5	03/12/12 16:23	tcd
pH (lab)	SM4500H+ B								
pH		8.1	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		21.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	1450			mg/L	10	20	02/24/12 15:11	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	853		*	mg/L	9	36	02/24/12 13:52	mla
Sulfate	SM4500 SO4-D	750			mg/L	10	50	03/05/12 8:51	abm
TDS (calculated)	Calculation	1360			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.07						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1RN

ACZ Sample ID: ***L93313-07***
Date Sampled: *02/21/12 11:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 11:41	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/01/12 10:55	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:26	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:26	pmc
Barium, dissolved	M200.7 ICP		U		mg/L	0.003	0.02	03/01/12 10:55	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:26	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:26	pmc
Calcium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/01/12 10:55	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:26	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:55	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/01/12 10:55	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:26	pmc
Magnesium, dissolved	M200.7 ICP		U		mg/L	0.2	1	03/01/12 10:55	jjc
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/01/12 10:55	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:48	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:55	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:55	jjc
Potassium, dissolved	M200.7 ICP		U		mg/L	0.3	2	03/01/12 10:55	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	03/19/12 18:07	erf
Silica, dissolved	M200.7 ICP		U		mg/L	0.4	2	03/01/12 10:55	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:45	pmc
Sodium, dissolved	M200.7 ICP	0.5	B		mg/L	0.3	2	03/01/12 10:55	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:26	pmc
Uranium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	02/29/12 18:36	scp
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/01/12 10:55	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:55	jjc

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1RN

ACZ Sample ID: ***L93313-07***
Date Sampled: *02/21/12 11:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		2	B		mg/L	2	20	02/27/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/27/12 0:00	abm
Total Alkalinity		2	B		mg/L	2	20	02/27/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		n/a			%			03/20/12 0:00	calc
Sum of Anions		0.5			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations			U		meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E		U		mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	5	B		umhos/cm	1	10	02/27/12 23:55	abm
Fluoride	SM4500F-C		U	*	mg/L	0.1	0.5	03/01/12 21:08	las
Hardness as CaCO3	SM2340B - Calculation		U		mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		UH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.02	0.1	02/29/12 0:46	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/29/12 0:46	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U	*	mg/L	0.05	0.5	03/12/12 16:24	tcd
pH (lab)	SM4500H+ B								
pH		6.9	H		units	0.1	0.1	02/27/12 0:00	abm
pH measured at		21.0			C	0.1	0.1	02/27/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C		U		mg/L	10	20	02/24/12 15:13	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	9	B	*	mg/L	5	20	02/24/12 13:54	mla
Sulfate	SM4500 SO4-D	20	B		mg/L	10	50	03/05/12 8:53	abm
TDS (calculated)	Calculation	22	B		mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	n/a						03/20/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1

ACZ Sample ID: ***L93313-08***
Date Sampled: *02/21/12 12:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS			*				02/28/12 11:51	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.04	B		mg/L	0.03	0.2	03/01/12 10:59	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:35	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.0026			mg/L	0.0005	0.002	03/08/12 0:35	pmc
Barium, dissolved	M200.7 ICP	0.046			mg/L	0.003	0.02	03/01/12 10:59	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:35	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:35	pmc
Calcium, dissolved	M200.7 ICP	52.6			mg/L	0.2	1	03/01/12 10:59	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:35	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:59	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/01/12 10:59	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:35	pmc
Magnesium, dissolved	M200.7 ICP	22.8			mg/L	0.2	1	03/01/12 10:59	jjc
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/01/12 10:59	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:50	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:59	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:59	jjc
Potassium, dissolved	M200.7 ICP	2.5			mg/L	0.3	2	03/01/12 10:59	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride	0.0022	B		mg/L	0.001	0.005	03/19/12 18:08	erf
Silica, dissolved	M200.7 ICP	16.9			mg/L	0.4	2	03/01/12 10:59	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:48	pmc
Sodium, dissolved	M200.7 ICP	38.3			mg/L	0.3	2	03/01/12 10:59	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:35	pmc
Uranium, total	M200.8 ICP-MS	0.0110			mg/L	0.0005	0.003	02/29/12 18:39	scp
Vanadium, dissolved	M200.7 ICP	0.005	B		mg/L	0.005	0.03	03/01/12 10:59	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 10:59	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1

ACZ Sample ID: ***L93313-08***
Date Sampled: *02/21/12 12:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		171			mg/L	2	20	02/28/12 0:00	abm
Carbonate as CaCO3		3	B		mg/L	2	20	02/28/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/28/12 0:00	abm
Total Alkalinity		174		*	mg/L	2	20	02/28/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.3			%			03/20/12 0:00	calc
Sum of Anions		6.6			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		6.3			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	14			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	599		*	umhos/cm	1	10	02/28/12 0:04	abm
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	03/01/12 21:13	las
Hardness as CaCO3	SM2340B - Calculation	225			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.03	BH		mg/L	0.02	0.1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.03	BH	*	mg/L	0.02	0.1	02/29/12 0:48	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	02/29/12 0:48	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.05	B	*	mg/L	0.05	0.5	03/12/12 16:25	tcd
pH (lab)	SM4500H+ B								
pH		8.3	H	*	units	0.1	0.1	02/28/12 0:00	abm
pH measured at		21.0			C	0.1	0.1	02/28/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	390			mg/L	10	20	02/24/12 15:14	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	520		*	mg/L	20	80	02/24/12 13:56	mla
Sulfate	SM4500 SO4-D	130			mg/L	10	50	03/05/12 8:56	abm
TDS (calculated)	Calculation	382			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.02						03/20/12 0:00	calc

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-120221

ACZ Sample ID: ***L93313-09***
Date Sampled: *02/21/12 12:45*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							02/28/12 12:22	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	03/01/12 11:02	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	03/08/12 0:38	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:38	pmc
Barium, dissolved	M200.7 ICP	0.009	B		mg/L	0.003	0.02	03/01/12 11:02	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	03/08/12 0:38	pmc
Cadmium, dissolved	M200.8 ICP-MS	0.0017			mg/L	0.0001	0.0005	03/08/12 0:38	pmc
Calcium, dissolved	M200.7 ICP	270			mg/L	0.2	1	03/01/12 11:02	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	03/08/12 0:38	pmc
Copper, dissolved	M200.7 ICP	0.06			mg/L	0.01	0.05	03/01/12 11:02	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	03/01/12 11:02	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.0001	0.0005	03/08/12 0:38	pmc
Magnesium, dissolved	M200.7 ICP	131			mg/L	0.2	1	03/01/12 11:02	jjc
Manganese, dissolved	M200.7 ICP	0.147			mg/L	0.005	0.03	03/01/12 11:02	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	03/13/12 23:52	erf
Molybdenum, dissolved	M200.7 ICP	0.05			mg/L	0.01	0.05	03/01/12 11:02	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	03/01/12 11:02	jjc
Potassium, dissolved	M200.7 ICP	32.1			mg/L	0.3	2	03/01/12 11:02	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride	0.0047	B		mg/L	0.001	0.005	03/19/12 18:09	erf
Silica, dissolved	M200.7 ICP	3.5			mg/L	0.4	2	03/01/12 11:02	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	03/12/12 23:51	pmc
Sodium, dissolved	M200.7 ICP	77.6			mg/L	0.3	2	03/01/12 11:02	jjc
Thallium, dissolved	M200.8 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	03/08/12 0:38	pmc
Uranium, total	M200.8 ICP-MS	0.3002			mg/L	0.0002	0.001	03/01/12 21:44	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	03/01/12 11:02	jjc
Zinc, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	03/01/12 11:02	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-120221

ACZ Sample ID: ***L93313-09***
Date Sampled: *02/21/12 12:45*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		77			mg/L	2	20	02/28/12 0:00	abm
Carbonate as CaCO3			U		mg/L	2	20	02/28/12 0:00	abm
Hydroxide as CaCO3			U		mg/L	2	20	02/28/12 0:00	abm
Total Alkalinity		77			mg/L	2	20	02/28/12 0:00	abm
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.6			%			03/20/12 0:00	calc
Sum of Anions		30.1			meq/L	0.1	0.5	03/20/12 0:00	calc
Sum of Cations		28.6			meq/L	0.1	0.5	03/20/12 0:00	calc
Chloride	SM4500Cl-E	39			mg/L	1	5	03/13/12 11:16	tcd
Conductivity @25C	SM2510B	2220			umhos/cm	1	10	02/28/12 0:12	abm
Fluoride	SM4500F-C	0.7		*	mg/L	0.1	0.5	03/01/12 21:21	las
Hardness as CaCO3	SM2340B - Calculation	1210			mg/L	1	7	03/20/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	24.9	H		mg/L	0.2	1	03/20/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	25.2	H	*	mg/L	0.2	1	02/29/12 0:58	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.31	H	*	mg/L	0.01	0.05	02/29/12 0:49	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1.39		*	mg/L	0.05	0.5	03/12/12 16:29	tcd
pH (lab)	SM4500H+ B								
pH		8.1	H		units	0.1	0.1	02/28/12 0:00	abm
pH measured at		20.0			C	0.1	0.1	02/28/12 0:00	abm
Residue, Filterable (TDS) @180C	SM2540C	1950			mg/L	10	20	02/24/12 15:16	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	6	B	*	mg/L	5	20	02/24/12 13:58	mla
Sulfate	SM4500 SO4-D	1220			mg/L	10	50	03/05/12 8:58	abm
TDS (calculated)	Calculation	1930			mg/L	10	50	03/20/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.01						03/20/12 0:00	calc

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

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Project ID: LISBON VALLEY COPPER

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318841													
WG318841PBW1	PBW	02/27/12 15:33				U	mg/L		-20	20			
WG318841LCSW2	LCSW	02/27/12 15:46	WC120215-	820.0001		801.5	mg/L	97.7	90	110			
WG318841PBW2	PBW	02/27/12 18:58				U	mg/L		-20	20			
WG318841LCSW5	LCSW	02/27/12 19:12	WC120215-	820.0001		810	mg/L	98.8	90	110			
WG318841PBW3	PBW	02/27/12 22:38				U	mg/L		-20	20			
WG318841LCSW8	LCSW	02/27/12 22:52	WC120215-	820.0001		823.2	mg/L	100.4	90	110			
L93314-01DUP	DUP	02/28/12 0:33			487	484.4	mg/L				0.5	20	
WG318841PBW4	PBW	02/28/12 2:17				U	mg/L		-20	20			
WG318841LCSW11	LCSW	02/28/12 2:30	WC120215-	820.0001		813.6	mg/L	99.2	90	110			
WG318841LCSW14	LCSW	02/28/12 5:48	WC120215-	820.0001		822.3	mg/L	100.3	90	110			

Aluminum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		2.026	mg/L	101.3	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.09	0.09			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	1		1.026	mg/L	102.6	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	1	U	1.043	mg/L	104.3	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	1	U	1.043	mg/L	104.3	85	115	0	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		2.02	mg/L	101	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.09	0.09			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	1		.983	mg/L	98.3	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	1	U	.992	mg/L	99.2	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	1	U	.998	mg/L	99.8	85	115	0.6	20	

Antimony, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.02		.02089	mg/L	104.5	90	110			
WG319320ICB	ICB	03/07/12 23:23				.00051	mg/L		-0.0012	0.0012			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.01		.01055	mg/L	105.5	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.05	U	.0458	mg/L	91.6	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.05	U	.0473	mg/L	94.6	70	130	3.22	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	.25	U	.262	mg/L	104.8	70	130			
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	.25	U	.259	mg/L	103.6	70	130	1.15	20	

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.05128	mg/L	102.6	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0015	0.0015			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.05005		.05278	mg/L	105.5	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.25025	U	.2531	mg/L	101.1	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.25025	U	.2534	mg/L	101.3	70	130	0.12	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.25125	U	1.257	mg/L	100.5	70	130			
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.25125	U	1.246	mg/L	99.6	70	130	0.88	20	

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Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		2.0165	mg/L	100.8	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.009	0.009			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.5034	mg/L	100.7	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	.009	.5066	mg/L	99.5	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	.009	.5071	mg/L	99.6	85	115	0.1	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		2.0068	mg/L	100.3	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.009	0.009			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.4722	mg/L	94.4	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	.116	.5822	mg/L	93.2	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	.116	.5875	mg/L	94.3	85	115	0.91	20	

Beryllium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.04591	mg/L	91.8	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0003	0.0003			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.0501		.0493	mg/L	98.4	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.2505	U	.24245	mg/L	96.8	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.2505	U	.2403	mg/L	95.9	70	130	0.89	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.2525	U	1.2095	mg/L	96.6	70	130			
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.2525	U	1.2175	mg/L	97.2	70	130	0.66	20	

Cadmium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.04929	mg/L	98.6	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0003	0.0003			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.0501		.05035	mg/L	100.5	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.2505	U	.239	mg/L	95.4	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.2505	U	.24	mg/L	95.8	70	130	0.42	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.2525	U	1.2533	mg/L	100.1	70	130			
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.2525	U	1.2533	mg/L	100.1	70	130	0	20	

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Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	100		98.33	mg/L	98.3	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.6	0.6			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	67.99734		69.3	mg/L	101.9	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	67.99734	227	286.7	mg/L	87.8	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	67.99734	227	287.5	mg/L	89	85	115	0.28	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	100		97.08	mg/L	97.1	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.6	0.6			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	67.99734		65.36	mg/L	96.1	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	67.99734	93.5	154	mg/L	89	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	67.99734	93.5	154.9	mg/L	90.3	85	115	0.58	20	

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319485													
WG319485ICB	ICB	03/13/12 10:10				U	mg/L		-3	3			
WG319485ICV	ICV	03/13/12 10:10	WI120312-3	55.11		60.4	mg/L	109.6	90	110			
WG319485LFB1	LFB	03/13/12 11:06	WI111130-1	30.03		32.3	mg/L	107.6	90	110			
WG319485LFB2	LFB	03/13/12 11:16	WI111130-1	30.03		32.5	mg/L	108.2	90	110			
L93313-09AS	AS	03/13/12 11:16	WI111130-1	30.03	39	66.5	mg/L	91.6	90	110			
L93306-07AS	AS	03/13/12 11:29	10XCL	300	2200	2490	mg/L	96.7	90	110			
L93306-08DUP	DUP	03/13/12 11:29			190	188	mg/L				1.1	20	
L93324-01DUP	DUP	03/13/12 11:36			240	240	mg/L				0	20	

Chromium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.04817	mg/L	96.3	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0015	0.0015			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.05005		.05023	mg/L	100.4	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.25025	U	.2417	mg/L	96.6	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.25025	U	.2428	mg/L	97	70	130	0.45	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.25125	U	1.218	mg/L	97.3	70	130			
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.25125	U	1.217	mg/L	97.3	70	130	0.08	20	

Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318841													
WG318841LCSW1	LCSW	02/27/12 15:35	PCN38464	1408.8		1465	umhos/cm	104	90	110			
WG318841LCSW4	LCSW	02/27/12 19:00	PCN38464	1408.8		1446.6	umhos/cm	102.7	90	110			
WG318841LCSW7	LCSW	02/27/12 22:40	PCN38464	1408.8		1428.3	umhos/cm	101.4	90	110			
L93314-01DUP	DUP	02/28/12 0:33			2170	2180	umhos/cm				0.5	20	
WG318841LCSW10	LCSW	02/28/12 2:18	PCN38464	1408.8		1420.1	umhos/cm	100.8	90	110			
WG318841LCSW13	LCSW	02/28/12 5:37	PCN38464	1408.8		1395.7	umhos/cm	99.1	90	110			

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Copper, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		1.986	mg/L	99.3	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.03	0.03			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.505	mg/L	101	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	U	.498	mg/L	99.6	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	U	.498	mg/L	99.6	85	115	0	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		1.971	mg/L	98.6	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.03	0.03			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.473	mg/L	94.6	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	U	.474	mg/L	94.8	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	U	.48	mg/L	96	85	115	1.26	20	

Fluoride SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319054													
WG319054ICV	ICV	03/01/12 18:39	WC120301-	2.002		1.96	mg/L	97.9	95	105			
WG319054ICB	ICB	03/01/12 18:47				U	mg/L		-0.3	0.3			
WG319054LFB1	LFB	03/01/12 18:58	WC120124-	5		4.8	mg/L	96	90	110			
L93313-01AS	AS	03/01/12 20:29	WC120124-	5	.4	5.05	mg/L	93	90	110			
L93313-01DUP	DUP	03/01/12 20:33			.4	.41	mg/L				2.5	20	RA
WG319054LFB2	LFB	03/01/12 21:33	WC120124-	5		4.71	mg/L	94.2	90	110			

Iron, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		1.968	mg/L	98.4	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.06	0.06			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	1		1.022	mg/L	102.2	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	1	1.2	2.133	mg/L	93.3	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	1	1.2	2.148	mg/L	94.8	85	115	0.7	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		1.95	mg/L	97.5	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.06	0.06			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	1		.948	mg/L	94.8	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	1	U	.939	mg/L	93.9	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	1	U	.949	mg/L	94.9	85	115	1.06	20	

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Lead, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.04952	mg/L	99	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0003	0.0003			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.05005		.05057	mg/L	101	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.25025	U	.26205	mg/L	104.7	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.25025	U	.26135	mg/L	104.4	70	130	0.27	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.25125	U	1.8333	mg/L	146.5	70	130			M1
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.25125	U	1.858	mg/L	148.5	70	130	1.34	20	M1

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	100		102.58	mg/L	102.6	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.6	0.6			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	50.0051		50.94	mg/L	101.9	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	50.0051	82.6	132.3	mg/L	99.4	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	50.0051	82.6	132.5	mg/L	99.8	85	115	0.15	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	100		101.5	mg/L	101.5	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.6	0.6			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	50.0051		48.35	mg/L	96.7	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	50.0051	15.7	63.61	mg/L	95.8	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	50.0051	15.7	63.91	mg/L	96.4	85	115	0.47	20	

Manganese, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		1.969	mg/L	98.5	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.015	0.015			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.5009	mg/L	100.2	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	.162	.6431	mg/L	96.2	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	.162	.6445	mg/L	96.5	85	115	0.22	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		1.95	mg/L	97.5	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.015	0.015			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.4682	mg/L	93.6	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	U	.4654	mg/L	93.1	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	U	.4701	mg/L	94	85	115	1	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

Project ID: LISBON VALLEY COPPER

Mercury, dissolved M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319449													
WG319449ICV	ICV	03/13/12 19:05	II120223-1	.005015		.00494	mg/L	98.5	95	105			
WG319449ICB	ICB	03/13/12 19:07				U	mg/L		-0.0002	0.0002			
WG319503													
WG319503LRB	LRB	03/13/12 23:13				U	mg/L		-0.00044	0.00044			
WG319503LFB	LFB	03/13/12 23:15	II120308-4	.002002		.00215	mg/L	107.4	85	115			
L93313-03LFM	LFM	03/13/12 23:32	II120308-4	.002002	U	.00202	mg/L	100.9	85	115			
L93313-03LFMD	LFMD	03/13/12 23:39	II120308-4	.002002	U	.00194	mg/L	96.9	85	115	4.04	20	
L93313-09LFM	LFM	03/13/12 23:54	II120308-4	.002002	U	.00214	mg/L	106.9	85	115			
L93313-09LFMD	LFMD	03/13/12 23:57	II120308-4	.002002	U	.00202	mg/L	100.9	85	115	5.77	20	

Molybdenum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		2.025	mg/L	101.3	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.03	0.03			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.516	mg/L	103.2	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	.02	.521	mg/L	100.2	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	.02	.521	mg/L	100.2	85	115	0	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		2.009	mg/L	100.5	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.03	0.03			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.482	mg/L	96.4	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	U	.478	mg/L	95.6	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	U	.486	mg/L	97.2	85	115	1.66	20	

Nickel, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2.002		2.018	mg/L	100.8	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.03	0.03			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.508	mg/L	101.6	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	U	.493	mg/L	98.6	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	U	.493	mg/L	98.6	85	115	0	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2.002		1.991	mg/L	99.5	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.03	0.03			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.472	mg/L	94.4	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	U	.458	mg/L	91.6	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	U	.463	mg/L	92.6	85	115	1.09	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L93313***

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318794													
WG318794ICV	ICV	02/24/12 20:41	WI120104-7	2.416		2.539	mg/L	105.1	90	110			
WG318794ICB	ICB	02/24/12 20:43				U	mg/L		-0.06	0.06			
WG318797													
WG318797LFB1	LFB	02/24/12 21:35	WI120211-3	2		2.096	mg/L	104.8	90	110			
L93305-01AS	AS	02/24/12 21:37	WI120211-3	2	U	2.162	mg/L	108.1	90	110			
L93305-02DUP	DUP	02/24/12 21:40			3.09	3.133	mg/L				1.4	20	
WG318797LFB2	LFB	02/24/12 22:09	WI120211-3	2		2.104	mg/L	105.2	90	110			
WG318941													
WG318941ICV	ICV	02/28/12 22:14	WI120104-7	2.416		2.438	mg/L	100.9	90	110			
WG318941ICB	ICB	02/28/12 22:15				U	mg/L		-0.06	0.06			
WG318951													
WG318951LFB	LFB	02/29/12 0:39	WI120211-3	2		2.003	mg/L	100.2	90	110			
L93313-04AS	AS	02/29/12 0:42	WI120211-3	2	.11	2.044	mg/L	96.7	90	110			
L93313-05DUP	DUP	02/29/12 0:44			U	U	mg/L				0	20	RA

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318794													
WG318794ICV	ICV	02/24/12 20:41	WI120104-7	.609		.619	mg/L	101.6	90	110			
WG318794ICB	ICB	02/24/12 20:43				U	mg/L		-0.03	0.03			
WG318797													
WG318797LFB1	LFB	02/24/12 21:35	WI120211-3	1		1.033	mg/L	103.3	90	110			
L93305-01AS	AS	02/24/12 21:37	WI120211-3	1	U	1.064	mg/L	106.4	90	110			
L93305-02DUP	DUP	02/24/12 21:40				U	mg/L				0	20	RA
WG318797LFB2	LFB	02/24/12 22:09	WI120211-3	1		1.023	mg/L	102.3	90	110			
WG318941													
WG318941ICV	ICV	02/28/12 22:14	WI120104-7	.609		.597	mg/L	98	90	110			
WG318941ICB	ICB	02/28/12 22:15				U	mg/L		-0.03	0.03			
WG318951													
WG318951LFB	LFB	02/29/12 0:39	WI120211-3	1		1.008	mg/L	100.8	90	110			
L93313-04AS	AS	02/29/12 0:42	WI120211-3	1	.06	.926	mg/L	86.6	90	110			M2
L93313-05DUP	DUP	02/29/12 0:44			.02	U	mg/L				200	20	RA

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***
Project ID: LISBON VALLEY COPPER

Nitrogen, ammonia M350.1 - Automated Phenate

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318890													
WG318890ICV	ICV	02/28/12 11:39	WI111117-1	1.002		.995	mg/L	99.3	90	110			
WG318890ICB	ICB	02/28/12 11:42				U	mg/L		-0.15	0.15			
WG318935													
WG318935LFB1	LFB	02/28/12 17:34	WI111101-3	1		1.039	mg/L	103.9	90	110			
WG318935LFB2	LFB	02/28/12 18:06	WI111101-3	1		1.061	mg/L	106.1	90	110			
L93309-06AS	AS	02/28/12 18:08	WI111101-3	1	.99	1.947	mg/L	95.7	90	110			
L93309-07DUP	DUP	02/28/12 18:10			.88	.881	mg/L				0.1	20	
WG319447													
WG319447ICV	ICV	03/12/12 16:11	WI111117-1	1.002		1.035	mg/L	103.3	90	110			
WG319447ICB	ICB	03/12/12 16:14				U	mg/L		-0.15	0.15			
WG319447LFB1	LFB	03/12/12 16:16	WI111101-3	1		1.073	mg/L	107.3	90	110			
L93313-02AS	AS	03/12/12 16:18	WI111101-3	1	U	1.01	mg/L	101	90	110			
L93313-03DUP	DUP	03/12/12 16:20			U	.056	mg/L				200	20	RA
WG319447LFB2	LFB	03/12/12 16:47	WI111101-3	1		1.059	mg/L	105.9	90	110			

pH (lab) SM4500H+ B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318841													
WG318841LCSW3	LCSW	02/27/12 15:49	PCN37073	6		6.06	units	101	98	102			
WG318841LCSW6	LCSW	02/27/12 19:15	PCN37073	6		6.07	units	101.2	98	102			
WG318841LCSW9	LCSW	02/27/12 22:55	PCN37073	6		6.07	units	101.2	98	102			
L93314-01DUP	DUP	02/28/12 0:33			8	8	units				0	20	
WG318841LCSW12	LCSW	02/28/12 2:33	PCN37073	6		6.06	units	101	98	102			
WG318841LCSW15	LCSW	02/28/12 5:52	PCN37073	6		6.07	units	101.2	98	102			

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	20		20.09	mg/L	100.5	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.9	0.9			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	99.97161		99.57	mg/L	99.6	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	99.97161	12.3	113.8	mg/L	101.5	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	99.97161	12.3	114.2	mg/L	101.9	85	115	0.35	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	20		19.95	mg/L	99.8	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.9	0.9			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	99.97161		94.92	mg/L	94.9	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	99.97161	4.4	99.93	mg/L	95.6	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	99.97161	4.4	100.5	mg/L	96.1	85	115	0.57	20	

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318781													
WG318781PBW	PBW	02/24/12 15:00				U	mg/L		-20	20			
WG318781LCSW	LCSW	02/24/12 15:01	PCN38657	260		268	mg/L	103.1	80	120			
L93313-08DUP	DUP	02/24/12 15:15			390	394	mg/L				1	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L93313***

Residue, Non-Filterable (TSS) @105C SM2540D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318777													
WG318777PBW	PBW	02/24/12 13:20				U	mg/L		-15	15			
WG318777LCSW	LCSW	02/24/12 13:21	PCN38657	160		156	mg/L	97.5	80	120			
L93313-09DUP	DUP	02/24/12 13:59			6	6	mg/L				0	20	RA

Selenium, dissolved SM 3114 B, AA-Hydride

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319515													
WG319515ICV	ICV	03/19/12 17:16	II120109-2	.025		.0252	mg/L	100.8	90	110			
WG319515ICB	ICB	03/19/12 17:17				U	mg/L		-0.003	0.003			
WG319514													
WG319514LRB	LRB	03/19/12 17:50				U	mg/L		-0.003	0.003			
WG319514LFB	LFB	03/19/12 17:51	II120112-8	.02		.0197	mg/L	98.5	85	115			
L93313-03LFM	LFM	03/19/12 17:58	II120112-8	.02	.0011	.0209	mg/L	99	85	115			
L93313-03LFMD	LFMD	03/19/12 17:59	II120112-8	.02	.0011	.0185	mg/L	87	85	115	12.18	20	

Silica, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	42.8		43.8	mg/L	102.3	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-1.2	1.2			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	21.424		22.56	mg/L	105.3	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	21.424	10.5	32.72	mg/L	103.7	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	21.424	10.5	32.76	mg/L	103.9	85	115	0.12	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	42.8		43.48	mg/L	101.6	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-1.2	1.2			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	21.424		21.11	mg/L	98.5	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	21.424	33.4	53.18	mg/L	92.3	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	21.424	33.4	53.69	mg/L	94.7	85	115	0.95	20	

Silver, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319375													
WG319375ICV	ICV	03/12/12 23:24	MS120109-1	.01996		.02028	mg/L	101.6	90	110			
WG319375ICB	ICB	03/12/12 23:27				U	mg/L		-0.00015	0.00015			
WG319375LFB	LFB	03/12/12 23:30	MS120216-6	.01002		.009647	mg/L	96.3	85	115			
L93324-01AS	AS	03/13/12 0:03	MS120216-6	.2004	U	.1794	mg/L	89.5	70	130			
L93324-01ASD	ASD	03/13/12 0:06	MS120216-6	.2004	U	.1859	mg/L	92.8	70	130	3.56	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

Project ID: LISBON VALLEY COPPER

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	100		101.23	mg/L	101.2	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.9	0.9			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	100.018		100.6	mg/L	100.6	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	100.018	52	152.9	mg/L	100.9	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	100.018	52	153.5	mg/L	101.5	85	115	0.39	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	100		100.57	mg/L	100.6	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.9	0.9			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	100.018		95.76	mg/L	95.7	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	100.018	103	196.5	mg/L	93.5	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	100.018	103	196.5	mg/L	93.5	85	115	0	20	

Sulfate SM4500 SO4-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319126													
WG319126PBW	PBW	03/05/12 8:35				U	mg/L		-30	30			
WG319126LCSW	LCSW	03/05/12 8:37	WC110510-	100		110	mg/L	110	80	120			
L93318-06DUP	DUP	03/05/12 9:03			2220	2103	mg/L				5.4	20	

Thallium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG319320													
WG319320ICV	ICV	03/07/12 23:20	MS120109-1	.05		.05081	mg/L	101.6	90	110			
WG319320ICB	ICB	03/07/12 23:23				U	mg/L		-0.0003	0.0003			
WG319320LFB	LFB	03/07/12 23:26	MS120216-6	.05005		.0511	mg/L	102.1	85	115			
L93306-03AS	AS	03/07/12 23:35	MS120216-6	.25025	U	.26705	mg/L	106.7	70	130			
L93306-03ASD	ASD	03/07/12 23:38	MS120216-6	.25025	U	.2678	mg/L	107	70	130	0.28	20	
L93313-04AS	AS	03/08/12 0:14	MS120216-6	1.25125	U	1.8353	mg/L	146.7	70	130			M1
L93313-04ASD	ASD	03/08/12 0:17	MS120216-6	1.25125	U	1.8698	mg/L	149.4	70	130	1.86	20	M1

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***
Project ID: LISBON VALLEY COPPER

Uranium, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318999													
WG318999ICV	ICV	02/29/12 17:31	MS120109-1	.05		.05189	mg/L	103.8	90	110			
WG318999ICB	ICB	02/29/12 17:34				U	mg/L		-0.0003	0.0003			
WG318872LRB	LRB	02/29/12 17:38				U	mg/L		-0.00022	0.00022			
WG318872LFB	LFB	02/29/12 17:42	MS120216-6	.05		.04984	mg/L	99.7	85	115			
L93245-04LFM	LFM	02/29/12 17:52	MS120216-6	.05	U	.04446	mg/L	88.9	70	130			
L93245-04LFMD	LFMD	02/29/12 17:56	MS120216-6	.05	U	.04539	mg/L	90.8	70	130	2.07	20	
L93313-08LFM	LFM	02/29/12 18:43	MS5XW	.25	.011	.226	mg/L	86	70	130			
L93313-08LFMD	LFMD	02/29/12 18:46	MS5XW	.25	.011	.22455	mg/L	85.4	70	130	0.64	20	
WG319061													
WG319061ICV	ICV	03/01/12 21:06	MS120109-1	.05		.05175	mg/L	103.5	90	110			
WG319061ICB	ICB	03/01/12 21:08				U	mg/L		-0.0003	0.0003			
WG318748LRB	LRB	03/01/12 21:11				U	mg/L		-0.00022	0.00022			
WG318748LFB	LFB	03/01/12 21:14	MS120216-6	.05		.0482	mg/L	96.4	85	115			
WG318872LRB	LRB	03/01/12 21:26				U	mg/L		-0.00022	0.00022			
WG318872LFB	LFB	03/01/12 21:29	MS120216-6	.05		.04934	mg/L	98.7	85	115			
L93313-08LFM	LFM	03/01/12 21:39	MS5XW	.25	.013	.2728	mg/L	103.9	70	130			
L93313-08LFMD	LFMD	03/01/12 21:42	MS5XW	.25	.013	.2718	mg/L	103.5	70	130	0.37	20	

Vanadium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		2.0148	mg/L	100.7	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.015	0.015			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.5034	mg/L	100.7	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	U	.5005	mg/L	100.1	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	U	.5018	mg/L	100.4	85	115	0.26	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		1.9845	mg/L	99.2	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.015	0.015			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.4813	mg/L	96.3	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	.007	.4866	mg/L	95.9	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	.007	.4883	mg/L	96.3	85	115	0.35	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

Project ID: LISBON VALLEY COPPER

Zinc, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG318910													
WG318910ICV	ICV	02/28/12 19:09	II120112-3	2		1.949	mg/L	97.5	95	105			
WG318910ICB	ICB	02/28/12 19:15				U	mg/L		-0.03	0.03			
WG318910LFB	LFB	02/28/12 19:28	II120216-1	.5		.501	mg/L	100.2	85	115			
L93313-01AS	AS	02/28/12 19:34	II120216-1	.5	.06	.542	mg/L	98.4	85	115			
L93313-01ASD	ASD	02/28/12 19:37	II120216-1	.5	.06	.537	mg/L	97.4	85	115	0.93	20	
WG319027													
WG319027ICV	ICV	03/01/12 10:22	II120112-3	2		1.922	mg/L	96.1	95	105			
WG319027ICB	ICB	03/01/12 10:28				U	mg/L		-0.03	0.03			
WG319027LFB	LFB	03/01/12 10:40	II120216-1	.5		.47	mg/L	94	85	115			
L93281-01AS	AS	03/01/12 10:46	II120216-1	.5	.04	.498	mg/L	91.6	85	115			
L93281-01ASD	ASD	03/01/12 10:49	II120216-1	.5	.04	.504	mg/L	92.8	85	115	1.2	20	

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L93313-01	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318797	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L93313-02	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318797	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L93313-03	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318797	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L93313-04	WG319320	Antimony, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Arsenic, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Beryllium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Cadmium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Chromium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Lead, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319375	Silver, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [< MDL].
			M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
	WG319320	Thallium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L93313-05	WG319320	Antimony, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Arsenic, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Beryllium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Cadmium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Chromium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Lead, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319375	Silver, dissolved	M200.8 ICP-MS	BE	Target analyte in continuing calibration blank (CCB) at or above the acceptance criteria. Target analyte was not detected in the sample [< MDL].
			M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
	WG319320	Thallium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L93313-06	WG318872	Total Hot Plate Digestion	M200.2 ICP-MS	DF	Sample required dilution due to high sediment.
	WG319320	Lead, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Thallium, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L93313-07	WG319320	Lead, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Thallium, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L93313-08	WG318872	Total Hot Plate Digestion	M200.2 ICP-MS	DF	Sample required dilution due to high sediment.
	WG319320	Lead, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Thallium, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG318841	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318841	pH	SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318841	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L93313-09	WG319320	Lead, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
		Thallium, dissolved	M200.8 ICP-MS	M1	Matrix spike recovery was high, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG319054	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318951	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG319447	Nitrogen, ammonia	M350.1 - Automated Phenate	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG318777	Residue, Non-Filterable (TSS) @105C	SM2540D	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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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-3-12-1
Locator:

ACZ Sample ID: ***L93313-01***
Date Sampled: *02/20/12 12:20*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/02/12 16:00		23	7.5	3.9	pCi/L		jjg
Gross Beta	03/02/12 16:00		19	5.6	6.8	pCi/L		jjg

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PW-6-12-1
Locator:

ACZ Sample ID: ***L93313-02***
Date Sampled: *02/20/12 14:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/02/12 16:02		21	6.1	2.9	pCi/L		jjg
Gross Beta	03/02/12 16:02		19	4.6	5.1	pCi/L		jjg

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-1
Locator:

ACZ Sample ID: ***L93313-03***
Date Sampled: *02/20/12 10:00*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/02/12 16:03		23	6.6	3	pCi/L		jjg
Gross Beta	03/02/12 16:03		17	4.5	5.2	pCi/L		jjg

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-1
Locator:

ACZ Sample ID: ***L93313-04***
Date Sampled: *02/21/12 8:30*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/02/12 16:05		11	5	3.4	pCi/L		jjg
Gross Beta	03/02/12 16:05		18	4.8	6	pCi/L		jjg

ACZ Laboratories, Inc.
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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-1
Locator:

ACZ Sample ID: ***L93313-05***
Date Sampled: *02/21/12 10:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/14/12 15:39		2.2	2.3	2.2	pCi/L		thf
Gross Beta	03/14/12 15:39		13	3.4	4.1	pCi/L		thf

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-1
Locator:

ACZ Sample ID: ***L93313-06***
Date Sampled: *02/21/12 10:40*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/14/12 15:40		37	12	6.6	pCi/L		thf
Gross Beta	03/14/12 15:40		43	11	12	pCi/L		thf

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1RN
Locator:

ACZ Sample ID: ***L93313-07***
Date Sampled: *02/21/12 11:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/14/12 15:42		2.5	1.6	1.5	pCi/L		thf
Gross Beta	03/14/12 15:42		1.3	2.8	4	pCi/L		thf

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-1
Locator:

ACZ Sample ID: ***L93313-08***
Date Sampled: *02/21/12 12:10*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/14/12 15:43		66	18	7.9	pCi/L		thf
Gross Beta	03/14/12 15:43		79	13	14	pCi/L		thf

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-120221
Locator:

ACZ Sample ID: ***L93313-09***
Date Sampled: *02/21/12 12:45*
Date Received: *02/24/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	03/14/12 15:45		190	23	5.2	pCi/L		thf
Gross Beta	03/14/12 15:45		93	10	9.1	pCi/L		thf

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.
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.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Replicate Error Ratio (RER) accepted because sample concentrations are less than 10x the MDL.
U	No nuclides detected above the Lower Limit of Detection (LLD)
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
X	QC is out of control. See Case Narrative.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) & 20th edition (1998).
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

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Radiochemistry QC Summary

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L93313***

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
WG319300																
WG319037PBW	PBW	03/02/12						.27	1.2	1.4			2.8			
WG319037LCSW	LCSW	03/02/12	RC111214-2	81.06				89	8.1	1.4	109.8	84	129			
L93182-01DUP	DUP-R	03/02/12			7.9	3.4	2.1	16	4.5	2.2				1.44	2	
L93306-08DUP	DUP-R	03/02/12			24	9	4.8	51	12	4.8				1.8	2	
L93182-03MS	MS	03/02/12	RC111214-2	81.06	8.7	3.6	2.2	100	11	2.3	112.6	84	129			
WG319635																
WG319519PBW	PBW	03/14/12						.23	1.5	1.4			2.8			
WG319519LCSW	LCSW	03/14/12	RC111214-2	81.06				72	7.3	1.4	88.8	84	129			
L93313-05DUP	DUP-R	03/14/12			2.2	2.3	2.2	1.3	1.7	2.1				0.31	2	
L93343-01DUP	DUP-R	03/14/12			410	24	2.7	380	23	2.7				0.9	2	
L93313-07MS	MS	03/14/12	RC111214-2	81.06	2.5	1.6	1.5	98	8.8	1.5	117.8	84	129			

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
WG319300																
WG319037PBW	PBW	03/02/12						-1.5	2.7	4			8			
WG319037LCSW	LCSW	03/02/12	PCN32801	200				200	8.9	4	100	62	133			
L93182-01DUP	DUP-R	03/02/12			5.9	3	4.1	12	3.5	4.1				1.32	2	
L93306-08DUP	DUP-R	03/02/12			35	7.6	8.3	57	8.3	8.3				1.95	2	
L93205-02MS	MS	03/02/12	PCN32801	571.43	9.5	9.2	12	580	26	12	99.8	62	133			
WG319635																
WG319519PBW	PBW	03/14/12						4.9	3	4			8			
WG319519LCSW	LCSW	03/14/12	RC110517-11	100				110	6.9	4	110	62	133			
L93313-05DUP	DUP-R	03/14/12			13	3.4	4.1	8.3	3.3	4.1				0.99	2	
L93344-01MS	MS	03/14/12	RC110517-11	111.11	200	9.6	4.6	320	12	4.5	108	62	133			

ACZ Laboratories, Inc.
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RadChem Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93313***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L93313
Date Received: 02/24/2012 10:11
Received By: ksj
Date Printed: 2/24/2012

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?		X	
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

Some parameters were received past hold time.

Contact (For any discrepancies, the client must be contacted)

The client was not contacted.

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3203		5.3	12
2731		2.6	17

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L93313
Date Received: 02/24/2012 10:11
Received By: ksj
Date Printed: 2/24/2012

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L93313-01	PW-3-12-1	Y	Y		Y							
L93313-02	PW-6-12-1	Y	Y		Y							
L93313-03	MW96-29-12-1	Y	Y		Y							
L93313-04	MW06-15-12-1	Y	Y		Y							
L93313-05	MW96-7B-12-1	Y	Y		Y							
L93313-06	MW96-7A-12-1	Y	Y		Y							
L93313-07	SLV2-12-1RN	Y	Y		Y							
L93313-08	SLV2-12-1	Y	Y		Y							
L93313-09	PENNY PIT-120221	Y	Y		Y							

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L93313

LISBON VALLEY MINING CO

P.O. Box 248
La Sal, Utah 84530

Chain of Custody Record

Send report with laboratory QA to:
lindergard@lisbonvalley.com
swyman@whetstone-associates.com

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE NUMBER	DATE	TIME	Diss. Wet Chemistry [1]	Dissolved metals [2]	Ammonia, NO2, NO3	Total uranium	Total alkalinity & TSS	Radiochemistry [3]	pH & conductivity [4]	Number of Containers
PW-3-12-1	2/20/12	12:20	1	1	1	1	1	1		6
PW-6-12-1	2/20/12	14:00	↓	↓	↓	↓	↓	↓		↓
MW96-29-12-1	2/20/12	10:00								
MW96-15-12-1	2/21/12	8:30								
MW96-7B-12-1	↓	10:10								
MW96-7A-12-1		10:40								
SLVZ-12-1RN		11:10								
SLVZ-12-1		12:10								
Penny Pit-120221	↓	12:45	↓	↓	↓	↓	↓	↓		↓

Remarks / Comments

Matrix: Water

Samples Stored on Ice

1) Chloride, hardness, sulfate, TDS, fluoride (Field Filtered 0.45 um)
2) Field Filtered 0.45 um
3) Gross alpha, gross beta
4) Centrifuge tube for pH, E.C., alkalinity

Note:

- Follow standard analytical suite for project and required detection limits

Sampled By: Nick Cocina

Total Number of Containers: 54

Sampler's Signature: Nick C

Contact Person:
Susan Wyman
Phone: (970) 641-7471 Fax: (970) 641-7431

Relinquished By:	Date / Time:	Received By:	Date / Time:
Nick Cocina	2/21/12 14:15		2-24-12 10:11

Method of Shipment: Fed Ex

L93313 Chain of Custody

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

Analytical Report

April 09, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L93692

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on March 21, 2012. This project has been assigned to ACZ's project number, L93692. 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 L93692. 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 May 09, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/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 reports for five years.

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

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 1ST QTR 1/20

ACZ Sample ID: ***L93692-01***
Date Sampled: *03/15/12 00:00*
Date Received: *03/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	04/04/12 23:22	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:15	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/29/12 14:15	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:15	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:15	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:15	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0048			mg/L	0.0001	0.0005	04/04/12 23:22	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:15	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4995.58			g			03/27/12 0:00	mss2
Extraction pH		5.7			units			03/27/12 0:00	mss2
Extraction Time		27			hrs			03/27/12 0:00	mss2
Leachate pH		7.61			units			03/27/12 0:00	mss2
Leachate Volume		5023.99			mL			03/27/12 0:00	mss2
Particle Size over 5 cm		70.61			%			03/27/12 0:00	mss2
Retained Moisture		9.74			%			03/27/12 0:00	mss2

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 1ST QTR 2/7

ACZ Sample ID: ***L93692-02***
Date Sampled: *03/15/12 00:00*
Date Received: *03/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	04/04/12 23:27	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:24	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/29/12 14:24	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:24	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:24	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:24	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0152			mg/L	0.0001	0.0005	04/04/12 23:27	pmc
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:24	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4993.18			g			03/27/12 0:00	mss2
Extraction pH		5.7			units			03/27/12 0:00	mss2
Extraction Time		27			hrs			03/27/12 0:00	mss2
Leachate pH		7.83			units			03/27/12 0:00	mss2
Leachate Volume		5017.54			mL			03/27/12 0:00	mss2
Particle Size over 5 cm		73.24			%			03/27/12 0:00	mss2
Retained Moisture		9.78			%			03/27/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 1ST QTR 3/13

ACZ Sample ID: ***L93692-03***
Date Sampled: *03/15/12 00:00*
Date Received: *03/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	04/04/12 23:30	pmc
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:30	aeb
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	03/29/12 14:30	aeb
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:30	aeb
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	03/29/12 14:30	aeb
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	03/29/12 14:30	aeb
Uranium (MWMT)	M6020 ICP-MS	0.0042			mg/L	0.0001	0.0005	04/04/12 23:30	pmc
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	03/29/12 14:30	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4994.28			g			03/28/12 0:00	mss2
Extraction pH		5.7			units			03/28/12 0:00	mss2
Extraction Time		27			hrs			03/28/12 0:00	mss2
Leachate pH		7.78			units			03/28/12 0:00	mss2
Leachate Volume		5019.99			mL			03/28/12 0:00	mss2
Particle Size over 5 cm		66.64			%			03/28/12 0:00	mss2
Retained Moisture		7.41			%			03/28/12 0:00	mss2

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93692***
Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320608													
WG320608ICV	ICV	04/04/12 23:06	MS120109-1	.02		.02102	mg/L	105.1	90	110			
WG320608ICB	ICB	04/04/12 23:09				.00072	mg/L		-0.0012	0.0012			
WG320129PBS	PBS	04/04/12 23:19				U	mg/L		-0.0012	0.0012			
L93692-03AS	AS	04/04/12 23:32	MS120327-3	.01	U	.00926	mg/L	92.6	75	125			
L93692-03ASD	ASD	04/04/12 23:35	MS120327-3	.01	U	.01005	mg/L	100.5	75	125	8.18	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	4		4.102	mg/L	102.6	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.18	0.18			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.18	0.18			
L93692-01AS	AS	03/29/12 14:18	II120306-2	1	U	1.102	mg/L	110.2	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	1	U	1.094	mg/L	109.4	75	125	0.73	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	2		1.934	mg/L	96.7	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.015	0.015			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.015	0.015			
L93692-01AS	AS	03/29/12 14:18	II120306-2	.5	U	.4887	mg/L	97.7	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	.5	U	.4936	mg/L	98.7	75	125	1	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	2		1.967	mg/L	98.4	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.03	0.03			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.03	0.03			
L93692-01AS	AS	03/29/12 14:18	II120306-2	.5	U	.502	mg/L	100.4	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	.5	U	.505	mg/L	101	75	125	0.6	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	2		2.003	mg/L	100.2	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.03	0.03			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.03	0.03			
L93692-01AS	AS	03/29/12 14:18	II120306-2	.5	U	.514	mg/L	102.8	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	.5	U	.515	mg/L	103	75	125	0.19	20	

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L93692***

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	4		4.169	mg/L	104.2	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.18	0.18			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.18	0.18			
L93692-01AS	AS	03/29/12 14:18	II120306-2	1	U	1.013	mg/L	101.3	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	1	U	1.094	mg/L	109.4	75	125	7.69	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320608													
WG320608ICV	ICV	04/04/12 23:06	MS120109-1	.05		.05211	mg/L	104.2	90	110			
WG320608ICB	ICB	04/04/12 23:09				U	mg/L		-0.0003	0.0003			
WG320129PBS	PBS	04/04/12 23:19				U	mg/L		-0.0003	0.0003			
L93692-03AS	AS	04/04/12 23:32	MS120327-3	.05	.0042	.05539	mg/L	102.4	75	125			
L93692-03ASD	ASD	04/04/12 23:35	MS120327-3	.05	.0042	.05579	mg/L	103.2	75	125	0.72	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG320296													
WG320296ICV	ICV	03/29/12 13:57	II120112-3	2		1.981	mg/L	99.1	90	110			
WG320296ICB	ICB	03/29/12 14:00				U	mg/L		-0.03	0.03			
WG320129PBS	PBS	03/29/12 14:12				U	mg/L		-0.03	0.03			
L93692-01AS	AS	03/29/12 14:18	II120306-2	.5	U	.518	mg/L	103.6	75	125			
L93692-01ASD	ASD	03/29/12 14:21	II120306-2	.5	U	.524	mg/L	104.8	75	125	1.15	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93692***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L93692***

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L93692
Date Received: 03/21/2012 09:54
Received By: ksj
Date Printed: 3/21/2012

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3435		13.9	16

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

Notes

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

Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L93692
Date Received: 03/21/2012 09:54
Received By: ksj
Date Printed: 3/21/2012

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L93692-01	BED 14 1ST QTR 1/20									X		
L93692-02	BED 14 1ST QTR 2/7									X		
L93692-03	BED 14 1ST QTR 3/13									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L93692

Lisbon Valley Mining Co.
P.O. Box 248
920 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-9950

Chain of Custody Record

Send report with laboratory QA to:
920 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
Bed 14, 1st QTR, 1/20/2012	3/15/2012		x	1	Centennial Pit 2012
Bed 14, 1st QTR, 2/7/2012	3/15/2012		x	1	Centennial Pit 2012
Bed 14, 1st QTR, 3/13/2012	3/15/2012		x	1	Centennial Pit 2012

Sampled By:
Ken Ezpeleta

Total Number of Containers: 3

Sampler's Signature

Contact Person:
Lantz M Indergard
Phone: (435) 686-9950 ext. 1 107 Fax: (435) 686-2223

Relinquished By:	Date / Time:	Received By:	Date / Time:
Lantz Indergard	3/15/2012 10:01 AM		

Method of Shipment:
UPS

Comments:
STANDARD (ACIDIC LEACH) MWMP METHOD

3-15-12

WPL 3-21-12
9:54

L93692 Chain of Custody

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

Analytical Report

May 30, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Susan Wyman

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L94460

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 10, 2012. This project has been assigned to ACZ's project number, L94460. 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 L94460. 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 June 30, 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.

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC

May 30, 2012

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L94460

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 7 ground water samples from Lisbon Valley Mining Company, LLC on May 10, 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 L94460. 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 following anomaly required further explanation not provided by the Extended Qualifier Report:

1. For dissolved silver values flagged with an "N1", sulfur/organic constituents in the sample caused silver to precipitate and fail in QC. The samples were run on a 25-50X dilution.

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-12-2

ACZ Sample ID: ***L94460-01***
Date Sampled: *05/09/12 14:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 15:47	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.2	0.8	05/17/12 5:27	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.002	0.01	05/22/12 5:00	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.003	0.01	05/22/12 5:00	pmc
Barium, dissolved	M200.7 ICP		U		mg/L	0.02	0.08	05/17/12 5:27	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	05/22/12 5:00	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	05/22/12 5:00	pmc
Calcium, dissolved	M200.7 ICP	614			mg/L	1	5	05/17/12 5:27	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.003	0.01	05/22/12 5:00	pmc
Copper, dissolved	M200.7 ICP	0.11	B		mg/L	0.05	0.3	05/17/12 5:27	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.1	0.3	05/17/12 5:27	jjc
Lead, dissolved	M200.8 ICP-MS	0.0020	B		mg/L	0.0005	0.003	05/22/12 5:00	pmc
Magnesium, dissolved	M200.7 ICP	398			mg/L	1	5	05/17/12 5:27	jjc
Manganese, dissolved	M200.7 ICP	0.26			mg/L	0.03	0.1	05/17/12 5:27	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:11	erf
Molybdenum, dissolved	M200.7 ICP	0.11	B		mg/L	0.05	0.3	05/17/12 5:27	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.05	0.3	05/17/12 5:27	jjc
Potassium, dissolved	M200.7 ICP	57			mg/L	2	8	05/17/12 5:27	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride	0.0056			mg/L	0.001	0.005	05/25/12 0:54	erf
Silica, dissolved	M200.7 ICP	9	B		mg/L	2	10	05/17/12 5:27	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.0003	0.001	05/22/12 5:00	pmc
Sodium, dissolved	M200.7 ICP	172			mg/L	2	8	05/17/12 5:27	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.003	05/22/12 5:00	pmc
Uranium, total	M200.8 ICP-MS	0.9680			mg/L	0.0005	0.003	05/25/12 1:05	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.03	0.1	05/17/12 5:27	jjc
Zinc, dissolved	M200.7 ICP	0.06	B		mg/L	0.05	0.3	05/17/12 5:27	jjc

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-12-2

ACZ Sample ID: ***L94460-01***
Date Sampled: *05/09/12 14:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		196			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		196			mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.6			%			05/30/12 0:00	calc
Sum of Anions		74.9			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		72.5			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	69			mg/L	1	5	05/24/12 11:29	lhb
Conductivity @25C	SM2510B	4590			umhos/cm	1	10	05/11/12 19:46	mla
Fluoride	SM4500F-C	0.8		*	mg/L	0.1	0.5	05/18/12 12:41	mla
Hardness as CaCO3	SM2340B - Calculation	3170			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	21.0			mg/L	0.3	2	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	25.8			mg/L	0.3	2	05/10/12 22:51	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	4.8		*	mg/L	0.2	0.8	05/10/12 22:51	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1.88			mg/L	0.05	0.5	05/29/12 13:08	mpb
pH (lab)	SM4500H+ B								
pH		8.2	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		24.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	4940		*	mg/L	10	20	05/11/12 10:35	mla
Residue, Non-Filterable (TSS) @105C	SM2540D		U		mg/L	5	20	05/11/12 10:43	las
Sulfate	SM4500 SO4-D	3200		*	mg/L	100	500	05/12/12 13:40	mla
TDS (calculated)	Calculation	4750			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.04						05/30/12 0:00	calc

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-2

ACZ Sample ID: ***L94460-02***
Date Sampled: *05/09/12 13:30*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS			*				05/21/12 15:57	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.03	B		mg/L	0.03	0.2	05/17/12 5:30	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	05/22/12 5:03	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.0025			mg/L	0.0005	0.002	05/22/12 5:03	pmc
Barium, dissolved	M200.7 ICP	0.051			mg/L	0.003	0.02	05/17/12 5:30	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:03	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:03	pmc
Calcium, dissolved	M200.7 ICP	55.9			mg/L	0.2	1	05/17/12 5:30	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	05/22/12 5:03	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:30	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	05/17/12 5:30	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:03	pmc
Magnesium, dissolved	M200.7 ICP	24.0			mg/L	0.2	1	05/17/12 5:30	jjc
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:30	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:13	erf
Molybdenum, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	05/17/12 5:30	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:30	jjc
Potassium, dissolved	M200.7 ICP	2.6			mg/L	0.3	2	05/17/12 5:30	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride	0.0026	B		mg/L	0.001	0.005	05/25/12 0:55	erf
Silica, dissolved	M200.7 ICP	17.1			mg/L	0.4	2	05/17/12 5:30	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	05/22/12 5:03	pmc
Sodium, dissolved	M200.7 ICP	40.1			mg/L	0.3	2	05/17/12 5:30	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:03	pmc
Uranium, total	M200.8 ICP-MS	0.0130			mg/L	0.0005	0.003	05/25/12 1:08	pmc
Vanadium, dissolved	M200.7 ICP	0.009	B		mg/L	0.005	0.03	05/17/12 5:30	jjc
Zinc, dissolved	M200.7 ICP	0.06			mg/L	0.01	0.05	05/17/12 5:30	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-2

ACZ Sample ID: ***L94460-02***
Date Sampled: *05/09/12 13:30*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		166			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3		7	B		mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		173		*	mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.5			%			05/30/12 0:00	calc
Sum of Anions		6.8			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		6.6			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	15			mg/L	1	5	05/24/12 11:29	lhb
Conductivity @25C	SM2510B	614		*	umhos/cm	1	10	05/11/12 19:55	mla
Fluoride	SM4500F-C	0.4	B	*	mg/L	0.1	0.5	05/18/12 12:45	mla
Hardness as CaCO3	SM2340B - Calculation	238			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.05	B		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.05	B		mg/L	0.02	0.1	05/10/12 22:52	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	05/10/12 22:52	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.19	B		mg/L	0.05	0.5	05/29/12 13:11	mpb
pH (lab)	SM4500H+ B								
pH		8.4	H	*	units	0.1	0.1	05/11/12 0:00	mla
pH measured at		24.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	400			mg/L	10	20	05/11/12 10:36	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	556			mg/L	5	20	05/11/12 10:45	las
Sulfate	SM4500 SO4-D	140		*	mg/L	10	50	05/12/12 13:43	mla
TDS (calculated)	Calculation	399			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.00						05/30/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2

ACZ Sample ID: ***L94460-03***
Date Sampled: *05/09/12 11:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 16:27	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.03	B		mg/L	0.03	0.2	05/17/12 5:33	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	05/22/12 5:12	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.0016	B		mg/L	0.0005	0.002	05/22/12 5:12	pmc
Barium, dissolved	M200.7 ICP	0.015	B		mg/L	0.003	0.02	05/17/12 5:33	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:12	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:12	pmc
Calcium, dissolved	M200.7 ICP	211			mg/L	0.2	1	05/17/12 5:33	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	05/22/12 5:12	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:33	jjc
Iron, dissolved	M200.7 ICP	4.20			mg/L	0.02	0.05	05/17/12 5:33	jjc
Lead, dissolved	M200.8 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	05/22/12 5:12	pmc
Magnesium, dissolved	M200.7 ICP	97.5			mg/L	0.2	1	05/17/12 5:33	jjc
Manganese, dissolved	M200.7 ICP	0.292			mg/L	0.005	0.03	05/17/12 5:33	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:15	erf
Molybdenum, dissolved	M200.7 ICP	0.02	B		mg/L	0.01	0.05	05/17/12 5:33	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:33	jjc
Potassium, dissolved	M200.7 ICP	14.2			mg/L	0.3	2	05/17/12 5:33	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	05/25/12 0:56	erf
Silica, dissolved	M200.7 ICP	8.7			mg/L	0.4	2	05/17/12 5:33	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	05/22/12 5:12	pmc
Sodium, dissolved	M200.7 ICP	92.6			mg/L	0.3	2	05/17/12 5:33	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:12	pmc
Uranium, total	M200.8 ICP-MS	0.0049			mg/L	0.0001	0.0005	05/25/12 1:17	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:33	jjc
Zinc, dissolved	M200.7 ICP	0.07			mg/L	0.01	0.05	05/17/12 5:33	jjc

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2

ACZ Sample ID: ***L94460-03***
Date Sampled: *05/09/12 11:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		307			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		307			mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-0.2			%			05/30/12 0:00	calc
Sum of Anions		23.4			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		23.3			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	23			mg/L	1	5	05/24/12 11:29	lhb
Conductivity @25C	SM2510B	1840			umhos/cm	1	10	05/11/12 20:04	mla
Fluoride	SM4500F-C	0.3	B	*	mg/L	0.1	0.5	05/18/12 12:50	mla
Hardness as CaCO3	SM2340B - Calculation	928			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.02	B		mg/L	0.02	0.1	05/10/12 22:20	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.01	B	*	mg/L	0.01	0.05	05/10/12 22:20	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.26	B		mg/L	0.05	0.5	05/29/12 13:12	mpb
pH (lab)	SM4500H+ B								
pH		8.0	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		24.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	1480			mg/L	10	20	05/11/12 10:37	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	640			mg/L	5	20	05/11/12 10:47	las
Sulfate	SM4500 SO4-D	790		*	mg/L	50	250	05/12/12 13:45	mla
TDS (calculated)	Calculation	1430			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.03						05/30/12 0:00	calc

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-2

ACZ Sample ID: ***L94460-04***
Date Sampled: *05/09/12 11:03*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 16:36	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	05/17/12 5:36	jjc
Antimony, dissolved	M200.8 ICP-MS		U	*	mg/L	0.01	0.05	05/22/12 6:15	pmc
Arsenic, dissolved	M200.8 ICP-MS	0.02	B		mg/L	0.01	0.05	05/25/12 6:11	pmc
Barium, dissolved	M200.7 ICP	0.072			mg/L	0.003	0.02	05/17/12 5:36	jjc
Beryllium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:15	pmc
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:15	pmc
Calcium, dissolved	M200.7 ICP	11.9			mg/L	0.2	1	05/17/12 5:36	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.01	0.05	05/25/12 6:11	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:36	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	05/17/12 5:36	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:15	pmc
Magnesium, dissolved	M200.7 ICP	13.0			mg/L	0.2	1	05/17/12 5:36	jjc
Manganese, dissolved	M200.7 ICP	0.019	B		mg/L	0.005	0.03	05/17/12 5:36	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:21	erf
Molybdenum, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	05/17/12 5:36	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:36	jjc
Potassium, dissolved	M200.7 ICP	7.4			mg/L	0.3	2	05/17/12 5:36	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	05/25/12 1:00	erf
Silica, dissolved	M200.7 ICP	10.4			mg/L	0.4	2	05/17/12 5:36	jjc
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.001	0.006	05/22/12 6:15	pmc
Sodium, dissolved	M200.7 ICP	131			mg/L	0.3	2	05/17/12 5:36	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:15	pmc
Uranium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/25/12 1:26	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:36	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:36	jjc

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-2

ACZ Sample ID: ***L94460-04***
Date Sampled: *05/09/12 11:03*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		215			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3		30			mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		245			mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.3			%			05/30/12 0:00	calc
Sum of Anions		7.8			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		7.6			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	14			mg/L	1	5	05/24/12 11:29	lhb
Conductivity @25C	SM2510B	722			umhos/cm	1	10	05/11/12 20:13	mla
Fluoride	SM4500F-C	0.5	B	*	mg/L	0.1	0.5	05/18/12 12:54	mla
Hardness as CaCO3	SM2340B - Calculation	83			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U		mg/L	0.02	0.1	05/10/12 22:21	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	05/10/12 22:21	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.14	B		mg/L	0.05	0.5	05/29/12 13:13	mpb
pH (lab)	SM4500H+ B								
pH		8.9	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		25.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	430			mg/L	10	20	05/11/12 10:39	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	9	B		mg/L	5	20	05/11/12 10:49	las
Sulfate	SM4500 SO4-D	120		*	mg/L	10	50	05/12/12 13:48	mla
TDS (calculated)	Calculation	455			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.95						05/30/12 0:00	calc

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-2

ACZ Sample ID: ***L94460-05***
Date Sampled: *05/09/12 09:35*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 16:46	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.04	B		mg/L	0.03	0.2	05/17/12 5:40	jjc
Antimony, dissolved	M200.8 ICP-MS		U	*	mg/L	0.02	0.1	05/22/12 6:19	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.03	0.1	05/25/12 6:14	pmc
Barium, dissolved	M200.7 ICP	0.165			mg/L	0.003	0.02	05/17/12 5:40	jjc
Beryllium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:19	pmc
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:19	pmc
Calcium, dissolved	M200.7 ICP	4.2			mg/L	0.2	1	05/17/12 5:40	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.03	0.1	05/25/12 6:14	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:40	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	05/17/12 5:40	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:19	pmc
Magnesium, dissolved	M200.7 ICP	2.6			mg/L	0.2	1	05/17/12 5:40	jjc
Manganese, dissolved	M200.7 ICP	0.008	B		mg/L	0.005	0.03	05/17/12 5:40	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:29	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:40	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:40	jjc
Potassium, dissolved	M200.7 ICP	6.2			mg/L	0.3	2	05/17/12 5:40	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	05/25/12 1:04	erf
Silica, dissolved	M200.7 ICP	10.3			mg/L	0.4	2	05/17/12 5:40	jjc
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:19	pmc
Sodium, dissolved	M200.7 ICP	293			mg/L	0.3	2	05/17/12 5:40	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:19	pmc
Uranium, total	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	05/25/12 1:29	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:40	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:40	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-2

ACZ Sample ID: ***L94460-05***
Date Sampled: *05/09/12 09:35*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		357			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3		72			mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		429			mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.9			%			05/30/12 0:00	calc
Sum of Anions		14.3			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		13.5			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	170			mg/L	10	50	05/24/12 11:38	lhb
Conductivity @25C	SM2510B	1300			umhos/cm	1	10	05/11/12 20:23	mla
Fluoride	SM4500F-C	2.6		*	mg/L	0.1	0.5	05/18/12 12:59	mla
Hardness as CaCO3	SM2340B - Calculation	21			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U		mg/L	0.02	0.1	05/10/12 22:22	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	05/10/12 22:22	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.09	B		mg/L	0.05	0.5	05/29/12 14:11	mpb
pH (lab)	SM4500H+ B								
pH		9.1	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		25.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	750			mg/L	10	20	05/11/12 10:40	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	610			mg/L	10	40	05/11/12 10:51	las
Sulfate	SM4500 SO4-D	40	B	*	mg/L	10	50	05/12/12 13:50	mla
TDS (calculated)	Calculation	786			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.95						05/30/12 0:00	calc

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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-2

ACZ Sample ID: ***L94460-06***
Date Sampled: *05/09/12 14:45*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 16:56	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.07	B		mg/L	0.03	0.2	05/17/12 5:49	jjc
Antimony, dissolved	M200.8 ICP-MS		U	*	mg/L	0.02	0.1	05/22/12 6:22	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.03	0.1	05/25/12 6:18	pmc
Barium, dissolved	M200.7 ICP	0.165			mg/L	0.003	0.02	05/17/12 5:49	jjc
Beryllium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:22	pmc
Cadmium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:22	pmc
Calcium, dissolved	M200.7 ICP	4.2			mg/L	0.2	1	05/17/12 5:49	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.03	0.1	05/25/12 6:18	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:49	jjc
Iron, dissolved	M200.7 ICP	0.03	B		mg/L	0.02	0.05	05/17/12 5:49	jjc
Lead, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:22	pmc
Magnesium, dissolved	M200.7 ICP	2.6			mg/L	0.2	1	05/17/12 5:49	jjc
Manganese, dissolved	M200.7 ICP	0.008	B		mg/L	0.005	0.03	05/17/12 5:49	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:31	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:49	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:49	jjc
Potassium, dissolved	M200.7 ICP	6.2			mg/L	0.3	2	05/17/12 5:49	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	05/25/12 1:05	erf
Silica, dissolved	M200.7 ICP	10.3			mg/L	0.4	2	05/17/12 5:49	jjc
Silver, dissolved	M200.8 ICP-MS		U	*	mg/L	0.003	0.01	05/22/12 6:22	pmc
Sodium, dissolved	M200.7 ICP	291			mg/L	0.3	2	05/17/12 5:49	jjc
Thallium, dissolved	M200.8 ICP-MS		U	*	mg/L	0.005	0.03	05/22/12 6:22	pmc
Uranium, total	M200.8 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	05/25/12 1:32	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:49	jjc
Zinc, dissolved	M200.7 ICP	0.01	B		mg/L	0.01	0.05	05/17/12 5:49	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-2

ACZ Sample ID: ***L94460-06***
Date Sampled: *05/09/12 14:45*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		366			mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3		67			mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		434			mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-4.3			%			05/30/12 0:00	calc
Sum of Anions		14.6			meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations		13.4			meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E	170			mg/L	10	50	05/24/12 11:44	lhb
Conductivity @25C	SM2510B	1300			umhos/cm	1	10	05/11/12 20:33	mla
Fluoride	SM4500F-C	2.6		*	mg/L	0.1	0.5	05/18/12 13:02	mla
Hardness as CaCO3	SM2340B - Calculation	21			mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.02	0.1	05/10/12 22:23	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	05/10/12 22:23	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate		U		mg/L	0.05	0.5	05/29/12 14:12	mpb
pH (lab)	SM4500H+ B								
pH		9.0	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		25.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C	740			mg/L	10	20	05/11/12 10:41	mla
Residue, Non-Filterable (TSS) @105C	SM2540D	490			mg/L	20	80	05/11/12 10:55	las
Sulfate	SM4500 SO4-D	50	B	*	mg/L	10	50	05/12/12 13:52	mla
TDS (calculated)	Calculation	797			mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	0.93						05/30/12 0:00	calc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2-RN

ACZ Sample ID: ***L94460-07***
Date Sampled: *05/09/12 10:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							05/21/12 17:06	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U		mg/L	0.03	0.2	05/17/12 5:52	jjc
Antimony, dissolved	M200.8 ICP-MS		U		mg/L	0.0004	0.002	05/22/12 5:15	pmc
Arsenic, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	05/22/12 5:15	pmc
Barium, dissolved	M200.7 ICP		U		mg/L	0.003	0.02	05/17/12 5:52	jjc
Beryllium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:15	pmc
Cadmium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:15	pmc
Calcium, dissolved	M200.7 ICP		U		mg/L	0.2	1	05/17/12 5:52	jjc
Chromium, dissolved	M200.8 ICP-MS		U		mg/L	0.0005	0.002	05/22/12 5:15	pmc
Copper, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:52	jjc
Iron, dissolved	M200.7 ICP		U		mg/L	0.02	0.05	05/17/12 5:52	jjc
Lead, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:15	pmc
Magnesium, dissolved	M200.7 ICP		U		mg/L	0.2	1	05/17/12 5:52	jjc
Manganese, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:52	jjc
Mercury, dissolved	M245.1 CVAA		U		mg/L	0.0002	0.001	05/24/12 23:33	erf
Molybdenum, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:52	jjc
Nickel, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:52	jjc
Potassium, dissolved	M200.7 ICP		U		mg/L	0.3	2	05/17/12 5:52	jjc
Selenium, dissolved	SM 3114 B, AA-Hydride		U		mg/L	0.001	0.005	05/25/12 1:07	erf
Silica, dissolved	M200.7 ICP		U		mg/L	0.4	2	05/17/12 5:52	jjc
Silver, dissolved	M200.8 ICP-MS		U		mg/L	0.00005	0.0003	05/22/12 5:15	pmc
Sodium, dissolved	M200.7 ICP	0.7	B		mg/L	0.3	2	05/17/12 5:52	jjc
Thallium, dissolved	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/22/12 5:15	pmc
Uranium, total	M200.8 ICP-MS		U		mg/L	0.0001	0.0005	05/25/12 1:35	pmc
Vanadium, dissolved	M200.7 ICP		U		mg/L	0.005	0.03	05/17/12 5:52	jjc
Zinc, dissolved	M200.7 ICP		U		mg/L	0.01	0.05	05/17/12 5:52	jjc

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2-RN

ACZ Sample ID: ***L94460-07***
Date Sampled: *05/09/12 10:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration								
Bicarbonate as CaCO3		2	B		mg/L	2	20	05/11/12 0:00	mla
Carbonate as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Hydroxide as CaCO3			U		mg/L	2	20	05/11/12 0:00	mla
Total Alkalinity		2	B		mg/L	2	20	05/11/12 0:00	mla
Cation-Anion Balance	Calculation								
Cation-Anion Balance		n/a			%			05/30/12 0:00	calc
Sum of Anions			U		meq/L	0.1	0.5	05/30/12 0:00	calc
Sum of Cations			U		meq/L	0.1	0.5	05/30/12 0:00	calc
Chloride	SM4500Cl-E		U		mg/L	1	5	05/24/12 11:30	lhb
Conductivity @25C	SM2510B	6	B		umhos/cm	1	10	05/11/12 21:11	mla
Fluoride	SM4500F-C		U	*	mg/L	0.1	0.5	05/18/12 13:20	mla
Hardness as CaCO3	SM2340B - Calculation		U		mg/L	1	7	05/30/12 0:00	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U		mg/L	0.02	0.1	05/30/12 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.02	0.1	05/10/12 22:25	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	05/10/12 22:25	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	0.08	B		mg/L	0.05	0.5	05/29/12 13:19	mpb
pH (lab)	SM4500H+ B								
pH		6.9	H		units	0.1	0.1	05/11/12 0:00	mla
pH measured at		24.0			C	0.1	0.1	05/11/12 0:00	mla
Residue, Filterable (TDS) @180C	SM2540C		U		mg/L	10	20	05/11/12 10:43	mla
Residue, Non-Filterable (TSS) @105C	SM2540D		U		mg/L	5	20	05/11/12 10:57	las
Sulfate	SM4500 SO4-D		U	*	mg/L	10	50	05/12/12 13:55	mla
TDS (calculated)	Calculation		U		mg/L	10	50	05/30/12 0:00	calc
TDS (ratio - measured/calculated)	Calculation	n/a						05/30/12 0:00	calc

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

Project ID: LISBON VALLEY COPPER

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322544													
WG322544PBW1	PBW	05/11/12 17:22				U	mg/L		-20	20			
WG322544LCSW2	LCSW	05/11/12 17:35	WC120420-2	820		799.9	mg/L	97.5	90	110			
L94460-06DUP	DUP	05/11/12 20:44			434	433.2	mg/L				0.2	20	
WG322544PBW2	PBW	05/11/12 20:49				U	mg/L		-20	20			
WG322544LCSW5	LCSW	05/11/12 21:02	WC120420-2	820		806.1	mg/L	98.3	90	110			
L94463-04DUP	DUP	05/11/12 23:30			746	742.7	mg/L				0.4	20	
WG322544PBW3	PBW	05/12/12 1:02				U	mg/L		-20	20			
WG322544LCSW8	LCSW	05/12/12 1:16	WC120420-2	820		804.4	mg/L	98.1	90	110			
WG322544PBW4	PBW	05/12/12 4:11				U	mg/L		-20	20			
WG322544LCSW11	LCSW	05/12/12 4:24	WC120420-2	820		808.7	mg/L	98.6	90	110			
WG322544LCSW14	LCSW	05/12/12 7:21	WC120420-2	820		817.3	mg/L	99.7	90	110			

Aluminum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		2.094	mg/L	104.7	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.09	0.09			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	1		1.08	mg/L	108	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	1	U	1.101	mg/L	110.1	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	1	U	1.092	mg/L	109.2	85	115	0.82	20	

Antimony, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.02		.02138	mg/L	106.9	90	110			
WG323084ICB	ICB	05/22/12 4:48				.00063	mg/L		-0.0012	0.0012			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.01		.01048	mg/L	104.8	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.01	U	.00947	mg/L	94.7	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.01	U	.0097	mg/L	97	70	130	2.4	20	

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.05328	mg/L	106.6	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0015	0.0015			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.05005		.05029	mg/L	100.5	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.05005	.0025	.05718	mg/L	109.3	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.05005	.0025	.05633	mg/L	107.6	70	130	1.5	20	
WG323327													
WG323327ICV	ICV	05/25/12 6:02	MS120416-2	.05		.05379	mg/L	107.6	90	110			
WG323327ICB	ICB	05/25/12 6:05				U	mg/L		-0.0015	0.0015			
WG323327LFB	LFB	05/25/12 6:08	MS120430-3	.05005		.05387	mg/L	107.6	85	115			
L94523-01AS	AS	05/25/12 6:24	MS120430-3	.05005	U	.05569	mg/L	111.3	70	130			
L94523-01ASD	ASD	05/25/12 6:27	MS120430-3	.05005	U	.05554	mg/L	111	70	130	0.27	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

Project ID: LISBON VALLEY COPPER

Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		2.0208	mg/L	101	95	105			
WG322768ICB	ICB	05/17/12 4:59				.003	mg/L		-0.009	0.009			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.5063	mg/L	101.3	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	.013	.5263	mg/L	102.7	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	.013	.5235	mg/L	102.1	85	115	0.53	20	

Beryllium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.04844	mg/L	96.9	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0003	0.0003			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.0501		.04816	mg/L	96.1	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.0501	U	.04868	mg/L	97.2	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.0501	U	.04965	mg/L	99.1	70	130	1.97	20	

Cadmium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.05137	mg/L	102.7	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0003	0.0003			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.0501		.04914	mg/L	98.1	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.0501	U	.04887	mg/L	97.5	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.0501	U	.04964	mg/L	99.1	70	130	1.56	20	

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	100		98.34	mg/L	98.3	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.6	0.6			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	68.0137		70.39	mg/L	103.5	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	68.0137	128	195.3	mg/L	99	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	68.0137	128	193.8	mg/L	96.7	85	115	0.77	20	

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323265													
WG323265ICB	ICB	05/24/12 10:45				U	mg/L		-3	3			
WG323265ICV	ICV	05/24/12 10:45	WI120312-3	55.11		58.1	mg/L	105.4	90	110			
WG323265LFB1	LFB	05/24/12 11:28	WI111130-1	30.03		31.9	mg/L	106.2	90	110			
L94455-01AS	AS	05/24/12 11:28	WI111130-1	30.03	23	50.5	mg/L	91.6	90	110			
L94455-02DUP	DUP	05/24/12 11:29			22	21.7	mg/L				1.4	20	
WG323265LFB2	LFB	05/24/12 11:32	WI111130-1	30.03		32.2	mg/L	107.2	90	110			

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

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Chromium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.05025	mg/L	100.5	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0015	0.0015			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.05005		.04987	mg/L	99.6	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.05005	U	.0488	mg/L	97.5	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.05005	U	.04885	mg/L	97.6	70	130	0.1	20	
WG323327													
WG323327ICV	ICV	05/25/12 6:02	MS120416-2	.05		.05143	mg/L	102.9	90	110			
WG323327ICB	ICB	05/25/12 6:05				U	mg/L		-0.0015	0.0015			
WG323327LFB	LFB	05/25/12 6:08	MS120430-3	.05005		.05306	mg/L	106	85	115			
L94523-01AS	AS	05/25/12 6:24	MS120430-3	.05005	U	.0507	mg/L	101.3	70	130			
L94523-01ASD	ASD	05/25/12 6:27	MS120430-3	.05005	U	.05114	mg/L	102.2	70	130	0.86	20	

Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322544													
WG322544LCSW1	LCSW	05/11/12 17:23	PCN38464	1408.8		1501.8	umhos/cm	106.6	90	110			
L94460-06DUP	DUP	05/11/12 20:44			1300	1297	umhos/cm				0.2	20	
WG322544LCSW4	LCSW	05/11/12 20:51	PCN38464	1408.8		1464.5	umhos/cm	104	90	110			
L94463-04DUP	DUP	05/11/12 23:30			1570	1537	umhos/cm				2.1	20	
WG322544LCSW7	LCSW	05/12/12 1:04	PCN38464	1408.8		1465.5	umhos/cm	104	90	110			
WG322544LCSW10	LCSW	05/12/12 4:12	PCN38464	1408.8		1445.3	umhos/cm	102.6	90	110			
WG322544LCSW13	LCSW	05/12/12 7:09	PCN38464	1408.8		1429.1	umhos/cm	101.4	90	110			

Copper, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		1.997	mg/L	99.9	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.03	0.03			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.529	mg/L	105.8	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	U	.522	mg/L	104.4	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	U	.518	mg/L	103.6	85	115	0.77	20	

Fluoride SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322921													
WG322921ICV	ICV	05/18/12 12:06	WC120508-1	2.002		1.92	mg/L	95.9	95	105			
WG322921ICB	ICB	05/18/12 12:12				U	mg/L		-0.3	0.3			
WG322921LFB1	LFB	05/18/12 12:24	WC120124-7	5		5	mg/L	100	90	110			
L94455-02AS	AS	05/18/12 12:34	WC120124-7	5	.4	5.49	mg/L	101.8	90	110			
L94455-02DUP	DUP	05/18/12 12:38			.4	.37	mg/L				7.8	20	RA
WG322921LFB2	LFB	05/18/12 14:39	WC120124-7	5		4.95	mg/L	99	90	110			

Lisbon Valley Mining Company, LLC
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Iron, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		1.992	mg/L	99.6	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.06	0.06			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	1		1.032	mg/L	103.2	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	1	.29	1.316	mg/L	102.6	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	1	.29	1.302	mg/L	101.2	85	115	1.07	20	

Lead, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.05223	mg/L	104.5	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0003	0.0003			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.05005		.0495	mg/L	98.9	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.05005	U	.04957	mg/L	99	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.05005	U	.0505	mg/L	100.9	70	130	1.86	20	

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	100		100.73	mg/L	100.7	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.6	0.6			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	50.007		50.99	mg/L	102	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	50.007	49	100.7	mg/L	103.4	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	50.007	49	99.71	mg/L	101.4	85	115	0.99	20	

Manganese, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		1.975	mg/L	98.8	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.015	0.015			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.5124	mg/L	102.5	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	.029	.5415	mg/L	102.5	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	.029	.535	mg/L	101.2	85	115	1.21	20	

Mercury, dissolved M245.1 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323148													
WG323148ICV	ICV	05/24/12 17:47	II120515-1	.005015		.00498	mg/L	99.3	95	105			
WG323148ICB	ICB	05/24/12 17:50				U	mg/L		-0.0002	0.0002			
WG323293													
WG323293LRB	LRB	05/24/12 23:03				U	mg/L		-0.00044	0.00044			
WG323293LFB	LFB	05/24/12 23:05	II120507-5	.002002		.0018	mg/L	89.9	85	115			
L94460-03LFM	LFM	05/24/12 23:17	II120507-5	.002002	U	.00184	mg/L	91.9	85	115			
L94460-03LFMD	LFMD	05/24/12 23:19	II120507-5	.002002	U	.00183	mg/L	91.4	85	115	0.54	20	

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Molybdenum, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		2.034	mg/L	101.7	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.03	0.03			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.521	mg/L	104.2	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	.02	.536	mg/L	103.2	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	.02	.541	mg/L	104.2	85	115	0.93	20	

Nickel, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2.002		1.986	mg/L	99.2	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.03	0.03			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.506	mg/L	101.2	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	U	.497	mg/L	99.4	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	U	.501	mg/L	100.2	85	115	0.8	20	

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322491													
WG322491ICV	ICV	05/10/12 22:01	WI120405-3	2.416		2.532	mg/L	104.8	90	110			
WG322491ICB	ICB	05/10/12 22:02				U	mg/L		-0.06	0.06			
WG322491LFB1	LFB	05/10/12 22:05	WI120211-3	2		2.04	mg/L	102	90	110			
L94451-03AS	AS	05/10/12 22:08	WI120211-3	2	U	1.962	mg/L	98.1	90	110			
L94451-04DUP	DUP	05/10/12 22:10			.73	.737	mg/L				1	20	
L94460-06AS	AS	05/10/12 22:24	WI120211-3	2	U	2.046	mg/L	102.3	90	110			
L94460-07DUP	DUP	05/10/12 22:27			U	U	mg/L				0	20	RA
WG322491LFB2	LFB	05/10/12 22:39	WI120211-3	2		2.03	mg/L	101.5	90	110			

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322491													
WG322491ICV	ICV	05/10/12 22:01	WI120405-3	.609		.635	mg/L	104.3	90	110			
WG322491ICB	ICB	05/10/12 22:02				U	mg/L		-0.03	0.03			
WG322491LFB1	LFB	05/10/12 22:05	WI120211-3	1		1.028	mg/L	102.8	90	110			
L94451-03AS	AS	05/10/12 22:08	WI120211-3	1	U	1.054	mg/L	105.4	90	110			
L94451-04DUP	DUP	05/10/12 22:10			U	U	mg/L				0	20	RA
L94460-06AS	AS	05/10/12 22:24	WI120211-3	1	U	.974	mg/L	97.4	90	110			
L94460-07DUP	DUP	05/10/12 22:27			U	U	mg/L				0	20	RA
WG322491LFB2	LFB	05/10/12 22:39	WI120211-3	1		1.02	mg/L	102	90	110			

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

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Nitrogen, ammonia M350.1 - Automated Phenate

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323469													
WG323469ICV	ICV	05/29/12 13:03	WI111117-1	1.002		.989	mg/L	98.7	90	110			
WG323469ICB	ICB	05/29/12 13:04				U	mg/L		-0.15	0.15			
WG323469LFB1	LFB	05/29/12 13:05	WI111101-3	1		1.009	mg/L	100.9	90	110			
L94455-02AS	AS	05/29/12 13:07	WI111101-3	1	.22	1.215	mg/L	99.5	90	110			
L94460-01DUP	DUP	05/29/12 13:10			1.88	1.882	mg/L				0.1	20	
WG323469LFB2	LFB	05/29/12 13:38	WI111101-3	1		1.018	mg/L	101.8	90	110			

pH (lab) SM4500H+ B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322544													
WG322544LCSW3	LCSW	05/11/12 17:39	PCN37073	6		6.06	units	101	98	102			
L94460-06DUP	DUP	05/11/12 20:44			9	9.01	units				0.1	20	
WG322544LCSW6	LCSW	05/11/12 21:05	PCN37073	6		6.06	units	101	98	102			
L94463-04DUP	DUP	05/11/12 23:30			8.9	8.92	units				0.2	20	
WG322544LCSW9	LCSW	05/12/12 1:19	PCN37073	6		6.06	units	101	98	102			
WG322544LCSW12	LCSW	05/12/12 4:27	PCN37073	6		6.08	units	101.3	98	102			
WG322544LCSW15	LCSW	05/12/12 7:24	PCN37073	6		6.08	units	101.3	98	102			

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	20		19.93	mg/L	99.7	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.9	0.9			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	99.91917		100.1	mg/L	100.2	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	99.91917	8.7	111.1	mg/L	102.5	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	99.91917	8.7	110.9	mg/L	102.3	85	115	0.18	20	

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322508													
WG322508PBW	PBW	05/11/12 10:30				U	mg/L		-20	20			
WG322508LCSW	LCSW	05/11/12 10:31	PCN39020	260		250	mg/L	96.2	80	120			
L94461-01DUP	DUP	05/11/12 10:45			2110	2114	mg/L				0.2	20	

Residue, Non-Filterable (TSS) @105C SM2540D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322507													
WG322507PBW	PBW	05/11/12 10:30				U	mg/L		-15	15			
WG322507LCSW	LCSW	05/11/12 10:31	PCN39020	160		171	mg/L	106.9	80	120			
L94460-05DUP	DUP	05/11/12 10:53			610	570	mg/L				6.8	20	
L94462-11DUP	DUP	05/11/12 11:12			51	51	mg/L				0	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

Project ID: LISBON VALLEY COPPER

Selenium, dissolved SM 3114 B, AA-Hydride

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322888													
WG322888ICV	ICV	05/25/12 0:46	II120416-4	.025		.0257	mg/L	102.8	90	110			
WG322888ICB	ICB	05/25/12 0:48				U	mg/L		-0.003	0.003			
WG322888LRB	LRB	05/25/12 0:49				U	mg/L		-0.003	0.003			
WG322888LFB	LFB	05/25/12 0:50	II120406-2	.02052		.0201	mg/L	98	85	115			
L94460-03LFM	LFM	05/25/12 0:58	II120406-2	.02052	U	.019	mg/L	92.6	85	115			
L94460-03LFMD	LFMD	05/25/12 0:59	II120406-2	.02052	U	.0197	mg/L	96	85	115	3.62	20	

Silica, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	42.8		43.59	mg/L	101.8	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-1.2	1.2			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	21.428		22.41	mg/L	104.6	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	21.428	12.8	35.44	mg/L	105.7	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	21.428	12.8	35.1	mg/L	104.1	85	115	0.96	20	

Silver, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.02006		.02028	mg/L	101.1	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.00015	0.00015			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.01002		.01003	mg/L	100.1	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.01002	U	.00923	mg/L	92.1	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.01002	U	.009279	mg/L	92.6	70	130	0.53	20	

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	100		100.22	mg/L	100.2	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.9	0.9			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	100.0338		100.8	mg/L	100.8	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	100.0338	135	235.2	mg/L	100.2	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	100.0338	135	233.2	mg/L	98.2	85	115	0.85	20	

Sulfate SM4500 SO4-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322556													
WG322556PBW	PBW	05/12/12 13:10				U	mg/L		-30	30			
WG322556LCSW	LCSW	05/12/12 13:12	WC120511-2	100		96	mg/L	96	80	120			
L94480-01DUP	DUP	05/12/12 14:00			20	14	mg/L				35.3	20	RA

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

Project ID: LISBON VALLEY COPPER

Thallium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323084													
WG323084ICV	ICV	05/22/12 4:45	MS120416-2	.05		.05399	mg/L	108	90	110			
WG323084ICB	ICB	05/22/12 4:48				U	mg/L		-0.0003	0.0003			
WG323084LFB	LFB	05/22/12 4:51	MS120430-3	.05005		.05082	mg/L	101.5	85	115			
L94460-02AS	AS	05/22/12 5:06	MS120430-3	.05005	U	.05072	mg/L	101.3	70	130			
L94460-02ASD	ASD	05/22/12 5:09	MS120430-3	.05005	U	.05193	mg/L	103.8	70	130	2.36	20	

Uranium, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG323320													
WG323320ICV	ICV	05/25/12 0:47	MS120416-2	.05		.05271	mg/L	105.4	90	110			
WG323320ICB	ICB	05/25/12 0:50				U	mg/L		-0.0003	0.0003			
WG323051LRB	LRB	05/25/12 0:53				U	mg/L		-0.00022	0.00022			
WG323051LFB	LFB	05/25/12 0:56	MS120430-3	.05		.05018	mg/L	100.4	85	115			
L94460-02LFM	LFM	05/25/12 1:11	MS5XW	.25	.013	.2687	mg/L	102.3	70	130			
L94460-02LFMD	LFMD	05/25/12 1:14	MS5XW	.25	.013	.2661	mg/L	101.2	70	130	0.97	20	

Vanadium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		1.9998	mg/L	100	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.015	0.015			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.5189	mg/L	103.8	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	U	.5212	mg/L	104.2	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	U	.5203	mg/L	104.1	85	115	0.17	20	

Zinc, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG322768													
WG322768ICV	ICV	05/17/12 4:53	II120430-3	2		1.972	mg/L	98.6	95	105			
WG322768ICB	ICB	05/17/12 4:59				U	mg/L		-0.03	0.03			
WG322768LFB	LFB	05/17/12 5:11	II120509-2	.5		.509	mg/L	101.8	85	115			
L94455-01AS	AS	05/17/12 5:17	II120509-2	.5	.02	.523	mg/L	100.6	85	115			
L94455-01ASD	ASD	05/17/12 5:20	II120509-2	.5	.02	.521	mg/L	100.2	85	115	0.38	20	

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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L94460-01	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322508	Residue, Filterable (TDS) @180C	SM2540C	ZO	Concentration is based on a final residue greater than 200 mg.
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L94460-02	WG323051	Total Hot Plate Digestion	M200.2 ICP-MS	DF	Sample required dilution due to high sediment.
	WG322544	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322544	pH	SM4500H+ B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322544	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
L94460-03	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L94460-04	WG323084	Antimony, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Beryllium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Cadmium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Lead, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Silver, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	N1	See Case Narrative.
		Thallium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L94460-05	WG323084	Antimony, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Beryllium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Cadmium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Lead, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Silver, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	N1	See Case Narrative.
		Thallium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L94460-06	WG323084	Antimony, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Beryllium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Cadmium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Lead, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
		Silver, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
			M200.8 ICP-MS	N1	See Case Narrative.
		Thallium, dissolved	M200.8 ICP-MS	DD	Sample required dilution due to matrix color or odor.
	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322556	Sulfate	SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L94460-07	WG322921	Fluoride	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322491	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG322556	Sulfate	SM4500 SO4-D	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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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: PENNY PIT-12-2
Locator:

ACZ Sample ID: ***L94460-01***
Date Sampled: *05/09/12 14:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:07		590	68	15	pCi/L	*	zsh
Gross Beta	05/21/12 14:07		250	30	27	pCi/L		zsh

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: SLV2-12-2
Locator:

ACZ Sample ID: ***L94460-02***
Date Sampled: *05/09/12 13:30*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:08		33	7.6	3.1	pCi/L	*	zsh
Gross Beta	05/21/12 14:08		25	4.5	4.5	pCi/L		zsh

** Please refer to Qualifier Reports for details.*

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2
Locator:

ACZ Sample ID: ***L94460-03***
Date Sampled: *05/09/12 11:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:10		32	10	5.9	pCi/L	*	zsh
Gross Beta	05/21/12 14:10		39	8.5	8.7	pCi/L		zsh

** Please refer to Qualifier Reports for details.*

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7B-12-2
Locator:

ACZ Sample ID: ***L94460-04***
Date Sampled: *05/09/12 11:03*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:11		0.04	1.6	2.1	pCi/L	*	zsh
Gross Beta	05/21/12 14:11		4.4	2.8	3.9	pCi/L		zsh

** Please refer to Qualifier Reports for details.*

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW06-15-12-2
Locator:

ACZ Sample ID: ***L94460-05***
Date Sampled: *05/09/12 9:35*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:13		5.9	4.3	3.7	pCi/L	*	zsh
Gross Beta	05/21/12 14:13		11	4.3	5.6	pCi/L		zsh

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-29-12-2
Locator:

ACZ Sample ID: ***L94460-06***
Date Sampled: *05/09/12 14:45*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:14		0.11	1.1	1.6	pCi/L	*	zsh
Gross Beta	05/21/12 14:14		10	4.3	5.7	pCi/L		zsh

** Please refer to Qualifier Reports for details.*

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RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: MW96-7A-12-2-RN
Locator:

ACZ Sample ID: ***L94460-07***
Date Sampled: *05/09/12 10:20*
Date Received: *05/10/12*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	05/21/12 14:15		0.07	1.1	1.5	pCi/L	*	zsh
Gross Beta	05/21/12 14:15		0.22	2.7	3.7	pCi/L		zsh

** Please refer to Qualifier Reports for details.*

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.
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.
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Replicate Error Ratio (RER) accepted because sample concentrations are less than 10x the MDL.
U	No nuclides detected above the Lower Limit of Detection (LLD)
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
X	QC is out of control. See Case Narrative.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) & 20th edition (1998).
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

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER

ACZ Project ID: ***L94460***

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
WG323130																
WG322734PBW	PBW	05/21/12						-.04	0.9	1.4			2.8			
WG322734LCSW	LCSW	05/21/12	RC111214-2	81.06				80	7.7	1.4	98.7	84	129			
L94527-01DUP	DUP-RE	05/21/12			1	1.4	1.6	2.2	1.7	1.6				0.54	2	
L94528-01DUP	DUP-RE	05/21/12			17	4.7	2.3	17	5.1	2.5				0	2	
L94460-04MS	MS	05/21/12	RC111214-2	81.06	0.04	1.6	2.1	66	8.7	2.2	81.4	84	129			M2

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
WG323130																
WG322734PBW	PBW	05/21/12						.14	2.7	3.9			7.8			
WG322734LCSW	LCSW	05/21/12	RC110517-11	100				97	6.3	3.8	97	62	133			
L94527-01DUP	DUP-RE	05/21/12			2.7	2.6	3.8	.51	2.5	3.9				0.61	2	
L94528-01DUP	DUP-RE	05/21/12			5.9	3	4	11	3.5	4				1.11	2	
L94538-01MS	MS	05/21/12	RC110517-11	100	8.7	3	3.8	100	6.5	3.9	91.3	62	133			

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L94460***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L94460-01	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-02	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-03	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-04	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-05	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-06	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L94460-07	WG323130	Gross Alpha	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.

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Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L94460***

No certification qualifiers associated with this analysis

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Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L94460
Date Received: 05/10/2012 10:17
Received By: ksj
Date Printed: 5/10/2012

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3774		2.3	13
1471		1.6	13

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

Notes

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L94460
Date Received: 05/10/2012 10:17
Received By: ksj
Date Printed: 5/10/2012

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L94460-01	PENNY PIT-12-2	Y	Y		Y							
L94460-02	SLV2-12-2	Y	Y		Y							
L94460-03	MW96-7A-12-2	Y	Y		Y							
L94460-04	MW96-7B-12-2	Y	Y		Y							
L94460-05	MW06-15-12-2	Y	Y		Y							
L94460-06	MW96-29-12-2	Y	Y		Y							
L94460-07	MW96-7A-12-2-RN	Y	Y		Y							

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L94460

LISBON VALLEY MINING CO

P.O. Box 248
La Sal, Utah 84530

Chain of Custody Record

Send report with laboratory QA to:
lindergard@lisbonvalley.com
swyman@whetstone-associates.com

Lisbon Valley Copper Project

ANALYSES

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE NUMBER	DATE	TIME	Diss. Wet Chemistry [1]	Dissolved metals [2]	Ammonia, NO2, NO3	Total uranium	Total alkalinity & TSS	Radiochemistry [3]	pH & conductivity [4]	Number of Containers
PENNPIT-12-2	5/9/2012	14:20	1	1	1	1	1	1		6
SLV2-12-2	5/9/2012	15:30	1	1	1	1	1	1		6
MW96-7A-12-2	5/9/2012	11:20	1	1	1	1	1	1		6
MW96-7B-12-2	5/9/2012	11:03	1	1	1	1	1	1		6
MW06-15-12-2	5/9/2012	9:35	1	1	1	1	1	1		6
MW96-29-12-2	5/9/2012	14:45	1	1	1	1	1	1		6
MW96-7A-12-2 RN	5/9/2012	10:20	1	1	1	1	1	1		6

Remarks / Comments

Matrix: Water

Samples Stored on Ice

1) Chloride, hardness, sulfate, TDS, fluoride (Field Filtered 0.45 um)
2) Field Filtered 0.45 um
3) Gross alpha, gross beta
4) Centrifuge tube for pH, E.C., alkalinity

Note:

- Follow standard analytical suite for project and required detection limits

Sampled By: JAMES HAAG

Total Number of Containers: 42

Sampler's Signature: James Haag

Contact Person:
Susan Wyman
Phone: (970) 641-7471 Fax: (970) 641-7431

Relinquished By:	Date / Time:	Received By:	Date / Time:
JAMES HAAG	5/9/2012 15:45	[illegible]	5-10-12 10:12

Method of Shipment:

L94460 Chain of Custody

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

Analytical Report

July 09, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Ken Ezpeleta

Project ID: LISBON VALLEY COPPER
ACZ Project ID: L95225

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 19, 2012. This project has been assigned to ACZ's project number, L95225. 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 L95225. 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 August 09, 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.

Sue Webber has reviewed and approved this report.

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 2ND QTR 4/4/2012

ACZ Sample ID: ***L95225-01***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0004	0.002	07/05/12 16:36	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:29	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 20:29	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 20:29	jjc
Molybdenum (MWMT)	M6010B ICP	0.18			mg/L	0.01	0.05	07/02/12 20:29	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:29	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0885			mg/L	0.0001	0.0005	06/30/12 2:49	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	07/02/12 20:29	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5036.35			g			06/28/12 0:00	mss2
Extraction pH		na			units			06/28/12 0:00	mss2
Extraction Time		26			hrs			06/28/12 0:00	mss2
Leachate pH		7.46			units			06/28/12 0:00	mss2
Leachate Volume		5063.24			mL			06/28/12 0:00	mss2
Particle Size over 5 cm		88.4			%			06/28/12 0:00	mss2
Retained Moisture		10.24			%			06/28/12 0:00	mss2

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 2ND QTR 4/5/2012

ACZ Sample ID: ***L95225-02***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	07/05/12 16:42	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:38	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 20:38	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 20:38	jjc
Molybdenum (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	07/02/12 20:38	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:38	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0010			mg/L	0.0001	0.0005	06/30/12 2:52	pmc
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	07/02/12 20:38	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4968.1			g			06/28/12 0:00	mss2
Extraction pH		na			units			06/28/12 0:00	mss2
Extraction Time		28			hrs			06/28/12 0:00	mss2
Leachate pH		7.97			units			06/28/12 0:00	mss2
Leachate Volume		4971.22			mL			06/28/12 0:00	mss2
Particle Size over 5 cm		8.89			%			06/28/12 0:00	mss2
Retained Moisture		12.2			%			06/28/12 0:00	mss2

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 2ND QTR 5/17/2012

ACZ Sample ID: ***L95225-03***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	07/05/12 16:44	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:45	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 20:45	jjc
Copper (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	07/02/12 20:45	jjc
Molybdenum (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	07/02/12 20:45	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:45	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0016			mg/L	0.0001	0.0005	06/30/12 2:59	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	07/02/12 20:45	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4986.79			g			06/28/12 0:00	mss2
Extraction pH		na			units			06/28/12 0:00	mss2
Extraction Time		28			hrs			06/28/12 0:00	mss2
Leachate pH		7.78			units			06/28/12 0:00	mss2
Leachate Volume		4991.89			mL			06/28/12 0:00	mss2
Particle Size over 5 cm		56.98			%			06/28/12 0:00	mss2
Retained Moisture		9.46			%			06/28/12 0:00	mss2

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 2ND QTR 5/17/2012

ACZ Sample ID: ***L95225-04***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	07/05/12 16:48	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:48	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 20:48	jjc
Copper (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	07/02/12 20:48	jjc
Molybdenum (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	07/02/12 20:48	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:48	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0065			mg/L	0.0001	0.0005	06/30/12 3:02	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	07/02/12 20:48	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5023.16			g			06/29/12 0:00	mss2
Extraction pH		na			units			06/29/12 0:00	mss2
Extraction Time		28			hrs			06/29/12 0:00	mss2
Leachate pH		7.77			units			06/29/12 0:00	mss2
Leachate Volume		5046.39			mL			06/29/12 0:00	mss2
Particle Size over 5 cm		97.1			%			06/29/12 0:00	mss2
Retained Moisture		6.25			%			06/29/12 0:00	mss2

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 15 2ND QTR 6/12/2012

ACZ Sample ID: ***L95225-05***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	07/05/12 16:54	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:51	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 20:51	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 20:51	jjc
Molybdenum (MWMT)	M6010B ICP	0.09			mg/L	0.01	0.05	07/02/12 20:51	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 20:51	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0214			mg/L	0.0001	0.0005	06/30/12 3:17	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	07/02/12 20:51	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5034.89			g			06/29/12 0:00	mss2
Extraction pH		na			units			06/29/12 0:00	mss2
Extraction Time		28			hrs			06/29/12 0:00	mss2
Leachate pH		7.76			units			06/29/12 0:00	mss2
Leachate Volume		5048.34			mL			06/29/12 0:00	mss2
Particle Size over 5 cm		94.51			%			06/29/12 0:00	mss2
Retained Moisture		5.27			%			06/29/12 0:00	mss2

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 14 2ND QTR 6/12/2012

ACZ Sample ID: ***L95225-06***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	07/05/12 16:56	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 21:00	jjc
Cadmium (MWMT)	M6010B ICP		U		mg/L	0.005	0.02	07/02/12 21:00	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 21:00	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 21:00	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 21:00	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0023			mg/L	0.0001	0.0005	06/30/12 3:20	pmc
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	07/02/12 21:00	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5010.49			g			06/29/12 0:00	mss2
Extraction pH		na			units			06/29/12 0:00	mss2
Extraction Time		26			hrs			06/29/12 0:00	mss2
Leachate pH		8.09			units			06/29/12 0:00	mss2
Leachate Volume		5017.52			mL			06/29/12 0:00	mss2
Particle Size over 5 cm		78.87			%			06/29/12 0:00	mss2
Retained Moisture		5.78			%			06/29/12 0:00	mss2

Lisbon Valley Mining Company, LLC
Project ID: LISBON VALLEY COPPER
Sample ID: BED 13 2ND QTR 6/12/2012

ACZ Sample ID: ***L95225-07***
Date Sampled: *06/15/12 00:00*
Date Received: *06/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony (MWMT)	M6020 ICP-MS	0.0039			mg/L	0.0004	0.002	07/05/12 16:58	msh
Arsenic (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 21:03	jjc
Cadmium (MWMT)	M6010B ICP	0.016	B		mg/L	0.005	0.02	07/02/12 21:03	jjc
Copper (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 21:03	jjc
Molybdenum (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	07/02/12 21:03	jjc
Selenium (MWMT)	M6010B ICP		U		mg/L	0.06	0.3	07/02/12 21:03	jjc
Uranium (MWMT)	M6020 ICP-MS	0.0123			mg/L	0.0001	0.0005	06/30/12 3:23	pmc
Zinc (MWMT)	M6010B ICP	0.03	B		mg/L	0.01	0.05	07/02/12 21:03	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5031.4			g			06/29/12 0:00	mss2
Extraction pH		na			units			06/29/12 0:00	mss2
Extraction Time		28			hrs			06/29/12 0:00	mss2
Leachate pH		7.58			units			06/29/12 0:00	mss2
Leachate Volume		5045.59			mL			06/29/12 0:00	mss2
Particle Size over 5 cm		96.42			%			06/29/12 0:00	mss2
Retained Moisture		5.9			%			06/29/12 0:00	mss2

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	Amount of the true value or spike added recovered, 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, Third Edition with Update III, December 1996.
(5)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

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.

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L95225***

Project ID: LISBON VALLEY COPPER

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325692													
WG325692ICV	ICV	07/05/12 16:07	MS120628-1	.02		.022	mg/L	110	90	110			
WG325692ICB	ICB	07/05/12 16:09				U	mg/L		-0.0012	0.0012			
L95194-01DUP	DUP	07/05/12 16:30			.0137	.01443	mg/L				5.2	20	
WG325254PBS	PBS	07/05/12 16:32				U	mg/L		-0.0012	0.0012			
WG325254LFB	LFB	07/05/12 16:34	MS120702-3	.01		.01057	mg/L	105.7	80	120			
L95225-01AS	AS	07/05/12 16:38	MS120702-3	.01	.0007	.01114	mg/L	104.4	75	125			
L95225-01ASD	ASD	07/05/12 16:40	MS120702-3	.01	.0007	.01136	mg/L	106.6	75	125	1.96	20	

Arsenic (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	4		4.224	mg/L	105.6	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.18	0.18			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.18	0.18			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	1		1.117	mg/L	111.7	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	1	U	1.07	mg/L	107	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	1	U	1.068	mg/L	106.8	75	125	0.19	20	

Cadmium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	2		1.931	mg/L	96.6	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.015	0.015			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.015	0.015			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	.5		.5028	mg/L	100.6	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	.5	U	.4991	mg/L	99.8	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	.5	U	.497	mg/L	99.4	75	125	0.42	20	

Copper (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	2		1.976	mg/L	98.8	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.03	0.03			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.03	0.03			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	.5		.512	mg/L	102.4	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	.5	U	.518	mg/L	103.6	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	.5	U	.512	mg/L	102.4	75	125	1.17	20	

Molybdenum (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	2		2.015	mg/L	100.8	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.03	0.03			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.03	0.03			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	.5		.53	mg/L	106	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	.5	.18	.706	mg/L	105.2	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	.5	.18	.704	mg/L	104.8	75	125	0.28	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L95225***
Project ID: LISBON VALLEY COPPER

Selenium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	4		4.067	mg/L	101.7	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.18	0.18			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.18	0.18			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	1		1.102	mg/L	110.2	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	1	U	1.068	mg/L	106.8	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	1	U	1.149	mg/L	114.9	75	125	7.31	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325467													
WG325467ICV	ICV	06/30/12 2:21	MS120628-1	.05		.05199	mg/L	104	90	110			
WG325467ICB	ICB	06/30/12 2:24				U	mg/L		-0.0003	0.0003			
L95194-01DUP	DUP	06/30/12 2:43			.0219	.02239	mg/L				2.2	20	
WG325254PBS	PBS	06/30/12 2:46				U	mg/L		-0.0003	0.0003			
L95225-04AS	AS	06/30/12 3:11	MS120628-3	.05	.0065	.05881	mg/L	104.6	75	125			
L95225-04ASD	ASD	06/30/12 3:14	MS120628-3	.05	.0065	.05856	mg/L	104.1	75	125	0.43	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG325526													
WG325526ICV	ICV	07/02/12 20:08	II120430-3	2		1.951	mg/L	97.6	90	110			
WG325526ICB	ICB	07/02/12 20:11				U	mg/L		-0.03	0.03			
WG325254PBS	PBS	07/02/12 20:23				U	mg/L		-0.03	0.03			
WG325254LFB	LFB	07/02/12 20:26	II120606-2	.5		.539	mg/L	107.8	85	115			
L95225-01MS	MS	07/02/12 20:32	II120606-2	.5	.02	.54	mg/L	104	75	125			
L95225-01MSD	MSD	07/02/12 20:35	II120606-2	.5	.02	.539	mg/L	103.8	75	125	0.19	20	

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L95225***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

ACZ Laboratories, Inc.
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Certification Qualifiers

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L95225***

No certification qualifiers associated with this analysis

ACZ Laboratories, Inc.
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Sample Receipt

Lisbon Valley Mining Company, LLC
LISBON VALLEY COPPER

ACZ Project ID: L95225
Date Received: 06/19/2012 10:16
Received By: ksj
Date Printed: 6/20/2012

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 conatiners 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?
NA15593	23.5	15	Yes

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

C95215 Page 1 of 1

Lisbon Valley Mining Co. P.O. Box 248 920 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Chain of Custody Record Send report with laboratory QA to: 920 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES		ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE LABEL	DATE	TIME	MVMP	Number of Containers	Remarks / Comments
Bed 15, 2nd QTR, 4/4/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 14, 2nd QTR, 4/5/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 14, 2nd QTR, 5/17/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 15, 2nd QTR, 5/17/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 15, 2nd QTR, 6/12/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 14, 2nd QTR, 6/12/2012	6-15-2012		x	1	Centennial Pit 2012
Bed 13, 2nd QTR, 6/12/2012	6-15-2012		x	1	Centennial Pit 2012
			Total Number of Containers	7	

Sampled By: Ken Ezpeleta	Contact Person: Lantz M Indergard & Ken Ezpeleta Phone: (435) 686-9950 ext. 1 107	Lindergard@lisbonmine.com kezpeleta@lisbonmine.com Fax: (435) 686-2223
Sampler's Signature		
Relinquished By: Ken Ezpeleta	Date / Time: 6/15/2012 9:00 AM	Received By: Date / Time:
Method of Shipment: UPS	Comments:	

L95225 Chain of Custod

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

Analytical Report

November 16, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Ken Ezpeleta

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Project ID: Lisbon Valley Copper Project
ACZ Project ID: L97461

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 19, 2012. This project has been assigned to ACZ's project number, L97461. 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 L97461. 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.

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 17 2ND QTR 6/28/2012

ACZ Sample ID: ***L97461-01***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.178		*	mg/L	0.005	0.03	11/16/12 9:10	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:09	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0035			mg/L	0.0002	0.001	11/12/12 17:09	msh
Barium (MWMT)	M6010B ICP	0.026		*	mg/L	0.003	0.02	11/12/12 19:24	aeb
Beryllium (MWMT)	M6020 ICP-MS	0.00006	B	*	mg/L	0.00005	0.0003	11/12/12 17:09	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:09	msh
Calcium (MWMT)	M6010B ICP	4.9		*	mg/L	0.2	1	11/12/12 19:24	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0009	B	*	mg/L	0.0005	0.002	11/12/12 17:09	msh
Copper (MWMT)	M6020 ICP-MS	0.0011	B	*	mg/L	0.0005	0.003	11/12/12 17:09	msh
Iron (MWMT)	M6010B ICP	0.36			mg/L	0.02	0.05	11/12/12 19:24	aeb
Lead (MWMT)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0005	11/12/12 17:09	msh
Magnesium (MWMT)	M6010B ICP	2.1			mg/L	0.2	1	11/12/12 19:24	aeb
Manganese (MWMT)	M6010B ICP	0.007	B	*	mg/L	0.005	0.03	11/12/12 19:24	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:08	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0020	B	*	mg/L	0.0005	0.003	11/12/12 17:09	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:09	msh
Potassium (MWMT)	M6010B ICP	7.2			mg/L	0.3	2	11/12/12 19:24	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0002	B	*	mg/L	0.0001	0.0003	11/12/12 17:09	msh
Silica (MWMT)	M6010B ICP	9.7			mg/L	0.4	2	11/12/12 19:24	aeb
Sodium (MWMT)	M6010B ICP	38.4			mg/L	0.3	2	11/12/12 19:24	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:09	msh
Uranium (MWMT)	M6020 ICP-MS	0.0024		*	mg/L	0.0001	0.0005	11/12/12 17:09	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:24	aeb
Zinc (MWMT)	M6010B ICP	0.01	B	*	mg/L	0.01	0.05	11/12/12 19:24	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/07/12 0:00	cdb
Extraction pH		n/a			units			11/07/12 0:00	cdb
Extraction Time		24			hrs			11/07/12 0:00	cdb
Leachate pH		8.57			units			11/07/12 0:00	cdb
Leachate Volume		1117.19			mL			11/07/12 0:00	cdb
Particle Size over 5 cm		61			%			11/07/12 0:00	cdb
Retained Moisture		n/a			%			11/07/12 0:00	cdb

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 14 3RD QTR 7/27/2012

ACZ Sample ID: ***L97461-02***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.214		*	mg/L	0.001	0.005	11/12/12 17:15	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:15	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0014			mg/L	0.0002	0.001	11/12/12 17:15	msh
Barium (MWMT)	M6010B ICP	0.038		*	mg/L	0.003	0.02	11/12/12 19:30	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:15	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:15	msh
Calcium (MWMT)	M6010B ICP	31.5		*	mg/L	0.2	1	11/12/12 19:30	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:15	msh
Copper (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0005	0.003	11/12/12 17:15	msh
Iron (MWMT)	M6010B ICP	0.06			mg/L	0.02	0.05	11/12/12 19:30	aeb
Lead (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:15	msh
Magnesium (MWMT)	M6010B ICP	11.6			mg/L	0.2	1	11/12/12 19:30	aeb
Manganese (MWMT)	M6010B ICP	0.024	B	*	mg/L	0.005	0.03	11/12/12 19:30	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:12	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0035		*	mg/L	0.0005	0.003	11/12/12 17:15	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:15	msh
Potassium (MWMT)	M6010B ICP	33.7			mg/L	0.3	2	11/12/12 19:30	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0022		*	mg/L	0.0001	0.0003	11/12/12 17:15	msh
Silica (MWMT)	M6010B ICP	10.9			mg/L	0.4	2	11/12/12 19:30	aeb
Sodium (MWMT)	M6010B ICP	10.2			mg/L	0.3	2	11/12/12 19:30	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:15	msh
Uranium (MWMT)	M6020 ICP-MS	0.0054		*	mg/L	0.0001	0.0005	11/12/12 17:15	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:30	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:30	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		7.98			units			11/08/12 0:00	cdb
Leachate Volume		1096.15			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		16.7			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 17 3RD QTR 7/27/2012

ACZ Sample ID: ***L97461-03***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	1.570		*	mg/L	0.005	0.03	11/16/12 9:14	msh
Antimony (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0004	0.002	11/12/12 17:19	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0086			mg/L	0.0002	0.001	11/12/12 17:19	msh
Barium (MWMT)	M6010B ICP	0.018	B	*	mg/L	0.003	0.02	11/12/12 19:40	aeb
Beryllium (MWMT)	M6020 ICP-MS	0.00007	B	*	mg/L	0.00005	0.0003	11/12/12 17:19	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:19	msh
Calcium (MWMT)	M6010B ICP	2.1		*	mg/L	0.2	1	11/12/12 19:40	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0010	B	*	mg/L	0.0005	0.002	11/12/12 17:19	msh
Copper (MWMT)	M6020 ICP-MS	0.0011	B	*	mg/L	0.0005	0.003	11/12/12 17:19	msh
Iron (MWMT)	M6010B ICP	0.30			mg/L	0.02	0.05	11/12/12 19:40	aeb
Lead (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0001	0.0005	11/12/12 17:19	msh
Magnesium (MWMT)	M6010B ICP	1.0	B		mg/L	0.2	1	11/12/12 19:40	aeb
Manganese (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:40	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:14	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0030	B	*	mg/L	0.0005	0.003	11/12/12 17:19	msh
Nickel (MWMT)	M6020 ICP-MS	0.0007	B	*	mg/L	0.0006	0.003	11/12/12 17:19	msh
Potassium (MWMT)	M6010B ICP	5.6			mg/L	0.3	2	11/12/12 19:40	aeb
Selenium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/12/12 17:19	msh
Silica (MWMT)	M6010B ICP	9.1			mg/L	0.4	2	11/12/12 19:40	aeb
Sodium (MWMT)	M6010B ICP	49.0			mg/L	0.3	2	11/12/12 19:40	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:19	msh
Uranium (MWMT)	M6020 ICP-MS	0.0023		*	mg/L	0.0001	0.0005	11/12/12 17:19	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:40	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:40	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.89			units			11/08/12 0:00	cdb
Leachate Volume		1096.57			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		54.3			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 14 3RD QTR 8/30/2012

ACZ Sample ID: ***L97461-04***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.098		*	mg/L	0.001	0.005	11/12/12 17:22	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:22	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0002	0.001	11/12/12 17:22	msh
Barium (MWMT)	M6010B ICP	0.050		*	mg/L	0.003	0.02	11/12/12 19:43	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:22	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:22	msh
Calcium (MWMT)	M6010B ICP	25.9		*	mg/L	0.2	1	11/12/12 19:43	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:22	msh
Copper (MWMT)	M6020 ICP-MS	0.0010	B	*	mg/L	0.0005	0.003	11/12/12 17:22	msh
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	11/12/12 19:43	aeb
Lead (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:22	msh
Magnesium (MWMT)	M6010B ICP	7.0			mg/L	0.2	1	11/12/12 19:43	aeb
Manganese (MWMT)	M6010B ICP	0.008	B	*	mg/L	0.005	0.03	11/12/12 19:43	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:22	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0069		*	mg/L	0.0005	0.003	11/12/12 17:22	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:22	msh
Potassium (MWMT)	M6010B ICP	24.4			mg/L	0.3	2	11/12/12 19:43	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0004		*	mg/L	0.0001	0.0003	11/12/12 17:22	msh
Silica (MWMT)	M6010B ICP	7.4			mg/L	0.4	2	11/12/12 19:43	aeb
Sodium (MWMT)	M6010B ICP	10.0			mg/L	0.3	2	11/12/12 19:43	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:22	msh
Uranium (MWMT)	M6020 ICP-MS	0.0019		*	mg/L	0.0001	0.0005	11/12/12 17:22	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:43	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:43	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.25			units			11/08/12 0:00	cdb
Leachate Volume		1088.28			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		42.8			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 15 3RD QTR 8/30/2012

ACZ Sample ID: ***L97461-05***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.042		*	mg/L	0.001	0.005	11/12/12 17:25	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:25	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0002	0.001	11/12/12 17:25	msh
Barium (MWMT)	M6010B ICP	0.035		*	mg/L	0.003	0.02	11/12/12 19:46	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:25	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:25	msh
Calcium (MWMT)	M6010B ICP	43.9		*	mg/L	0.2	1	11/12/12 19:46	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:25	msh
Copper (MWMT)	M6020 ICP-MS	0.0005	B	*	mg/L	0.0005	0.003	11/12/12 17:25	msh
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	11/12/12 19:46	aeb
Lead (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:25	msh
Magnesium (MWMT)	M6010B ICP	29.7			mg/L	0.2	1	11/12/12 19:46	aeb
Manganese (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:46	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:28	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0050		*	mg/L	0.0005	0.003	11/12/12 17:25	msh
Nickel (MWMT)	M6020 ICP-MS	0.0006	B	*	mg/L	0.0006	0.003	11/12/12 17:25	msh
Potassium (MWMT)	M6010B ICP	19.0			mg/L	0.3	2	11/12/12 19:46	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0009		*	mg/L	0.0001	0.0003	11/12/12 17:25	msh
Silica (MWMT)	M6010B ICP	2.8			mg/L	0.4	2	11/12/12 19:46	aeb
Sodium (MWMT)	M6010B ICP	5.7			mg/L	0.3	2	11/12/12 19:46	aeb
Thallium (MWMT)	M6020 ICP-MS	0.0004	B	*	mg/L	0.0001	0.0005	11/12/12 17:25	msh
Uranium (MWMT)	M6020 ICP-MS	0.0029		*	mg/L	0.0001	0.0005	11/12/12 17:25	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:46	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:46	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.28			units			11/08/12 0:00	cdb
Leachate Volume		1116.88			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		54			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 17 3RD QTR 8/30/2012

ACZ Sample ID: ***L97461-06***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.604		*	mg/L	0.001	0.005	11/12/12 17:29	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:29	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0002	0.001	11/12/12 17:29	msh
Barium (MWMT)	M6010B ICP	0.011	B	*	mg/L	0.003	0.02	11/12/12 19:49	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:29	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:29	msh
Calcium (MWMT)	M6010B ICP	11.6		*	mg/L	0.2	1	11/12/12 19:49	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:29	msh
Copper (MWMT)	M6020 ICP-MS	0.0007	B	*	mg/L	0.0005	0.003	11/12/12 17:29	msh
Iron (MWMT)	M6010B ICP	0.13			mg/L	0.02	0.05	11/12/12 19:49	aeb
Lead (MWMT)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	11/12/12 17:29	msh
Magnesium (MWMT)	M6010B ICP	4.3			mg/L	0.2	1	11/12/12 19:49	aeb
Manganese (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:49	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:31	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0118		*	mg/L	0.0005	0.003	11/12/12 17:29	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:29	msh
Potassium (MWMT)	M6010B ICP	13.6			mg/L	0.3	2	11/12/12 19:49	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0006		*	mg/L	0.0001	0.0003	11/12/12 17:29	msh
Silica (MWMT)	M6010B ICP	4.8			mg/L	0.4	2	11/12/12 19:49	aeb
Sodium (MWMT)	M6010B ICP	27.9			mg/L	0.3	2	11/12/12 19:49	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:29	msh
Uranium (MWMT)	M6020 ICP-MS	0.0008		*	mg/L	0.0001	0.0005	11/12/12 17:29	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:49	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:49	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.52			units			11/08/12 0:00	cdb
Leachate Volume		1079.85			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		33.1			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 14 3RD QTR 9/27/2012

ACZ Sample ID: ***L97461-07***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.096		*	mg/L	0.001	0.005	11/12/12 17:42	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:42	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0002	0.001	11/12/12 17:42	msh
Barium (MWMT)	M6010B ICP	0.079		*	mg/L	0.003	0.02	11/12/12 19:58	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:42	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:42	msh
Calcium (MWMT)	M6010B ICP	21.1		*	mg/L	0.2	1	11/12/12 19:58	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:42	msh
Copper (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.003	11/12/12 17:42	msh
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	11/12/12 19:58	aeb
Lead (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:42	msh
Magnesium (MWMT)	M6010B ICP	4.7			mg/L	0.2	1	11/12/12 19:58	aeb
Manganese (MWMT)	M6010B ICP	0.008	B	*	mg/L	0.005	0.03	11/12/12 19:58	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:33	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0091		*	mg/L	0.0005	0.003	11/12/12 17:42	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:42	msh
Potassium (MWMT)	M6010B ICP	21.5			mg/L	0.3	2	11/12/12 19:58	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0006		*	mg/L	0.0001	0.0003	11/12/12 17:42	msh
Silica (MWMT)	M6010B ICP	7.0			mg/L	0.4	2	11/12/12 19:58	aeb
Sodium (MWMT)	M6010B ICP	8.5			mg/L	0.3	2	11/12/12 19:58	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:42	msh
Uranium (MWMT)	M6020 ICP-MS	0.0020		*	mg/L	0.0001	0.0005	11/12/12 17:42	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 19:58	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 19:58	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.16			units			11/08/12 0:00	cdb
Leachate Volume		1089.7			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		49.1			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 15 3RD QTR 9/27/2012

ACZ Sample ID: ***L97461-08***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.053		*	mg/L	0.001	0.005	11/12/12 17:52	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:52	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0002	0.001	11/12/12 17:52	msh
Barium (MWMT)	M6010B ICP	0.025		*	mg/L	0.003	0.02	11/12/12 20:04	aeb
Beryllium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.00005	0.0003	11/12/12 17:52	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:52	msh
Calcium (MWMT)	M6010B ICP	60.0		*	mg/L	0.2	1	11/12/12 20:04	aeb
Chromium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.002	11/12/12 17:52	msh
Copper (MWMT)	M6020 ICP-MS	0.0375		*	mg/L	0.0005	0.003	11/12/12 17:52	msh
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	11/12/12 20:04	aeb
Lead (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:52	msh
Magnesium (MWMT)	M6010B ICP	14.9			mg/L	0.2	1	11/12/12 20:04	aeb
Manganese (MWMT)	M6010B ICP	0.012	B	*	mg/L	0.005	0.03	11/12/12 20:04	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:35	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0463		*	mg/L	0.0005	0.003	11/12/12 17:52	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:52	msh
Potassium (MWMT)	M6010B ICP	19.9			mg/L	0.3	2	11/12/12 20:04	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0036		*	mg/L	0.0001	0.0003	11/12/12 17:52	msh
Silica (MWMT)	M6010B ICP	21.2			mg/L	0.4	2	11/12/12 20:04	aeb
Sodium (MWMT)	M6010B ICP	7.7			mg/L	0.3	2	11/12/12 20:04	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:52	msh
Uranium (MWMT)	M6020 ICP-MS	0.0048		*	mg/L	0.0001	0.0005	11/12/12 17:52	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 20:04	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 20:04	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.04			units			11/08/12 0:00	cdb
Leachate Volume		1082.7			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		36.7			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 17 3RD QTR 9/27/2012

ACZ Sample ID: ***L97461-09***
Date Sampled: *10/17/12 00:00*
Date Received: *10/19/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.386		*	mg/L	0.005	0.03	11/16/12 9:18	msh
Antimony (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0004	0.002	11/12/12 17:56	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0024			mg/L	0.0002	0.001	11/12/12 17:56	msh
Barium (MWMT)	M6010B ICP	0.005	B	*	mg/L	0.003	0.02	11/12/12 20:07	aeb
Beryllium (MWMT)	M6020 ICP-MS	0.00011	B	*	mg/L	0.00005	0.0003	11/12/12 17:56	msh
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:56	msh
Calcium (MWMT)	M6010B ICP	1.8		*	mg/L	0.2	1	11/12/12 20:07	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0008	B	*	mg/L	0.0005	0.002	11/12/12 17:56	msh
Copper (MWMT)	M6020 ICP-MS	0.0008	B	*	mg/L	0.0005	0.003	11/12/12 17:56	msh
Iron (MWMT)	M6010B ICP	0.33			mg/L	0.02	0.05	11/12/12 20:07	aeb
Lead (MWMT)	M6020 ICP-MS	0.0006		*	mg/L	0.0001	0.0005	11/12/12 17:56	msh
Magnesium (MWMT)	M6010B ICP	0.9	B		mg/L	0.2	1	11/12/12 20:07	aeb
Manganese (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 20:07	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	11/13/12 14:38	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0017	B	*	mg/L	0.0005	0.003	11/12/12 17:56	msh
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	11/12/12 17:56	msh
Potassium (MWMT)	M6010B ICP	4.4			mg/L	0.3	2	11/12/12 20:07	aeb
Selenium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0003	11/12/12 17:56	msh
Silica (MWMT)	M6010B ICP	12.1			mg/L	0.4	2	11/12/12 20:07	aeb
Sodium (MWMT)	M6010B ICP	50.1			mg/L	0.3	2	11/12/12 20:07	aeb
Thallium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	11/12/12 17:56	msh
Uranium (MWMT)	M6020 ICP-MS	0.0016		*	mg/L	0.0001	0.0005	11/12/12 17:56	msh
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	11/12/12 20:07	aeb
Zinc (MWMT)	M6010B ICP		U	*	mg/L	0.01	0.05	11/12/12 20:07	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT, Sept. 19, 1990								
Dry Weight		1000			g			11/08/12 0:00	cdb
Extraction pH		n/a			units			11/08/12 0:00	cdb
Extraction Time		24			hrs			11/08/12 0:00	cdb
Leachate pH		8.76			units			11/08/12 0:00	cdb
Leachate Volume		1076.62			mL			11/08/12 0:00	cdb
Particle Size over 5 cm		13.8			%			11/08/12 0:00	cdb
Retained Moisture		n/a			%			11/08/12 0:00	cdb

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

Aluminum (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.1		.1018	mg/L	101.8	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.003	0.003			
WG333648PBS	PBS	11/12/12 17:05				.0021	mg/L		-0.003	0.003			
L97461-01DUP	DUP	11/12/12 17:12			1.74	2.297	mg/L				27.6	20	RC
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.050055	.096	.1474	mg/L	102.7	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.050055	.096	.1732	mg/L	154.2	75	125	16.09	20	MA
WG334046													
WG334046ICV	ICV	11/16/12 8:57	MS121001-5	.1		.1038	mg/L	103.8	90	110			
WG334046ICB	ICB	11/16/12 8:59				U	mg/L		-0.003	0.003			
WG333648PBS	PBS	11/16/12 9:07				.0016	mg/L		-0.003	0.003			
L97461-01DUP	DUP	11/16/12 9:12			.178	.2363	mg/L				28.1	20	RC
L97631-07AS	AS	11/16/12 9:30	MS121009-6	.250275	.211	.4421	mg/L	92.3	75	125			
L97631-07ASD	ASD	11/16/12 9:32	MS121009-6	.250275	.211	.4433	mg/L	92.8	75	125	0.27	20	

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.02		.02041	mg/L	102.1	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0012	0.0012			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0012	0.0012			
L97461-01DUP	DUP	11/12/12 17:12			U	U	mg/L				0	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.01	U	.01104	mg/L	110.4	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.01	U	.01145	mg/L	114.5	75	125	3.65	20	

Arsenic (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05254	mg/L	105.1	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0006	0.0006			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0006	0.0006			
L97461-01DUP	DUP	11/12/12 17:12			.0035	.00392	mg/L				11.3	20	
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	.0007	.05259	mg/L	103.7	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	.0007	.05579	mg/L	110.1	75	125	5.91	20	

Barium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	2		1.969	mg/L	98.5	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.009	0.009			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.009	0.009			
L97461-01DUP	DUP	11/12/12 19:27			.026	.0289	mg/L				10.6	20	RA
L97461-02AS	AS	11/12/12 19:33	II121029-3	.5	.038	.5356	mg/L	99.5	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	.5	.038	.532	mg/L	98.8	75	125	0.67	20	

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Beryllium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.04686	mg/L	93.7	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.00015	0.00015			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.00015	0.00015			
L97461-01DUP	DUP	11/12/12 17:12			.00006	.000056	mg/L				6.9	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.0501	U	.04633	mg/L	92.5	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.0501	U	.0475	mg/L	94.8	75	125	2.49	20	

Cadmium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05064	mg/L	101.3	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0003	0.0003			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0003	0.0003			
L97461-01DUP	DUP	11/12/12 17:12			U	U	mg/L				0	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.0501	U	.04999	mg/L	99.8	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.0501	U	.05121	mg/L	102.2	75	125	2.41	20	

Calcium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	100		98.94	mg/L	98.9	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.6	0.6			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.6	0.6			
L97461-01DUP	DUP	11/12/12 19:27			4.9	3.89	mg/L				23	20	RD
L97461-02AS	AS	11/12/12 19:33	II121029-3	67.97554	31.5	100.9	mg/L	102.1	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	67.97554	31.5	100.5	mg/L	101.5	75	125	0.4	20	

Chromium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.04856	mg/L	97.1	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0015	0.0015			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0015	0.0015			
L97461-01DUP	DUP	11/12/12 17:12			.0009	.00112	mg/L				21.8	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	U	.04635	mg/L	92.6	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	U	.04883	mg/L	97.6	75	125	5.21	20	

Copper (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.04975	mg/L	99.5	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0015	0.0015			
WG333648PBS	PBS	11/12/12 17:05				.0006	mg/L		-0.0015	0.0015			
L97461-01DUP	DUP	11/12/12 17:12			.0011	.00096	mg/L				13.6	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	U	.0458	mg/L	91.5	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	U	.04824	mg/L	96.4	75	125	5.19	20	

Lisbon Valley Mining Company, LLC

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Iron (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	2		1.98	mg/L	99	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.06	0.06			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.06	0.06			
L97461-01DUP	DUP	11/12/12 19:27			.37	.41	mg/L				13	20	
L97461-02AS	AS	11/12/12 19:33	II121029-3	1	.07	1.088	mg/L	102.8	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	1	.07	1.091	mg/L	103.1	75	125	0.28	20	

Lead (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05364	mg/L	107.3	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0003	0.0003			
WG333648PBS	PBS	11/12/12 17:05				.00011	mg/L		-0.0003	0.0003			
L97461-01DUP	DUP	11/12/12 17:12			.0002	.00031	mg/L				43.1	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	U	.05111	mg/L	102.1	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	U	.05306	mg/L	106	75	125	3.74	20	

Magnesium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	100		100.7	mg/L	100.7	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.6	0.6			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.6	0.6			
L97461-01DUP	DUP	11/12/12 19:27			2.1	1.91	mg/L				9.5	20	
L97461-02AS	AS	11/12/12 19:33	II121029-3	50.00131	11.6	63.02	mg/L	102.8	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	50.00131	11.6	62.68	mg/L	102.2	75	125	0.54	20	

Manganese (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	2		1.938	mg/L	96.9	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.015	0.015			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.015	0.015			
L97461-01DUP	DUP	11/12/12 19:27			.007	U	mg/L				200	20	RA
L97461-02AS	AS	11/12/12 19:33	II121029-3	.5	.024	.5191	mg/L	99	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	.5	.024	.5176	mg/L	98.7	75	125	0.29	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L97461***

Mercury (MWMT) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333830													
WG333830ICV	ICV	11/13/12 10:50	II121107-3	.005025		.00522	mg/L	103.9	95	105			
WG333830ICB	ICB	11/13/12 10:52				U	mg/L		-0.0002	0.0002			
WG333922													
WG333922PBW	PBW	11/13/12 14:02				U	mg/L		-0.00044	0.00044			
WG333922LCSW	LCSW	11/13/12 14:04	II121107-3	.005025		.0052	mg/L	103.5	85	115			
WG333648PBS	PBS	11/13/12 14:06				U	mg/Kg		-0.0006	0.0006			
L97461-01DUP	DUP	11/13/12 14:10			U	U	mg/L				0	20	RA
L97461-03MS	MS	11/13/12 14:17	II121030-3	.002002	U	.00201	mg/L	100.4	85	115			
L97461-03MSD	MSD	11/13/12 14:20	II121030-3	.002002	U	.00191	mg/L	95.4	85	115	5.1	20	

Molybdenum (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.02004		.02012	mg/L	100.4	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0015	0.0015			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0015	0.0015			
L97461-01DUP	DUP	11/12/12 17:12			.002	.00243	mg/L				19.4	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05	.0091	.05998	mg/L	101.8	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05	.0091	.06128	mg/L	104.4	75	125	2.14	20	

Nickel (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.04989	mg/L	99.8	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0018	0.0018			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0018	0.0018			
L97461-01DUP	DUP	11/12/12 17:12			U	U	mg/L				0	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	U	.04572	mg/L	91.3	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	U	.04794	mg/L	95.8	75	125	4.74	20	

Potassium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	20		19.9	mg/L	99.5	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.9	0.9			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.9	0.9			
L97461-01DUP	DUP	11/12/12 19:27			7.2	7.57	mg/L				5	20	
L97461-02AS	AS	11/12/12 19:33	II121029-3	99.90868	33.7	135.6	mg/L	102	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	99.90868	33.7	134.6	mg/L	101	75	125	0.74	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L97461***

Selenium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05078	mg/L	101.6	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0003	0.0003			
WG333648PBS	PBS	11/12/12 17:05				U	mg/L		-0.0003	0.0003			
L97461-01DUP	DUP	11/12/12 17:12			.0002	.00013	mg/L				42.4	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	.0006	.05625	mg/L	111.2	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	.0006	.05994	mg/L	118.6	75	125	6.35	20	

Silica (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	42.8		43.93	mg/L	102.6	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-1.2	1.2			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-1.2	1.2			
L97461-01DUP	DUP	11/12/12 19:27			9.7	11.51	mg/L				17.1	20	
L97461-02AS	AS	11/12/12 19:33	II121029-3	21.428	10.9	34.05	mg/L	108	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	21.428	10.9	34.09	mg/L	108.2	75	125	0.12	20	

Sodium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	100		99.53	mg/L	99.5	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.9	0.9			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.9	0.9			
L97461-01DUP	DUP	11/12/12 19:27			38.4	45.54	mg/L				17	20	
L97461-02AS	AS	11/12/12 19:33	II121029-3	100.0416	10.2	111.4	mg/L	101.2	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	100.0416	10.2	111.3	mg/L	101.1	75	125	0.09	20	

Thallium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05329	mg/L	106.6	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0003	0.0003			
WG333648PBS	PBS	11/12/12 17:05				.00029	mg/L		-0.0003	0.0003			
L97461-01DUP	DUP	11/12/12 17:12			U	U	mg/L				0	20	RA
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05005	U	.05138	mg/L	102.7	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05005	U	.05357	mg/L	107	75	125	4.17	20	

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333938													
WG333938ICV	ICV	11/12/12 16:48	MS121001-5	.05		.05206	mg/L	104.1	90	110			
WG333938ICB	ICB	11/12/12 16:52				U	mg/L		-0.0003	0.0003			
WG333648PBS	PBS	11/12/12 17:05				.00015	mg/L		-0.0003	0.0003			
L97461-01DUP	DUP	11/12/12 17:12			.0024	.00182	mg/L				27.5	20	RC
L97461-07AS	AS	11/12/12 17:46	MS121009-6	.05	.002	.05319	mg/L	102.4	75	125			
L97461-07ASD	ASD	11/12/12 17:49	MS121009-6	.05	.002	.05549	mg/L	107	75	125	4.23	20	

Lisbon Valley Mining Company, LLC

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Vanadium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	2		1.98	mg/L	99	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.015	0.015			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.015	0.015			
L97461-01DUP	DUP	11/12/12 19:27			U	U	mg/L				0	20	RA
L97461-02AS	AS	11/12/12 19:33	II121029-3	.5	U	.5097	mg/L	101.9	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	.5	U	.5101	mg/L	102	75	125	0.08	20	

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG333940													
WG333940ICV	ICV	11/12/12 19:06	II120914-1	2		1.963	mg/L	98.2	90	110			
WG333940ICB	ICB	11/12/12 19:09				U	mg/L		-0.03	0.03			
WG333648PBS	PBS	11/12/12 19:21				U	mg/L		-0.03	0.03			
L97461-01DUP	DUP	11/12/12 19:27			U	U	mg/L				200	20	RA
L97461-02AS	AS	11/12/12 19:33	II121029-3	.5	U	.515	mg/L	103	75	125			
L97461-02ASD	ASD	11/12/12 19:37	II121029-3	.5	U	.514	mg/L	102.8	75	125	0.19	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-01	WG334046	Aluminum (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG333938	Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

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ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-02	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-03	WG334046	Aluminum (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG333938	Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-04	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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.
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Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-05	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-06	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-07	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-08	WG333938	Aluminum (MWMT)	M6020 ICP-MS	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
		Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L97461***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L97461-09	WG334046	Aluminum (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
			M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG333938	Antimony (MWMT)	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).
	WG333940	Barium (MWMT)	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).
			M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG333938	Beryllium (MWMT)	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).
		Cadmium (MWMT)	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).
	WG333940	Calcium (MWMT)	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.
	WG333938	Chromium (MWMT)	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).
		Copper (MWMT)	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 (MWMT)	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).
	WG333940	Manganese (MWMT)	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).
	WG333922	Mercury (MWMT)	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).
	WG333938	Molybdenum (MWMT)	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).
		Nickel (MWMT)	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).
		Selenium (MWMT)	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).
		Thallium (MWMT)	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).
		Uranium (MWMT)	M6020 ICP-MS	RC	For a solid matrix, the matrix duplicate precision assessment (RPD or RER) exceeded the control limit, which is attributable to the non-homogeneity of the sample.
	WG333940	Vanadium (MWMT)	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).
		Zinc (MWMT)	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).

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
Lisbon Valley Copper Project

ACZ Project ID: L97461
Date Received: 10/19/2012 15:03
Received By: ksj
Date Printed: 10/22/2012

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?
NA16435	15.3	14	Yes

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

L97461

Lisbon Valley Mining Co. P.O. Box 248 928 S. County Rd. 313 La Sal, Utah 84530 Phone: (435) 686-9950	Chain of Custody Record Send report with laboratory QA to: 928 S County Rd 313 La Sal, Utah 84530

Lisbon Valley Copper Project			ANALYSES								ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO (970) 879-6590
SAMPLE LABEL	DATE	TIME	MWMP							Number of Containers	Remarks / Comments
Bed 17, 2nd QTR, 6/28/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 14, 3rd QTR, 7/27/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 17, 3rd QTR, 7/27/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 14, 3rd QTR, 8/30/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 15, 3rd QTR, 8/30/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 17, 3rd QTR, 8/30/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 14, 3rd QTR, 9/27/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 15, 3rd QTR, 9/27/2012	10-17-2012		x							1	Centennial Pit 2012
Bed 17, 3rd QTR, 9/27/2012	10-17-2012		x							1	Centennial Pit 2012

Sampled By: Ken Ezpeleta	Total Number of Containers	9
Sampler's Signature	Contact Person: Lantz M Indergard & Ken Ezpeleta Phone: (435) 686-9950 ext. 1 107 Fax: (435) 686-2223	lindergard@lisbonmine.com kezpeleta@lisbonmine.com

Relinquished By:		Date / Time:	Received By:	Date / Time:
Ken Ezpeleta	10-17-2012	9:00 AM		10/19/12 1500

Method of Shipment: UPS	Comments: Please reduce detection limits to meet ground water standards(see attached). Use Neutral Extraction PH. Use a standardized particle size. See Quote #: MWMP-Extended-2012

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

Analytical Report

December 20, 2012

Report to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

Bill to:
Lantz Indergard
Lisbon Valley Mining Company, LLC
P.O. Box 248
La Sal, UT 84530

cc: Ken Ezpeleta

Project ID: Lisbon Valley Copper Project
ACZ Project ID: L98007

Lantz Indergard:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 21, 2012. This project has been assigned to ACZ's project number, L98007. 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 L98007. 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 20, 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.

Sue Webber has reviewed and approved this report.

Lisbon Valley Mining Company, LLC

December 20, 2012

Project ID: Lisbon Valley Copper Project
ACZ Project ID: L98007

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 17 soil samples from Lisbon Valley Mining Company, LLC on November 21, 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 L98007. 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 parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following anomaly required further explanation not provided by the Extended Qualifier Report:

1. For the MWMP extraction data flagged with an "N1", the extraction fluid pH was 7 per instructions from the client. Also, a water feed line temporarily disconnected was re-connected.

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 5 10/29/12

ACZ Sample ID: ***L98007-01***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.331			mg/L	0.001	0.005	12/13/12 2:05	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/13/12 2:05	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0002	0.001	12/13/12 2:05	pmc
Barium (MWMT)	M6010B ICP	0.013	B		mg/L	0.003	0.02	12/13/12 11:45	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:05	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/13/12 2:05	pmc
Calcium (MWMT)	M6010B ICP	1.7			mg/L	0.2	1	12/13/12 11:45	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/13/12 2:05	pmc
Copper (MWMT)	M6020 ICP-MS	0.0028	B		mg/L	0.0005	0.003	12/13/12 2:05	pmc
Iron (MWMT)	M6010B ICP	0.15			mg/L	0.02	0.05	12/13/12 11:45	aeb
Lead (MWMT)	M6020 ICP-MS	0.0022			mg/L	0.0001	0.0005	12/13/12 2:05	pmc
Magnesium (MWMT)	M6010B ICP	0.3	B		mg/L	0.2	1	12/13/12 11:45	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:45	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:17	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0026	B		mg/L	0.0005	0.003	12/13/12 2:05	pmc
Nickel (MWMT)	M6020 ICP-MS		U		mg/L	0.0006	0.003	12/13/12 2:05	pmc
Potassium (MWMT)	M6010B ICP	0.6	B		mg/L	0.3	2	12/13/12 11:45	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	12/13/12 2:05	pmc
Silica (MWMT)	M6010B ICP	4.6			mg/L	0.4	2	12/13/12 11:45	aeb
Sodium (MWMT)	M6010B ICP	7.8			mg/L	0.3	2	12/13/12 11:45	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:05	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	12/13/12 2:05	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:45	aeb
Zinc (MWMT)	M6010B ICP	0.01	B		mg/L	0.01	0.05	12/13/12 11:45	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4999.1			g			12/09/12 0:00	cdb
Extraction pH		6.86			units			12/09/12 0:00	cdb
Extraction Time		27			hrs			12/09/12 0:00	cdb
Leachate pH		6.67			units			12/09/12 0:00	cdb
Leachate Volume		5025.7			mL			12/09/12 0:00	cdb
Particle Size over 5 cm		54.8			%			12/09/12 0:00	cdb
Retained Moisture		4.9			%			12/09/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 6 & 8 10/29/12

ACZ Sample ID: ***L98007-02***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	56.0			mg/L	0.1	0.5	12/18/12 18:04	msh
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	12/17/12 17:26	msh
Arsenic (MWMT)	M6020 ICP-MS	0.0011		*	mg/L	0.0002	0.001	12/17/12 17:26	msh
Barium (MWMT)	M6010B ICP	0.021		*	mg/L	0.003	0.02	12/14/12 16:03	jjc
Beryllium (MWMT)	M6020 ICP-MS	0.033			mg/L	0.005	0.03	12/18/12 18:04	msh
Cadmium (MWMT)	M6020 ICP-MS	0.0815			mg/L	0.0001	0.0005	12/17/12 17:26	msh
Calcium (MWMT)	M6010B ICP	311			mg/L	0.2	1	12/14/12 16:03	jjc
Chromium (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0005	0.002	12/17/12 17:26	msh
Copper (MWMT)	M6020 ICP-MS	0.0078			mg/L	0.0005	0.003	12/17/12 17:26	msh
Iron (MWMT)	M6010B ICP	0.18		*	mg/L	0.02	0.05	12/14/12 16:03	jjc
Lead (MWMT)	M6020 ICP-MS	0.0038			mg/L	0.0001	0.0005	12/17/12 17:26	msh
Magnesium (MWMT)	M6010B ICP	228			mg/L	0.2	1	12/14/12 16:03	jjc
Manganese (MWMT)	M6010B ICP	1.900			mg/L	0.005	0.03	12/14/12 16:03	jjc
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/14/12 14:52	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0017	B		mg/L	0.0005	0.003	12/17/12 17:26	msh
Nickel (MWMT)	M6020 ICP-MS	0.3423			mg/L	0.0006	0.003	12/17/12 17:26	msh
Potassium (MWMT)	M6010B ICP	18.7			mg/L	0.3	2	12/14/12 16:03	jjc
Selenium (MWMT)	M6020 ICP-MS	0.0631		*	mg/L	0.0001	0.0003	12/17/12 17:26	msh
Silica (MWMT)	M6010B ICP	28.1			mg/L	0.4	2	12/14/12 16:03	jjc
Sodium (MWMT)	M6010B ICP	171			mg/L	0.3	2	12/14/12 16:03	jjc
Thallium (MWMT)	M6020 ICP-MS	0.0093			mg/L	0.0001	0.0005	12/17/12 17:26	msh
Uranium (MWMT)	M6020 ICP-MS	0.0016			mg/L	0.0001	0.0005	12/17/12 17:26	msh
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/14/12 16:03	jjc
Zinc (MWMT)	M6010B ICP	4.38			mg/L	0.01	0.05	12/14/12 16:03	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		3917		*	g			12/13/12 0:00	brd
Extraction pH		7.04		*	units			12/13/12 0:00	brd
Extraction Time		48		*	hrs			12/13/12 0:00	brd
Leachate pH		3.34		*	units			12/13/12 0:00	brd
Leachate Volume		3927		*	mL			12/13/12 0:00	brd
Particle Size over 5 cm		7.7		*	%			12/13/12 0:00	brd
Retained Moisture		19.0		*	%			12/13/12 0:00	brd

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 13 11/9/12

ACZ Sample ID: ***L98007-03***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.028			mg/L	0.001	0.005	12/13/12 2:08	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/13/12 2:08	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0002	0.001	12/13/12 2:08	pmc
Barium (MWMT)	M6010B ICP	0.007	B		mg/L	0.003	0.02	12/13/12 11:48	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:08	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	12/13/12 2:08	pmc
Calcium (MWMT)	M6010B ICP	5.9			mg/L	0.2	1	12/13/12 11:48	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0013	B		mg/L	0.0005	0.002	12/13/12 2:08	pmc
Copper (MWMT)	M6020 ICP-MS	0.0048			mg/L	0.0005	0.003	12/13/12 2:08	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/13/12 11:48	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:08	pmc
Magnesium (MWMT)	M6010B ICP	1.2			mg/L	0.2	1	12/13/12 11:48	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:48	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:19	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0108			mg/L	0.0005	0.003	12/13/12 2:08	pmc
Nickel (MWMT)	M6020 ICP-MS		U		mg/L	0.0006	0.003	12/13/12 2:08	pmc
Potassium (MWMT)	M6010B ICP	1.8	B		mg/L	0.3	2	12/13/12 11:48	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0005			mg/L	0.0001	0.0003	12/13/12 2:08	pmc
Silica (MWMT)	M6010B ICP	4.8			mg/L	0.4	2	12/13/12 11:48	aeb
Sodium (MWMT)	M6010B ICP	2.8			mg/L	0.3	2	12/13/12 11:48	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:08	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/13/12 2:08	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:48	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/13/12 11:48	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4998.4			g			12/09/12 0:00	cdb
Extraction pH		6.86			units			12/09/12 0:00	cdb
Extraction Time		28			hrs			12/09/12 0:00	cdb
Leachate pH		6.78			units			12/09/12 0:00	cdb
Leachate Volume		4999.4			mL			12/09/12 0:00	cdb
Particle Size over 5 cm		49.7			%			12/09/12 0:00	cdb
Retained Moisture		6.5			%			12/09/12 0:00	cdb

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 7 10/29/12

ACZ Sample ID: ***L98007-04***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.128			mg/L	0.001	0.005	12/18/12 18:11	msh
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/17/12 17:33	msh
Arsenic (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0002	0.001	12/17/12 17:33	msh
Barium (MWMT)	M6010B ICP	0.016	B	*	mg/L	0.003	0.02	12/14/12 16:09	jjc
Beryllium (MWMT)	M6020 ICP-MS	0.00027	B		mg/L	0.00005	0.0003	12/18/12 18:11	msh
Cadmium (MWMT)	M6020 ICP-MS	0.0016			mg/L	0.0001	0.0005	12/17/12 17:33	msh
Calcium (MWMT)	M6010B ICP	34.8			mg/L	0.2	1	12/14/12 16:09	jjc
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/17/12 17:33	msh
Copper (MWMT)	M6020 ICP-MS	0.0117			mg/L	0.0005	0.003	12/17/12 17:33	msh
Iron (MWMT)	M6010B ICP	0.02	B	*	mg/L	0.02	0.05	12/14/12 16:09	jjc
Lead (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	12/17/12 17:33	msh
Magnesium (MWMT)	M6010B ICP	19.5			mg/L	0.2	1	12/14/12 16:09	jjc
Manganese (MWMT)	M6010B ICP	0.022	B		mg/L	0.005	0.03	12/14/12 16:09	jjc
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/14/12 14:54	mfm
Molybdenum (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.003	12/17/12 17:33	msh
Nickel (MWMT)	M6020 ICP-MS	0.0101			mg/L	0.0006	0.003	12/17/12 17:33	msh
Potassium (MWMT)	M6010B ICP	6.0			mg/L	0.3	2	12/14/12 16:09	jjc
Selenium (MWMT)	M6020 ICP-MS	0.0111		*	mg/L	0.0001	0.0003	12/17/12 17:33	msh
Silica (MWMT)	M6010B ICP	24.6			mg/L	0.4	2	12/14/12 16:09	jjc
Sodium (MWMT)	M6010B ICP	29.0			mg/L	0.3	2	12/14/12 16:09	jjc
Thallium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	12/17/12 17:33	msh
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	12/17/12 17:33	msh
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/14/12 16:09	jjc
Zinc (MWMT)	M6010B ICP	0.08			mg/L	0.01	0.05	12/14/12 16:09	jjc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		3758		*	g			12/13/12 0:00	brd
Extraction pH		7.04		*	units			12/13/12 0:00	brd
Extraction Time		45.5		*	hrs			12/13/12 0:00	brd
Leachate pH		5.73		*	units			12/13/12 0:00	brd
Leachate Volume		3758		*	mL			12/13/12 0:00	brd
Particle Size over 5 cm		12.2		*	%			12/13/12 0:00	brd
Retained Moisture		28.6		*	%			12/13/12 0:00	brd

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 15 11/9/12

ACZ Sample ID: ***L98007-05***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.171			mg/L	0.001	0.005	12/13/12 2:15	pmc
Antimony (MWMT)	M6020 ICP-MS	0.0011	B		mg/L	0.0004	0.002	12/13/12 2:15	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0091			mg/L	0.0002	0.001	12/13/12 2:15	pmc
Barium (MWMT)	M6010B ICP	0.017	B		mg/L	0.003	0.02	12/13/12 11:57	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:15	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0068			mg/L	0.0001	0.0005	12/13/12 2:15	pmc
Calcium (MWMT)	M6010B ICP	9.8			mg/L	0.2	1	12/13/12 11:57	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/13/12 2:15	pmc
Copper (MWMT)	M6020 ICP-MS	0.0035			mg/L	0.0005	0.003	12/13/12 2:15	pmc
Iron (MWMT)	M6010B ICP	0.03	B		mg/L	0.02	0.05	12/13/12 11:57	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:15	pmc
Magnesium (MWMT)	M6010B ICP	2.0			mg/L	0.2	1	12/13/12 11:57	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:57	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:26	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0595			mg/L	0.0005	0.003	12/13/12 2:15	pmc
Nickel (MWMT)	M6020 ICP-MS	0.0008	B		mg/L	0.0006	0.003	12/13/12 2:15	pmc
Potassium (MWMT)	M6010B ICP	6.4			mg/L	0.3	2	12/13/12 11:57	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0185			mg/L	0.0001	0.0003	12/13/12 2:15	pmc
Silica (MWMT)	M6010B ICP	5.1			mg/L	0.4	2	12/13/12 11:57	aeb
Sodium (MWMT)	M6010B ICP	2.5			mg/L	0.3	2	12/13/12 11:57	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:15	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0088			mg/L	0.0001	0.0005	12/13/12 2:15	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 11:57	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/13/12 11:57	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5005.5			g			12/09/12 0:00	cdb
Extraction pH		6.86			units			12/09/12 0:00	cdb
Extraction Time		27			hrs			12/09/12 0:00	cdb
Leachate pH		7.1			units			12/09/12 0:00	cdb
Leachate Volume		5015.8			mL			12/09/12 0:00	cdb
Particle Size over 5 cm		92.1			%			12/09/12 0:00	cdb
Retained Moisture		7.4			%			12/09/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 14 10/29/12

ACZ Sample ID: ***L98007-06***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.122			mg/L	0.001	0.005	12/13/12 2:18	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/13/12 2:18	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0002	0.001	12/13/12 2:18	pmc
Barium (MWMT)	M6010B ICP	0.008	B		mg/L	0.003	0.02	12/13/12 12:00	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:18	pmc
Cadmium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:18	pmc
Calcium (MWMT)	M6010B ICP	6.8			mg/L	0.2	1	12/13/12 12:00	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/13/12 2:18	pmc
Copper (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0005	0.003	12/13/12 2:18	pmc
Iron (MWMT)	M6010B ICP	0.04	B		mg/L	0.02	0.05	12/13/12 12:00	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:18	pmc
Magnesium (MWMT)	M6010B ICP	1.6			mg/L	0.2	1	12/13/12 12:00	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 12:00	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:28	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0030	B		mg/L	0.0005	0.003	12/13/12 2:18	pmc
Nickel (MWMT)	M6020 ICP-MS		U		mg/L	0.0006	0.003	12/13/12 2:18	pmc
Potassium (MWMT)	M6010B ICP	7.0			mg/L	0.3	2	12/13/12 12:00	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0003	12/13/12 2:18	pmc
Silica (MWMT)	M6010B ICP	4.5			mg/L	0.4	2	12/13/12 12:00	aeb
Sodium (MWMT)	M6010B ICP	4.1			mg/L	0.3	2	12/13/12 12:00	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:18	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	12/13/12 2:18	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 12:00	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/13/12 12:00	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4979.2			g			12/09/12 0:00	cdb
Extraction pH		6.86			units			12/09/12 0:00	cdb
Extraction Time		28			hrs			12/09/12 0:00	cdb
Leachate pH		7.69			units			12/09/12 0:00	cdb
Leachate Volume		4995.2			mL			12/09/12 0:00	cdb
Particle Size over 5 cm		6.9			%			12/09/12 0:00	cdb
Retained Moisture		3.6			%			12/09/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 17 10/29/12

ACZ Sample ID: ***L98007-07***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	1.080		*	mg/L	0.002	0.01	12/13/12 18:40	pmc
Antimony (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0004	0.002	12/13/12 2:21	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0187			mg/L	0.0002	0.001	12/13/12 2:21	pmc
Barium (MWMT)	M6010B ICP	0.008	B		mg/L	0.003	0.02	12/13/12 12:03	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:21	pmc
Cadmium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:21	pmc
Calcium (MWMT)	M6010B ICP	2.4			mg/L	0.2	1	12/13/12 12:03	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/13/12 2:21	pmc
Copper (MWMT)	M6020 ICP-MS	0.0007	B		mg/L	0.0005	0.003	12/13/12 2:21	pmc
Iron (MWMT)	M6010B ICP	0.31			mg/L	0.02	0.05	12/13/12 12:03	aeb
Lead (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/13/12 2:21	pmc
Magnesium (MWMT)	M6010B ICP	1.1			mg/L	0.2	1	12/13/12 12:03	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 12:03	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:30	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0017	B		mg/L	0.0005	0.003	12/13/12 2:21	pmc
Nickel (MWMT)	M6020 ICP-MS		U		mg/L	0.0006	0.003	12/13/12 2:21	pmc
Potassium (MWMT)	M6010B ICP	4.0			mg/L	0.3	2	12/13/12 12:03	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	12/13/12 2:21	pmc
Silica (MWMT)	M6010B ICP	13.6			mg/L	0.4	2	12/13/12 12:03	aeb
Sodium (MWMT)	M6010B ICP	51.3			mg/L	0.3	2	12/13/12 12:03	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:21	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0012			mg/L	0.0001	0.0005	12/13/12 2:21	pmc
Vanadium (MWMT)	M6010B ICP	0.011	B		mg/L	0.005	0.03	12/13/12 12:03	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/13/12 12:03	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4925.4			g			12/10/12 0:00	cdb
Extraction pH		6.86			units			12/10/12 0:00	cdb
Extraction Time		27			hrs			12/10/12 0:00	cdb
Leachate pH		8.97			units			12/10/12 0:00	cdb
Leachate Volume		4957.4			mL			12/10/12 0:00	cdb
Particle Size over 5 cm		24.7			%			12/10/12 0:00	cdb
Retained Moisture		9.2			%			12/10/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 12 11/9/12

ACZ Sample ID: ***L98007-08***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.872			mg/L	0.001	0.005	12/13/12 2:24	pmc
Antimony (MWMT)	M6020 ICP-MS	0.0013	B		mg/L	0.0004	0.002	12/13/12 2:24	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0014			mg/L	0.0002	0.001	12/13/12 2:24	pmc
Barium (MWMT)	M6010B ICP	0.015	B		mg/L	0.003	0.02	12/13/12 12:09	aeb
Beryllium (MWMT)	M6020 ICP-MS	0.00010	B		mg/L	0.00005	0.0003	12/13/12 2:24	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0009			mg/L	0.0001	0.0005	12/13/12 2:24	pmc
Calcium (MWMT)	M6010B ICP	7.3			mg/L	0.2	1	12/13/12 12:09	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0005	0.002	12/13/12 2:24	pmc
Copper (MWMT)	M6020 ICP-MS	0.0391			mg/L	0.0005	0.003	12/13/12 2:24	pmc
Iron (MWMT)	M6010B ICP	1.22			mg/L	0.02	0.05	12/13/12 12:09	aeb
Lead (MWMT)	M6020 ICP-MS	0.0004	B		mg/L	0.0001	0.0005	12/13/12 2:24	pmc
Magnesium (MWMT)	M6010B ICP	2.6			mg/L	0.2	1	12/13/12 12:09	aeb
Manganese (MWMT)	M6010B ICP	0.006	B		mg/L	0.005	0.03	12/13/12 12:09	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:37	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0779			mg/L	0.0005	0.003	12/13/12 2:24	pmc
Nickel (MWMT)	M6020 ICP-MS		U		mg/L	0.0006	0.003	12/13/12 2:24	pmc
Potassium (MWMT)	M6010B ICP	4.9			mg/L	0.3	2	12/13/12 12:09	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0018			mg/L	0.0001	0.0003	12/13/12 2:24	pmc
Silica (MWMT)	M6010B ICP	31.8			mg/L	0.4	2	12/13/12 12:09	aeb
Sodium (MWMT)	M6010B ICP	3.8			mg/L	0.3	2	12/13/12 12:09	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:24	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0015			mg/L	0.0001	0.0005	12/13/12 2:24	pmc
Vanadium (MWMT)	M6010B ICP	0.007	B		mg/L	0.005	0.03	12/13/12 12:09	aeb
Zinc (MWMT)	M6010B ICP	0.02	B		mg/L	0.01	0.05	12/13/12 12:09	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4971.1			g			12/10/12 0:00	cdb
Extraction pH		6.86			units			12/10/12 0:00	cdb
Extraction Time		30			hrs			12/10/12 0:00	cdb
Leachate pH		7.25			units			12/10/12 0:00	cdb
Leachate Volume		5011.3			mL			12/10/12 0:00	cdb
Particle Size over 5 cm		0			%			12/10/12 0:00	cdb
Retained Moisture		10.7			%			12/10/12 0:00	cdb

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 13 11/9/12

ACZ Sample ID: ***L98007-09***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.032			mg/L	0.001	0.005	12/13/12 2:27	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/13/12 2:27	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0015			mg/L	0.0002	0.001	12/13/12 2:27	pmc
Barium (MWMT)	M6010B ICP	0.070			mg/L	0.003	0.02	12/13/12 12:19	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/13/12 2:27	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0019			mg/L	0.0001	0.0005	12/13/12 2:27	pmc
Calcium (MWMT)	M6010B ICP	9.6			mg/L	0.2	1	12/13/12 12:19	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0005	0.002	12/13/12 2:27	pmc
Copper (MWMT)	M6020 ICP-MS	0.0186			mg/L	0.0005	0.003	12/13/12 2:27	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/13/12 12:19	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:27	pmc
Magnesium (MWMT)	M6010B ICP	0.9	B		mg/L	0.2	1	12/13/12 12:19	aeb
Manganese (MWMT)	M6010B ICP	0.020	B		mg/L	0.005	0.03	12/13/12 12:19	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/13/12 13:39	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0081			mg/L	0.0005	0.003	12/13/12 2:27	pmc
Nickel (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0006	0.003	12/13/12 2:27	pmc
Potassium (MWMT)	M6010B ICP	1.6	B		mg/L	0.3	2	12/13/12 12:19	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0012			mg/L	0.0001	0.0003	12/13/12 2:27	pmc
Silica (MWMT)	M6010B ICP	4.3			mg/L	0.4	2	12/13/12 12:19	aeb
Sodium (MWMT)	M6010B ICP	2.2			mg/L	0.3	2	12/13/12 12:19	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/13/12 2:27	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0011			mg/L	0.0001	0.0005	12/13/12 2:27	pmc
Vanadium (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/13/12 12:19	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/13/12 12:19	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5006.9			g			12/10/12 0:00	cdb
Extraction pH		6.86			units			12/10/12 0:00	cdb
Extraction Time		33			hrs			12/10/12 0:00	cdb
Leachate pH		7.07			units			12/10/12 0:00	cdb
Leachate Volume		5031.6			mL			12/10/12 0:00	cdb
Particle Size over 5 cm		42.2			%			12/10/12 0:00	cdb
Retained Moisture		4.5			%			12/10/12 0:00	cdb

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 15 10/29/12

ACZ Sample ID: ***L98007-10***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.022		*	mg/L	0.001	0.005	12/11/12 0:21	pmc
Antimony (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0004	0.002	12/11/12 0:21	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0002	0.001	12/11/12 0:21	pmc
Barium (MWMT)	M6010B ICP	0.018	B	*	mg/L	0.003	0.02	12/07/12 12:16	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:21	pmc
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	12/11/12 0:21	pmc
Calcium (MWMT)	M6010B ICP	27.0		*	mg/L	0.2	1	12/07/12 12:16	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:21	pmc
Copper (MWMT)	M6020 ICP-MS	0.0058		*	mg/L	0.0005	0.003	12/11/12 0:21	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/07/12 12:16	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:21	pmc
Magnesium (MWMT)	M6010B ICP	6.2			mg/L	0.2	1	12/07/12 12:16	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/07/12 12:16	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:38	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0087			mg/L	0.0005	0.003	12/11/12 0:21	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:21	pmc
Potassium (MWMT)	M6010B ICP	13.3			mg/L	0.3	2	12/07/12 12:16	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0003	12/11/12 0:21	pmc
Silica (MWMT)	M6010B ICP	4.6			mg/L	0.4	2	12/07/12 12:16	aeb
Sodium (MWMT)	M6010B ICP	7.1			mg/L	0.3	2	12/07/12 12:16	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:21	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0089			mg/L	0.0001	0.0005	12/11/12 0:21	pmc
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	12/07/12 12:16	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:16	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4976.8			g			12/05/12 0:00	cdb
Extraction pH		6.96			units			12/05/12 0:00	cdb
Extraction Time		26.5			hrs			12/05/12 0:00	cdb
Leachate pH		6.63			units			12/05/12 0:00	cdb
Leachate Volume		5008.8			mL			12/05/12 0:00	cdb
Particle Size over 5 cm		68.1			%			12/05/12 0:00	cdb
Retained Moisture		3.5			%			12/05/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 15 BACKFILL 11/16/12

ACZ Sample ID: ***L98007-11***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.058		*	mg/L	0.001	0.005	12/11/12 0:27	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:27	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0002	0.001	12/11/12 0:27	pmc
Barium (MWMT)	M6010B ICP	0.005	B	*	mg/L	0.003	0.02	12/07/12 12:25	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:27	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0234		*	mg/L	0.0001	0.0005	12/11/12 0:27	pmc
Calcium (MWMT)	M6010B ICP	5.3		*	mg/L	0.2	1	12/07/12 12:25	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:27	pmc
Copper (MWMT)	M6020 ICP-MS	0.0234		*	mg/L	0.0005	0.003	12/11/12 0:27	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/07/12 12:25	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:27	pmc
Magnesium (MWMT)	M6010B ICP	2.2			mg/L	0.2	1	12/07/12 12:25	aeb
Manganese (MWMT)	M6010B ICP	0.008	B		mg/L	0.005	0.03	12/07/12 12:25	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:41	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.1874			mg/L	0.0005	0.003	12/11/12 0:27	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:27	pmc
Potassium (MWMT)	M6010B ICP	5.7			mg/L	0.3	2	12/07/12 12:25	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0004			mg/L	0.0001	0.0003	12/11/12 0:27	pmc
Silica (MWMT)	M6010B ICP	9.0			mg/L	0.4	2	12/07/12 12:25	aeb
Sodium (MWMT)	M6010B ICP	1.9	B		mg/L	0.3	2	12/07/12 12:25	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:27	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0003	B		mg/L	0.0001	0.0005	12/11/12 0:27	pmc
Vanadium (MWMT)	M6010B ICP	0.010	B	*	mg/L	0.005	0.03	12/07/12 12:25	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:25	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4997.2			g			12/05/12 0:00	cdb
Extraction pH		6.96			units			12/05/12 0:00	cdb
Extraction Time		29			hrs			12/05/12 0:00	cdb
Leachate pH		6.26			units			12/05/12 0:00	cdb
Leachate Volume		5022.5			mL			12/05/12 0:00	cdb
Particle Size over 5 cm		30.2			%			12/05/12 0:00	cdb
Retained Moisture		7.7			%			12/05/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 13 BACKFILL 11/16/12

ACZ Sample ID: ***L98007-12***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.006		*	mg/L	0.001	0.005	12/11/12 0:30	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:30	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0002	0.001	12/11/12 0:30	pmc
Barium (MWMT)	M6010B ICP	0.006	B	*	mg/L	0.003	0.02	12/07/12 12:29	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:30	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0528		*	mg/L	0.0001	0.0005	12/11/12 0:30	pmc
Calcium (MWMT)	M6010B ICP	12.6		*	mg/L	0.2	1	12/07/12 12:29	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:30	pmc
Copper (MWMT)	M6020 ICP-MS	0.543			mg/L	0.001	0.005	12/12/12 1:42	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/07/12 12:29	aeb
Lead (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/11/12 0:30	pmc
Magnesium (MWMT)	M6010B ICP	13.4			mg/L	0.2	1	12/07/12 12:29	aeb
Manganese (MWMT)	M6010B ICP	0.064			mg/L	0.005	0.03	12/07/12 12:29	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:43	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0140			mg/L	0.0005	0.003	12/11/12 0:30	pmc
Nickel (MWMT)	M6020 ICP-MS	0.0116		*	mg/L	0.0006	0.003	12/11/12 0:30	pmc
Potassium (MWMT)	M6010B ICP	3.8			mg/L	0.3	2	12/07/12 12:29	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0012			mg/L	0.0001	0.0003	12/11/12 0:30	pmc
Silica (MWMT)	M6010B ICP	4.3			mg/L	0.4	2	12/07/12 12:29	aeb
Sodium (MWMT)	M6010B ICP	5.8			mg/L	0.3	2	12/07/12 12:29	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:30	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	12/11/12 0:30	pmc
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	12/07/12 12:29	aeb
Zinc (MWMT)	M6010B ICP	0.47			mg/L	0.01	0.05	12/07/12 12:29	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4999.2			g			12/05/12 0:00	cdb
Extraction pH		6.96			units			12/05/12 0:00	cdb
Extraction Time		30			hrs			12/05/12 0:00	cdb
Leachate pH		5.53			units			12/05/12 0:00	cdb
Leachate Volume		5010			mL			12/05/12 0:00	cdb
Particle Size over 5 cm		77			%			12/05/12 0:00	cdb
Retained Moisture		9			%			12/05/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: BED 14 BACKFILL 11/16/12

ACZ Sample ID: ***L98007-13***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.059		*	mg/L	0.001	0.005	12/11/12 0:33	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:33	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0006	B		mg/L	0.0002	0.001	12/11/12 0:33	pmc
Barium (MWMT)	M6010B ICP	0.018	B	*	mg/L	0.003	0.02	12/07/12 12:32	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:33	pmc
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	12/11/12 0:33	pmc
Calcium (MWMT)	M6010B ICP	6.6		*	mg/L	0.2	1	12/07/12 12:32	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:33	pmc
Copper (MWMT)	M6020 ICP-MS	0.0052		*	mg/L	0.0005	0.003	12/11/12 0:33	pmc
Iron (MWMT)	M6010B ICP	0.04	B		mg/L	0.02	0.05	12/07/12 12:32	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:33	pmc
Magnesium (MWMT)	M6010B ICP	5.7			mg/L	0.2	1	12/07/12 12:32	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/07/12 12:32	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:49	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0090			mg/L	0.0005	0.003	12/11/12 0:33	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:33	pmc
Potassium (MWMT)	M6010B ICP	6.2			mg/L	0.3	2	12/07/12 12:32	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0027			mg/L	0.0001	0.0003	12/11/12 0:33	pmc
Silica (MWMT)	M6010B ICP	8.1			mg/L	0.4	2	12/07/12 12:32	aeb
Sodium (MWMT)	M6010B ICP	16.8			mg/L	0.3	2	12/07/12 12:32	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:33	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0088			mg/L	0.0001	0.0005	12/11/12 0:33	pmc
Vanadium (MWMT)	M6010B ICP	0.008	B	*	mg/L	0.005	0.03	12/07/12 12:32	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:32	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4968.2			g			12/05/12 0:00	cdb
Extraction pH		6.96			units			12/05/12 0:00	cdb
Extraction Time		28.5			hrs			12/05/12 0:00	cdb
Leachate pH		6.53			units			12/05/12 0:00	cdb
Leachate Volume		4969.1			mL			12/05/12 0:00	cdb
Particle Size over 5 cm		39.3			%			12/05/12 0:00	cdb
Retained Moisture		4.1			%			12/05/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: RT3 BED 5 11/16/12

ACZ Sample ID: ***L98007-14***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.054		*	mg/L	0.001	0.005	12/11/12 0:36	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:36	pmc
Arsenic (MWMT)	M6020 ICP-MS		U		mg/L	0.0002	0.001	12/11/12 0:36	pmc
Barium (MWMT)	M6010B ICP	0.024		*	mg/L	0.003	0.02	12/07/12 12:35	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:36	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.0001	B	*	mg/L	0.0001	0.0005	12/11/12 0:36	pmc
Calcium (MWMT)	M6010B ICP	6.8		*	mg/L	0.2	1	12/07/12 12:35	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:36	pmc
Copper (MWMT)	M6020 ICP-MS	0.0042		*	mg/L	0.0005	0.003	12/11/12 0:36	pmc
Iron (MWMT)	M6010B ICP		U		mg/L	0.02	0.05	12/07/12 12:35	aeb
Lead (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	12/11/12 0:36	pmc
Magnesium (MWMT)	M6010B ICP	1.3			mg/L	0.2	1	12/07/12 12:35	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/07/12 12:35	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:51	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0046			mg/L	0.0005	0.003	12/11/12 0:36	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:36	pmc
Potassium (MWMT)	M6010B ICP	0.4	B		mg/L	0.3	2	12/07/12 12:35	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0003	12/11/12 0:36	pmc
Silica (MWMT)	M6010B ICP	4.0			mg/L	0.4	2	12/07/12 12:35	aeb
Sodium (MWMT)	M6010B ICP	6.2			mg/L	0.3	2	12/07/12 12:35	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:36	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0002	B		mg/L	0.0001	0.0005	12/11/12 0:36	pmc
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	12/07/12 12:35	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:35	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		5000.1			g			12/05/12 0:00	cdb
Extraction pH		6.96			units			12/05/12 0:00	cdb
Extraction Time		26.5			hrs			12/05/12 0:00	cdb
Leachate pH		6.34			units			12/05/12 0:00	cdb
Leachate Volume		5024.6			mL			12/05/12 0:00	cdb
Particle Size over 5 cm		66.5			%			12/05/12 0:00	cdb
Retained Moisture		3.8			%			12/05/12 0:00	cdb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: RT8 BED 17 11/16/12

ACZ Sample ID: ***L98007-15***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.162		*	mg/L	0.001	0.005	12/11/12 0:40	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:40	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0057			mg/L	0.0002	0.001	12/11/12 0:40	pmc
Barium (MWMT)	M6010B ICP	0.007	B	*	mg/L	0.003	0.02	12/07/12 12:38	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:40	pmc
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	12/11/12 0:40	pmc
Calcium (MWMT)	M6010B ICP	1.0	B	*	mg/L	0.2	1	12/07/12 12:38	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:40	pmc
Copper (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0005	0.003	12/11/12 0:40	pmc
Iron (MWMT)	M6010B ICP	0.69			mg/L	0.02	0.05	12/07/12 12:38	aeb
Lead (MWMT)	M6020 ICP-MS	0.0001	B		mg/L	0.0001	0.0005	12/11/12 0:40	pmc
Magnesium (MWMT)	M6010B ICP	0.5	B		mg/L	0.2	1	12/07/12 12:38	aeb
Manganese (MWMT)	M6010B ICP	0.006	B		mg/L	0.005	0.03	12/07/12 12:38	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 15:58	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0019	B		mg/L	0.0005	0.003	12/11/12 0:40	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:40	pmc
Potassium (MWMT)	M6010B ICP	2.9			mg/L	0.3	2	12/07/12 12:38	aeb
Selenium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0003	12/11/12 0:40	pmc
Silica (MWMT)	M6010B ICP	14.4			mg/L	0.4	2	12/07/12 12:38	aeb
Sodium (MWMT)	M6010B ICP	42.9			mg/L	0.3	2	12/07/12 12:38	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:40	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0005	B		mg/L	0.0001	0.0005	12/11/12 0:40	pmc
Vanadium (MWMT)	M6010B ICP	0.013	B	*	mg/L	0.005	0.03	12/07/12 12:38	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:38	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4982.2			g			12/06/12 0:00	cdb
Extraction pH		6.96			units			12/06/12 0:00	cdb
Extraction Time		26.5			hrs			12/06/12 0:00	cdb
Leachate pH		7.72			units			12/06/12 0:00	cdb
Leachate Volume		4996.2			mL			12/06/12 0:00	cdb
Particle Size over 5 cm		70.3			%			12/06/12 0:00	cdb
Retained Moisture		8.1			%			12/06/12 0:00	cdb

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

Inorganic Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: RT7 BED 14,15 11/16/12

ACZ Sample ID: ***L98007-16***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	0.082		*	mg/L	0.001	0.005	12/11/12 0:43	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:43	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0017			mg/L	0.0002	0.001	12/11/12 0:43	pmc
Barium (MWMT)	M6010B ICP	0.009	B	*	mg/L	0.003	0.02	12/07/12 12:50	aeb
Beryllium (MWMT)	M6020 ICP-MS		U		mg/L	0.00005	0.0003	12/11/12 0:43	pmc
Cadmium (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0001	0.0005	12/11/12 0:43	pmc
Calcium (MWMT)	M6010B ICP	12.1		*	mg/L	0.2	1	12/07/12 12:50	aeb
Chromium (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.002	12/11/12 0:43	pmc
Copper (MWMT)	M6020 ICP-MS	0.0010	B	*	mg/L	0.0005	0.003	12/11/12 0:43	pmc
Iron (MWMT)	M6010B ICP	0.03	B		mg/L	0.02	0.05	12/07/12 12:50	aeb
Lead (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:43	pmc
Magnesium (MWMT)	M6010B ICP	3.6			mg/L	0.2	1	12/07/12 12:50	aeb
Manganese (MWMT)	M6010B ICP		U		mg/L	0.005	0.03	12/07/12 12:50	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 16:00	mfm
Molybdenum (MWMT)	M6020 ICP-MS	0.0095			mg/L	0.0005	0.003	12/11/12 0:43	pmc
Nickel (MWMT)	M6020 ICP-MS		U	*	mg/L	0.0006	0.003	12/11/12 0:43	pmc
Potassium (MWMT)	M6010B ICP	8.5			mg/L	0.3	2	12/07/12 12:50	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0005			mg/L	0.0001	0.0003	12/11/12 0:43	pmc
Silica (MWMT)	M6010B ICP	5.7			mg/L	0.4	2	12/07/12 12:50	aeb
Sodium (MWMT)	M6010B ICP	9.5			mg/L	0.3	2	12/07/12 12:50	aeb
Thallium (MWMT)	M6020 ICP-MS		U		mg/L	0.0001	0.0005	12/11/12 0:43	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0023			mg/L	0.0001	0.0005	12/11/12 0:43	pmc
Vanadium (MWMT)	M6010B ICP		U	*	mg/L	0.005	0.03	12/07/12 12:50	aeb
Zinc (MWMT)	M6010B ICP		U		mg/L	0.01	0.05	12/07/12 12:50	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4996			g			12/06/12 0:00	cdb
Extraction pH		6.96			units			12/06/12 0:00	cdb
Extraction Time		29			hrs			12/06/12 0:00	cdb
Leachate pH		6.8			units			12/06/12 0:00	cdb
Leachate Volume		5042.8			mL			12/06/12 0:00	cdb
Particle Size over 5 cm		41.1			%			12/06/12 0:00	cdb
Retained Moisture		7.9			%			12/06/12 0:00	cdb

** Please refer to Qualifier Reports for details.*

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Copper Projec
Sample ID: RT4 BED 6,7,8 11/16/12

ACZ Sample ID: ***L98007-17***
Date Sampled: *11/16/12 00:00*
Date Received: *11/21/12*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6020 ICP-MS	52.3		*	mg/L	0.1	0.5	12/12/12 1:47	pmc
Antimony (MWMT)	M6020 ICP-MS		U		mg/L	0.0004	0.002	12/11/12 0:52	pmc
Arsenic (MWMT)	M6020 ICP-MS	0.0024			mg/L	0.0002	0.001	12/11/12 0:52	pmc
Barium (MWMT)	M6010B ICP	0.016	B	*	mg/L	0.003	0.02	12/07/12 12:53	aeb
Beryllium (MWMT)	M6020 ICP-MS	0.04926			mg/L	0.00005	0.0003	12/11/12 0:52	pmc
Cadmium (MWMT)	M6020 ICP-MS	0.24			mg/L	0.01	0.05	12/12/12 1:47	pmc
Calcium (MWMT)	M6010B ICP	104		*	mg/L	0.2	1	12/07/12 12:53	aeb
Chromium (MWMT)	M6020 ICP-MS	0.0023			mg/L	0.0005	0.002	12/11/12 0:52	pmc
Copper (MWMT)	M6020 ICP-MS	11.90			mg/L	0.05	0.3	12/12/12 1:47	pmc
Iron (MWMT)	M6010B ICP	0.13			mg/L	0.02	0.05	12/07/12 12:53	aeb
Lead (MWMT)	M6020 ICP-MS	0.0076			mg/L	0.0001	0.0005	12/11/12 0:52	pmc
Magnesium (MWMT)	M6010B ICP	258			mg/L	0.2	1	12/07/12 12:53	aeb
Manganese (MWMT)	M6010B ICP	2.430			mg/L	0.005	0.03	12/07/12 12:53	aeb
Mercury (MWMT)	M7470 CVAA		U	*	mg/L	0.0002	0.001	12/10/12 16:02	mfm
Molybdenum (MWMT)	M6020 ICP-MS		U		mg/L	0.0005	0.003	12/11/12 0:52	pmc
Nickel (MWMT)	M6020 ICP-MS	1.10			mg/L	0.06	0.3	12/12/12 1:47	pmc
Potassium (MWMT)	M6010B ICP	33.2			mg/L	0.3	2	12/07/12 12:53	aeb
Selenium (MWMT)	M6020 ICP-MS	0.0491			mg/L	0.0001	0.0003	12/11/12 0:52	pmc
Silica (MWMT)	M6010B ICP	43.4			mg/L	0.4	2	12/07/12 12:53	aeb
Sodium (MWMT)	M6010B ICP	33.2			mg/L	0.3	2	12/07/12 12:53	aeb
Thallium (MWMT)	M6020 ICP-MS	0.0089			mg/L	0.0001	0.0005	12/11/12 0:52	pmc
Uranium (MWMT)	M6020 ICP-MS	0.0100			mg/L	0.0001	0.0005	12/11/12 0:52	pmc
Vanadium (MWMT)	M6010B ICP	0.010	B	*	mg/L	0.005	0.03	12/07/12 12:53	aeb
Zinc (MWMT)	M6010B ICP	8.07			mg/L	0.01	0.05	12/07/12 12:53	aeb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	NDEP - MWMT Column Method, 1996								
Dry Weight		4970.8			g			12/06/12 0:00	cdb
Extraction pH		6.96			units			12/06/12 0:00	cdb
Extraction Time		28.5			hrs			12/06/12 0:00	cdb
Leachate pH		3.7			units			12/06/12 0:00	cdb
Leachate Volume		4975.3			mL			12/06/12 0:00	cdb
Particle Size over 5 cm		13			%			12/06/12 0:00	cdb
Retained Moisture		20.4			%			12/06/12 0:00	cdb

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

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Aluminum (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.1		.0992	mg/L	99.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.003	0.003			
WG335216PBS	PBS	12/11/12 0:17				.0019	mg/L		-0.003	0.003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.050055	44.8	45.39	mg/L	1178.7	75	125			M3
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.050055	44.8	44.58	mg/L	-439.5	75	125	1.8	20	M3
WG335665													
WG335665ICV	ICV	12/12/12 1:25	MS121001-5	.1		.0994	mg/L	99.4	90	110			
WG335665ICB	ICB	12/12/12 1:28				U	mg/L		-0.003	0.003			
WG335216PBS	PBS	12/12/12 1:39				.0013	mg/L		-0.003	0.003			
L98007-17AS	AS	12/12/12 1:50	MS121130-3	5.0055	52.3	57.81	mg/L	110.1	75	125			
L98007-17ASD	ASD	12/12/12 1:52	MS121130-3	5.0055	52.3	58.61	mg/L	126.1	75	125	1.37	20	M3
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.1		.0981	mg/L	98.1	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.003	0.003			
WG335531PBS	PBS	12/13/12 2:02				.002	mg/L		-0.003	0.003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.050055	.032	.082	mg/L	99.9	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.050055	.032	.0818	mg/L	99.5	75	125	0.24	20	
WG335803													
WG335803ICV	ICV	12/13/12 18:29	MS121001-5	.1		.1012	mg/L	101.2	90	110			
WG335803ICB	ICB	12/13/12 18:31				U	mg/L		-0.003	0.003			
WG335531PBS	PBS	12/13/12 18:38				U	mg/L		-0.003	0.003			
L98007-07AS	AS	12/13/12 18:44	MS121130-3	.10011	1.08	1.1848	mg/L	104.7	75	125			
L98007-07ASD	ASD	12/13/12 18:46	MS121130-3	.10011	1.08	1.2154	mg/L	135.3	75	125	2.55	20	M3
WG336021													
WG336021ICV	ICV	12/18/12 17:44	MS121001-5	.1		.099	mg/L	99	90	110			
WG336021ICB	ICB	12/18/12 17:47				U	mg/L		-0.003	0.003			
WG335672PBS	PBS	12/18/12 18:01				.0027	mg/L		-0.003	0.003			
L98007-04AS	AS	12/18/12 18:14	MS121130-3	.050055	.128	.1803	mg/L	104.5	75	125			
L98007-04ASD	ASD	12/18/12 18:18	MS121130-3	.050055	.128	.1846	mg/L	113.1	75	125	2.36	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L98007***

Antimony (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.02		.02012	mg/L	100.6	90	110			
WG335607ICB	ICB	12/11/12 0:04				.00041	mg/L		-0.0012	0.0012			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0012	0.0012			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.01	U	.01041	mg/L	104.1	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.01	U	.01095	mg/L	109.5	75	125	5.06	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.02		.01976	mg/L	98.8	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0012	0.0012			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0012	0.0012			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.01	U	.01014	mg/L	101.4	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.01	U	.01035	mg/L	103.5	75	125	2.05	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.02		.02025	mg/L	101.3	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0012	0.0012			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0012	0.0012			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.01	U	.0101	mg/L	101	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.01	U	.01049	mg/L	104.9	75	125	3.79	20	

Arsenic (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.0526	mg/L	105.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0006	0.0006			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0006	0.0006			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.0024	.05465	mg/L	104.4	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.0024	.05545	mg/L	106	75	125	1.45	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.05102	mg/L	102	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0006	0.0006			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0006	0.0006			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	.0015	.05487	mg/L	106.6	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	.0015	.05362	mg/L	104.1	75	125	2.3	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.0495	mg/L	99	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0006	0.0006			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0006	0.0006			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	U	.05013	mg/L	100.2	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	U	.05036	mg/L	100.6	75	125	0.46	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Barium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	2		1.976	mg/L	98.8	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.009	0.009			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.009	0.009			
L98007-10AS	AS	12/07/12 12:19	II121129-6	.5	.018	.5088	mg/L	98.2	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	.5	.018	.5122	mg/L	98.8	75	125	0.67	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	2		1.966	mg/L	98.3	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.009	0.009			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.009	0.009			
L98007-03AS	AS	12/13/12 11:51	II121210-2	.5	.007	.4829	mg/L	95.2	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	.5	.007	.4841	mg/L	95.4	75	125	0.25	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	2		1.979	mg/L	99	90	110			
WG335850ICB	ICB	12/14/12 15:47				.0043	mg/L		-0.009	0.009			
WG335672PBS	PBS	12/14/12 16:00				.004	mg/L		-0.009	0.009			
L98007-04AS	AS	12/14/12 16:12	II121210-2	.5	.016	.4945	mg/L	95.7	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	.5	.016	.5034	mg/L	97.5	75	125	1.78	20	

Beryllium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.0471	mg/L	94.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.00015	0.00015			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.00015	0.00015			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.0501	.04926	.08733	mg/L	76	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.0501	.04926	.08693	mg/L	75.2	75	125	0.46	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04596	mg/L	91.9	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.00015	0.00015			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.00015	0.00015			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.0501	U	.05279	mg/L	105.4	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.0501	U	.05252	mg/L	104.8	75	125	0.51	20	
WG336021													
WG336021ICV	ICV	12/18/12 17:44	MS121001-5	.05		.04734	mg/L	94.7	90	110			
WG336021ICB	ICB	12/18/12 17:47				U	mg/L		-0.00015	0.00015			
WG335672PBS	PBS	12/18/12 18:01				U	mg/L		-0.00015	0.00015			
L98007-04AS	AS	12/18/12 18:14	MS121130-3	.0501	.00027	.04983	mg/L	98.9	75	125			
L98007-04ASD	ASD	12/18/12 18:18	MS121130-3	.0501	.00027	.05198	mg/L	103.2	75	125	4.22	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Cadmium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.04958	mg/L	99.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.0501	.22	.2547	mg/L	69.3	75	125			M3
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.0501	.22	.2626	mg/L	85	75	125	3.05	20	
WG335665													
WG335665ICV	ICV	12/12/12 1:25	MS121001-5	.05		.05043	mg/L	100.9	90	110			
WG335665ICB	ICB	12/12/12 1:28				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/12/12 1:39				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/12/12 1:50	MS121130-3	5.01	.24	5.178	mg/L	98.6	75	125			
L98007-17ASD	ASD	12/12/12 1:52	MS121130-3	5.01	.24	5.289	mg/L	100.8	75	125	2.12	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04958	mg/L	99.2	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0003	0.0003			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0003	0.0003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.0501	.0019	.05179	mg/L	99.6	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.0501	.0019	.05158	mg/L	99.2	75	125	0.41	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05043	mg/L	100.9	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0003	0.0003			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0003	0.0003			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.0501	.0016	.04881	mg/L	94.2	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.0501	.0016	.05033	mg/L	97.3	75	125	3.07	20	

Calcium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	100		101	mg/L	101	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.6	0.6			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.6	0.6			
L98007-10AS	AS	12/07/12 12:19	II121129-6	67.97554	27	98.84	mg/L	105.7	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	67.97554	27	99.39	mg/L	106.5	75	125	0.55	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	100		99.06	mg/L	99.1	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.6	0.6			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.6	0.6			
L98007-03AS	AS	12/13/12 11:51	II121210-2	67.97554	5.9	73.25	mg/L	99.1	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	67.97554	5.9	73.13	mg/L	98.9	75	125	0.16	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	100		98.6	mg/L	98.6	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.6	0.6			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.6	0.6			
L98007-04AS	AS	12/14/12 16:12	II121210-2	67.97554	34.8	101.9	mg/L	98.7	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	67.97554	34.8	103.4	mg/L	100.9	75	125	1.46	20	

Chromium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.04977	mg/L	99.5	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0015	0.0015			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0015	0.0015			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.0023	.04687	mg/L	89.1	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.0023	.04711	mg/L	89.5	75	125	0.51	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04873	mg/L	97.5	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0015	0.0015			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0015	0.0015			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	.0005	.04934	mg/L	97.6	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	.0005	.04834	mg/L	95.6	75	125	2.05	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.04968	mg/L	99.4	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0015	0.0015			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0015	0.0015			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	U	.04694	mg/L	93.8	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	U	.04744	mg/L	94.8	75	125	1.06	20	

Copper (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05065	mg/L	101.3	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0015	0.0015			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0015	0.0015			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	11.1	11.04	mg/L	-119.9	75	125			M3
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	11.1	11.04	mg/L	-119.9	75	125	0	20	M3
WG335665													
WG335665ICV	ICV	12/12/12 1:25	MS121001-5	.05		.05002	mg/L	100	90	110			
WG335665ICB	ICB	12/12/12 1:28				U	mg/L		-0.0015	0.0015			
WG335216PBS	PBS	12/12/12 1:39				U	mg/L		-0.0015	0.0015			
L98007-17AS	AS	12/12/12 1:50	MS121130-3	5.005	11.9	16.78	mg/L	97.5	75	125			
L98007-17ASD	ASD	12/12/12 1:52	MS121130-3	5.005	11.9	16.86	mg/L	99.1	75	125	0.48	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04992	mg/L	99.8	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0015	0.0015			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0015	0.0015			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	.0186	.06684	mg/L	96.4	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	.0186	.06554	mg/L	93.8	75	125	1.96	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05113	mg/L	102.3	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0015	0.0015			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0015	0.0015			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	.0117	.05782	mg/L	92.1	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	.0117	.05839	mg/L	93.3	75	125	0.98	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Iron (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	2		2.005	mg/L	100.3	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.06	0.06			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.06	0.06			
L98007-10AS	AS	12/07/12 12:19	II121129-6	1	U	1.01	mg/L	101	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	1	U	1.016	mg/L	101.6	75	125	0.59	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	2		1.986	mg/L	99.3	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.06	0.06			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.06	0.06			
L98007-03AS	AS	12/13/12 11:51	II121210-2	1	U	.983	mg/L	98.3	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	1	U	.98	mg/L	98	75	125	0.31	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	2		1.995	mg/L	99.8	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.06	0.06			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.06	0.06			
L98007-04AS	AS	12/14/12 16:12	II121210-2	1	.03	1.007	mg/L	98.7	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	1	.03	1.023	mg/L	100.3	75	125	1.58	20	

Lead (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05058	mg/L	101.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.0076	.05658	mg/L	97.9	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.0076	.05713	mg/L	99	75	125	0.97	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04988	mg/L	99.8	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0003	0.0003			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0003	0.0003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	U	.04821	mg/L	96.3	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	U	.04796	mg/L	95.8	75	125	0.52	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05335	mg/L	106.7	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0003	0.0003			
WG335672PBS	PBS	12/17/12 17:23				.00018	mg/L		-0.0003	0.0003			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	.0003	.04982	mg/L	98.9	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	.0003	.05027	mg/L	99.8	75	125	0.9	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Magnesium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	100		102.25	mg/L	102.3	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.6	0.6			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.6	0.6			
L98007-10AS	AS	12/07/12 12:19	II121129-6	50.00131	6.2	58.1	mg/L	103.8	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	50.00131	6.2	58.69	mg/L	105	75	125	1.01	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	100		101.2	mg/L	101.2	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.6	0.6			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.6	0.6			
L98007-03AS	AS	12/13/12 11:51	II121210-2	50.00131	1.2	50.76	mg/L	99.1	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	50.00131	1.2	50.42	mg/L	98.4	75	125	0.67	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	100		100.2	mg/L	100.2	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.6	0.6			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.6	0.6			
L98007-04AS	AS	12/14/12 16:12	II121210-2	50.00131	19.5	69.27	mg/L	99.5	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	50.00131	19.5	70.2	mg/L	101.4	75	125	1.33	20	

Manganese (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	2		1.9403	mg/L	97	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.015	0.015			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.015	0.015			
L98007-10AS	AS	12/07/12 12:19	II121129-6	.5	U	.4979	mg/L	99.6	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	.5	U	.5025	mg/L	100.5	75	125	0.92	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	2		1.922	mg/L	96.1	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.015	0.015			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.015	0.015			
L98007-03AS	AS	12/13/12 11:51	II121210-2	.5	U	.4786	mg/L	95.7	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	.5	U	.4802	mg/L	96	75	125	0.33	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	2		1.933	mg/L	96.7	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.015	0.015			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.015	0.015			
L98007-04AS	AS	12/14/12 16:12	II121210-2	.5	.022	.5015	mg/L	95.9	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	.5	.022	.512	mg/L	98	75	125	2.07	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Mercury (MWMT) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335461													
WG335461PBW	PBW	12/10/12 15:32				U	mg/L		-0.00044	0.00044			
WG335461LCSW	LCSW	12/10/12 15:34	II121127-2	.005025		.00468	mg/L	93.1	85	115			
WG335216PBS	PBS	12/10/12 15:36				U	mg/Kg		-0.0006	0.0006			
L98007-12MS	MS	12/10/12 15:45	II121119-3	.002002	U	.00189	mg/L	94.4	85	115			
L98007-12MSD	MSD	12/10/12 15:47	II121119-3	.002002	U	.00181	mg/L	90.4	85	115	4.32	20	
WG335683													
WG335683ICV	ICV	12/13/12 10:30	II121207-2	.005025		.00502	mg/L	99.9	95	105			
WG335683ICB	ICB	12/13/12 10:32				U	mg/L		-0.0002	0.0002			
WG335737													
WG335737PBW	PBW	12/13/12 13:09				U	mg/L		-0.00044	0.00044			
WG335737LCSW	LCSW	12/13/12 13:12	II121207-2	.005025		.00456	mg/L	90.7	85	115			
WG335531PBS	PBS	12/13/12 13:14				U	mg/Kg		-0.0006	0.0006			
L98007-03MS	MS	12/13/12 13:21	II121119-3	.002002	U	.00176	mg/L	87.9	85	115			
L98007-03MSD	MSD	12/13/12 13:24	II121119-3	.002002	U	.00173	mg/L	86.4	85	115	1.72	20	
WG335741													
WG335741ICV	ICV	12/14/12 11:12	II121207-2	.005025		.00496	mg/L	98.7	95	105			
WG335741ICB	ICB	12/14/12 11:15				U	mg/L		-0.0002	0.0002			
WG335839													
WG335839PBW	PBW	12/14/12 14:45				U	mg/L		-0.00044	0.00044			
WG335839LCSW	LCSW	12/14/12 14:48	II121207-2	.005025		.00441	mg/L	87.8	85	115			
WG335672PBS	PBS	12/14/12 14:50				U	mg/Kg		-0.0006	0.0006			
L98007-04MS	MS	12/14/12 14:57	II121214-6	.002002	U	.00168	mg/L	83.9	85	115			MA
L98007-04MSD	MSD	12/14/12 14:59	II121214-6	.002002	U	.00177	mg/L	88.4	85	115	5.22	20	

Molybdenum (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.02004		.01969	mg/L	98.3	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0015	0.0015			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0015	0.0015			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05	U	.0498	mg/L	99.6	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05	U	.05032	mg/L	100.6	75	125	1.04	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.02004		.01949	mg/L	97.3	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0015	0.0015			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0015	0.0015			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05	.0081	.05785	mg/L	99.5	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05	.0081	.05684	mg/L	97.5	75	125	1.76	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.02004		.02073	mg/L	103.4	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0015	0.0015			
WG335672PBS	PBS	12/17/12 17:23				.00063	mg/L		-0.0015	0.0015			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05	U	.04678	mg/L	93.6	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05	U	.04786	mg/L	95.7	75	125	2.28	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L98007***

Nickel (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05012	mg/L	100.2	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0018	0.0018			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0018	0.0018			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.9848	1.012	mg/L	54.3	75	125			M3
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.9848	1.009	mg/L	48.4	75	125	0.3	20	M3
WG335665													
WG335665ICV	ICV	12/12/12 1:25	MS121001-5	.05		.04909	mg/L	98.2	90	110			
WG335665ICB	ICB	12/12/12 1:28				U	mg/L		-0.0018	0.0018			
WG335216PBS	PBS	12/12/12 1:39				U	mg/L		-0.0018	0.0018			
L98007-17AS	AS	12/12/12 1:50	MS121130-3	5.005	1.1	5.822	mg/L	94.3	75	125			
L98007-17ASD	ASD	12/12/12 1:52	MS121130-3	5.005	1.1	5.824	mg/L	94.4	75	125	0.03	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.04916	mg/L	98.3	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0018	0.0018			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0018	0.0018			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	.0006	.04746	mg/L	93.6	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	.0006	.04655	mg/L	91.8	75	125	1.94	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05153	mg/L	103.1	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0018	0.0018			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0018	0.0018			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	.0101	.05553	mg/L	90.8	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	.0101	.05612	mg/L	91.9	75	125	1.06	20	

Potassium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	20		20.09	mg/L	100.5	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.9	0.9			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.9	0.9			
L98007-10AS	AS	12/07/12 12:19	II121129-6	99.90868	13.3	112.39	mg/L	99.2	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	99.90868	13.3	112.66	mg/L	99.5	75	125	0.24	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	20		19.87	mg/L	99.4	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.9	0.9			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.9	0.9			
L98007-03AS	AS	12/13/12 11:51	II121210-2	99.90868	1.8	99.83	mg/L	98.1	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	99.90868	1.8	99.19	mg/L	97.5	75	125	0.64	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	20		19.76	mg/L	98.8	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.9	0.9			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.9	0.9			
L98007-04AS	AS	12/14/12 16:12	II121210-2	99.90868	6	103.8	mg/L	97.9	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	99.90868	6	105.7	mg/L	99.8	75	125	1.81	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Selenium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05085	mg/L	101.7	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.0491	.09784	mg/L	97.4	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.0491	.09627	mg/L	94.2	75	125	1.62	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.05032	mg/L	100.6	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0003	0.0003			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0003	0.0003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	.0012	.05362	mg/L	104.7	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	.0012	.055	mg/L	107.5	75	125	2.54	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05085	mg/L	101.7	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0003	0.0003			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0003	0.0003			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	.0111	.0647	mg/L	107.1	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	.0111	.06578	mg/L	109.3	75	125	1.66	20	

Silica (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	42.8		41.88	mg/L	97.9	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-1.2	1.2			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-1.2	1.2			
L98007-10AS	AS	12/07/12 12:19	II121129-6	21.428	4.6	25.99	mg/L	99.8	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	21.428	4.6	26.13	mg/L	100.5	75	125	0.54	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	42.8		42.89	mg/L	100.2	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-1.2	1.2			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-1.2	1.2			
L98007-03AS	AS	12/13/12 11:51	II121210-2	21.428	4.8	26.69	mg/L	102.2	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	21.428	4.8	26.64	mg/L	101.9	75	125	0.19	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	42.8		43.27	mg/L	101.1	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-1.2	1.2			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-1.2	1.2			
L98007-04AS	AS	12/14/12 16:12	II121210-2	21.428	24.6	46.42	mg/L	101.8	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	21.428	24.6	47.23	mg/L	105.6	75	125	1.73	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

Sodium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	100		100.2	mg/L	100.2	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.9	0.9			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.9	0.9			
L98007-10AS	AS	12/07/12 12:19	II121129-6	100.0416	7.1	105.68	mg/L	98.5	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	100.0416	7.1	106.18	mg/L	99	75	125	0.47	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	100		99.9	mg/L	99.9	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.9	0.9			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.9	0.9			
L98007-03AS	AS	12/13/12 11:51	II121210-2	100.0416	2.8	101.3	mg/L	98.5	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	100.0416	2.8	100.6	mg/L	97.8	75	125	0.69	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	100		99.25	mg/L	99.3	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.9	0.9			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.9	0.9			
L98007-04AS	AS	12/14/12 16:12	II121210-2	100.0416	29	126.5	mg/L	97.5	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	100.0416	29	128.7	mg/L	99.7	75	125	1.72	20	

Thallium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05199	mg/L	104	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05005	.0089	.05947	mg/L	101	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05005	.0089	.0602	mg/L	102.5	75	125	1.22	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.05208	mg/L	104.2	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0003	0.0003			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0003	0.0003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05005	U	.0504	mg/L	100.7	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05005	U	.05023	mg/L	100.4	75	125	0.34	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05389	mg/L	107.8	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0003	0.0003			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0003	0.0003			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05005	.0004	.05036	mg/L	99.8	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05005	.0004	.05009	mg/L	99.3	75	125	0.54	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L98007***

Uranium (MWMT) M6020 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335607													
WG335607ICV	ICV	12/11/12 0:01	MS121001-5	.05		.05239	mg/L	104.8	90	110			
WG335607ICB	ICB	12/11/12 0:04				U	mg/L		-0.0003	0.0003			
WG335216PBS	PBS	12/11/12 0:17				U	mg/L		-0.0003	0.0003			
L98007-17AS	AS	12/11/12 0:55	MS121130-3	.05	.01	.06395	mg/L	107.9	75	125			
L98007-17ASD	ASD	12/11/12 0:59	MS121130-3	.05	.01	.06373	mg/L	107.5	75	125	0.34	20	
WG335732													
WG335732ICV	ICV	12/13/12 1:46	MS121001-5	.05		.05071	mg/L	101.4	90	110			
WG335732ICB	ICB	12/13/12 1:49				U	mg/L		-0.0003	0.0003			
WG335531PBS	PBS	12/13/12 2:02				U	mg/L		-0.0003	0.0003			
L98007-09AS	AS	12/13/12 2:37	MS121130-3	.05	.0011	.05075	mg/L	99.3	75	125			
L98007-09ASD	ASD	12/13/12 2:40	MS121130-3	.05	.0011	.0504	mg/L	98.6	75	125	0.69	20	
WG335764													
WG335764ICV	ICV	12/17/12 17:06	MS121001-5	.05		.05289	mg/L	105.8	90	110			
WG335764ICB	ICB	12/17/12 17:09				U	mg/L		-0.0003	0.0003			
WG335672PBS	PBS	12/17/12 17:23				U	mg/L		-0.0003	0.0003			
L98007-04AS	AS	12/17/12 17:36	MS121130-3	.05	.0003	.05189	mg/L	103.2	75	125			
L98007-04ASD	ASD	12/17/12 17:40	MS121130-3	.05	.0003	.05194	mg/L	103.3	75	125	0.1	20	

Vanadium (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	2		2.0903	mg/L	104.5	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.015	0.015			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.015	0.015			
L98007-10AS	AS	12/07/12 12:19	II121129-6	.5	U	.5193	mg/L	103.9	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	.5	U	.5234	mg/L	104.7	75	125	0.79	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	2		1.981	mg/L	99.1	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.015	0.015			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.015	0.015			
L98007-03AS	AS	12/13/12 11:51	II121210-2	.5	U	.4924	mg/L	98.5	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	.5	U	.4895	mg/L	97.9	75	125	0.59	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	2		1.975	mg/L	98.8	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.015	0.015			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.015	0.015			
L98007-04AS	AS	12/14/12 16:12	II121210-2	.5	U	.4929	mg/L	98.6	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	.5	U	.5063	mg/L	101.3	75	125	2.68	20	

Lisbon Valley Mining Company, LLC

ACZ Project ID: ***L98007***

Zinc (MWMT) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG335471													
WG335471ICV	ICV	12/07/12 11:57	II121126-1	2		1.942	mg/L	97.1	90	110			
WG335471ICB	ICB	12/07/12 12:01				U	mg/L		-0.03	0.03			
WG335216PBS	PBS	12/07/12 12:13				U	mg/L		-0.03	0.03			
L98007-10AS	AS	12/07/12 12:19	II121129-6	.5	U	.518	mg/L	103.6	75	125			
L98007-10ASD	ASD	12/07/12 12:22	II121129-6	.5	U	.508	mg/L	101.6	75	125	1.95	20	
WG335751													
WG335751ICV	ICV	12/13/12 11:26	II121126-1	2		1.961	mg/L	98.1	90	110			
WG335751ICB	ICB	12/13/12 11:29				U	mg/L		-0.03	0.03			
WG335531PBS	PBS	12/13/12 11:42				U	mg/L		-0.03	0.03			
L98007-03AS	AS	12/13/12 11:51	II121210-2	.5	U	.493	mg/L	98.6	75	125			
L98007-03ASD	ASD	12/13/12 11:54	II121210-2	.5	U	.485	mg/L	97	75	125	1.64	20	
WG335850													
WG335850ICV	ICV	12/14/12 15:44	II121126-1	2		1.917	mg/L	95.9	90	110			
WG335850ICB	ICB	12/14/12 15:47				U	mg/L		-0.03	0.03			
WG335672PBS	PBS	12/14/12 16:00				U	mg/L		-0.03	0.03			
L98007-04AS	AS	12/14/12 16:12	II121210-2	.5	.09	.571	mg/L	98.2	75	125			
L98007-04ASD	ASD	12/14/12 16:15	II121210-2	.5	.09	.581	mg/L	100.2	75	125	1.74	20	

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-01	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-02	WG335764	Arsenic (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335850	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Iron (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335839	Mercury (MWMT)	M7470 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335764	Selenium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG335672	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
L98007-03	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-04	WG335764	Arsenic (MWMT)	M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335850	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Iron (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335839	Mercury (MWMT)	M7470 CVAA	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
			M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335764	Selenium (MWMT)	M6020 ICP-MS	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.
	WG335672	Dry Weight	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Extraction Time	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate pH	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Leachate Volume	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Particle Size over 5 cm	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
		Retained Moisture	NDEP - MWMT Column Method, 1996	N1	See Case Narrative.
L98007-05	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.

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

Inorganic Extended Qualifier Report

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-06	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-07	WG335803	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-08	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-09	WG335737	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
L98007-10	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-11	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L98007-12	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-13	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L98007-14	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-15	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
L98007-16	WG335607	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Cadmium (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335607	Copper (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335607	Nickel (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

Lisbon Valley Mining Company, LLC ACZ Project ID: ***L98007***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L98007-17	WG335665	Aluminum (MWMT)	M6020 ICP-MS	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
			M6020 ICP-MS	ZB	The ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 100 times the MDL.
	WG335471	Barium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Calcium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG335461	Mercury (MWMT)	M7470 CVAA	Q6	Sample was received above recommended temperature.
	WG335471	Vanadium (MWMT)	M6010B ICP	ZG	The ICP Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.

No certification qualifiers associated with this analysis

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

Sample Receipt

Lisbon Valley Mining Company, LLC
Lisbon Valley Copper Project

ACZ Project ID: L98007
Date Received: 11/21/2012 15:35
Received By: ksj
Date Printed: 11/27/2012

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	

The sample matrix was entered per the requested quotation.

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?
NA16625	18.7	15	N/A

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

L98007

Lisbon Valley Mining Co.
P.O. Box 248
930 S. County Rd. 313
La Sal, Utah 84530
Phone: (435) 686-2350

Chain of Custody Record

Send report with laboratory QA to:
930 S County Rd 313
La Sal, Utah 84530

Lisbon Valley Copper Project

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO
(970) 879-6590

SAMPLE LABEL	DATE	TIME	ANALYSES: MWMP	Number of Containers	Remarks / Comments
Bed 5 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 6 & 8 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 13 11/6/12	11/16/2012		x	1	Sentinel Pit 2012
Bed 7 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 15 11/6/12	11/16/2012		x	1	Sentinel Pit 2012
Bed 14 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 17 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 12 11/6/12	11/16/2012		x	1	GTO Pit 2012
Bed 13 11/6/12	11/16/2012		x	1	GTO Pit 2012
Bed 15 10/29/12	11/16/2012		x	1	Centennial Pit 2012
Bed 16 Backfill 11/16/12	11/16/2012		x	1	GTO Pit 2012
Bed 13 Backfill 11/16/12	11/16/2012		x	1	GTO Pit 2012
Bed 14 Backfill 11/16/12	11/16/2012		x	1	GTO Pit 2012
RT3 Bed 5 11/16/12	11/16/2012		x	1	Centennial Pit 2012
RT8 Bed 17 11/16/12	11/16/2012		x	1	Centennial Pit 2012
RT7 Bed 14, 15 11/16/12	11/16/2012		x	1	Centennial Pit 2012
RT4 Bed 8, 7, 8 11/16/12	11/16/2012		x	1	Centennial Pit 2012

Sampled By: Ken Ezpeleta

Total Number of Containers: #17

Sampler's Signature:

Contact Person: Lindergard@lisbonmine.com
Lantz M Indergard & Ken Ezpeleta kezpeleta@lisbonmine.com
Phone: (435) 686-2350 ext. 1107 Fax: (435) 686-2223

Relinquished By: Ken Ezpeleta — Date / Time: 11/16/2012 12:26 PM

Received By: — Date / Time:

Method of Shipment: Old Dominion

Comments: Please reduce detection limits to meet ground water standards(see attached). Use Neutral Extraction PH. Use a standardized particle size. See Quote #: MWMP-Extended-2012

L98007 Chain of Custody

ARCADIS

Appendix A-4

Meteoric Water Mobility Procedure and Solid Phase Element Analysis Laboratory Reports

(Adrian Brown Consultants 1997)

9129A.911203

AdrianBrown
Groundwater Hydrology•Geochemistry•Remediation

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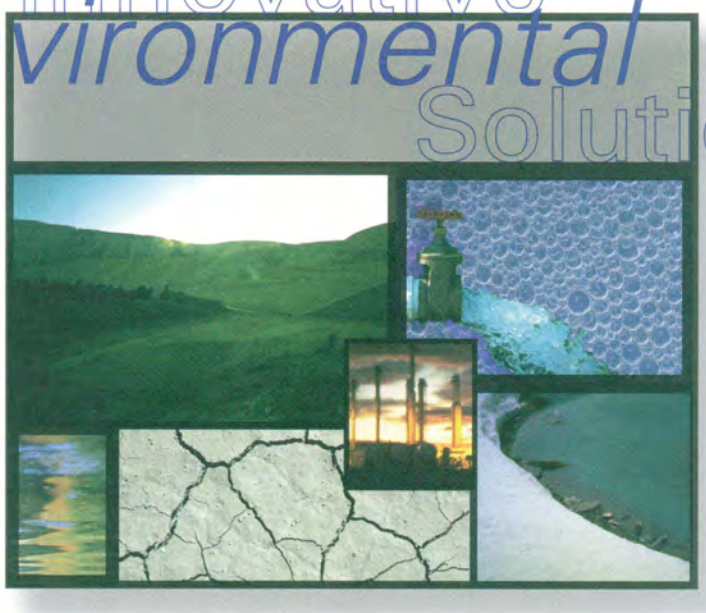
"Innovative Environmental Solutions"

Innovative Environmental Solutions



Meteoric Water Mobility Test
Methods and Results
Lisbon Valley Copper Project

Summo USA Corporation
P.O. Box 547
Moab, UT 84532

AdrianBrown
Groundwater Hydrology•Geochemistry•Remediation

Meteoric Water Mobility Test
Methods and Results
Lisbon Valley Copper Project

Prepared for:

Summo USA Corporation
P.O. Box 547
Moab, Utah 84532

December 3, 1997

Project No. 1424A

AdrianBrown

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1. Introduction

The meteoric water mobility procedure test (MWMT) was designed by the Bureau of Mining Regulation and Reclamation, Nevada Division of Environmental Protection, as a means for obtaining extracts from mine rock samples. The extracts may be used to evaluate the final pH and release of certain constituents of mine rocks exposed to meteoric events.

Reverse circulation drill cuttings from the Lisbon Valley mine site were subjected to the MWMT test, and analyzed for the list of parameters selected by BLM geochemist William White. The procedure was modified to account for a number of variations as required by the site conditions (i.e. adjustment of the extractant pH and sample size). Any modifications to the procedure are placed in italics. These modifications were made following discussion with and approval of the BLM (represented by William White who consulted with various industry experts and representatives). Solid phase analyses were also performed on all samples, for the list of parameters selected by BLM geochemist William White.

1.1 MWMT Guidelines

METEORIC WATER MOBILITY PROCEDURE

(MWMT)

Standardized Column Percolation Test Procedure

I. Scope

The purpose of the Meteoric Water Mobility Procedure Test (MWMT) is to evaluate the potential for dissolution and mobility of certain constituents from a mine rock sample by meteoric water. The procedure consists of a single-pass column leach over a 24 hour period using a mine rock sample to extraction fluid (effluent) ratio of 1:1. *The extraction fluids used were adjusted to pH 7, 8 or 9 to reflect groundwater conditions. The pH 9 solution was first adjusted using sodium bicarbonate to a bicarbonate concentration of 300 mg/L, and then brought to a pH of 9 using sodium hydroxide, whereas the pH 7 or 8 solutions were adjusted with sodium bicarbonate only.*

II. Reference Documents

A. Meteoric Water Mobility Procedure, Bureau of Mining Regulation and Reclamation, Nevada Division of Environmental Protection, 9/19/90.

B. Standard Methods for the Examination of Water and Wastewater, 18th edition, APHA/AWWA/WEF, 1992, Method 1080.

III. Significance and Use

A. This procedure is intended as a means for obtaining extracts from mine rock samples. The extracts may be used to evaluate the final pH and release of certain constituents of mine rocks exposed to meteoric events.

B. The pH of the extraction fluid used in this procedure is to reflect the pH of the groundwater in the site area.

C. This procedure is designed to mobilize potential contaminants present in the solids, so that the resulting extract can be used to assess leachate which could potentially be produced from mine rock in the field.

D. This procedure produces extracts that are amenable to the determination of both major and minor (trace) constituents. When minor constituents are being determined, it is especially important that precautions be taken in sample storage and handling to avoid possible contamination of the samples.

This procedure may not be suitable for obtaining extracts from finely divided solids (such as clayey soils, sludges, mill tailings, etc.). An alternate extraction procedure may then be advised. *However, the procedure was amended to accommodate the finely divided materials.*

I. Apparatus

A. Extraction Device, PVC column of 15 cm (6") O.D. of sufficient height to contain a minimum of 5 kg of minus 5 cm (2") mine rock sample and sufficient additional height to contain applied extraction fluid should blinding (ponding) occur. (Approximately 8 kg of minus 5 cm solids per 30.5 cm of column height). For a 5 kg mine rock sample, a 15 cm O.D. x 45 cm high column is recommended. Additional column height will be required for mine rock sample quantities greater than 5 kg. The bottom of the column must be sealed (bubble cap) and a solution discharge outlet situated above the sealed bottom of the column and below the "punch plate".

B. Glass Wool (inert) - glass wool is placed onto the "punch plate" before loading the mine rock charge into the column to minimize fines migration and onto the top of the mine rock charge after column loading to aid even extraction fluid distribution.

C. Metering pump or constant head device to insure constant rate extraction fluid application

D. Extraction fluid (influent) and effluent containers sufficient in size to contain liquid used during extraction. Containers must be covered to avoid possible contamination from sources outside the test apparatus.

E. Laboratory balance capable of weighing to 1.0 g.

F. Drying pans or dishes for moisture content determinations.

G. pH meter with a readability of 0.01 units and an accuracy of ±0.05 units at 25°C.

H. Filtration assembly device of a composition suitable to the nature of the analyses to be performed and equipped with a 0.45µm pore size filter. An assembly for prefiltration or centrifugation may be required if 0.45µm filtration is difficult.

I. Tubing - surgical or Tygon tubing sufficient in diameter and length for the extraction device assembly (pump, column effluent outlet).

II. Reagents

A. Water, Type II reagent grade - Water purified by distillation, ion exchange, reverse osmosis, electrodialysis, or a combination thereof, *adjusted to pH 7, 8 or 9.*

III. Sampling (Field)

A. Field sampling should be accomplished to insure a representative mine rock sample is obtained.

B. The minimum quantity of mine rock sample required for the MWMT is 5 kg (*This quantity was adjusted to 2 kg to allow for more efficient filtration, since the "rock samples" were actually finely divided reverse circulation drill cuttings).* At least 7 kg of mine rock sample should be submitted to the laboratory for feed moisture content determination, MWMT, and other potential analyses requested by the submitting company. Mine rock samples of up to 25 kg are appropriate for submittal.

C. It is important that the mine rock sample be representative with respect to surface area, as variations in surface area may directly affect the leaching characteristics of the sample. Mine rock samples should contain a representative distribution of particle sizes. *Samples of reverse-circulation drill cuttings, rather than much coarser waste rock, were used in this study.*

D. Keep samples in closed containers (bags, buckets) appropriate to sample type and analysis for transport to the laboratory.

IV. Sample Preparation (Laboratory)

A. Remove mine rock sample from the container and blend by coning or rolling and obtain sample for feed moisture content (~1 kg). *Samples were completely dry when received, therefore, moisture content was not determined.*

B. Screen remainder (5 kg or more) on a 5 cm (2") screen. Save minus 5 cm material for subsequent recombination with crushed plus 5 cm material. *Samples were comprised of either finely divided reverse circulation drill cuttings or alluvial material and did not require screening.*

C. After screening, weigh plus and minus 5 cm screened materials and calculate plus and minus 5 cm weight distributions.

Ex: wt of +5 cm : total wt x 100 = % plus 5 cm.

D. Crush (may hand break) plus 5 cm material to just pass a 5 cm (2") screen and recombine with the screened minus 5 cm material.

E. *Thoroughly blend an equivalent amount of the minus 5 cm mine rock samples from each depth interval, and weigh out three 2-kg samples for testing at pH 7, 8 and 9.*

Load the *2-kg* mine rock sample into the extraction device (column). To minimize particle segregation and compaction during column loading, the sample shall be dropped from no more than 24 inches when introduced from the top of the column, and no tamping, shaking, or other methods to compact the sample will be employed.

I. Extraction Procedure

A. Adjust the extraction fluid application rate such that the number of milliliters of water applied to the column in a 24 hour period will be equal to the number of dry grams of mine rock sample in the column.

Ex: 2000 g x 1mL/1g x 1 hr/60 min x 1/24 hr = 1.38 mL/min

The extraction fluid can be metered via variable speed delivery devices such as peristaltic pumps or diaphragm pumps. A constant hydraulic head device can be used wherein a single speed pump delivers the extraction fluid to and elevated vessel which is equipped with an overflow back to the extraction fluid reservoir. The constant head vessel is tapped at the bottom to supply extraction fluid to the extraction column. A variable pinch clamp or screw clamp can be used to control the rate of extraction fluid application to the column.

B. Measure and record the initial pH of the extraction fluid.

C. Begin metering the extraction fluid onto the top of the mine rock contained in the column at the predetermined rate.

D. When a volume equal to the mass of dry solids in the column has been delivered through the column (assume 1 mL/g), cease application of the extraction fluid. Note: The mine rock charge will retain water so extraction fluid application must continue until the target effluent volume (1:1 solids to effluent ratio) has been collected. This will require application time beyond 24 hours, but not to exceed 48 hours. *Due to the nature of the finely divided material, it was difficult to predict when the 1:1 solids to effluent volume would be complete. Thus, effluent volumes were commonly higher than the 1:1 ratio. Conversely, some materials passed less water than the 1:1 ratio, even after 48 hours. However, of the 93 samples tested on rock materials, 86% performed as expected, and 86% of those drained within ± 30% of the required liquid.*

E. Thoroughly mix the effluent immediately. Then procure sufficient quantity for the required analyses (*pH, conductivity, TDS, alkalinity and dissolved As, Sb, Cd, Cu, Mo, Se, U and Zn*).

F. Measure and record the pH of the extract.

G. Filter the sample through a 0.45µm inert membrane to obtain extract for dissolved constituent analyses.

H. Preserve the extract sample appropriately for the required analyses.

I. Allow the mine rock solids, after extraction, to drain until the surface of the sample no longer "glistens" and at least two minutes elapse between drops of effluent from the column. *Due to the nature of the finely divided material, water would commonly pool atop the material and would require many days to drain completely. Thus, water was poured off of the top of the column after at least two minutes elapsed between drops of effluent from the column.*

J. Remove the mine rock residue (solids) from the column and take a representative portion for residual moisture determination. Residual moisture can be determined by placing a representative portion of the moist mine rock residue (following step 8.9) into a preweighed beaker or similar vessel. The sample is then placed in an oven controlled at 105.2°C overnight, or until the difference between weighings at 30 minute heating intervals is less than 0.1%. The difference between wet and dry weights divided by the wet weight and multiplied by 100 yields the percent residual moisture. (wet wt - dry wt) 100 = % RM. *A representative portion of material from each column was sealed in a plastic bag and stored for future residual moisture determination, if required.*

K. Blend and split the moist mine rock residue to obtain samples for additional analysis if necessary.

If it is evident at Step 8.3 that the particle size of the sample (finely divided solids such as clayey soils, sludges, mill tailings, etc.) is not allowing reasonable percolation of the extraction fluid to occur, aborting the extraction procedure and submitting the sample to an alternate extraction procedure may be advised.

2. Approach

Samples were tested from eleven different boreholes drilled using a reverse circulation air rotary rig. The sample locations are shown in Figure 1. Testing was performed according to the MWMT procedure established by the Bureau of Mining Regulation and Reclamation, Nevada Division of Environmental Protection. The four rock types which were tested from the boreholes are:

- Rock type 1 (RT-1): Qal
- Rock type 2 (RT-2): Mancos Shale
- Rock type 6 (RT-6): Bed 11/12/13

- Rock type 7 (RT-7): Bed 14

Additional alluvial (RT-1) material was tested from two bulk samples, CP-1 and SP-1, collected near the Centennial and Sentinel pits, respectively. The bulk samples were collected to make up for a lack of alluvial material at drill sites 97R2 (Centennial Pit area) and 97R6 (Sentinel Pit area).

Each material was tested using an extractant pH of 7, 8 and 9 for a total of three tests per material. The pH of the extractant was adjusted to 7 or 8 using sodium bicarbonate ($NaHCO_3$). However, for adjustment of the extractant to pH 9, sodium bicarbonate was added until a bicarbonate concentration of 300 mg/L was achieved. Final adjustment of the extractant to pH 9 was attained using sodium hydroxide (NaOH). A total of 94 MWMT tests on these materials have been performed including 4 duplicates and one blank on the glass wool material used in the columns.

In addition to the MWMT testing, solid phase analyses were performed on each material using EPA Method 3052. This method involves a rigorous digestion in order to completely solubilize the material.

3. Results

The attached data sheets list the analytical results and laboratory measured parameters from the MWMT tests, as well as the bulk chemistry (solid phase) of each of the solids tested. Negative signs indicate results which were below detection limits and outlining boxes indicate results which were less than the practical quantitation limit (PQL), or a qualitative result. Samples are labeled as such:

Example: 97R9/RT-1;8

where 97R9 corresponds to drill hole 97R9, RT-1 corresponds to rock type 1 (Qal), and 8 is the pH of the starting solution. CP-1 and SP-1 correspond to bulk samples from the Centennial and Sentinel pits, respectively.

3.1 Drainage Characteristics

The drainage characteristics of materials evaluated presented the principal departures from the recommended test procedure performed. Initial tests on 5 kg solid charges drained poorly due to the finely divided state of the solid. Inadequate drainage character was for the most part overcome by using a 2 kg solid charge rather than the prescribed 5 kg charge. Duplicates of tests using 2 kg charges produced leachates with consistent compositions. Overall, the relative percent difference between duplicate results was 10 %, which is considered excellent.

Table 1 below lists the tests performed and any deviations that occurred from the MWMT procedure. Of the 93 samples tested on rock materials, 86% performed as expected, and 86% of those drained within ± 30% of the required liquid. The rock types that did not drain or drain well are:

- RT-2 (Mancos Shale) - Borehole 97R8 solids did not drain at any pH. Borehole 97R9 solids did not drain at pH 8 and 9 and therefore, was not tested at pH 7. Borehole 97R10 solids drained slowly and 3 of 4 tests drained < 70 % of the required liquid.

- RT-6 (Bed 11/12/13) - Borehole 97R 8 solids did not drain at any pH. Borehole 97R9 solids did not drain at pH 7 and 8.
- RT-7 (Bed 14) - Borehole 97R8 solids did not drain for pH 8 and drained < 70 % of the required liquid at pH 7. Borehole 97R9 solids did not drain at pH 7 and 8.

3.2 Chemical Characteristics

The collected solutions from each test were analyzed for: As, Sb, Cd, Cu, Mo, Se, U, Zn (metals were determined as dissolved), alkalinity, total dissolved solids (TDS), conductivity and pH. The analytical results are listed in the attached data sheets.

Table 1. List of tests performed.

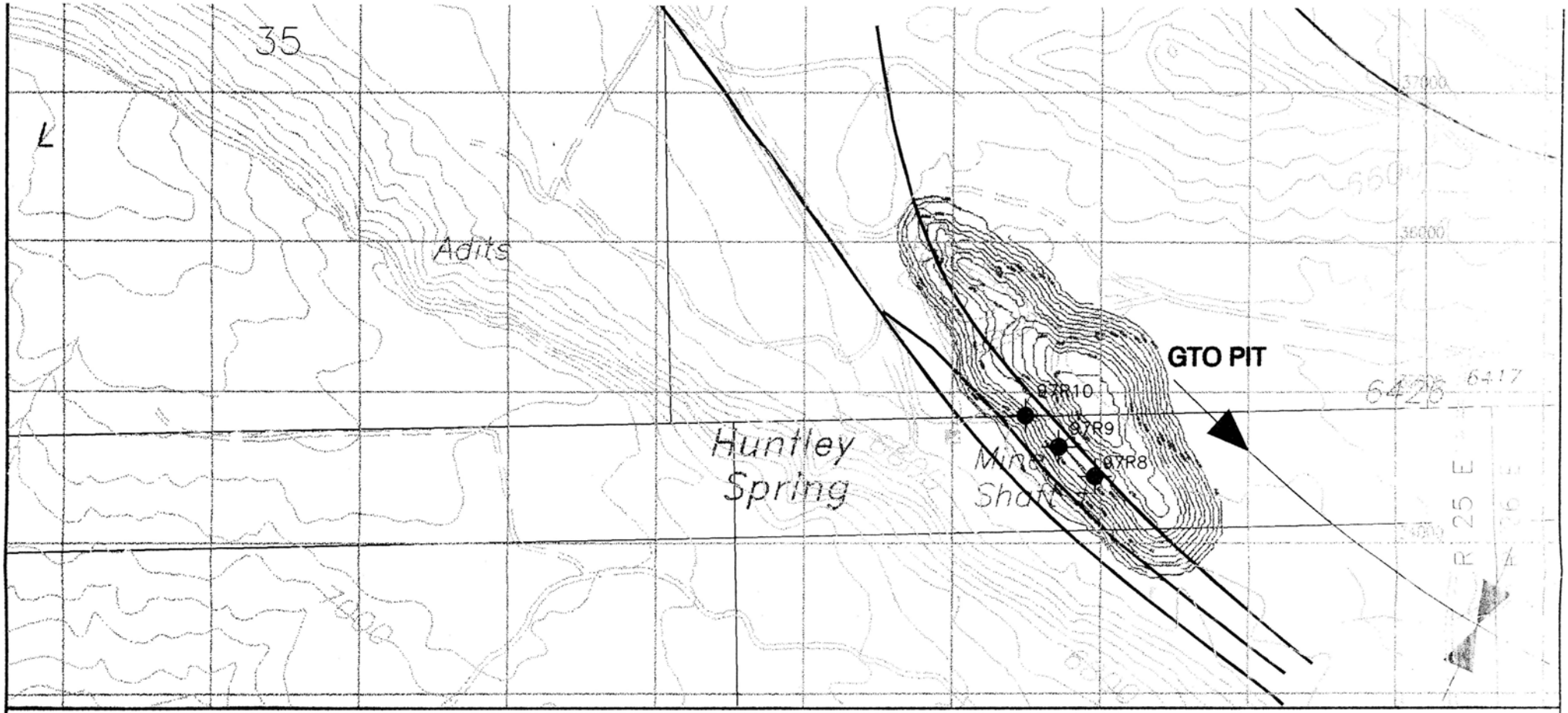
Rock Type	ID #	pH 7	pH 8	pH 9
Qal	97R1/RT-1	X	X	X
	97R3/RT-1	X	O	X
	97R5/RT-1	X	X	X
	97R7/RT-1	X	X	X
	97R8/RT-1	X	X	X
	97R9/RT-1	X	X	X
	97R10/RT-1*	XX	X	O
	CP-1/RT-1	X	X	X
	SP-1/RT-1	X	X	X
Mancos Shale	97R8/RT-2	ND	ND	ND
	97R9/RT-2	-	ND	ND
	97R10/RT-2*	XO	O	O
Bed 11/12/13	97R1/RT-6	X	X	O
	97R2/RT-6	X	O	X
	97R3/RT-6	X	X	X
	97R4/RT-6*	XX	X	X
	97R8/RT-6	ND	ND	ND
	97R9/RT-6	ND	ND	X
	97R10/RT-6	X	X	X
	97R13/RT-6	X	X	X
Bed 14	97R1/RT-7	X	X	O
	97R2/RT-7	X	X	X
	97R3/RT-7	X	X	X
	97R4/RT-7	X	X	O
	97R6/RT-7	X	X	X
	97R7/RT-7*	XX	X	X
	97R8/RT-7	O	ND	X
	97R9/RT-7	ND	ND	X
	97R10/RT-7	X	X	X
	97R13/RT-7	X	X	X

* Duplicates of this material were performed.

ND = Material did not drain during MWMT test.

X = Test was performed as expected.

O = Solution collected was ± 30% of the required weight.



LEGEND

97R1 — REVERSE CIRCULATION DRILL SAMPLE

CP–1 — BULK SAMPLE

FOLD AXIS

FAULT

N

CONTOUR INTERVAL: 50'

FIGURE NUMBER: 1

LISBON VALLEY UTAH

DESIGNED	SW	DATE:	10/17/97
DRAWN	VS	DATE:	10/17/97
CHECKED		DATE:	

FILE: (VS) D:\1424A\10-97\FIG-MWMT.DWG; 10/17/97

1000 0 1000

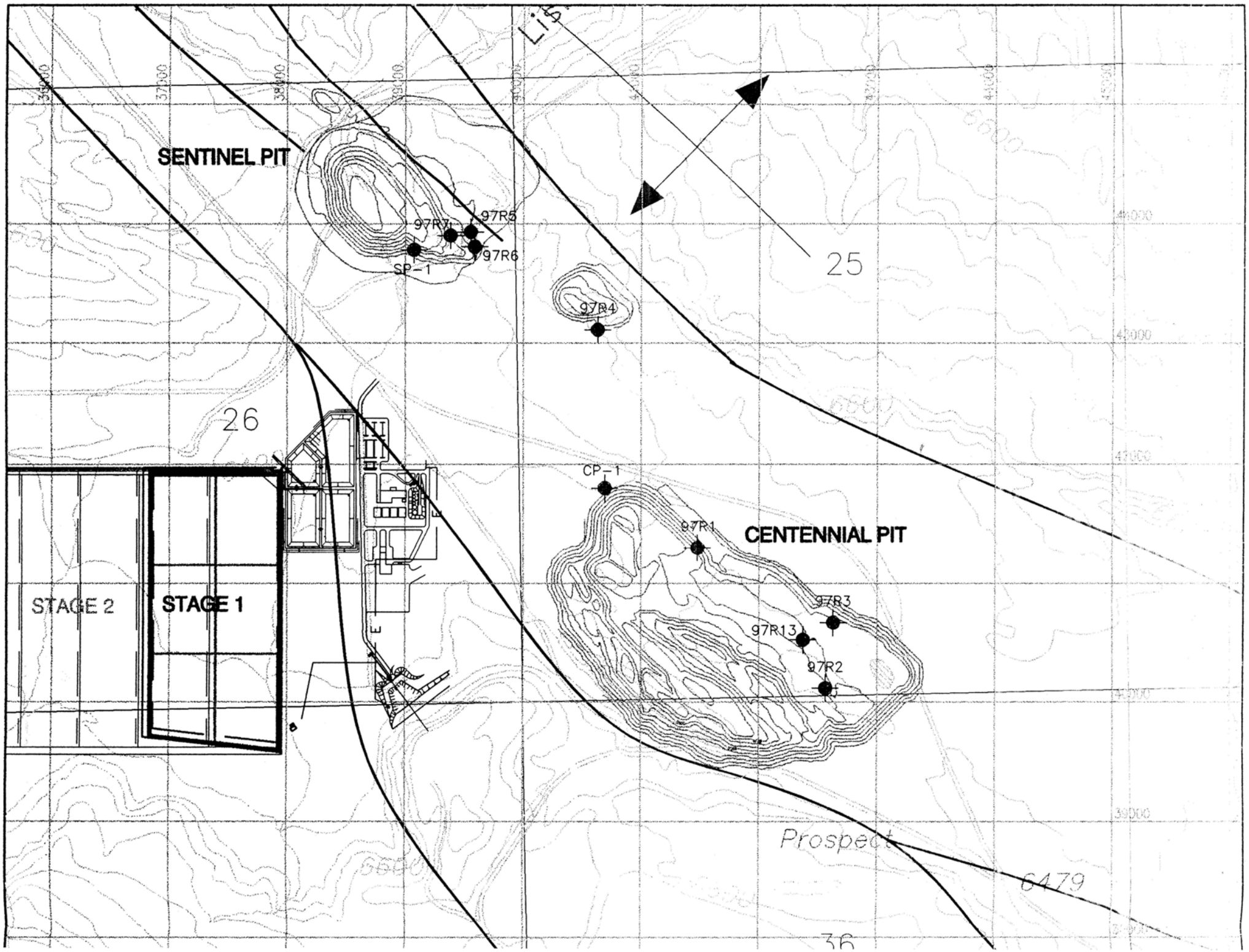
SCALE IN FEET

SUMMO CORPORATION USA

MWMT SAMPLE LOCATIONS

AdrianBrown

Groundwater Hydrology · Geochemistry · Innovative Environmental Solutions


SENTINEL PIT
97R7
97R5
97R6
SP-1
97R4
25
26
CP-1
97R1
CENTENNIAL PIT
97R3
97R13
97R2
STAGE 2
STAGE 1
Prospect
6479
36

SAMPLENUM	UNITS	L16071-02	L16071-01	L16071-03
CLIENTID		97R1/RT-1;7	97R1/RT-1;8	97R1/RT-1;9
SAMPLEDATE		10/19/97 9:15	10/19/97 9:00	10/19/97 8:30
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	129	133	313
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	129	133	313
Arsenic, dissolved	mg/L	0.01	0.01	0.01
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005
Copper, dissolved	mg/L	0.18	0.18	0.18
Conductivity @25C	umhos/cm	935	929	1330
Molybdenum, dissolved	mg/L	0.03	0.03	0.02
pH (lab)	s.u.	7.7	7.7	8.2
Antimony, dissolved	mg/L	-0.01	-0.01	-0.01
Selenium, dissolved	mg/L	0.002	0.002	0.002
Residue, Filterable (TDS) @180C	mg/L	930	920	1250
Uranium, dissolved	mg/L	0.007	0.0016	0.009
Zinc, dissolved	mg/L	0.01	0.01	0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.012	0.09	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.5	10.9	117.0
Amount of HCO3 added	mg/L	3.9	28.9	300.0
pH of extraction water	s.u.	6.95	7.94	8.97
Extraction time	min	2735	2435	2140
Final extract	g	2536	2453	2013
weight after filtration	g	2519	2435	2000

Solid Analysis

SAMPLENUM	UNITS	L15835-04
CLIENTID		97R1/RT-1
SAMPLEDATE		10/3/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	5
Copper, total (3052)	mg/kg	42
Molybdenum, total (3052)	mg/kg	73
Solids, Percent	mg/kg	98.3
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2
Zinc, total (3052)	mg/kg	134

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16071-10	L16071-09	L16071-07
CLIENTID		97R3/RT-1;7	97R3/RT-1;8	97R3/RT-1;9
SAMPLEDATE		10/19/97 9:50	10/19/97 9:30	10/19/97 9:25
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	243	254	298
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	243	254	298
Arsenic, dissolved	mg/L	-0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	0.009	0.01	0.009
Copper, dissolved	mg/L	0.05	0.03	0.04
Conductivity @25C	umhos/cm	3970	3820	4290
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01
pH (lab)	s.u.	7.8	7.9	7.9
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.006	0.003	0.006
Residue, Filterable (TDS) @180C	mg/L	3650	3520	3940
Uranium, dissolved	mg/L	0.0042	0.004	0.0047
Zinc, dissolved	mg/L	0.05	0.04	0.04
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.012	0.09	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.5	10.9	117.0
Amount of HCO3 added	mg/L	3.9	28.9	300.0
pH of extraction water	s.u.	6.95	7.94	8.97
Extraction time	min	2435	2435	2880
Final extract	g	2135	2612	1879
weight after filtration	g	2111	2593	1862

Solid Analysis

SAMPLENUM	UNITS	L15851-01
CLIENTID		97R3/RT-1
SAMPLEDATE		10/6/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	255
Molybdenum, total (3052)	mg/kg	77
Solids, Percent	mg/kg	97.8
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2
Zinc, total (3052)	mg/kg	127

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16298-10	L16289-07	L16289-08
CLIENTID		97R5/RT-1;7	97R5/RT-1;8	97R5/RT-1;9
SAMPLEDATE		11/7/97 8:05	11/4/97 13:20	11/4/97 13:20
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	74	80	220
Carbonate as CaCO3	mg/L	-2	-2	12
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	74	80	232
Arsenic, dissolved	mg/L	0.002	0.002	0.003
Cadmium, dissolved	mg/L	-0.003	-0.0005	-0.0005
Copper, dissolved	mg/L	0.02	0.02	0.02
Conductivity @25C	umhos/cm	200	202	469
Molybdenum, dissolved	mg/L	0.01	-0.05	0.07
pH (lab)	s.u.	7.7	7.8	8.4
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	130	150	300
Uranium, dissolved	mg/L	0.0008	0.001	0.0029
Zinc, dissolved	mg/L	-0.01	-0.05	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.008	0.065	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.0	7.9	117.0
Amount of HCO3 added	mg/L	2.6	20.9	300.0
pH of extraction water	s.u.	7.09	8.01	9.1
Extraction time	min	1830	2139	2139
Final extract	g	1843	2425	2218
weight after filtration	g	1825	2398	2206
Solid Analysis				
SAMPLENUM	UNITS	L16199-05		
CLIENTID		97R5/RT-1		
SAMPLEDATE		10/29/97		
Arsenic, total (3052)	mg/kg	5		
Cadmium, total (3052)	mg/kg	8		
Copper, total (3052)	mg/kg	108		
Molybdenum, total (3052)	mg/kg	-5		
Solids, Percent	mg/kg	97		
Antimony, total (3052)	mg/kg	-2		
Selenium (HF)	mg/kg	-0.5		
Uranium, total (3052)	mg/kg	1.8		
Zinc, total (3052)	mg/kg	109		

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16289-03	L16198-09	L16198-03
CLIENTID		97R7/RT-1;7	97R7/RT-1;8	97R7/RT-1;9
SAMPLEDATE		11/4/97 13:20	10/30/97 8:05	10/30/97 7:35
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	76	81	245
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	76	81	245
Arsenic, dissolved	mg/L	0.004	0.004	0.004
Cadmium, dissolved	mg/L	-0.0005	-0.01	-0.01
Copper, dissolved	mg/L	0.3	0.26	0.24
Conductivity @25C	umhos/cm	451	419	669
Molybdenum, dissolved	mg/L	-0.05	0.01	-0.01
pH (lab)	s.u.	7.6	7.8	8.2
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	0.003	0.002
Residue, Filterable (TDS) @180C	mg/L	410	360	490
Uranium, dissolved	mg/L	0.0013	0.0014	0.0059
Zinc, dissolved	mg/L	-0.05	0.02	0.03
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.01	0.06	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.031
Amount of Na added	mg/L	1.2	7.3	116.7
Amount of HCO3 added	mg/L	3.2	19.3	300.0
pH of extraction water	s.u.	7.1	7.94	8.97
Extraction time	min	2139	2280	2280
Final extract	g	2287	2436	2398
weight after filtration	g	2263	2417	2366

Solid Analysis

SAMPLENUM	UNITS	L16072-01
CLIENTID		97R7/RT-1
SAMPLEDATE		10/21/97
Arsenic, total (3052)	mg/kg	6
Cadmium, total (3052)	mg/kg	5
Copper, total (3052)	mg/kg	215
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	99
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	-1.02
Zinc, total (3052)	mg/kg	126

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16298-03	L16298-02	L16298-01
CLIENTID		97R8/RT-1;7	97R8/RT-1;8	97R8/RT-1;9
SAMPLEDATE		11/6/97 7:45	11/6/97 7:35	11/6/97 7:10
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	100	92	213
Carbonate as CaCO3	mg/L	-2	-2	7
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	100	92	220
Arsenic, dissolved	mg/L	0.006	0.003	0.003
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.01	0.01	-0.01
Conductivity @25C	umhos/cm	1040	916	1180
Molybdenum, dissolved	mg/L	0.21	0.17	0.14
pH (lab)	s.u.	8	8	8.3
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.064	0.056	0.056
Residue, Filterable (TDS) @180C	mg/L	730	640	790
Uranium, dissolved	mg/L	0.0016	0.0014	0.0029
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.008	0.04	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.0	4.9	116.8
Amount of HCO3 added	mg/L	2.6	12.9	300.0
pH of extraction water	s.u.	7.09	8.1	9.01
Extraction time	min	2220	2220	2220
Final extract	g	2042	2424	2247
weight after filtration	g	2026	2403	2228

Solid Analysis			
SAMPLENUM	UNITS	L16498-01	
CLIENTID		97R8/RT-1	
SAMPLEDATE		11/14/97	
Arsenic, total (3052)	mg/kg	3.8	
Cadmium, total (3052)	mg/kg	4	
Copper, total (3052)	mg/kg	37	
Molybdenum, total (3052)	mg/kg	-5	
Solids, Percent	mg/kg	99.3	
Antimony, total (3052)	mg/kg	1	
Selenium (HF)	mg/kg	-0.5	
Uranium, total (3052)	mg/kg	1.7	
Zinc, total (3052)	mg/kg	104	

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16289-02	L16198-06	L16198-02
CLIENTID		97R9/RT-1;7	97R9/RT-1;8	97R9/RT-1;9
SAMPLEDATE		11/4/97 13:20	10/30/97 8:15	10/30/97 7:50
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	140	133	234
Carbonate as CaCO3	mg/L	-2	10	16
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	140	143	251
Arsenic, dissolved	mg/L	0.006	0.006	0.005
Cadmium, dissolved	mg/L	-0.0005	-0.003	-0.01
Copper, dissolved	mg/L	0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	1530	1490	1500
Molybdenum, dissolved	mg/L	-0.05	0.01	0.01
pH (lab)	s.u.	8.1	8.4	8.4
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.126	0.12	0.095
Residue, Filterable (TDS) @180C	mg/L	1040	970	996
Uranium, dissolved	mg/L	0.0072	0.0079	0.0118
Zinc, dissolved	mg/L	-0.05	0.03	0.03
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.01	0.06	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.031
Amount of Na added	mg/L	1.2	7.3	116.7
Amount of HCO3 added	mg/L	3.2	19.3	300.0
pH of extraction water	s.u.	7.1	7.94	8.97
Extraction time	min	2139	2280	2280
Final extract	g	2064	2006	2331
weight after filtration	g	2035	1989	2312

Solid Analysis			
SAMPLENUM	UNITS	L16072-06	
CLIENTID		97R9/RT-1	
SAMPLEDATE		10/21/97	
Arsenic, total (3052)	mg/kg	8	
Cadmium, total (3052)	mg/kg	2	
Copper, total (3052)	mg/kg	23	
Molybdenum, total (3052)	mg/kg	-5	
Solids, Percent	mg/kg	99.1	
Antimony, total (3052)	mg/kg	-10	
Selenium (HF)	mg/kg	-0.5	
Uranium, total (3052)	mg/kg	-1.02	
Zinc, total (3052)	mg/kg	105	

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16198-07	L16198-04	L16198-08	L16198-01
CLIENTID		97R10/RT-1A;7	97R10/RT-1B;7	97R10/RT-1;8	97R10/RT-1;9
SAMPLEDATE		10/30/97 8:50	10/30/97 9:00	10/30/97 8:25	10/30/97 9:50
MWMT Analytical Results					
Bicarbonate as CaCO3	mg/L	109	105	103	218
Carbonate as CaCO3	mg/L	-2	-2	-2	9
Hydroxide as CaCO3	mg/L	-2	-2	-2	-2
Total Alkalinity	mg/L	109	105	103	227
Arsenic, dissolved	mg/L	0.003	0.003	0.003	0.003
Cadmium, dissolved	mg/L	-0.01	-0.01	-0.01	-0.01
Copper, dissolved	mg/L	-0.01	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	1530	1490	1400	1800
Molybdenum, dissolved	mg/L	0.04	0.04	0.01	0.02
pH (lab)	s.u.	8	8	8.1	8.3
Antimony, dissolved	mg/L	-0.002	-0.01	-0.002	-0.002
Selenium, dissolved	mg/L	0.22	0.23	0.22	0.26
Residue, Filterable (TDS) @180C	mg/L	1070	1040	980	1290
Uranium, dissolved	mg/L	0.0046	0.0046	0.0039	0.009
Zinc, dissolved	mg/L	0.02	0.02	0.05	0.02
Laboratory Parameters					
Dry test sample	g	2000	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.013	0.013	0.06	0
Amount of NaHCO3 added (g)	g	0	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0	0.031
Amount of Na added	mg/L	1.6	1.6	7.3	116.7
Amount of HCO3 added	mg/L	4.2	4.2	19.3	300.0
pH of extraction water	s.u.	6.94	6.94	7.94	8.97
Extraction time	min	2280	2280	2280	2375
Final extract	g	2305	2482	2702	2006
weight after filtration	g	2288	2464	2680	1989

Solid Analysis		
SAMPLENUM	UNITS	L16072-02
CLIENTID		97R10/RT-1
SAMPLEDATE		10/21/97
Arsenic, total (3052)	mg/kg	5
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	30
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	99
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	1.7
Zinc, total (3052)	mg/kg	124

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16289-01	L16289-06	L16289-05
CLIENTID		SP-1/RT-1;7	SP-1/RT-1;8	SP-1/RT-1;9
SAMPLEDATE		11/4/97 13:20	11/4/97 13:20	11/4/97 13:20
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	70	73	235
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	70	73	235
Arsenic, dissolved	mg/L	0.004	0.004	0.006
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.11	0.12	0.12
Conductivity @25C	umhos/cm	688	715	971
Molybdenum, dissolved	mg/L	-0.05	0.05	0.06
pH (lab)	s.u.	7.3	7.4	8.2
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.004	0.004	0.004
Residue, Filterable (TDS) @180C	mg/L	580	620	730
Uranium, dissolved	mg/L	0.0014	0.0015	0.0071
Zinc, dissolved	mg/L	-0.05	-0.05	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.01	0.065	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.2	7.9	117.0
Amount of HCO3 added	mg/L	3.2	20.9	300.0
pH of extraction water	s.u.	7.1	8.01	9.1
Extraction time	min	2139	2139	2139
Final extract	g	2261	2148	2110
weight after filtration	g	2237	2128	2083

Solid Analysis

SAMPLENUM	UNITS	L16199-02
CLIENTID		SP-1
SAMPLEDATE		10/29/97
Arsenic, total (3052)	mg/kg	2.9
Cadmium, total (3052)	mg/kg	5
Copper, total (3052)	mg/kg	291
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	98.6
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	1.6
Zinc, total (3052)	mg/kg	105

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16298-06	L16298-05	L16298-04
CLIENTID		CP-1/RT-1;7	CP-1/RT-1;8	CP-1/RT-1;9
SAMPLEDATE		11/6/97 8:10	11/6/97 8:00	11/6/97 7:25
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	77	73	196
Carbonate as CaCO3	mg/L	-2	-2	13
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	77	73	209
Arsenic, dissolved	mg/L	0.007	0.002	0.002
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.01	0.01	0.01
Conductivity @25C	umhos/cm	450	391	669
Molybdenum, dissolved	mg/L	0.01	0.01	0.01
pH (lab)	s.u.	7.8	7.8	8.4
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.003	0.003	0.004
Residue, Filterable (TDS) @180C	mg/L	300	270	440
Uranium, dissolved	mg/L	0.001	0.001	0.006
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.008	0.04	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.0	4.9	116.8
Amount of HCO3 added	mg/L	2.6	12.9	300.0
pH of extraction water	s.u.	7.09	8.1	9.01
Extraction time	min	2220	2220	2220
Final extract	g	2330	2562	2056
weight after filtration	g	2310	2541	2036
Solid Analysis				
SAMPLENUM	UNITS	L16199-01		
CLIENTID		CP-1		
SAMPLEDATE		10/29/97		
Arsenic, total (3052)	mg/kg	5.2		
Cadmium, total (3052)	mg/kg	5		
Copper, total (3052)	mg/kg	50		
Molybdenum, total (3052)	mg/kg	-5		
Solids, Percent	mg/kg	96.8		
Antimony, total (3052)	mg/kg	-2		
Selenium (HF)	mg/kg	-0.5		
Uranium, total (3052)	mg/kg	2.2		
Zinc, total (3052)	mg/kg	127		

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	
CLIENTID		97R8/RT-2
SAMPLEDATE		No Drain
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	
Carbonate as CaCO3	mg/L	
Hydroxide as CaCO3	mg/L	
Total Alkalinity	mg/L	
Arsenic, dissolved	mg/L	
Cadmium, dissolved	mg/L	
Copper, dissolved	mg/L	
Conductivity @25C	umhos/cm	
Molybdenum, dissolved	mg/L	
pH (lab)	s.u.	
Antimony, dissolved	mg/L	
Selenium, dissolved	mg/L	
Residue, Filterable (TDS) @180C	mg/L	
Uranium, dissolved	mg/L	
Zinc, dissolved	mg/L	
Laboratory Parameters		
Dry test sample	g	
Rate of water addition	mL/min	
Original amount of extractant	L	
Amount of 0.1 M NaHCO3 added	L	
Amount of NaHCO3 added (g)	g	
Amount of 0.1 M NaOH added	L	
Amount of Na added	mg/L	
Amount of HCO3 added	mg/L	
pH of extraction water	s.u.	
Extraction time	min	
Final extract	g	
weight after filtration	g	
Solid Analysis		
SAMPLENUM	UNITS	L16072-05
CLIENTID		97R8/RT-2
SAMPLEDATE		10/10/97
Arsenic, total (3052)	mg/kg	9
Cadmium, total (3052)	mg/kg	8
Copper, total (3052)	mg/kg	21
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	97.3
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	0.7
Uranium, total (3052)	mg/kg	6
Zinc, total (3052)	mg/kg	206

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	
CLIENTID		97R9/RT-2
SAMPLEDATE		No Drain
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	
Carbonate as CaCO3	mg/L	
Hydroxide as CaCO3	mg/L	
Total Alkalinity	mg/L	
Arsenic, dissolved	mg/L	
Cadmium, dissolved	mg/L	
Copper, dissolved	mg/L	
Conductivity @25C	umhos/cm	
Molybdenum, dissolved	mg/L	
pH (lab)	s.u.	
Antimony, dissolved	mg/L	
Selenium, dissolved	mg/L	
Residue, Filterable (TDS) @180C	mg/L	
Uranium, dissolved	mg/L	
Zinc, dissolved	mg/L	
Laboratory Parameters		
Dry test sample	g	
Rate of water addition	mL/min	
Original amount of extractant	L	
Amount of 0.1 M NaHCO3 added	L	
Amount of NaHCO3 added (g)	g	
Amount of 0.1 M NaOH added	L	
Amount of Na added	mg/L	
Amount of HCO3 added	mg/L	
pH of extraction water	s.u.	
Extraction time	min	
Final extract	g	
weight after filtration	g	
Solid Analysis		
SAMPLENUM	UNITS	L16199-04
CLIENTID		97R9/RT-2
SAMPLEDATE		10/29/97
Arsenic, total (3052)	mg/kg	14
Cadmium, total (3052)	mg/kg	9
Copper, total (3052)	mg/kg	24
Molybdenum, total (3052)	mg/kg	7
Solids, Percent	mg/kg	97.7
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	1.5
Uranium, total (3052)	mg/kg	5
Zinc, total (3052)	mg/kg	150

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L15953-01	L15953-02	L16141-05	L16141-04
CLIENTID		9710/RT-2C;7	9710/RT-2D;7	97R10/RT-2;8	97R10/RT-2;9
SAMPLEDATE		10/12/97 13:10	10/12/97 13:25	10/24/97 12:45	10/24/97 12:20
MWMT Analytical Results					
Bicarbonate as CaCO3	mg/L	52	48	54	63
Carbonate as CaCO3	mg/L	-2	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2	-2
Total Alkalinity	mg/L	52	48	54	63
Arsenic, dissolved	mg/L	-0.001	-0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	5520	4990	5280	5600
Molybdenum, dissolved	mg/L	0.15	0.14	-0.5	-0.5
pH (lab)	s.u.	7.3	7.3	7.3	7.5
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.078	0.069	0.1	0.09
Residue, Filterable (TDS) @180C	mg/L	5300	4840	4910	5180
Uranium, dissolved	mg/L	0.0086	0.0078	0.011	0.014
Zinc, dissolved	mg/L	0.01	0.01	-0.5	-0.5
Laboratory Parameters					
Dry test sample	g	2000	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0055	0.0055	0.077	0
Amount of NaHCO3 added (g)	g	0	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0	0.035
Amount of Na added	mg/L	0.7	0.7	9.3	117.2
Amount of HCO3 added	mg/L	1.8	1.8	24.7	300.0
pH of extraction water	s.u.	6.96	6.96	7.97	8.94
Extraction time	min	2880	2880	2880	2880
Final extract	g	1256	1536	1203	1066
weight after filtration	g	1204	1520	1182	1046

Solid Analysis

SAMPLENUM	UNITS	L15933-01
CLIENTID		97R10/RT-2
SAMPLEDATE		10/8/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	8
Copper, total (3052)	mg/kg	39
Molybdenum, total (3052)	mg/kg	84
Solids, Percent	mg/kg	95.7
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	2
Uranium, total (3052)	mg/kg	6
Zinc, total (3052)	mg/kg	133

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16011-01	L16011-08	L16011-05
CLIENTID		97R1/RT-6;7	97R1/RT-6;8	97R1/RT-6;9
SAMPLEDATE		10/16/97 11:30	10/16/97 11:10	10/16/97 11:50
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	104	98	143
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	104	98	143
Arsenic, dissolved	mg/L	0.001	0.001	0.002
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.02	0.02	0.02
Conductivity @25C	umhos/cm	391	395	541
Molybdenum, dissolved	mg/L	0.12	0.12	0.16
pH (lab)	s.u.	7.7	7.7	8
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	0.001
Residue, Filterable (TDS) @180C	mg/L	240	240	330
Uranium, dissolved	mg/L	0.0046	0.0048	0.0049
Zinc, dissolved	mg/L	0.01	0.01	-0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0055	0.051	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.029
Amount of Na added	mg/L	0.7	6.2	116.5
Amount of HCO3 added	mg/L	1.8	16.4	300.0
pH of extraction water	s.u.	7.05	7.94	9.08
Extraction time	min	2880	2880	2880
Final extract	g	2285	2133	1376
weight after filtration	g	2265	2117	1358

Solid Analysis

SAMPLENUM	UNITS	L15708-01
CLIENTID		R1-11/12/13
SAMPLEDATE		9/26/97 17:30
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	3
Copper, total (3052)	mg/kg	573
Molybdenum, total (3052)	mg/kg	75
Solids, Percent	mg/kg	98.8
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2
Zinc, total (3052)	mg/kg	92

Negative sign = less than detection limits

Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16141-01	L16141-02	L16141-03
CLIENTID		97R2/RT-6;7	97R2/RT-6;8	97R2/RT-6;9
SAMPLEDATE		10/24/97 9:50	10/24/97 11:40	10/24/97 12:00
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	116	113	161
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	116	113	161
Arsenic, dissolved	mg/L	-0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	0.01
Conductivity @25C	umhos/cm	596	555	852
Molybdenum, dissolved	mg/L	-0.5	-0.5	-0.5
pH (lab)	s.u.	7.9	8	8.2
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.002	0.002	0.004
Residue, Filterable (TDS) @180C	mg/L	410	370	600
Uranium, dissolved	mg/L	0.0051	0.0046	0.0078
Zinc, dissolved	mg/L	-0.5	1.3	0.6
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.015	0.077	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.035
Amount of Na added	mg/L	1.8	9.3	117.2
Amount of HCO3 added	mg/L	4.8	24.7	300.0
pH of extraction water	s.u.	6.9	7.97	8.94
Extraction time	min	1990	2880	2880
Final extract	g	2387	2668	1454
weight after filtration	g	2366	2643	1362

Solid Analysis

SAMPLENUM	UNITS	L16199-03
CLIENTID		97R2/RT-6
SAMPLEDATE		10/29/97
Arsenic, total (3052)	mg/kg	3.1
Cadmium, total (3052)	mg/kg	8
Copper, total (3052)	mg/kg	301
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	98
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	1.5
Zinc, total (3052)	mg/kg	156

Negative sign = less than detection limits

Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16454-01	L16454-02	L16454-04
CLIENTID		97R3/RT-6;7	97R3/RT-6;8	97R3/RT-6;9
SAMPLEDATE		11/16/97 10:00	11/16/97 9:50	11/16/97 9:35
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	101	102	162
Carbonate as CaCO3	mg/L	-2	-2	8
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	101	102	170
Arsenic, dissolved	mg/L	0.002	0.002	0.003
Cadmium, dissolved	mg/L	-0.0005	-0.001	-0.0005
Copper, dissolved	mg/L	-0.01	0.01	0.01
Conductivity @25C	umhos/cm	572	526	642
Molybdenum, dissolved	mg/L	0.11	0.09	0.14
pH (lab)	s.u.	8.1	8	8.3
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.011	0.009	0.011
Residue, Filterable (TDS) @180C	mg/L	360	330	380
Uranium, dissolved	mg/L	0.017	0.0152	0.0363
Zinc, dissolved	mg/L	-0.01	-0.01	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0105	0.03	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.3	3.6	116.8
Amount of HCO3 added	mg/L	3.4	9.7	300.0
pH of extraction water	s.u.	7.02	8.01	8.96
Extraction time	min	2175	2175	2175
Final extract	g	1963	2382	2072
weight after filtration	g	1934	2364	2052
Solid Analysis				
SAMPLENUM	UNITS	L16400-01		
CLIENTID		97R3/RT-6		
SAMPLEDATE		11/11/97		
Arsenic, total (3052)	mg/kg	5.3		
Cadmium, total (3052)	mg/kg	5		
Copper, total (3052)	mg/kg	308		
Molybdenum, total (3052)	mg/kg	-5		
Solids, Percent	mg/kg	98.4		
Antimony, total (3052)	mg/kg	-2		
Selenium (HF)	mg/kg	-0.5		
Uranium, total (3052)	mg/kg	2.6		
Zinc, total (3052)	mg/kg	124		

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L15932-04	L15932-05	L16011-10	L16011-06
CLIENTID		97R4/RT-6A;7	97R4/RT-6B;7	97R4/RT-6;8	97R4/RT-6;9
SAMPLEDATE		10/9/97 21:45	10/9/97 21:50	10/15/97 16:50	10/16/97 10:20
MWMT Analytical Results					
Bicarbonate as CaCO3	mg/L	117	97	112	195
Carbonate as CaCO3	mg/L	-2	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2	-2
Total Alkalinity	mg/L	117	97	112	195
Arsenic, dissolved	mg/L	-0.001	0.001	0.001	-0.001
Cadmium, dissolved	mg/L	0.0035	0.0017	0.0012	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	0.01	0.01
Conductivity @25C	umhos/cm	700	654	753	1010
Molybdenum, dissolved	mg/L	0.06	0.07	0.04	0.03
pH (lab)	s.u.	7.7	7.8	7.9	8
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.003	0.002	-0.001	0.003
Residue, Filterable (TDS) @180C	mg/L	470	450	500	680
Uranium, dissolved	mg/L	0.0053	0.0047	0.0056	0.0093
Zinc, dissolved	mg/L	0.01	0.01	0.03	-0.01
Laboratory Parameters					
Dry test sample	g	2000	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.007	0.007	0.051	0
Amount of NaHCO3 added (g)	g	0	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0	0.029
Amount of Na added	mg/L	0.9	0.9	6.2	116.5
Amount of HCO3 added	mg/L	2.3	2.3	16.4	299.6
pH of extraction water	s.u.	7.00	7.00	7.94	9.08
Extraction time	min	1825	1845	1870	2880
Final extract	g	2095	2020	2023	1864
weight after filtration	g	2088	2012	2019	1845

Solid Analysis			
SAMPLENUM	UNITS	L15851-02	
CLIENTID		97R4/RT-6	
SAMPLEDATE		10/6/97	
Arsenic, total (3052)	mg/kg	10	
Cadmium, total (3052)	mg/kg	18	
Copper, total (3052)	mg/kg	12	
Molybdenum, total (3052)	mg/kg	70	
Solids, Percent	mg/kg	99.7	
Antimony, total (3052)	mg/kg	-10	
Selenium (HF)	mg/kg	-0.5	
Uranium, total (3052)	mg/kg	-1.27	
Zinc, total (3052)	mg/kg	98	

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L15932-04	L15932-05	L16011-10	L16011-06
CLIENTID		97R4/RT-6A;7	97R4/RT-6B;7	97R4/RT-6;8	97R4/RT-6;9
SAMPLEDATE		10/9/97 21:45	10/9/97 21:50	10/15/97 16:50	10/16/97 10:20
MWMT Analytical Results					
Bicarbonate as CaCO3	mg/L	117	97	112	195
Carbonate as CaCO3	mg/L	-2	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2	-2
Total Alkalinity	mg/L	117	97	112	195
Arsenic, dissolved	mg/L	-0.001	0.001	0.001	-0.001
Cadmium, dissolved	mg/L	0.0035	0.0017	0.0012	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	0.01	0.01
Conductivity @25C	umhos/cm	700	654	753	1010
Molybdenum, dissolved	mg/L	0.06	0.07	0.04	0.03
pH (lab)	s.u.	7.7	7.8	7.9	8
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.003	0.002	-0.001	0.003
Residue, Filterable (TDS) @180C	mg/L	470	450	500	680
Uranium, dissolved	mg/L	0.0053	0.0047	0.0056	0.0093
Zinc, dissolved	mg/L	0.01	0.01	0.03	-0.01
Laboratory Parameters					
Dry test sample	g	2000	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.007	0.007	0.051	0
Amount of NaHCO3 added (g)	g	0	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0	0.029
Amount of Na added	mg/L	0.9	0.9	6.2	116.5
Amount of HCO3 added	mg/L	2.3	2.3	16.4	299.6
pH of extraction water	s.u.	7.00	7.00	7.94	9.08
Extraction time	min	1825	1845	1870	2880
Final extract	g	2095	2020	2023	1864
weight after filtration	g	2088	2012	2019	1845

Solid Analysis			
SAMPLENUM	UNITS	L15851-02	
CLIENTID		97R4/RT-6	
SAMPLEDATE		10/6/97	
Arsenic, total (3052)	mg/kg	10	
Cadmium, total (3052)	mg/kg	18	
Copper, total (3052)	mg/kg	12	
Molybdenum, total (3052)	mg/kg	70	
Solids, Percent	mg/kg	99.7	
Antimony, total (3052)	mg/kg	-10	
Selenium (HF)	mg/kg	-0.5	
Uranium, total (3052)	mg/kg	-1.27	
Zinc, total (3052)	mg/kg	98	

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	
CLIENTID		97R8/RT-6
SAMPLEDATE		No Drain
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	
Carbonate as CaCO3	mg/L	
Hydroxide as CaCO3	mg/L	
Total Alkalinity	mg/L	
Arsenic, dissolved	mg/L	
Cadmium, dissolved	mg/L	
Copper, dissolved	mg/L	
Conductivity @25C	umhos/cm	
Molybdenum, dissolved	mg/L	
pH (lab)	s.u.	
Antimony, dissolved	mg/L	
Selenium, dissolved	mg/L	
Residue, Filterable (TDS) @180C	mg/L	
Uranium, dissolved	mg/L	
Zinc, dissolved	mg/L	
Laboratory Parameters		
Dry test sample	g	
Rate of water addition	mL/min	
Original amount of extractant	L	
Amount of 0.1 M NaHCO3 added	L	
Amount of NaHCO3 added (g)	g	
Amount of 0.1 M NaOH added	L	
Amount of Na added	mg/L	
Amount of HCO3 added	mg/L	
pH of extraction water	s.u.	
Extraction time	min	
Final extract	g	
weight after filtration	g	
Solid Analysis		
SAMPLENUM	UNITS	L16072-04
CLIENTID		97R8/RT-6
SAMPLEDATE		10/21/97
Arsenic, total (3052)	mg/kg	6
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	918
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	97.4
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	7
Zinc, total (3052)	mg/kg	150

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16289-04
CLIENTID		97R9/RT-6;9
SAMPLEDATE		11/4/97 13:20
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	240
Carbonate as CaCO3	mg/L	23
Hydroxide as CaCO3	mg/L	-2
Total Alkalinity	mg/L	264
Arsenic, dissolved	mg/L	0.002
Cadmium, dissolved	mg/L	-0.003
Copper, dissolved	mg/L	0.02
Conductivity @25C	umhos/cm	486
Molybdenum, dissolved	mg/L	-0.05
pH (lab)	s.u.	8.7
Antimony, dissolved	mg/L	-0.002
Selenium, dissolved	mg/L	-0.001
Residue, Filterable (TDS) @180C	mg/L	320
Uranium, dissolved	mg/L	0.0003
Zinc, dissolved	mg/L	-0.05
Laboratory Parameters		
Dry test sample	g	2000
Rate of water addition	mL/min	1.4
Original amount of extractant	L	18.925
Amount of 0.1 M NaHCO3 added	L	0
Amount of NaHCO3 added (g)	g	7.82
Amount of 0.1 M NaOH added	L	0.034
Amount of Na added	mg/L	117.0
Amount of HCO3 added	mg/L	300.0
pH of extraction water	s.u.	9.1
Extraction time	min	2139
Final extract	g	2341
weight after filtration	g	2236
Solid Analysis		
SAMPLENUM	UNITS	L16072-03
CLIENTID		97R9/RT-6
SAMPLEDATE		10/21/97
Arsenic, total (3052)	mg/kg	7
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	2020
Molybdenum, total (3052)	mg/kg	31
Solids, Percent	mg/kg	99.2
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	3
Zinc, total (3052)	mg/kg	136

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16454-06	L16454-09	L16454-03
CLIENTID		97R10/RT-6;7	97R10/RT-6;8	97R10/RT-6;9
SAMPLEDATE		11/16/97 10:30	11/16/97 10:25	11/16/97 10:10
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	100	85	223
Carbonate as CaCO3	mg/L	-2	-2	17
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	100	85	240
Arsenic, dissolved	mg/L	0.018	0.016	0.008
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.003
Copper, dissolved	mg/L	-0.05	-0.05	-0.01
Conductivity @25C	umhos/cm	930	882	1070
Molybdenum, dissolved	mg/L	1.13	0.99	1.08
pH (lab)	s.u.	8.1	8	8.5
Antimony, dissolved	mg/L	0.002	0.002	0.002
Selenium, dissolved	mg/L	0.017	0.017	0.014
Residue, Filterable (TDS) @180C	mg/L	620	590	660
Uranium, dissolved	mg/L	0.007	0.0066	0.013
Zinc, dissolved	mg/L	0.02	0.01	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0105	0.03	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.3	3.6	116.8
Amount of HCO3 added	mg/L	3.4	9.7	300.0
pH of extraction water	s.u.	7.02	8.01	8.96
Extraction time	min	2175	2175	2175
Final extract	g	2491	2432	2566
weight after filtration	g	2471	2414	2549

Solid Analysis		
SAMPLENUM	UNITS	L16400-03
CLIENTID		97R10/RT-6
SAMPLEDATE		11/11/97
Arsenic, total (3052)	mg/kg	11.2
Cadmium, total (3052)	mg/kg	66
Copper, total (3052)	mg/kg	241
Molybdenum, total (3052)	mg/kg	75
Solids, Percent	mg/kg	98.5
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2.8
Zinc, total (3052)	mg/kg	101

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16349-01	L16349-02	L16349-03
CLIENTID		97R13/RT-6;7	97R13/RT-6;8	97R13/RT-6;9
SAMPLEDATE		11/10/97 7:20	11/10/97 7:35	11/10/97 18:00
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	94	93	203
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	94	93	203
Arsenic, dissolved	mg/L	-0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	0.0011	0.0011	-0.0005
Copper, dissolved	mg/L	0.01	0.01	-0.05
Conductivity @25C	umhos/cm	934	916	1280
Molybdenum, dissolved	mg/L	0.04	0.04	0.03
pH (lab)	s.u.	7.6	7.7	8
Antimony, dissolved	mg/L	-0.002	-0.002	0.002
Selenium, dissolved	mg/L	0.004	0.004	0.005
Residue, Filterable (TDS) @180C	mg/L	670	660	950
Uranium, dissolved	mg/L	0.002	0.002	0.007
Zinc, dissolved	mg/L	-0.01	-0.01	0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.006	0.025	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.025
Amount of Na added	mg/L	0.7	3.0	116.0
Amount of HCO3 added	mg/L	1.9	8.0	300.0
pH of extraction water	s.u.	7	8.08	8.94
Extraction time	min	2220	2220	2880
Final extract	g	2440	2432	1843
weight after filtration	g	2423	2413	1821
Solid Analysis				
SAMPLENUM	UNITS	L16308-01		
CLIENTID		97R13/RT-6		
SAMPLEDATE		11/7/97		
Arsenic, total (3052)	mg/kg	3.2		
Cadmium, total (3052)	mg/kg	8		
Copper, total (3052)	mg/kg	169		
Molybdenum, total (3052)	mg/kg	-5		
Solids, Percent	mg/kg	98.6		
Antimony, total (3052)	mg/kg	-2		
Selenium (HF)	mg/kg	-0.5		
Uranium, total (3052)	mg/kg	1.2		
Zinc, total (3052)	mg/kg	120		

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16011-09	L16011-07	L16011-02
CLIENTID		97R1/RT-7;7	97R1/RT-7;8	97R1/RT-7;9
SAMPLEDATE		10/16/97 10:40	10/16/97 11:15	10/16/97 11:45
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	103	104	131
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	103	104	131
Arsenic, dissolved	mg/L	0.001	-0.001	0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.01	0.02	0.01
Conductivity @25C	umhos/cm	334	362	421
Molybdenum, dissolved	mg/L	0.02	0.02	0.02
pH (lab)	s.u.	7.9	7.8	7.9
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	200	220	270
Uranium, dissolved	mg/L	0.012	0.0126	0.0148
Zinc, dissolved	mg/L	0.03	0.01	0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0055	0.051	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.029
Amount of Na added	mg/L	0.7	6.2	116.5
Amount of HCO3 added	mg/L	1.8	16.4	300.0
pH of extraction water	s.u.	7.05	7.94	9.08
Extraction time	min	2880	2880	2880
Final extract	g	1822	1517	1173
weight after filtration	g	1808	1499	1153

Solid Analysis

SAMPLENUM	UNITS	L15835-03
CLIENTID		97R1/RT-7
SAMPLEDATE		10/2/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	18
Molybdenum, total (3052)	mg/kg	69
Solids, Percent	mg/kg	98.5
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2
Zinc, total (3052)	mg/kg	107

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16011-04	L16011-03	L16011-11
CLIENTID		97R2/RT-7;7	97R2/RT-7;8	97R2/RT-7;9
SAMPLEDATE		10/16/97 10:30	10/16/97 11:00	10/15/97 17:00
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	83	88	164
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	83	88	164
Arsenic, dissolved	mg/L	-0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	0.02	0.02	0.02
Conductivity @25C	umhos/cm	682	672	772
Molybdenum, dissolved	mg/L	0.01	0.01	-0.01
pH (lab)	s.u.	6.9	7.6	8.1
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	440	450	480
Uranium, dissolved	mg/L	0.0023	0.0024	0.0025
Zinc, dissolved	mg/L	0.01	-0.01	0.02
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0055	0.051	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.029
Amount of Na added	mg/L	0.7	6.2	116.5
Amount of HCO3 added	mg/L	1.8	16.4	300.0
pH of extraction water	s.u.	7.05	7.94	9.08
Extraction time	min	2880	2880	1870
Final extract	g	1983	1989	2025
weight after filtration	g	1967	1986	2004
Solid Analysis				
SAMPLENUM	UNITS	L15835-02		
CLIENTID		97R2/RT-7		
SAMPLEDATE		10/2/97		
Arsenic, total (3052)	mg/kg	10		
Cadmium, total (3052)	mg/kg	5		
Copper, total (3052)	mg/kg	266		
Molybdenum, total (3052)	mg/kg	72		
Solids, Percent	mg/kg	97.7		
Antimony, total (3052)	mg/kg	-10		
Selenium (HF)	mg/kg	-0.5		
Uranium, total (3052)	mg/kg	2		
Zinc, total (3052)	mg/kg	104		

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16398-05	L16398-04	L16398-03
CLIENTID		97R3/RT-7;7	97R3/RT-7;8	97R3/RT-7;9
SAMPLEDATE		11/12/97 9:25	11/12/97 9:10	11/12/97 8:50
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	69	68	177
Carbonate as CaCO3	mg/L	-2	-2	4
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	69	68	181
Arsenic, dissolved	mg/L	0.001	0.001	0.002
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	383	360	597
Molybdenum, dissolved	mg/L	0.02	0.02	0.02
pH (lab)	s.u.	7.6	7.5	8.2
Antimony, dissolved	mg/L	0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.001	0.001	0.001
Residue, Filterable (TDS) @180C	mg/L	240	220	370
Uranium, dissolved	mg/L	0.0109	0.0109	0.045
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.006	0.025	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.025
Amount of Na added	mg/L	0.7	3.0	116.0
Amount of HCO3 added	mg/L	1.9	8.0	300.0
pH of extraction water	s.u.	7	8.08	8.94
Extraction time	min	1790	1790	1790
Final extract	g	1862	2133	1889
weight after filtration	g	1842	2117	1871

Solid Analysis		
SAMPLENUM	UNITS	L16400-02
CLIENTID		97R3/RT-7
SAMPLEDATE		11/10/97
Arsenic, total (3052)	mg/kg	9
Cadmium, total (3052)	mg/kg	6
Copper, total (3052)	mg/kg	23
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	99.4
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	2.1
Zinc, total (3052)	mg/kg	90

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16071-11	L16071-12	L16071-04
CLIENTID		97R4/RT-7;7	97R4/RT-7;8	97R4/RT-7;9
SAMPLEDATE		10/19/97 11:10	10/19/97 10:55	10/19/97 10:40
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	58	57	46
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	58	57	46
Arsenic, dissolved	mg/L	0.001	-0.001	-0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	414	473	758
Molybdenum, dissolved	mg/L	0.03	0.03	0.06
pH (lab)	s.u.	7.4	6.5	6.8
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	230	270	510
Uranium, dissolved	mg/L	0.0006	0.0005	0.0004
Zinc, dissolved	mg/L	0.02	0.02	0.02
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.012	0.09	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.5	10.9	117.0
Amount of HCO3 added	mg/L	3.9	28.9	300.0
pH of extraction water	s.u.	6.95	7.94	8.97
Extraction time	min	2735	2735	2880
Final extract	g	2381	2297	759
weight after filtration	g	2362	2279	743

Solid Analysis

SAMPLENUM	UNITS	L15835-01
CLIENTID		97R4/RT-7
SAMPLEDATE		10/3/97
Arsenic, total (3052)	mg/kg	-10
Cadmium, total (3052)	mg/kg	10
Copper, total (3052)	mg/kg	59
Molybdenum, total (3052)	mg/kg	73
Solids, Percent	mg/kg	94.9
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	-1.31
Zinc, total (3052)	mg/kg	105

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16071-06	L16071-08	L16071-05
CLIENTID		97R6/RT-7;7	97R6/RT-7;8	97R6/RT-7;9
SAMPLEDATE		10/19/97 10:30	10/19/97 10:20	10/19/97 10:05
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	89	91	182
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	89	91	182
Arsenic, dissolved	mg/L	-0.001	-0.001	0.001
Cadmium, dissolved	mg/L	-0.0005	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	285	295	461
Molybdenum, dissolved	mg/L	0.05	0.07	0.03
pH (lab)	s.u.	7.7	8	8.1
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	130	160	260
Uranium, dissolved	mg/L	0.002	0.002	0.0028
Zinc, dissolved	mg/L	0.02	0.02	0.02
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.012	0.09	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.034
Amount of Na added	mg/L	1.5	10.9	117.0
Amount of HCO3 added	mg/L	3.9	28.9	300.0
pH of extraction water	s.u.	6.95	7.94	8.97
Extraction time	min	2435	2435	2857
Final extract	g	2180	2235	2008
weight after filtration	g	2164	2217	1989

Solid Analysis

SAMPLENUM	UNITS	L15851-04
CLIENTID		97R6/RT-7
SAMPLEDATE		10/6/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	4
Copper, total (3052)	mg/kg	19
Molybdenum, total (3052)	mg/kg	64
Solids, Percent	mg/kg	98.7
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	-1.27
Zinc, total (3052)	mg/kg	80

Negative sign = less than detection limits
Boxed result = less than PQL

MWMT/Solid Results

SAMPLENUM	UNITS	L16198-10	L16198-11	L16198-12	L16198-05
CLIENTID		97R7/RT-7A;7	97R7/RT-7B;7	97R7/RT-7;8	97R7/RT-7;9
SAMPLEDATE		10/30/97 9:45	10/30/97 14:20	10/30/97 17:15	10/30/97 9:15
MWMT Analytical Results					
Bicarbonate as CaCO3	mg/L	81	83	91	189
Carbonate as CaCO3	mg/L	-2	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2	-2
Total Alkalinity	mg/L	81	83	91	189
Arsenic, dissolved	mg/L	0.001	0.001	0.025	0.013
Cadmium, dissolved	mg/L	-0.0005	-0.003	-0.003	-0.003
Copper, dissolved	mg/L	-0.01	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	233	240	262	405
Molybdenum, dissolved	mg/L	0.02	0.01	0.02	0.01
pH (lab)	s.u.	7.7	7.8	7.9	8.2
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.001	-0.001	-0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	140	150	160	240
Uranium, dissolved	mg/L	0.0023	0.0022	0.0026	0.0021
Zinc, dissolved	mg/L	0.02	0.17	0.02	0.02
Laboratory Parameters					
Dry test sample	g	2000	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.013	0.013	0.06	0
Amount of NaHCO3 added (g)	g	0	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0	0.031
Amount of Na added	mg/L	1.6	1.6	7.3	116.7
Amount of HCO3 added	mg/L	4.2	4.2	19.3	300.0
pH of extraction water	s.u.	6.94	6.94	7.94	8.97
Extraction time	min	2380	2700	2880	2380
Final extract	g	2034	2012	1727	2007
weight after filtration	g	2018	1994	1708	1988

Solid Analysis

SAMPLENUM	UNITS	L15851-03
CLIENTID		97R7/RT-7
SAMPLEDATE		10/6/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	4
Copper, total (3052)	mg/kg	197
Molybdenum, total (3052)	mg/kg	63
Solids, Percent	mg/kg	98.6
Antimony, total (3052)	mg/kg	-10
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	-1.26
Zinc, total (3052)	mg/kg	80

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16398-06	L16398-02
CLIENTID		97R8/RT-7;7	97R8/RT-7;9
SAMPLEDATE		11/13/97 8:15	11/13/97 7:50
MWMT Analytical Results			
Bicarbonate as CaCO3	mg/L	148	298
Carbonate as CaCO3	mg/L	39	65
Hydroxide as CaCO3	mg/L	-2	-2
Total Alkalinity	mg/L	187	363
Arsenic, dissolved	mg/L	0.195	0.202
Cadmium, dissolved	mg/L	-0.0005	-0.0005
Copper, dissolved	mg/L	0.12	0.02
Conductivity @25C	umhos/cm	416	774
Molybdenum, dissolved	mg/L	0.06	0.09
pH (lab)	s.u.	9.2	9.1
Antimony, dissolved	mg/L	0.008	0.002
Selenium, dissolved	mg/L	0.03	0.04
Residue, Filterable (TDS) @180C	mg/L	260	570
Uranium, dissolved	mg/L	0.0104	0.197
Zinc, dissolved	mg/L	0.07	0.01
Laboratory Parameters			
Dry test sample	g	2000	2000
Rate of water addition	mL/min	1.4	1.4
Original amount of extractant	L	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.006	0
Amount of NaHCO3 added (g)	g	0	7.82
Amount of 0.1 M NaOH added	L	0	0.025
Amount of Na added	mg/L	0.7	116.0
Amount of HCO3 added	mg/L	1.9	300.0
pH of extraction water	s.u.	7	8.94
Extraction time	min	2880	2880
Final extract	g	958	1575
weight after filtration	g	-	1304
Solid Analysis			
SAMPLENUM	UNITS	L16400-06	
CLIENTID		97R8/RT-7	
SAMPLEDATE		11/10/97	
Arsenic, total (3052)	mg/kg	4.2	
Cadmium, total (3052)	mg/kg	4	
Copper, total (3052)	mg/kg	278	
Molybdenum, total (3052)	mg/kg	-5	
Solids, Percent	mg/kg	98.6	
Antimony, total (3052)	mg/kg	-2	
Selenium (HF)	mg/kg	-0.5	
Uranium, total (3052)	mg/kg	4.2	
Zinc, total (3052)	mg/kg	95	

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16398-01
CLIENTID		97R9/RT-7;9
SAMPLEDATE		11/12/97 9:40
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	243
Carbonate as CaCO3	mg/L	29
Hydroxide as CaCO3	mg/L	-2
Total Alkalinity	mg/L	272
Arsenic, dissolved	mg/L	0.001
Cadmium, dissolved	mg/L	-0.0005
Copper, dissolved	mg/L	0.24
Conductivity @25C	umhos/cm	490
Molybdenum, dissolved	mg/L	-0.01
pH (lab)	s.u.	8.7
Antimony, dissolved	mg/L	-0.002
Selenium, dissolved	mg/L	-0.001
Residue, Filterable (TDS) @180C	mg/L	570
Uranium, dissolved	mg/L	0.0004
Zinc, dissolved	mg/L	0.01
Laboratory Parameters		
Dry test sample	g	2000
Rate of water addition	mL/min	1.4
Original amount of extractant	L	18.925
Amount of 0.1 M NaHCO3 added	L	0
Amount of NaHCO3 added (g)	g	7.82
Amount of 0.1 M NaOH added	L	0.025
Amount of Na added	mg/L	116.0
Amount of HCO3 added	mg/L	300.0
pH of extraction water	s.u.	8.94
Extraction time	min	1790
Final extract	g	1918
weight after filtration	g	-
Solid Analysis		
SAMPLENUM	UNITS	L16400-05
CLIENTID		97R9/RT-7
SAMPLEDATE		11/10/97
Arsenic, total (3052)	mg/kg	-3
Cadmium, total (3052)	mg/kg	4
Copper, total (3052)	mg/kg	5670
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	94.5
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	4
Zinc, total (3052)	mg/kg	134

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16454-08	L16454-07	L16454-05
CLIENTID		97R10/RT-7;7	97R10/RT-7;8	97R10/RT-7;9
SAMPLEDATE		11/16/97 11:40	11/16/97 11:30	11/16/97 11:15
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	85	70	220
Carbonate as CaCO3	mg/L	-2	-2	20
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	85	70	240
Arsenic, dissolved	mg/L	0.007	0.01	0.004
Cadmium, dissolved	mg/L	-0.0005	-0.0005	0.014
Copper, dissolved	mg/L	-0.05	-0.05	0.01
Conductivity @25C	umhos/cm	552	480	681
Molybdenum, dissolved	mg/L	0.39	0.39	0.3
pH (lab)	s.u.	7.9	7.3	8.6
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.001	0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	350	270	400
Uranium, dissolved	mg/L	0.0043	0.0035	0.0061
Zinc, dissolved	mg/L	-0.05	0.03	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0105	0.03	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.3	3.6	116.8
Amount of HCO3 added	mg/L	3.4	9.7	300.0
pH of extraction water	s.u.	7.02	8.01	8.96
Extraction time	min	2175	2175	2175
Final extract	g	2291	2548	2557
weight after filtration	g	2217	-	2537

Solid Analysis		
SAMPLENUM	UNITS	L16400-04
CLIENTID		97R10/RT-7
SAMPLEDATE		11/11/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	10
Copper, total (3052)	mg/kg	60
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	96.3
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.6
Uranium, total (3052)	mg/kg	3.5
Zinc, total (3052)	mg/kg	169

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16454-08	L16454-07	L16454-05
CLIENTID		97R10/RT-7;7	97R10/RT-7;8	97R10/RT-7;9
SAMPLEDATE		11/16/97 11:40	11/16/97 11:30	11/16/97 11:15
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	85	70	220
Carbonate as CaCO3	mg/L	-2	-2	20
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	85	70	240
Arsenic, dissolved	mg/L	0.007	0.01	0.004
Cadmium, dissolved	mg/L	-0.0005	-0.0005	0.014
Copper, dissolved	mg/L	-0.05	-0.05	0.01
Conductivity @25C	umhos/cm	552	480	681
Molybdenum, dissolved	mg/L	0.39	0.39	0.3
pH (lab)	s.u.	7.9	7.3	8.6
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.001	0.001	-0.001
Residue, Filterable (TDS) @180C	mg/L	350	270	400
Uranium, dissolved	mg/L	0.0043	0.0035	0.0061
Zinc, dissolved	mg/L	-0.05	0.03	-0.05
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.0105	0.03	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.3	3.6	116.8
Amount of HCO3 added	mg/L	3.4	9.7	300.0
pH of extraction water	s.u.	7.02	8.01	8.96
Extraction time	min	2175	2175	2175
Final extract	g	2291	2548	2557
weight after filtration	g	2217	-	2537

Solid Analysis		
SAMPLENUM	UNITS	L16400-04
CLIENTID		97R10/RT-7
SAMPLEDATE		11/11/97
Arsenic, total (3052)	mg/kg	10
Cadmium, total (3052)	mg/kg	10
Copper, total (3052)	mg/kg	60
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	96.3
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.6
Uranium, total (3052)	mg/kg	3.5
Zinc, total (3052)	mg/kg	169

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16298-07	L16298-08	L16298-09
CLIENTID		97R13/RT-7;7	97R13/RT-7;8	97R13/RT-7;9
SAMPLEDATE		11/6/97 8:50	11/6/97 9:05	11/7/97 7:50
MWMT Analytical Results				
Bicarbonate as CaCO3	mg/L	95	102	137
Carbonate as CaCO3	mg/L	-2	-2	-2
Hydroxide as CaCO3	mg/L	-2	-2	-2
Total Alkalinity	mg/L	95	102	137
Arsenic, dissolved	mg/L	-0.001	0.001	-0.001
Cadmium, dissolved	mg/L	-0.003	-0.0005	-0.0005
Copper, dissolved	mg/L	-0.01	-0.01	-0.01
Conductivity @25C	umhos/cm	688	751	932
Molybdenum, dissolved	mg/L	0.02	0.01	0.01
pH (lab)	s.u.	7.8	8	8.1
Antimony, dissolved	mg/L	-0.002	-0.002	-0.002
Selenium, dissolved	mg/L	0.005	0.006	0.008
Residue, Filterable (TDS) @180C	mg/L	510	540	710
Uranium, dissolved	mg/L	0.0013	0.0014	0.0025
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01
Laboratory Parameters				
Dry test sample	g	2000	2000	2000
Rate of water addition	mL/min	1.4	1.4	1.4
Original amount of extractant	L	18.925	18.925	18.925
Amount of 0.1 M NaHCO3 added	L	0.008	0.04	0
Amount of NaHCO3 added (g)	g	0	0	7.82
Amount of 0.1 M NaOH added	L	0	0	0.032
Amount of Na added	mg/L	1.0	4.9	116.8
Amount of HCO3 added	mg/L	2.6	12.9	300.0
pH of extraction water	s.u.	7.09	8.1	9.01
Extraction time	min	2220	2220	2880
Final extract	g	2505	2396	1718
weight after filtration	g	2487	2375	1700

Solid Analysis

SAMPLENUM	UNITS	L16199-06
CLIENTID		97R13/RT-7
SAMPLEDATE		10/29/97
Arsenic, total (3052)	mg/kg	3
Cadmium, total (3052)	mg/kg	5
Copper, total (3052)	mg/kg	54
Molybdenum, total (3052)	mg/kg	-5
Solids, Percent	mg/kg	96
Antimony, total (3052)	mg/kg	-2
Selenium (HF)	mg/kg	-0.5
Uranium, total (3052)	mg/kg	1.4
Zinc, total (3052)	mg/kg	126

Negative sign = less than detection limits
Boxed result = less than PQL

SAMPLENUM	UNITS	L16011-12
CLIENTID		Glass Wool;7
SAMPLEDATE		10/15/97 16:00
MWMT Analytical Results		
Bicarbonate as CaCO3	mg/L	5
Carbonate as CaCO3	mg/L	-2
Hydroxide as CaCO3	mg/L	-2
Total Alkalinity	mg/L	5
Arsenic, dissolved	mg/L	-0.001
Cadmium, dissolved	mg/L	-0.0005
Copper, dissolved	mg/L	0.01
Conductivity @25C	umhos/cm	6
Molybdenum, dissolved	mg/L	-0.01
pH (lab)	s.u.	6.1
Antimony, dissolved	mg/L	-0.002
Selenium, dissolved	mg/L	-0.001
Residue, Filterable (TDS) @180C	mg/L	-10
Uranium, dissolved	mg/L	-0.0002
Zinc, dissolved	mg/L	0.02
Laboratory Parameters		
Dry test sample	g	7
Rate of water addition	mL/min	1.4
Original amount of extractant	L	18.925
Amount of 0.1 M NaHCO3 added	L	0.0055
Amount of NaHCO3 added (g)	g	0
Amount of 0.1 M NaOH added	L	0
Amount of Na added	mg/L	0.7
Amount of HCO3 added	mg/L	1.8
pH of extraction water	s.u.	7.05
Extraction time	min	1540
Final extract	g	1978
weight after filtration	g	1978

Negative sign = less than detection limits
Boxed result = less than PQL

APPENDIX A-4

Laboratory Data Sheets for Bed 14

From "Meteoric Water Mobility Procedure and Solid Phase Element Analysis Results"

(Adrian Brown Consultants, 1997)

MWMP Laboratory Data Sheets:

- 97R1/RT-7;7 – DH 97R1 Bed 14 MWMP pH 7
- 97R1/RT-7;8 – DH 97R1 Bed 14 MWMP pH 8
- 97R1/RT-7;9 – DH 97R1 Bed 14 MWMP pH 9
- 97R2/RT-7;7 – DH 97R2 Bed 14 MWMP pH 7
- 97R2/RT-7;8 – DH 97R2 Bed 14 MWMP pH 8
- 97R2/RT-7;9 – DH 97R2 Bed 14 MWMP pH 9
- 97R3/RT-7;7 – DH 97R3 Bed 14 MWMP pH 7
- 97R3/RT-7;8 – DH 97R3 Bed 14 MWMP pH 8
- 97R3/RT-7;9 – DH 97R3 Bed 14 MWMP pH 9
- 97R4/RT-7;7 – DH 97R4 Bed 14 MWMP pH 7
- 97R4/RT-7;8 – DH 97R4 Bed 14 MWMP pH 8
- 97R4/RT-7;9 – DH 97R4 Bed 14 MWMP pH 9
- 97R6/RT-7;7 – DH 97R6 Bed 14 MWMP pH 7
- 97R6/RT-7;8 – DH 97R6 Bed 14 MWMP pH 8
- 97R6/RT-7;9 – DH 97R6 Bed 14 MWMP pH 9
- 97R7/RT-7A;7 – DH 97R7 Bed 14 MWMP pH 7 (A)
- 97R7/RT-7B;7 – DH 97R7 Bed 14 MWMP pH 7 (B)
- 97R7/RT-7;8 – DH 97R7 Bed 14 MWMP pH 8
- 97R7/RT-7;9 – DH 97R7 Bed 14 MWMP pH 9
- 97R8/RT-7;7 – DH 97R8 Bed 14 MWMP pH 7
- 97R8/RT-7;9 – DH 97R8 Bed 14 MWMP pH 9
- 97R9/RT-7;9 – DH 97R9 Bed 14 MWMP pH 9
- 97R10/RT-7;7 – DH 97R10 Bed 14 MWMP pH 7
- 97R10/RT-7;8 – DH 97R10 Bed 14 MWMP pH 8
- 97R10/RT-7;9 – DH 97R10 Bed 14 MWMP pH 9
- 97R13/RT-7;7 – DH 97R13 Bed 14 MWMP pH 7
- 97R13/RT-7;8 – DH 97R13 Bed 14 MWMP pH 8
- 97R13/RT-7;9 – DH 97R13 Bed 14 MWMP pH 9
- Bed 14 MWMT – Bed 14 Outcrop MWMP

Whole Rock Laboratory Data Sheets:

- 97R1/RT-7 – DH 97R1 Bed 14 Whole Rock
- 97R2/RT-7 – DH 97R2 Bed 14 Whole Rock
- 97R3/RT-7 – DH 97R3 Bed 14 Whole Rock

- 97R4/RT-7 – DH 97R4 Bed 14 Whole Rock
- 97R6/RT-7 – DH 97R6 Bed 14 Whole Rock
- 97R7/RT-7 – DH 97R7 Bed 14 Whole Rock
- 97R8/RT-7 – DH 97R8 Bed 14 Whole Rock
- 97R9/RT-7 – DH 97R9 Bed 14 Whole Rock
- 97R10/RT-7 – DH 97R10 Bed 14 Whole Rock
- 97R13/RT-7 – DH 97R13 Bed 14 Whole Rock
- Bed 14 – Bed 14 Outcrop

ACZ

DH 97R1 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16011-09***
Client Sample ID: *97R1/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG54692*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/16/97 10:40*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0120		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		103		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		103		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	334		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	7.9		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	200		mg/L	10	20	10/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R1 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16011-07***
Client Sample ID: *97R1/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG54690*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/16/97 11:15*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0126		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		104		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		104		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	362		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	7.8		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	220		mg/L	10	20	10/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R1 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16011-02***
Client Sample ID: *97R1/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG54685*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/16/97 11:45*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0148		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		131		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		131		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	421		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	7.9		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	270		mg/L	10	20	10/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R2 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16011-04***
Client Sample ID: *97R2/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG54687*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/16/97 10:30*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0023		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		83		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		83		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	682		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	6.9		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	440		mg/L	10	20	10/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R2 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16011-03***
Client Sample ID: *97R2/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG54686*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/16/97 11:00*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0024		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		88		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		88		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	672		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	7.6		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	450		mg/L	10	20	10/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R2 Bed 14 mwmp pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L16011-11*
Client Sample ID: *97R2/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG54694*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/15/97 17:00*
Date Received: *10/17/97*
Date Reported: *10/24/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/23/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/23/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	fp
Copper, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw
Molybdenum, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/22/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/23/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0025		mg/L	0.0002	0.001	10/20/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/22/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		164		mg/L	2	10	10/24/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/24/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/24/97	ss
Total Alkalinity		164		mg/L	2	10	10/24/97	ss
Conductivity @25C	M120.1 - Meter	772		umhos/cm	1	10	10/24/97	ss
pH (lab)	M150.1 - Electrometric	8.1		units	0.1	0.1	10/24/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	480		mg/L	10	20	10/20/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R3 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-05***
Client Sample ID: *97R3/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG56891*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/12/97 09:25*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA	0.002	B	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0109		mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		69		mg/L	2	10	11/20/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/20/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/20/97	ss
Total Alkalinity		69		mg/L	2	10	11/20/97	ss
Conductivity @25C	M120.1 - Meter	383		umhos/cm	1	10	11/20/97	ss
pH (lab)	M150.1 - Electrometric	7.6		units	0.1	0.1	11/20/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	240		mg/L	10	20	11/17/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

QH 97R3 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-04***
Client Sample ID: *97R3/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG56890*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/12/97 09:10*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0109		mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		68		mg/L	2	10	11/20/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/20/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/20/97	ss
Total Alkalinity		68		mg/L	2	10	11/20/97	ss
Conductivity @25C	M120.1 - Meter	360		umhos/cm	1	10	11/20/97	ss
pH (lab)	M150.1 - Electrometric	7.5		units	0.1	0.1	11/20/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	220		mg/L	10	20	11/17/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R3 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-03***
Client Sample ID: *97R3/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG56889*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/12/97 08:50*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0450		mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		177		mg/L	2	10	11/20/97	ss
Carbonate as CaCO3		4	B	mg/L	2	10	11/20/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/20/97	ss
Total Alkalinity		181		mg/L	2	10	11/20/97	ss
Conductivity @25C	M120.1 - Meter	597		umhos/cm	1	10	11/20/97	ss
pH (lab)	M150.1 - Electrometric	8.2		units	0.1	0.1	11/20/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	370		mg/L	10	20	11/17/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R4 Bed 14 mwmP$_{pH}$ 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-11***
Client Sample ID: *97R4/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG54924*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 11:10*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/28/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	10/28/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0006	B	mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/28/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		58		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		58		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	414		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	7.4		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	230		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

pH 97R4 Bed 14 mwmp pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-12***
Client Sample ID: *97R4/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG54925*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 10:55*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/28/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	10/28/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0005	B	mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/28/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		57		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		57		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	473		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	6.5		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	270		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R4 Bed14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-04***
Client Sample ID: *97R4/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG54917*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 10:40*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/27/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.06		mg/L	0.01	0.05	10/27/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0004	B	mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/27/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		46		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		46		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	758		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	6.8		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	510		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R6 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-06***
Client Sample ID: *97R6/RT7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG54919*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 10:30*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/27/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.05		mg/L	0.01	0.05	10/27/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0020		mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/27/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		89		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		89		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	285		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	7.7		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	130		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R6 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-08***
Client Sample ID: *97R6/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG54921*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 10:20*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/28/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.07		mg/L	0.01	0.05	10/27/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0020		mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/27/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		91		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		91		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	295		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	8.0		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	160		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R6 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16071-05***
Client Sample ID: *97R6/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG54918*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/19/97 10:05*
Date Received: *10/22/97*
Date Reported: *10/29/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	10/27/97	fp
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	10/24/97	sh
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	10/24/97	sh
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/27/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	10/27/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	10/25/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0028		mg/L	0.0002	0.001	10/24/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	10/27/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		182		mg/L	2	10	10/28/97	ss
Carbonate as CaCO3			U	mg/L	2	10	10/28/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	10/28/97	ss
Total Alkalinity		182		mg/L	2	10	10/28/97	ss
Conductivity @25C	M120.1 - Meter	461		umhos/cm	1	10	10/28/97	ss
pH (lab)	M150.1 - Electrometric	8.1		units	0.1	0.1	10/28/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	260		mg/L	10	20	10/23/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

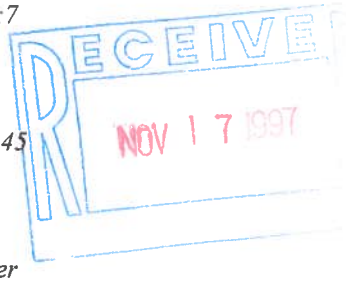
ACZ

DH 97R7 Bed 14 MWMP pH 7 (1)

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16198-10***
Client Sample ID: *97R7/RT-7A;7*
Client Project ID: *1424A*
ACZ Report ID: *RG55992*



Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/30/97 09:45*
Date Received: *10/31/97*
Date Reported: *11/7/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/7/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/7/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/6/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/6/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/6/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/5/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0023		mg/L	0.0002	0.001	11/3/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/6/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		81		mg/L	2	10	11/2/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/2/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/2/97	ss
Total Alkalinity		81		mg/L	2	10	11/2/97	ss
Conductivity @25C	M120.1 - Meter	233		umhos/cm	1	10	11/2/97	ss
pH (lab)	M150.1 - Electrometric	7.7		units	0.1	0.1	11/2/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	140		mg/L	10	20	11/4/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

S. Habermehl for RVP

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R7 Bed 14 MWMP pH 7 (B)

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16198-11***
Client Sample ID: *97R7/RT-7B;7*
Client Project ID: *1424A*
ACZ Report ID: *RG55993*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/30/97 14:20*
Date Received: *10/31/97*
Date Reported: *11/7/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/7/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/7/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.003	0.01	11/6/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/6/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/6/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	11/5/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0022		mg/L	0.0002	0.001	11/3/97	fep
Zinc, dissolved	M200.7 ICP	0.17		mg/L	0.01	0.05	11/6/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		83		mg/L	2	10	11/2/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/2/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/2/97	ss
Total Alkalinity		83		mg/L	2	10	11/2/97	ss
Conductivity @25C	M120.1 - Meter	240		umhos/cm	1	10	11/2/97	ss
pH (lab)	M150.1 - Electrometric	7.8		units	0.1	0.1	11/2/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	150		mg/L	10	20	11/4/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

S. Hausmehl for RVP

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R7 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Lab Sample ID: *L16198-12*
Client Sample ID: *97R7/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG55994*

Date Sampled: *10/30/97 17:15*
Date Received: *10/31/97*
Date Reported: *11/7/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/7/97	ss
Arsenic, dissolved	M206.2 GFAA	0.025		mg/L	0.001	0.005	11/7/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.003	0.01	11/6/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/6/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/6/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	11/5/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0026		mg/L	0.0002	0.001	11/3/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/6/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		91		mg/L	2	10	11/2/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/2/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/2/97	ss
Total Alkalinity		91		mg/L	2	10	11/2/97	ss
Conductivity @25C	M120.1 - Meter	262		umhos/cm	1	10	11/2/97	ss
pH (lab)	M150.1 - Electrometric	7.9		units	0.1	0.1	11/2/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	160		mg/L	10	20	11/4/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

S. Halvorsen for RVP

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R7 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16198-05***
Client Sample ID: *97R7/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG55987*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/30/97 09:15*
Date Received: *10/31/97*
Date Reported: *11/7/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/7/97	ss
Arsenic, dissolved	M206.2 GFAA	0.013		mg/L	0.001	0.005	11/7/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.003	0.01	11/6/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/6/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/6/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	11/6/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0021		mg/L	0.0002	0.001	11/3/97	fep
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/6/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		189		mg/L	2	10	11/2/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/2/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/2/97	ss
Total Alkalinity		189		mg/L	2	10	11/2/97	ss
Conductivity @25C	M120.1 - Meter	405		umhos/cm	1	10	11/2/97	ss
pH (lab)	M150.1 - Electrometric	8.2		units	0.1	0.1	11/2/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	240		mg/L	10	20	11/4/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

S. Habermehl for RVP
Vice President of Operations: Ralph Poulsen

ACZ

DH 97R8 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-06***
Client Sample ID: *97R8/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG56892*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/13/97 08:15*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA	0.008	B	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.195		mg/L	0.004	0.02	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP	0.12		mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP	0.06		mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.030		mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0104		mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP	0.07	B	mg/L	0.05	0.3	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		148		mg/L	2	10	11/20/97	ss
Carbonate as CaCO3		39		mg/L	2	10	11/20/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/20/97	ss
Total Alkalinity		187		mg/L	2	10	11/20/97	ss
Conductivity @25C	M120.1 - Meter	416		umhos/cm	1	10	11/20/97	ss
Lab Filtration	***						11/14/97	rd
pH (lab)	M150.1 - Electrometric	9.2		units	0.1	0.1	11/20/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	260		mg/L	10	20	11/17/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R8 Bed 14 MWMP pH9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-02***
Client Sample ID: *97R8/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG56888*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/13/97 07:50*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA	0.002	B	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.202		mg/L	0.004	0.02	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP	0.09		mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.040		mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.1970		mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		298		mg/L	2	10	11/15/97	ss
Carbonate as CaCO3		65		mg/L	2	10	11/15/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/15/97	ss
Total Alkalinity		363		mg/L	2	10	11/15/97	ss
Conductivity @25C	M120.1 - Meter	774		umhos/cm	1	10	11/15/97	ss
pH (lab)	M150.1 - Electrometric	9.1		units	0.1	0.1	11/15/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	570		mg/L	10	20	11/17/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R9 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16398-01***
Client Sample ID: *97R9/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG56887*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/12/97 09:40*
Date Received: *11/14/97*
Date Reported: *11/25/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/19/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/18/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/19/97	fp
Copper, dissolved	M200.7 ICP	0.24		mg/L	0.01	0.05	11/16/97	ss
Molybdenum, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/16/97	ss
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	11/19/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0004	B	mg/L	0.0001	0.0005	11/19/97	lcj
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/15/97	kr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		243		mg/L	2	10	11/15/97	ss
Carbonate as CaCO3		29		mg/L	2	10	11/15/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/15/97	ss
Total Alkalinity		272		mg/L	2	10	11/15/97	ss
Conductivity @25C	M120.1 - Meter	490		umhos/cm	1	10	11/15/97	ss
pH (lab)	M150.1 - Electrometric	8.7		units	0.1	0.1	11/15/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	570		mg/L	10	20	11/17/97	sts

Note: Sample was re-anlayzed for Conductivity and TDS to verify the reported values.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R10 Bed 14 mwmP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16454-08***
Client Sample ID: *97R10/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG57288*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/16/97 11:40*
Date Received: *11/19/97*
Date Reported: *11/26/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/21/97	fp
Arsenic, dissolved	M206.2 GFAA	0.007		mg/L	0.001	0.005	11/22/97	ss
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/24/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.05	0.3	11/25/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.39		mg/L	0.05	0.3	11/24/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/24/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0043		mg/L	0.0001	0.0005	11/24/97	lcj
Zinc, dissolved	M200.7 ICP		U	mg/L	0.05	0.3	11/25/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		85		mg/L	2	10	11/21/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/21/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/21/97	ss
Total Alkalinity		85		mg/L	2	10	11/21/97	ss
Conductivity @25C	M120.1 - Meter	552		umhos/cm	1	10	11/21/97	ss
pH (lab)	M150.1 - Electrometric	7.9		units	0.1	0.1	11/21/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	350		mg/L	10	20	11/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R10 Bed 14 MWMP pH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16454-07***
Client Sample ID: *97R10/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG57287*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/16/97 11:30*
Date Received: *11/19/97*
Date Reported: *11/26/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/21/97	fp
Arsenic, dissolved	M206.2 GFAA	0.010		mg/L	0.001	0.005	11/22/97	ss
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/24/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.05	0.3	11/25/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.39		mg/L	0.01	0.05	11/21/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	11/24/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0035		mg/L	0.0001	0.0005	11/24/97	lcj
Zinc, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	11/21/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		70		mg/L	2	10	11/21/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/21/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/21/97	ss
Total Alkalinity		70		mg/L	2	10	11/21/97	ss
Conductivity @25C	M120.1 - Meter	480		umhos/cm	1	10	11/21/97	ss
pH (lab)	M150.1 - Electrometric	7.3		units	0.1	0.1	11/21/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	270		mg/L	10	20	11/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

OH 97RID Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16454-05***
Client Sample ID: *97R10/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG57285*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/16/97 11:15*
Date Received: *11/19/97*
Date Reported: *11/26/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/21/97	fp
Arsenic, dissolved	M206.2 GFAA	0.004	B	mg/L	0.001	0.005	11/22/97	ss
Cadmium, dissolved	M213.2 GFAA	0.014	B	mg/L	0.005	0.03	11/25/97	fp
Copper, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/21/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.30		mg/L	0.05	0.3	11/24/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	11/24/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0061		mg/L	0.0001	0.0005	11/24/97	lcj
Zinc, dissolved	M200.7 ICP		U	mg/L	0.05	0.3	11/24/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		220		mg/L	2	10	11/21/97	ss
Carbonate as CaCO3		20		mg/L	2	10	11/21/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/21/97	ss
Total Alkalinity		240		mg/L	2	10	11/21/97	ss
Conductivity @25C	M120.1 - Meter	681		umhos/cm	1	10	11/21/97	ss
pH (lab)	M150.1 - Electrometric	8.6		units	0.1	0.1	11/21/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	400		mg/L	10	20	11/21/97	ac

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

OH 97R13 Bed 14 MWMP pH 7

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16298-07***
Client Sample ID: *97R13/RT-7;7*
Client Project ID: *1424A*
ACZ Report ID: *RG56404*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/6/97 08:50*
Date Received: *11/8/97*
Date Reported: *11/13/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/11/97	ss
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	11/11/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.003	0.01	11/12/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/13/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	11/12/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.005		mg/L	0.001	0.005	11/12/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0013		mg/L	0.0002	0.001	11/13/97	fep
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/12/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		95		mg/L	2	10	11/13/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/13/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/13/97	ss
Total Alkalinity		95		mg/L	2	10	11/13/97	ss
Conductivity @25C	M120.1 - Meter	688		umhos/cm	1	10	11/13/97	ss
pH (lab)	M150.1 - Electrometric	7.8		units	0.1	0.1	11/13/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	510		mg/L	10	20	11/10/97	sts

Note: The Dissolved Cadmium value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R13 Bed 14 mwmpH 8

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16298-08***
Client Sample ID: *97R13/RT-7;8*
Client Project ID: *1424A*
ACZ Report ID: *RG56405*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/6/97 09:05*
Date Received: *11/8/97*
Date Reported: *11/13/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/11/97	ss
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	11/11/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/12/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/13/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/12/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.006		mg/L	0.001	0.005	11/12/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0014		mg/L	0.0002	0.001	11/13/97	fep
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/12/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		102		mg/L	2	10	11/13/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/13/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/13/97	ss
Total Alkalinity		102		mg/L	2	10	11/13/97	ss
Conductivity @25C	M120.1 - Meter	751		umhos/cm	1	10	11/13/97	ss
pH (lab)	M150.1 - Electrometric	8.0		units	0.1	0.1	11/13/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	540		mg/L	10	20	11/10/97	sts

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R13 Bed 14 MWMP pH 9

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16298-09***
Client Sample ID: *97R13/RT-7;9*
Client Project ID: *1424A*
ACZ Report ID: *RG56406*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/7/97 07:50*
Date Received: *11/8/97*
Date Reported: *11/13/97*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.002	0.01	11/11/97	ss
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	11/11/97	fp
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	11/12/97	fp
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/13/97	jaw
Molybdenum, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	11/12/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.008		mg/L	0.001	0.005	11/12/97	bg
Uranium, dissolved	M200.8 ICP-MS	0.0025		mg/L	0.0002	0.001	11/13/97	fep
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	11/12/97	jaw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		137		mg/L	2	10	11/13/97	ss
Carbonate as CaCO3			U	mg/L	2	10	11/13/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	11/13/97	ss
Total Alkalinity		137		mg/L	2	10	11/13/97	ss
Conductivity @25C	M120.1 - Meter	932		umhos/cm	1	10	11/13/97	ss
pH (lab)	M150.1 - Electrometric	8.1		units	0.1	0.1	11/13/97	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	710		mg/L	10	20	11/10/97	sts

Note: The Dissolved Cadmium value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R Poulsen

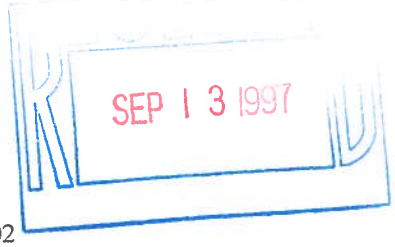
Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop MWMP

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493



Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209
Susan Wyman

Lab Sample ID: ***L15308-01***
Client Sample ID: *Bed 14 MWMT*
Client Project ID:
ACZ Report ID: *RG51368*

Date Sampled: *8/29/97 15:50*
Date Received: *9/2/97*
Date Reported: *9/10/97*

Sample Matrix: *Surface Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, total	M200.7 ICP		U	mg/L	0.03	0.2	9/5/97	jaw
Antimony, total	M204.2 GFAA		U	mg/L	0.002	0.01	9/8/97	sh
Arsenic, total	M206.2 GFAA		U	mg/L	0.001	0.005	9/3/97	sh
Barium, total	M200.7 ICP	0.552		mg/L	0.003	0.01	9/5/97	jaw
Beryllium, total	M210.2 GFAA		U	mg/L	0.0005	0.003	9/8/97	sh
Bismuth, total	M200.7 ICP		U	mg/L	0.1	0.5	9/5/97	jaw
Cadmium, total	M213.2 GFAA		U	mg/L	0.003	0.01	9/8/97	sh
Calcium, dissolved	M200.7 ICP	81.6		mg/L	0.2	1	9/8/97	kr
Chromium, total	M200.7 ICP		U	mg/L	0.01	0.05	9/5/97	jaw
Cobalt, total	M200.7 ICP		U	mg/L	0.01	0.05	9/5/97	jaw
Copper, total	M200.7 ICP	0.01	B	mg/L	0.01	0.05	9/5/97	jaw
Gallium, total	M200.7 ICP		U	mg/L	0.1	0.5	9/5/97	jaw
Iron, total	M200.7 ICP		U	mg/L	0.01	0.05	9/5/97	jaw
Lead, total	M239.2 GFAA		U	mg/L	0.001	0.005	9/4/97	sh
Lithium, total	M200.7 ICP	0.02	B	mg/L	0.02	0.1	9/5/97	jaw
Magnesium, dissolved	M200.7 ICP	17.2		mg/L	0.2	1	9/8/97	kr
Manganese, total	M200.7 ICP		U	mg/L	0.005	0.03	9/5/97	jaw
Mercury, total	M245.1 CVAA		U	mg/L	0.0002	0.001	9/5/97	bg
Molybdenum, total	M200.7 ICP		U	mg/L	0.01	0.05	9/5/97	jaw
Nickel, total	M200.7 ICP		U	mg/L	0.01	0.05	9/5/97	jaw
Potassium, dissolved	M200.7 ICP	17.6		mg/L	0.3	1	9/8/97	kr
Scandium, total	M200.7 ICP		U	mg/L	0.1	0.5	9/5/97	jaw
Selenium, total	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	9/9/97	bg
Silver, total	M200.7 ICP		U	mg/L	0.005	0.03	9/9/97	jaw
Sodium, dissolved	M200.7 ICP	209		mg/L	0.3	1	9/8/97	kr
Strontium, total	M200.7 ICP	1.04		mg/L	0.01	0.05	9/5/97	jaw
Thallium, total	M279.2 GFAA		U	mg/L	0.002	0.01	9/8/97	sh
Tin, total	M200.7 ICP		U	mg/L	0.1	0.5	9/9/97	lcj
Titanium. total	M200.7 ICP		U	mg/L	0.005	0.03	9/5/97	jaw
Uranium, total	M200.8 ICP-MS	0.009	B	mg/L	0.002	0.01	9/10/97	fep
Vanadium, total	M200.7 ICP		U	mg/L	0.005	0.03	9/5/97	jaw
Zinc, total	M200.7 ICP	0.02	B	mg/L	0.01	0.05	9/5/97	jaw

Outcrop

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop MWMP

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15308-01***
Client Sample ID: *Bed 14 MWMT*
Client Project ID:
ACZ Report ID: *RG51368*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209
Susan Wyman

Date Sampled: *8/29/97 15:50*
Date Received: *9/2/97*
Date Reported: *9/10/97*

Sample Matrix: *Surface Water*

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010 ICP						9/8/97	laa
Total Hot Plate Digestion	M3010 GFAA						9/3/97	rd
Total Hot Plate Digestion	M3010 ICP-MS						9/4/97	rd

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		646		mg/L	2	10	9/4/97	ss
Carbonate as CaCO3			U	mg/L	2	10	9/4/97	ss
Hydroxide as CaCO3			U	mg/L	2	10	9/4/97	ss
Total Alkalinity		646		mg/L	2	10	9/4/97	ss
Chloride	M325.2 - Colorimetric (RFA)	2	B	mg/L	1	5	9/5/97	gm
Cyanide, WAD	SM4500-CN I-Colorimetric w/ macro dist.		U	mg/L	0.03	0.1	9/9/97	jb
Fluoride	M340.2 - ISE	1.3		mg/L	0.1	0.5	9/9/97	mh
Nitrate as N, dissolved	M353.2 - Automated Cadmium Reduction	0.78		mg/L	0.02	0.1	9/2/97	gm
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.79		mg/L	0.02	0.1	9/2/97	gm
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.01	B	mg/L	0.01	0.05	9/2/97	gm
pH (lab)	M150.1 - Electrometric	8.0		units	0.1	0.1	9/4/97	ss
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	0.027		mg/L	0.005	0.03	9/3/97	jb
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	730		mg/L	10	20	9/4/97	ac
Sulfate	M375.3 - Gravimetric	10	B	mg/L	10	20	9/5/97	ac

Note: The Total Beryllium and Silver values are estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop MWMP

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Spgs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15308-01***
Client Sample ID: *Bed 14 MWMT*
Client Project ID:
ACZ Report ID:

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209

Date Sampled: *8/29/97*
Date Received: *9/2/97*
Date Reported: *9/9/97*

Att: Susan Wyman

Matrix: *Water*

Parameter	EPA Method	Result	Error (+/-)	Qual	Units	MDL	PQL	Date	Analyst
Gross alpha	EPA 9310	8	8	B	pCi/L	6	28	9-Sep-97	jjs
Gross beta	EPA 9310	19	6	B	pCi/L	6	29	9-Sep-97	jjs

Remarks:

Inorganic Qualifiers (based on EPA CLP 3/90)
< = Analyte at a concentration less than the detection limit
B = Concentration for analyte estimated between MDL and PQL
PQL = Practical Quantitation Limit

S. Halvemehl for RLP
VP-Operations: Ralph Poulsen

ACZ

DH 97R1 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15835-03***
Client Sample ID: *97R1/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG54091*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/2/97 00:00*
Date Received: *10/6/97*
Date Reported: *10/20/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	10	50	10/15/97	sh
Arsenic, total (3052)	M206.2 GFAA	10	B	mg/Kg	10	50	10/16/97	sh
Cadmium, total (3052)	M6010 ICP	6	B	mg/Kg	2	8	10/16/97	jaw
Copper, total (3052)	M6010 ICP	18	B	mg/Kg	5	30	10/15/97	kr/ss
Molybdenum, total (3052)	M6010 ICP	69		mg/Kg	5	30	10/15/97	kr/ss
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	10/16/97	bg
Uranium, total (3052)	M6020 ICPMS	2	B	mg/Kg	1.26	6.31	10/17/97	fep
Zinc, total (3052)	M6010 ICP	107		mg/Kg	5	30	10/15/97	kr/ss

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.5		%	0.1	0.5	10/13/97	as/cc

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						10/14/97	as

Note: The Molybdenium and Zinc values are estimated due to contamination of the digestion reagents @ 73 and 59 mg/Kg.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R2 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15835-02***
Client Sample ID: *97R2/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG54090*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/2/97 00:00*
Date Received: *10/6/97*
Date Reported: *10/20/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	10	50	10/15/97	sh
Arsenic, total (3052)	M206.2 GFAA	10	B	mg/Kg	10	50	10/16/97	sh
Cadmium, total (3052)	M6010 ICP	5	B	mg/Kg	2	8	10/16/97	jaw
Copper, total (3052)	M6010 ICP	266		mg/Kg	5	30	10/15/97	kr/ss
Molybdenum, total (3052)	M6010 ICP	72		mg/Kg	5	30	10/15/97	kr/ss
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	10/16/97	bg
Uranium, total (3052)	M6020 ICPMS	2	B	mg/Kg	1.31	6.53	10/17/97	fep
Zinc, total (3052)	M6010 ICP	104		mg/Kg	5	30	10/15/97	kr/ss

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	97.7		%	0.1	0.5	10/13/97	as/cc

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						10/14/97	as

Note: The Molybdenium and Zinc values are estimated due to contamination of the digestion reagents @ 73 and 59 mg/Kg.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R3 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16400-02***
Client Sample ID: *97R3/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG56986*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/10/97 00:00*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	2	10	11/21/97	fp
Arsenic, total (3052)	M206.2 GFAA	9	B	mg/Kg	3	10	11/20/97	ss
Cadmium, total (3052)	M6010 ICP	6	B	mg/Kg	2	8	11/19/97	kr
Copper, total (3052)	M6010 ICP	23	B	mg/Kg	5	30	11/21/97	kr
Molybdenum, total (3052)	M6010 ICP		U	mg/Kg	5	30	11/19/97	kr
Selenium, total (3052)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	11/21/97	bg
Uranium, total (3052)	M6020 ICPMS	2.10		mg/Kg	0.25	1.25	11/20/97	lcj
Zinc, total (3052)	M6010 ICP	90		mg/Kg	5	30	11/19/97	kr

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.4		%	0.1	0.5	11/18/97	sw

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						11/19/97	as

Note: Duplicate precision for Total Copper exceeds ACZ's QC criteria. Zinc is present in the digestion acids/reagents at 78 mg/L.

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R Poulsen

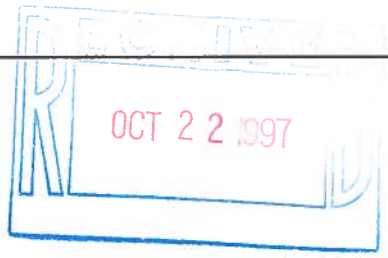
Vice President of Operations: Ralph Poulsen

ACZ

DH 97R4 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493



Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Lab Sample ID: ***L15835-01***
Client Sample ID: *97R4/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG54089*

Date Sampled: *10/3/97 00:00*
Date Received: *10/6/97*
Date Reported: *10/20/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	10	50	10/15/97	sh
Arsenic, total (3052)	M206.2 GFAA		U	mg/Kg	10	50	10/16/97	sh
Cadmium, total (3052)	M6010 ICP	10		mg/Kg	2	8	10/16/97	jaw
Copper, total (3052)	M6010 ICP	59		mg/Kg	5	30	10/15/97	kr/ss
Molybdenum, total (3052)	M6010 ICP	73		mg/Kg	5	30	10/15/97	kr/ss
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	10/16/97	bg
Uranium, total (3052)	M6020 ICPMS		U	mg/Kg	1.31	6.55	10/17/97	fep
Zinc, total (3052)	M6010 ICP	105		mg/Kg	5	30	10/15/97	kr/ss

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.9		%	0.1	0.5	10/13/97	as/cc

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						10/14/97	as

Note: The Molybdenium and Zinc values are estimated due to contamination of the digestion reagents @ 73 and 59 mg/Kg.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R6 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15851-04***
Client Sample ID: *97R6/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG54096*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/6/97 00:00*
Date Received: *10/7/97*
Date Reported: *10/20/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	10	50	10/15/97	sh
Arsenic, total (3052)	M206.2 GFAA	10	B	mg/Kg	10	50	10/16/97	sh
Cadmium, total (3052)	M6010 ICP	4	B	mg/Kg	2	8	10/16/97	jaw
Copper, total (3052)	M6010 ICP	19	B	mg/Kg	5	30	10/15/97	kr/ss
Molybdenum, total (3052)	M6010 ICP	64		mg/Kg	5	30	10/15/97	kr/ss
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	10/16/97	bg
Uranium, total (3052)	M6020 ICPMS		U	mg/Kg	1.27	6.36	10/17/97	fep
Zinc, total (3052)	M6010 ICP	80		mg/Kg	5	30	10/15/97	kr/ss

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.7		%	0.1	0.5	10/14/97	as

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						10/14/97	as

Note: The Molybdenium and Zinc values are estimated due to contamination of the digestion reagents @ 73 and 59 mg/Kg.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R7 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15851-03***
Client Sample ID: *97R7/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG54095*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *10/6/97 00:00*
Date Received: *10/7/97*
Date Reported: *10/20/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	10	50	10/15/97	sh
Arsenic, total (3052)	M206.2 GFAA	10	B	mg/Kg	10	50	10/16/97	sh
Cadmium, total (3052)	M6010 ICP	4	B	mg/Kg	2	8	10/16/97	jaw
Copper, total (3052)	M6010 ICP	197		mg/Kg	5	30	10/15/97	kr/ss
Molybdenum, total (3052)	M6010 ICP	63		mg/Kg	5	30	10/15/97	kr/ss
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	10/16/97	bg
Uranium, total (3052)	M6020 ICPMS		U	mg/Kg	1.26	6.31	10/17/97	fep
Zinc, total (3052)	M6010 ICP	80		mg/Kg	5	30	10/15/97	kr/ss

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.6		%	0.1	0.5	10/14/97	as

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						10/14/97	as

Note: The Molybdenium and Zinc values are estimated due to contamination of the digestion reagents @ 73 and 59 mg/Kg.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R8 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16400-06***
Client Sample ID: *97R8/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG56990*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/10/97 00:00*
Date Received: *11/14/97*
Date Reported: *11/30/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	2	10	11/21/97	fp
Arsenic, total (3052)	M206.2 GFAA	4.2		mg/Kg	0.5	3	11/20/97	ss
Cadmium, total (3052)	M6010 ICP	4	B	mg/Kg	2	8	11/19/97	kr
Copper, total (3052)	M6010 ICP	278		mg/Kg	5	30	11/21/97	kr
Molybdenum, total (3052)	M6010 ICP		U	mg/Kg	5	30	11/19/97	kr
Selenium, total (3052)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	11/21/97	bg
Uranium, total (3052)	M6020 ICPMS	4.200		mg/Kg	0.251	1.26	11/20/97	lcj
Zinc, total (3052)	M6010 ICP	95		mg/Kg	5	30	11/19/97	kr

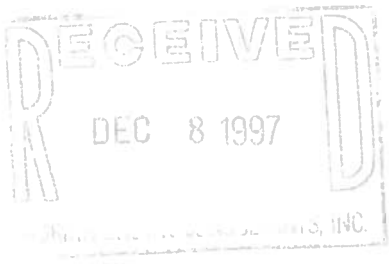
Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.6		%	0.1	0.5	11/18/97	sw

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						11/19/97	as

Note: Duplicate precision for Total copper exceeds ACZ's QC criteria. Zinc is present in the digestion acids/reagents at 78 mg/L.



Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R9 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16400-05***
Client Sample ID: *97R9/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG56989*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/10/97 00:00*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	2	10	11/21/97	fp
Arsenic, total (3052)	M206.2 GFAA		U	mg/Kg	3	10	11/20/97	ss
Cadmium, total (3052)	M6010 ICP	4	B	mg/Kg	2	8	11/19/97	kr
Copper, total (3052)	M6010 ICP	5670		mg/Kg	5	30	11/21/97	kr
Molybdenum, total (3052)	M6010 ICP		U	mg/Kg	5	30	11/19/97	kr
Selenium, total (3052)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	11/21/97	bg
Uranium, total (3052)	M6020 ICPMS	4.000		mg/Kg	0.267	1.34	11/20/97	lcj
Zinc, total (3052)	M6010 ICP	134		mg/Kg	5	30	11/19/97	kr

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.5		%	0.1	0.5	11/18/97	sw

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						11/19/97	as

Note: Duplicate precision for Total Copper exceeds ACZ's QC criteria. Zinc is present in the digestion acids/reagents at 78 mg/L.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R10 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16400-04***
Client Sample ID: *97R10/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG56988*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *11/11/97 00:00*
Date Received: *11/14/97*
Date Reported: *11/21/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	2	10	11/21/97	fp
Arsenic, total (3052)	M206.2 GFAA	10		mg/Kg	3	10	11/20/97	ss
Cadmium, total (3052)	M6010 ICP	10		mg/Kg	2	8	11/19/97	kr
Copper, total (3052)	M6010 ICP	60		mg/Kg	5	30	11/21/97	kr
Molybdenum, total (3052)	M6010 ICP		U	mg/Kg	5	30	11/19/97	kr
Selenium, total (3052)	M7742 Modified, AA-Hydride		U	mg/Kg	0.6	3	11/21/97	bg
Uranium, total (3052)	M6020 ICPMS	3.50		mg/Kg	0.26	1.3	11/20/97	lcj
Zinc, total (3052)	M6010 ICP	169		mg/Kg	5	30	11/19/97	kr

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.3		%	0.1	0.5	11/18/97	sw

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						11/19/97	as

Note: Duplicate precision for Total Copper exceeds ACZ's QC criteria. Zinc is present in the digestion acids/reagents at 78 mg/L.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

DH 97R13 Bed 14 Whole Rock

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L16199-06***
Client Sample ID: *A97R13/RT-7*
Client Project ID: *1424A*
ACZ Report ID: *RG56984*

Adrian Brown Consultants, Inc.
333 W. Bayaud Ave.
Denver, CO 80223
Paula Kelsey

Date Sampled: *10/29/97 00:00*
Date Received: *10/31/97*
Date Reported: *11/21/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	2	10	11/21/97	fp
Arsenic, total (3052)	M206.2 GFAA	3	B	mg/Kg	3	10	11/20/97	ss
Cadmium, total (3052)	M6010 ICP	5	B	mg/Kg	1	6	11/19/97	kr
Copper, total (3052)	M6010 ICP	54		mg/Kg	5	30	11/18/97	kr
Molybdenum, total (3052)	M6010 ICP		U	mg/Kg	5	30	11/18/97	kr
Selenium, total (3052)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	11/21/97	bg
Uranium, total (3052)	M6020 ICPMS	1.400		mg/Kg	0.265	1.32	11/17/97	lcj
Zinc, total (3052)	M6010 ICP	126		mg/Kg	5	30	11/18/97	kr

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.0		%	0.1	0.5	11/6/97	as

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
ICP 3052 Digestion	M3052						11/14/97	as

Note: Zinc is present in the digestion acids/reagents at 85 mg/L.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

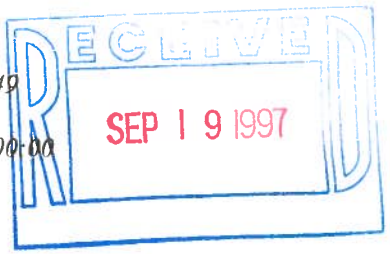
ACZ

Bed 14 Outcrop

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15396-01***
Client Sample ID: *Bed 14*
Client Project ID: *945*
ACZ Report ID: *RG51949*



Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *9/8/97 00:00*
Date Received: *9/9/97*
Date Reported: *9/16/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, total (3052)	M6010 ICP	40100		mg/Kg	20	80	9/11/97	jaw
Antimony, total (3052)	M7041 GFAA		U	mg/Kg	5	30	9/12/97	sh
Arsenic, total (3052)	M206.2 GFAA	4	B	mg/Kg	3	10	9/15/97	sh
Barium, total (3052)	M6010 ICP	638		mg/Kg	8	30	9/16/97	jaw
Beryllium, total (3052)	M6010 ICP	1	B	mg/Kg	1	5	9/11/97	jaw
Bismuth, total (3052)	M6010 ICP		U	mg/Kg	50	300	9/11/97	jaw
Cadmium, total (3052)	M6010 ICP	5	B	mg/Kg	2	8	9/11/97	jaw
Calcium, total (3052)	M6010 ICP	135000		mg/Kg	100	500	9/11/97	jaw
Chromium, total (3052)	M6010 ICP	26	B	mg/Kg	5	30	9/11/97	jaw
Cobalt, total (3052)	M6010 ICP	9	B	mg/Kg	5	30	9/11/97	jaw
Copper, total (3052)	M6010 ICP	12	B	mg/Kg	5	30	9/11/97	jaw
Gallium, total (3052)	M6010 ICP		U	mg/Kg	50	300	9/15/97	jaw
Iron, total (3052)	M6010 ICP	15000		mg/Kg	5	30	9/11/97	jaw
Lead, total (3052)	M206.2 GFAA	12		mg/Kg	3	10	9/15/97	sh
Lithium, total (3052)	M6010 ICP	20	B	mg/Kg	10	50	9/11/97	jaw
Magnesium, total (3052)	M6010 ICP	7830		mg/Kg	100	500	9/11/97	jaw
Manganese, total (3052)	M6010 ICP	658		mg/Kg	3	5	9/11/97	jaw
Mercury, total	M7471 CVAA	0.54		mg/Kg	0.02	0.1	9/16/97	bg
Molybdenum, total (3052)	M6010 ICP	71		mg/Kg	5	30	9/15/97	jaw
Nickel, total (3052)	M6010 ICP		U	mg/Kg	30	100	9/16/97	kr
Potassium, total (3052)	M6010 ICP	20000		mg/Kg	200	500	9/11/97	jaw
Scandium, total (3052)	M6010 ICP		U	mg/Kg	50	300	9/11/97	jaw
Selenium, total (3052)	M270.2 GFAA		U	mg/Kg	50	300	9/12/97	sh
Silver, total (3052)	M6010 ICP	3	B	mg/Kg	3	10	9/15/97	jaw
Sodium, total (3052)	M6010 ICP	700		mg/Kg	200	500	9/11/97	jaw
Strontium, total (3052)	M6010 ICP	243		mg/Kg	5	30	9/11/97	jaw
Thallium, total (3052)	M6010 ICP		U	mg/Kg	100	500	9/11/97	jaw
Tin, total (3052)	M6010 ICP	100	B	mg/Kg	50	300	9/11/97	jaw
Titanium, total (3052)	M6010 ICP	1770		mg/Kg	10	70	9/16/97	jaw
Vanadium, total (3052)	M6010 ICP	39		mg/Kg	3	10	9/11/97	jaw
Zinc, total (3052)	M6010 ICP	120		mg/Kg	5	30	9/15/97	jaw

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.5		%	0.1	0.5	9/9/97	sw
Sulfur, total	ASTM D-4239-85C, LECO Furnace		U	%	0.01	0.1	9/10/97	sw

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15396-01***
Client Sample ID: *Bed 14*
Client Project ID: *945*
ACZ Report ID: *RG51949*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *9/8/97 00:00*
Date Received: *9/9/97*
Date Reported: *9/16/97*

Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						9/9/97	sw
Crush and Pulverize	USDA No. 1, 1972						9/10/97	as
ICP 3052 Digestion	M3052						9/11/97	as
Water Extraction	ASA No. 9 10-2.3.2						9/10/97	sw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3, soluble (Water)	M310.1 - Titration							
Bicarbonate as CaCO3			U	mg/Kg	2	10	9/15/97	cbr
Carbonate as CaCO3			U	mg/Kg	2	10	9/15/97	cbr
Hydroxide as CaCO3			U	mg/Kg	2	10	9/15/97	cbr
Total Alkalinity			U	mg/Kg	2	10	9/15/97	cbr
Chloride, soluble (Water)	M325.2 - Colorimetric	69		mg/Kg	5	30	9/16/97	gm
Fluoride, soluble (Water)	M340.2 - ISE	4.6		mg/Kg	0.5	3	9/12/97	mh/ac
Nitrate as N, soluble (Water)	M353.2 - Automated	1.1		mg/Kg	0.1	0.5	9/15/97	lcj
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated	1.2		mg/Kg	0.1	0.5	9/15/97	lcj
Nitrite as N, soluble (Water)	M353.2 - Automated	0.06	B	mg/Kg	0.05	0.3	9/15/97	lcj
Sulfate, soluble (Water)	M375.3 - Gravimetric	130		mg/Kg	30	50	9/15/97	ac

Note: Duplicate precision for Barium (3052) exceeds ACZ's QC criteria. The Molybdenum (3052), Nickel (3052) and Zinc (3052) values are estimated due to reagents used in the 3052 digestion. The Seleniun value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RNP

Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15547-01***
Client Sample ID: *Bed 14*
Client Project ID: *945*
ACZ Report ID: *RG52435*

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209-9630
Paula Kelsey

Date Sampled: *9/8/97 00:00*
Date Received: *9/9/97*
Date Reported: *9/24/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Selenium (HF)	M7742 Modified, AA-Hydride		U	mg/Kg	0.5	3	9/23/97	bg
Uranium, total (3052)	M6020 ICPMS	1.700	B	mg/Kg	0.545	2.73	9/24/97	fep

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Bed 14 Outcrop

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Spgs, CO 80487
(800) 334-5493

Lab Sample ID: ***L15547-01***
Client Sample ID: *Bed 14*
Client Project ID: *945*
ACZ Report ID:

Adrian Brown Consultants, Inc.
155 S. Madison Street Suite 302
Denver, CO 80209

Date Sampled: *9/8/97*
Date Received: *9/9/97*
Date Reported: *9/24/97*

Att: Paula Kelsey

Matrix: *Soil*

Parameter	EPA Method	Result	Error (+/-)	Qual	Units	MDL	PQL	Date	Analyst
Gross alpha	EPA 9310/3052			<	pCi/g	10	52	23-Sep-97	cbr
Gross beta	EPA 9310/3052	22	11	B	pCi/g	11	57	23-Sep-97	cbr

Remarks:

Inorganic Qualifiers (based on EPA CLP 3/90)
< = Analyte at a concentration less than the detection limit
B = Concentration for analyte estimated between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

VP-Operations: Ralph Poulsen

ARCADIS

Appendix A-5

Column Testing Program Report

(Whetstone 2014)

METHOD AND RESULTS for ADDITIONAL GEOCHEMICAL TESTING OF LISBON VALLEY MINE WASTE ROCK

Prepared for:

LISBON VALLEY MINING CO

LISBON VALLEY MINING CO., LLC
755 N. Main Street, Suite B
P.O. Box 400
Moab, Utah 84532

Prepared by

Whetstone Associates, Inc.
104 W. Ruby Avenue
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(970) 641-7471
Document 4124.140327

March 2014

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Attachment 2. GeoSystems Report on Thin Section and X-Ray Diffraction Analyses, Lisbon Valley Project
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1. INTRODUCTION

Geochemical testing of waste rock from the Lisbon Valley Mine was conducted from November 2013 through February 2014 to support the technical evaluation of backfilling the open pits. The results of this study supplement previous geochemical testing (Table 1) to form the foundation for assessing the potential impacts to groundwater from proposed backfilling in the Centennial Pit. The additional geochemical characterization described herein was requested by the United States Department of Interior Bureau of Land Management, Moab Field Office (BLM) and their technical consultants to further evaluate proposed changes in the mining plan and associated changes in waste rock handling.

The geochemical testing was performed in accordance with procedures specified in the Work Plan for Additional Geochemical Testing prepared by Whetstone Associates, Inc., (Whetstone). The draft Work Plan was submitted to BLM and the Utah Division of Geology and Mining (DOGM) for review and comment in November 2013 (Whetstone, 2013b). The Work Plan was finalized in January 2014 (Whetstone, 2014) and describes:

1. Procedures for sample collection, preparation, and testing
2. The number, distribution, and type of tested samples
3. Quality Assurance (QA) and Quality Control (QC) procedures
4. The framework for data review, validation, and reporting

The study involved collecting 15 samples from 12 locations of weathered rock exposure in the walls of the Centennial and Sentinel West pits. The samples were composited and representative splits were prepared for column leaching tests, acid-base accounting (ABA), meteoric water mobility procedure (MWMP) tests, inductively coupled plasma atomic emission spectroscopy and mass spectrometry (ICP-AES and ICP-MS) for whole rock elemental content, x-ray diffraction (XRD), and transmitted light thin-section microscopy. The column leaching tests were performed to assess the ability of meteoric water mobility procedure (MWMP) tests to characterize potential geochemical releases from saturated backfill, and to specifically address issues of contact time and water:rock ratio.

Analytical work for the study was performed by ACZ Laboratories, Inc. (ACZ) of Steamboat Springs, Colorado. The petrographic work was completed by GeoSystems, LLP of Kingwood, Texas. Whetstone provided oversight for the study, and was responsible for sample preparation, particle size analysis, and column testing.

The purpose of this report is to summarize the testing procedures and results. The data generated by this study is part of the larger geochemical and hydrologic evaluation of the proposed action.

Table 1. Water Quality and Bed 14 and Bed 15 Geochemical Characterization for the Centennial Pit Area

Test Type	EIS (1997)	Adrian Brown Consultants (1998)	Operational Characterization (2005 - 2013)[1]	Compliance Monitoring (1998 - 2013)	Column Testing Program	Total - Current Study
ABA[1]	98	--	32	--	5	135
SPLP	3	--	--	--	--	3
MWMP Single Extraction[2]	--	10	42	--	5	57
MWMP Multiple Extraction[2]	--	--	2	--	--	2
Mineralogy[4]	--	--	--	--	4	4
Total Elemental Analysis	--	--	--	45	4	4
Column Testing[5]	--	--	--	46	5	5
Groundwater Samples: Burro Canyon Aquifer MW96-7A	8	--	--	46	2	48
Groundwater Samples: Burro Canyon Aquifer SLV3/PW-3	13	--	--	47		47

Notes: -- = None or not determined.

[1] Seven of the 98 samples subjected to ABA for the EIS were composited with waste rock from other beds.

[2] No MWMP samples were collected for operational characterization of waste rock from Jan 2008 - Mar 2009 during the mine shutdown because no waste rock was generated.

[3] Multiple extraction MWMP testing was conducted for the backfill evaluation and is not a standard method associated with the operational characterization program.

[4] X-ray diffraction (XRD) and transmitted light thin-section microscopy (this report).

[5] Includes a Bed 14 primary and replicate from Centennial Pit (this report).

2. GEOLOGIC SETTING

2.1 Geologic Setting

The Lisbon Valley Mine is a sandstone-hosted copper deposit located in the Paradox Basin, part of the Colorado Plateau Geologic Province. The Paradox Basin was a depositional basin in Pennsylvanian and Permian time, marked by the deposition of a thick sequence of evaporates, including salt and potash, with gypsum occurring at the base of this sequence. Shortly after burial, the weak, plastic evaporitic horizons were deformed in response to regional compression, largely as a result of uplift of the Uncompahgre region to the northeast. The result was a series of northwest-southeast anticlines, with salt occurring along the center of the anticline axis. The Lisbon Valley Anticline is one such regional structure.

The weight of the overlying sedimentary sequences on the underlying plastic salt accumulations along the central axis of the anticlines resulted in the collapse of the sedimentary sequences along fault and fold structures on the limbs of the anticlines. Faults and folds occur in the limbs of the anticlines, parallel to the regional trend of the anticlinal axis. The Lisbon Valley Fault is a primary structural feature that occurs near the Lisbon Valley Mine, southwest of the axis of the Lisbon Valley Anticline. To the northeast of the axis of the anticline, displacement was more of a combination of folding and faulting of the sequence. Due to the collapse, alluvium occurring along the axis of the anticline can be unusually thick locally (up to 700 feet or more).

The sedimentary host rock sequence for the Lisbon Valley copper deposits consist of the lower Cretaceous age Burro Canyon Formation and the overlying Dakota Formation. These units consist of interbedded

sandstone, siltstone, and shale lithologies. A numbering system has been developed to identify the stratigraphic sequence in the deposit area to facilitate mapping, logging, and correlation (Table 2).

Table 2. Stratigraphy and Bed Numbering System for the Lisbon Valley Mine

Unit Number	Formation	Lithology	Thickness (feet)	Copper Mineralization
1	Quaternary	red and yellow sand and silt, aeolian or alluvial	0-40	none
2	Mancos	black to brownish-green shale with local gypsum	0-70 in drillholes	sporadic, low-grade
3	Dakota	buff to white sandstone, may have shale at base	15-20	
4	Dakota	buff to white sandstone, minor gray shale	15-20	local economic grades
5	Dakota	buff sandstone, fine- to medium-grained	15-20	local economic grades at base
6	Dakota	coal, grades into carbonaceous shale	5-20	minor, at top
7	Dakota	light gray shale, may grade into sandstone	10-20	none
8	Dakota	coal, similar to #6 but shaley or sandy with pyrite balls	5-20	low-grade
9	Dakota	light gray shale, grading into fine-grained sandstone as #10	5-10	none
10	Dakota	sandstone with local mudstone, similar to #9	0-15	local economic grades
11	Dakota	white or buff sandstone, 1-10% shale or organics, similar to #__ when white	2-35	major ore host, GTO & Centennial
12	Dakota	greenish shale and sandstone, often pyritic	5-20	Locally minor
13	Dakota	white, buff or orange sandstone, poorly-cemented, similar to #11	20-50	major ore host, GTO & Centennial
14	Burro Canyon	varicolored shale, may grade into cherty limestone or conglomerate	70-120	
15	Burro Canyon	pure white quartzose sandstone, local shale intercalations	90-150	major ore host in Sentinel Pit
16	Burro Canyon	transition from #15 to #16; not always logged separately.	10-30	none
17	Morrison	red or white shale, some red sandstone	10+	minor
none	Morrison	mainly shale and sandstone, some limestone and conglomerate	600-800	minor
none	pre-Morrison	other Jurassic, Triassic, Permian, and Pennsylvanian sandstones, shales, etc.	several thousand	minor except possibly Cutler Fm.

Source: Pincock, Allen & Holt (2005)

2.2 Hydrogeologic Setting

Groundwater at the Lisbon Valley Mine primarily occurs in two aquifers, the Burro Canyon aquifer (or D-aquifer) which occurs at depths of less than 500 feet and the Navajo aquifer (or N-aquifer) which occurs below about 850 feet. These two aquifer systems are separated by several hundred feet of low-permeability interbedded shale, siltstone, and silty sandstone (Morrison Formation and Summerville Formation) as shown in Figure 1. An unsaturated zone exists between the upper and lower aquifers, and water levels indicate that strong downward vertical gradients exist.

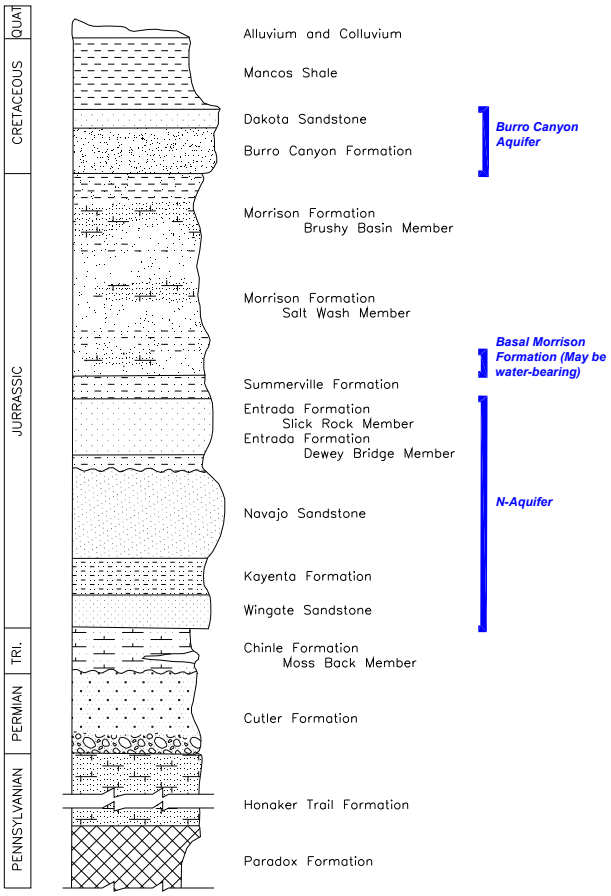

Figure 1. Stratigraphic Column Showing Burro Canyon Aquifer and N-Aquifer

2.3 Proposed Backfill

Approximately 25 to 50 million (M) tons of waste rock from Bed 14 and Bed 15 materials are proposed for backfilling within the Penny Phase and Keystone Phase of the greater Centennial Pit. The backfilling sequence would mirror the sequence of mining both phases of the Centennial Pit beginning with the Penny Phase followed by Keystone Phase. The Penny excavation would be backfilled by first constructing an access ramp using waste rock to access the bottom of the pit. From this point, waste would be backfilled in a circular pattern in 20-30' lifts. The Keystone Phase would be backfilled in a similar manner with access ramps and circular lifts. The partial backfill would extend 20 feet above the predicted post-mining static water level, and no permanent pit pool would develop.

Lisbon Valley Mining Co., LLC (LVMC) proposes a modification to its existing mine plan where characterized waste rock would be used for backfill in the Centennial Pit. The characterization process is designed to determine the acid-forming potential of the waste rock, followed by additional simulations of an updated groundwater model to determine fate and transport of dissolved constituents. Only waste rock with *de minimis* potential to form acidic leachate would be authorized to be placed as backfill in the Centennial Pit.

The proposed backfill will be waste rock derived from Bed 14 and Bed 15 materials. Based on the current mine design and a copper price of $3.75/lb, Bed 14 rock comprises 60% of the 25,600,000 tons of available backfill material (Table 3).

Table 3. Current Estimate of Backfill Material (Based on $3.75/lb Cu Evaluation)

Unit	Tons	%
Total Backfill (Bed 14 + 15)	25,554,070	
Potential Bed 14 Backfill	15,406,546	60%
Potential Bed 15 Backfill	10,147,524	40%

Bed 14 is a red to pale green varicolored mudstone and shale, which may grade into cherty limestone or conglomerate. The petrographic analysis of Bed 14 samples is discussed in Section 5.4.

Bed 15 is a typically a white to buff, well-rounded, moderately well-sorted, quartz sandstone with local shale intercalations. Where mineralized, Bed 15 is the dominant ore host. Unmineralized zones of Bed 15 material (i.e., those areas that fall below the cutoff grade for mining) are waste rock or overburden. The petrographic analysis of Bed 14 samples is discussed in Section 5.4.

3. TESTING REGIME

3.1 Overview of Study Design and Test Materials

The testing regime involved collecting samples of Bed 14 and Bed 15 rock materials from the walls of the existing Centennial and Sentinel West Pits (Table 4). Samples were collected by LVMC using the procedures described in Section 4.1. The bagged rock samples were sent to Whetstone Associates' (Whetstone's) geochemistry lab for preparation, including weighing, air-drying, crushing, and compositing, then subjected to testing regime shown in Figure 2.

A sieve analysis was conducted as described in Section 5.1. Representative split samples were sent to ACZ, a Utah-certified and NELAC-certified laboratory (Attachment 1), for ABA, MWMP, and whole rock elemental analysis as described in Sections 5.2 and 5.3. Samples were also submitted to GeoSystems Services (GSS) for XRD and thin section microscopy as described in Section 5.4. The saturated columns were set up and run by Whetstone using the column testing protocols described in Section 6 and the leachates were submitted to ACZ for analysis.

The column testing study represented the major component of the characterization. The kinetic column leaching tests were designed to simulate waste rock in contact with groundwater as the Burro Canyon Aquifer rebounds from its current dewatered condition. Four distinct monolithologic saturated columns were processed along with a replicate column for QC purposes. Corresponding unsaturated MWMP testing was performed by ACZ on representative splits of the column materials for characterization of meteoric water infiltrating through unsaturated waste rock.

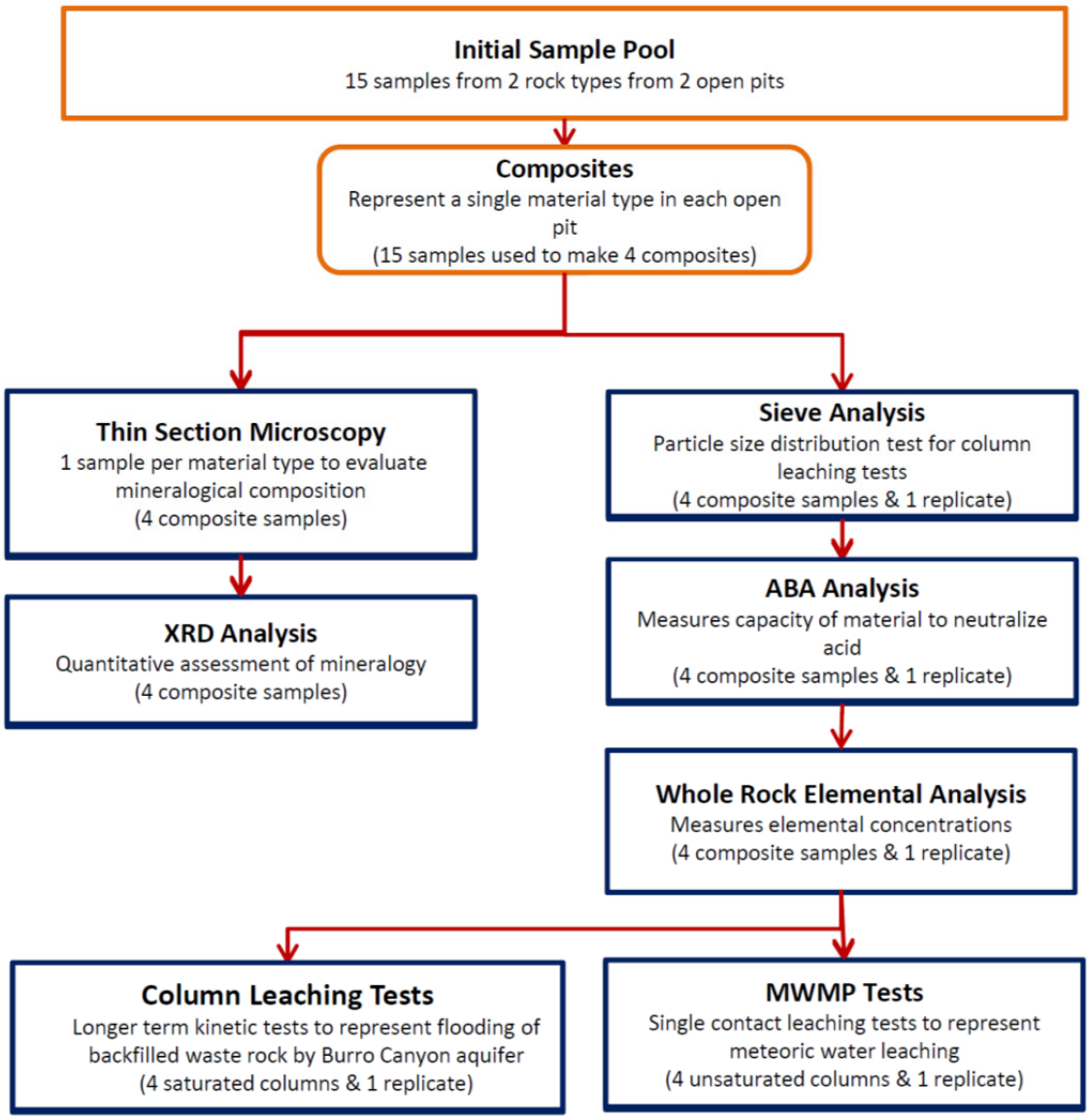

Figure 2. Overview of the Lisbon Valley Mine Backfill Geochemistry Study

3.2 Quality Assurance

The study was completed in accordance with the Work Plan (Whetstone, 2014) and oversight for the study was provided by Susan Wyman, P.E., P.G. with direction from Patsy Moran (ARCADIS) and Lantz Indergard (LVMC). Analytical work for the study was provided by ACZ Laboratories. ACZ is certified by the National Environmental Laboratory Accreditation Conference (NELAC) and by the State of Utah (Attachment 1). ACZs' Project Manager, Sue Webber, was responsible for laboratory QA/QC, reporting of results, and coordination of communication between ACZ and Whetstone.

Chain-of-custody procedures were followed for the rock samples collected by LVMC and for all solid samples and leachate samples generated in Whetstone's geochemistry lab. All sample containers were labeled using waterproof ink with the sample identification, date and time of sample collection, filtration

status, and preservatives (HNO_3, H_2SO_4, HCl, or raw). Time was recorded as military (24-hour) time on all sample labels and chain of custody forms. Chain of custody forms and custody seals provided by the laboratory were used for all samples shipped to the analytical laboratory.

Leachate samples were kept cool, either by refrigeration or by storage on ice from the time of collection to receipt by the analytical laboratory. The analytical laboratory evaluated the sample integrity, receiving temperature, receiving pH, chain-of-custody form, and custody seal condition upon arrival of the samples.

Analytical data from ACZ were reviewed upon receipt and validated. The purpose of validation is to provide data of documented quality that can be used for analysis of potential Project impacts. Method-specific or laboratory-determined QC acceptance ranges were used as validation criteria where available. Inorganic acceptance limits described in the United States Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Superfund Data Review (EPA, 2010) and professional judgment were used in the absence of method-specific or laboratory-determined QC acceptance ranges.

Analytical results for the study were compiled in a Microsoft Access-based database using the Enviro Data® software (Geotech, 2013). Electronic data deliverables (EDDs) from ACZ were imported directly into the database to prevent transcription errors. All data are stored as reported by the laboratory with ACZ-assigned analytical flags and qualifiers assigned by Whetstone.

4. SAMPLE COLLECTION AND PREPARATION

4.1 Rock Sample Collection

Rock samples from Bed 14 and Bed 15 in the exposed Centennial and Sentinel Pit walls were collected by LVMC in late November 2013 for the geochemistry study. Sample locations were selected to represent "weathered" conditions and were spatially distributed along the outcrop in the wall of the Centennial Pit (Figure 3) and Sentinel Pit (Figure 4, Figure 5). Limited access to weathered rock is available at the site due to geology, outcrop, and safety issues, and a significant effort was expended to obtain the spatially distributed samples. The 12 locations are considered adequate to characterize weathered waste rock material (Figure 6) because both Bed 14 and Bed 15 have been fully characterized previously, and are known to exhibit very little spatial variability across the area of interest.

Each sample was bagged and labeled separately and shipped by Old Dominion freight lines from Lisbon Valley Mine to Whetstone's geochemistry lab in Gunnison, Colorado. Samples were shipped on November 27, 2013 and received on December 3, 2013. Samples were logged in at Whetstone's geochemistry lab as shown in Table 4.

Table 4. Samples Received from Lisbon Valley Mine for Geochemical Testing

Bed	Sample ID	Check-in Date	Received Mass (g)	Moisture Content	Sample Integrity	Composite (Column) Sample ID
14	Cent 14A	12/4/2013	32,571.0	Dry	Intact	
14	Cent 14B	12/4/2013	20,012.1	Dry	Intact	
14	Cent 14C	12/5/2013	20,705.2	Dry	Intact	Cent-14 (CE-14-S1)
14	Cent 14A Dup	12/5/2013	24,561.4	Dry	Intact	Cent-16 (CE-14-S2)
14	Cent 14B Dup	12/5/2013	23,278.2	Damp	Intact	
14	Cent 14C Dup	12/5/2013	25,378.2	Dry	Intact	
14	SW 14A	12/5/2013	22,114.6	Dry	Intact	
14	SW 14B	12/5/2013	22,137.6	Damp	Intact	SW-14 (SW-14-S1)
14	SW 14C	12/5/2013	22,140.7	Dry	Intact	
15	Cent 15A	12/5/2013	21,289.9	Dry	Intact	
15	Cent 15B	12/5/2013	23,341.7	Dry	Intact	Cent-15 (CE-15-S1)
15	Cent 15C	12/5/2013	23,509.1	Dry	Intact	
15	SW 15A	12/5/2013	22,777.0	Dry	Intact	
15	SW 15B	12/5/2013	28,785.3	Dry	Intact	SW-15 (SW-15-S1)
15	SW 15C	12/5/2013	21,681.9	Dry	Intact	

Notes: "Cent-16" is the blind duplicate sample ID for the duplicate composite sample of Centennial Pit Bed 14 (Cent-14).

Figure 3. Plan View of Rock Sample Locations – Centennial Pit

Figure 4. Isometric View of Rock Sample Locations – Sentinel Pit

Figure 5. Plan View of Rock Sample Locations – Sentinel Pit

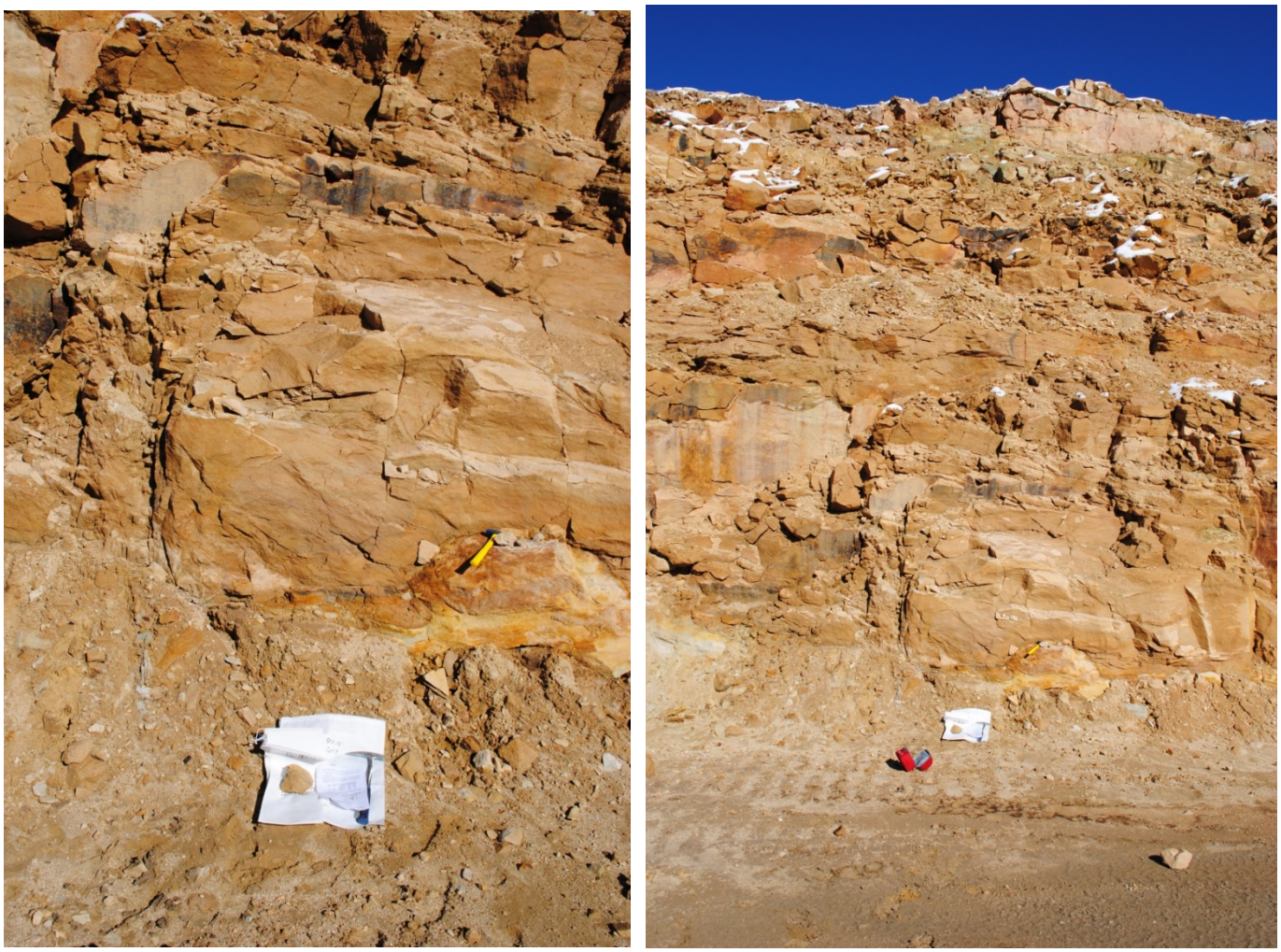

Figure 6. Photographs of Weathering Profile for Sample SW 15A

4.2 Groundwater Collection

Groundwater from well PW-3 was used as the head solution for column testing. PW-3 is a 6-inch well completed to a depth of 476 feet in the Burro Canyon Aquifer adjacent to the Centennial Pit (Figure 7). The well is equipped with a dedicated submersible pump and currently produces about 30 gallons per minute (gpm) for mine water supply. PW-3 is sampled quarterly and samples are collected at the wellhead from a dedicated ½-inch sampling port using a decontaminated ¾-inch garden hose.

The water for column testing was collected from well PW-3 on December 7, 2013 in conjunction with the 4th quarter groundwater monitoring event. The well had been pumping continuously at approximately 15 gpm for at least three days prior to groundwater collection (>60,000 gallons purged). The groundwater was collected in twelve 5-gallon cubitainers and dissolved oxygen (DO) was measured using a calibrated YSI 550A DO meter (Figure 8). To prevent the water from coming into contact with atmospheric oxygen, each cubitainer was filled from the bottom, allowed to overflow for several minutes, and immediately capped. The DO probe was placed at the bottom of each cubitainer and was representative of the DO within the sample vessel. The cubitainer functioned effectively as a flow-through cell; the rate of upflow (filling) exceeded the rate of oxygen diffusion through the small opening at the top of the cubitainer, and the stable

DO ranged from 0.08 to 0.15 mg/L, averaging 0.11 mg/L in the 12 containers (Table 5). Carbonate degassing was observed in all of the containers, as CO_2 bubbles formed within a few seconds of the groundwater being exposed to surface temperature and pressure (Figure 8).

The observed redox conditions for the Burro Canyon Aquifer were consistent with the anticipated reducing conditions based on the high average dissolved iron (suggesting ferrous iron, Fe^{2+}) and low dissolved aluminum concentrations. The redox conditions indicate that iron concentrations in the Burro Canyon aquifer are due to dissolved ferrous iron rather than nanoscale ferric iron colloids. Therefore, precautions were taken to collect a representative solution and prevent contact with atmospheric oxygen.

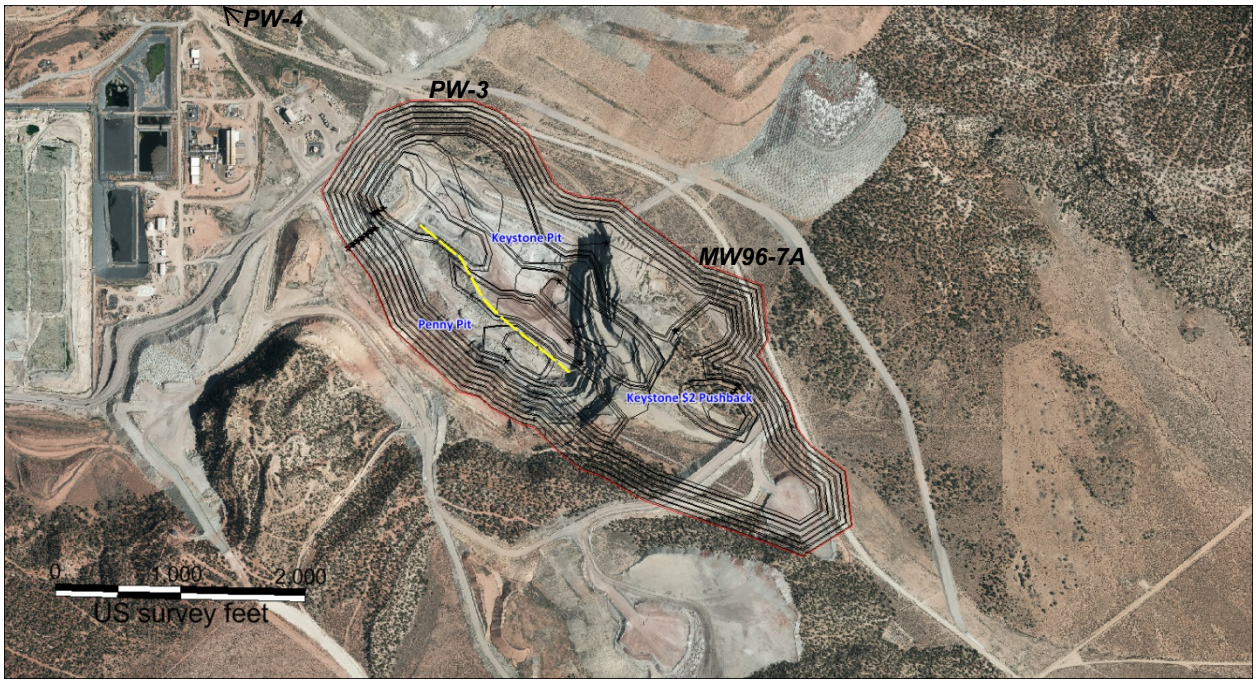

Figure 7. Location of Burro Canyon Aquifer Wells PW-3, PW-4, and MW96-7A

The twelve cubitainers were encased in cardboard and kept in cool storage prior to the start of the column leaching tests. Ambient air temperature on the day of collection was well below freezing. Water in the cubitainers was not allowed to freeze, and was transported by pickup truck to the column testing laboratory. The cubitainers were stored in an unlit area, and the cardboard also inhibited natural or artificial light from reaching the water. A temperature logger was used to monitor and record the temperature from the time the water was received at the column testing laboratory and throughout the column study. Temperatures during the pre-test storage period averaged 4.7°C and ranged from -6.7 to 13.5 °C. The temperature logger was located on top of the cardboard boxes containing the cubitainers, and although the ambient air temperature experienced significant diurnal variation (Figure 9), the water did not freeze. During testing, the groundwater was kept at the same temperature as the column room (21 ±3°C).

Groundwater from well PW-3 is a calcium-sulfate type water with high levels of dissolved solids. The water quality at PW-3 is similar to that of other wells completed in the Burro Canyon Aquifer near the Centennial Pit, including MW96-7A and PW-4 (Figure 10).

Figure 8. Groundwater Collection at Well PW-3, December 2013

(Note water flowing from top of cubitainer and CO_2 bubbles; DO reading was 0.11 mg/L, indicating no contact with atmospheric oxygen in the functional flow-through cell.)

Table 5. Field Parameters and Dissolved Oxygen Measured in Groundwater Collected from Well PW-3

Date	Time	Cube #	DO (mg/L)	DO (%)	pH	E.C. (uS/cm)	T (°C)
12/7/13	12:02	1	0.12	1.20%			
12/7/13	12:08	2	0.15	1.60%			
12/7/13	12:15	3	0.12	1.30%			
12/7/13	12:22	4	0.11	1.20%			
12/7/13	12:27	5	0.10	1.20%			
12/7/13	12:33	6	0.11	1.20%	7.82	1,740	17.0
12/7/13	12:37	7	0.10	1.00%			
12/7/13	12:41	8	0.11	1.10%			
12/7/13	12:46	9	0.10	1.00%			
12/7/13	12:51	10	0.11	1.10%			
12/7/13	12:56	11	0.08	0.50%			
12/7/13	13:01	12	0.09	0.90%			

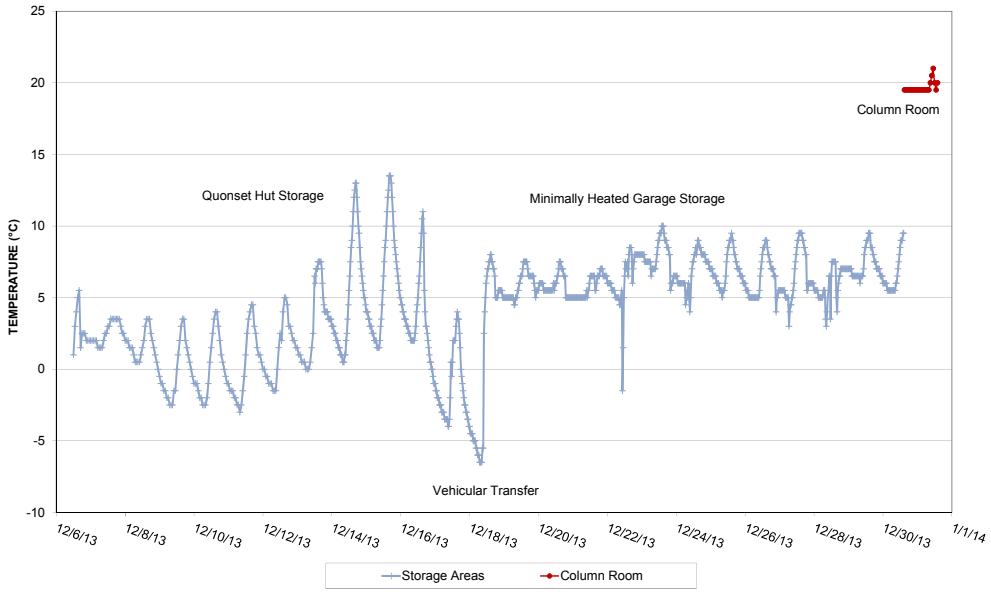

Figure 9. Air Temperature of Head Solution Storage Areas

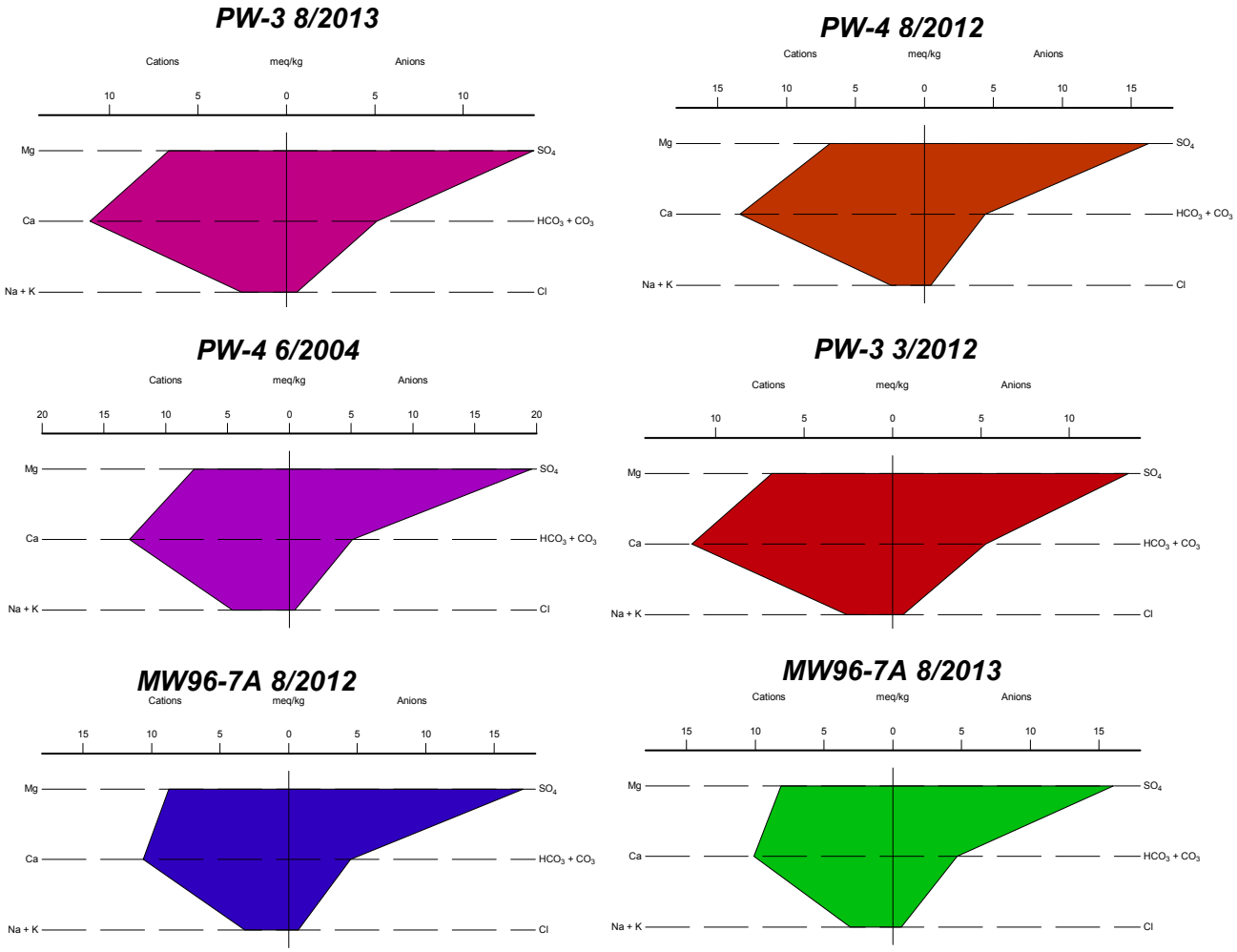

Figure 10. Stiff Diagrams Comparing Major Ion Chemistry in Burro Canyon Aquifer Wells

4.3 Rock Sample Preparation, Compositing, and Splitting

Waste rock samples for column leaching tests were air-dried as-received at room temperature (21°C ± 3°) to stable weight and logged for lithology, mineralogy, and weathering (Table 6). After drying, the entirety of each sample was screened to pass a 0.75-inch wire mesh to achieve a column diameter to maximum particle size ratio of 8:1. Oversized material was reduced by hand breaking or jaw crushing to meet the size specification.

Representative split samples were prepared by cone-and-quartering to meet the sample volumes required for ABA, whole rock, and MWMP analysis. Cone-and-quarter compositing and splitting were performed by gathering the sample into a pile (cone), digging out the center of the cone and distributing the material around the edges of the pile in a ring, and gathering the ring back into a center cone. This procedure homogenizes the sample and was repeated three times. The cone was then split into equal quarters and opposite quarters were combined to produce a representative split. Sequential generations of splits were combined until the sample for the composite was within 0.1 gram of the target weight. The resulting composited samples are believed to be representative of the materials of interest. Splits of each composite were sent to ACZ for ABA, whole rock elemental analysis, and MWMP testing, with a request to process and analyze the samples in their entirety. These procedures were implemented to avoid potential sample bias related to shipping, settlement, and unrepresentative splitting at the analytical lab.

Table 6. Lithologic Properties and Sample Mass

Bed	Sample ID	Received Mass (g)	Final Dry Mass (g)	Mass for MWMP (g)	Mass for Sieve (g)	Mass for ABA (g)	Mass for GSS (g)	Composite (g)	Mass for saturated column (g)	Retained Sample Mass (g)	Lithology	Induration	Color Code	HCl Rxn	Weathering
14	Cent 14A	32,571.0	31,308.0							31,308.0	dolo	poor	N7	s	w
14	Cent 14B	20,012.1	19,074.0							19,074.0	slt	poor	5YR3/2	n	sl
14	Cent 14C	20,705.2	20,205.4							20,205.4	dolo	poor	N7	s	w
14	Cent 14A Dup	24,561.4	24,101.0					20,000		4,101.0					
14	Cent 14B Dup	23,278.2	22,322.8					20,000		2,322.8					
14	Cent 14C Dup	25,378.2	24,580.3					20,000		4,580.3					
14	Cent 14	N/A-Composite	60,000.0	5,000.0	1,500.0	50.0	72.6	29,113.6	20000.0	4,336.4					
14	“Cent 16”	N/A-Composite	29,113.6	5,000.0	1,500.0	50.0			20000.0	2,563.6					
14	SW 14A	22,114.6	20,770.7					10,000		10,770.7	ls	poor	5YR8/1	s	w
14	SW 14B	22,137.6	21,211.1					10,000		11,211.1	ls	well	N6	s	sl
14	SW 14C	22,140.7	21,726.8					10,000		11,726.8	ls	hard	5Y4/1	s	sl
14	SW 14	N/A-Composite	30,000.0	5,000.0	1,500.0	50.0	79.1		20000.0	3,450.0					
15	Cent 15A	21,289.9	20,724.2					10,000		10,724.2	ss	poor	5Y8/1	n	w
15	Cent 15B	23,341.7	22,948.6					10,000		12,948.6	ss	poor	5Y8/1	n	w
15	Cent 15C	23,509.1	23,031.8					10,000		13,031.8	ss	poor	5Y8/1	n	w
15	Cent 15	N/A-Composite	30,000.0	5,000.0	1,500.0	50.0	61.8		20000.0	3,450.0					
15	SW 15A	22,777.0	22,283.8					10,000		12,283.8	ss	poor	5Y8/1	n	w
15	SW 15B	28,785.3	27,802.3					10,000		17,802.3	ss	poor	10YR8/2	n	w
15	SW 15C	21,681.9	21,073.8					10,000		11,073.8	ss	poor	10YR8/2	n	w
15	SW 15	N/A-Composite	30,000.0	5,000.0	1,500.0	50.0	97.3								

Notes: Lithology: dolo = domite, slt = siltstone, ls = limestone, ss = sandstone
HCl Rxn: Reaction to hydrochloric acid, s = strong, wk = weak, n = none
Weathering: w = weathered; sl = slightly weathered
Cent “16” is the blind duplicate sample ID for the duplicate composite sample of Centennial Pit Bed 14 (Cent 14)

5. GEOCHEMICAL TESTING

5.1 Particle Size Distribution (Sieve Analysis)

The composite samples for the columns were evaluated for particle size distribution. Particle size is an important scaling factor for columns from an operational perspective. As a general rule, the diameter of a column should be at least four times greater than the diameter of the largest particle being leached. This convention is recommended for samples with grain sizes exceeding 0.2 inches and is intended to prevent preferential flow along the grain-wall contact in the column (Potter, 1981; Cathles and Breen, 1983). Conversely, material with a high percentage of clay and fine silt may severely limit solution flow through a column or plug it completely. Particle size analysis was completed by Whetstone according to standard methods.

Each composite sample was poured onto the stack of sieves and mechanically shaken for 20 minutes. The sample mass on each sieve was then recorded. The results of the sieve analyses for the composite samples indicate that the maximum particle size was less than 0.75 inches. This sizing provides a minimum column diameter to particle size ratio of 8:1 and meets commonly accepted guidelines for column construction (Potter, 1981; Cathles and Breen, 1983). Unweighted averages for the composite samples indicate that 76.2% of the material used in the columns was gravel size, 21.9% of the material was sand size, and 1.9% of the material was silt size or smaller (Table 7, Figure 11, Figure 12).

Table 7. Summary of Particle Size Analyses for Composite Column Samples

	Gravel				Sand				Silt/Clay	
Sieve Size	**3/4"**	**3/4" - #5**	**#5 - #10**	**#10 - #18**	**#18 - #35**	**#35 - #60**	**#60 - #120**	**#120 - #230**	**#230**	
Grain Size (mm)	**>19.00**	**19.00 - 4.00**	**4.00 - 2.00**	**2.00 - 1.00**	**1.00 - 0.50**	**0.50 - 0.25**	**0.25 - 0.13**	**0.13 - 0.06**	**<0.06**	**Total (g)**
Sample ID										
SW-14	0.0%	74.6%	11.5%	5.4%	2.6%	1.7%	1.3%	1.2%	1.6%	1,496.1
SW-15	0.0%	44.8%	5.4%	2.4%	4.4%	20.8%	16.7%	4.1%	1.3%	1,498.1
CE-14	0.0%	73.3%	11.1%	5.5%	3.0%	2.1%	1.9%	1.6%	1.6%	1,496.2
CE-16	0.0%	58.9%	12.4%	8.1%	5.3%	4.4%	4.3%	3.7%	2.9%	1,495.9
CE-15	0.0%	59.9%	5.6%	2.2%	1.5%	9.4%	14.7%	4.7%	2.0%	1,497.0
Average	0.0%	62.3%	9.2%	4.7%	3.4%	7.7%	7.8%	3.1%	1.9%	

Notes: Sample "CE-16" was the duplicate of CE-14 (column ID CE-14-S2)

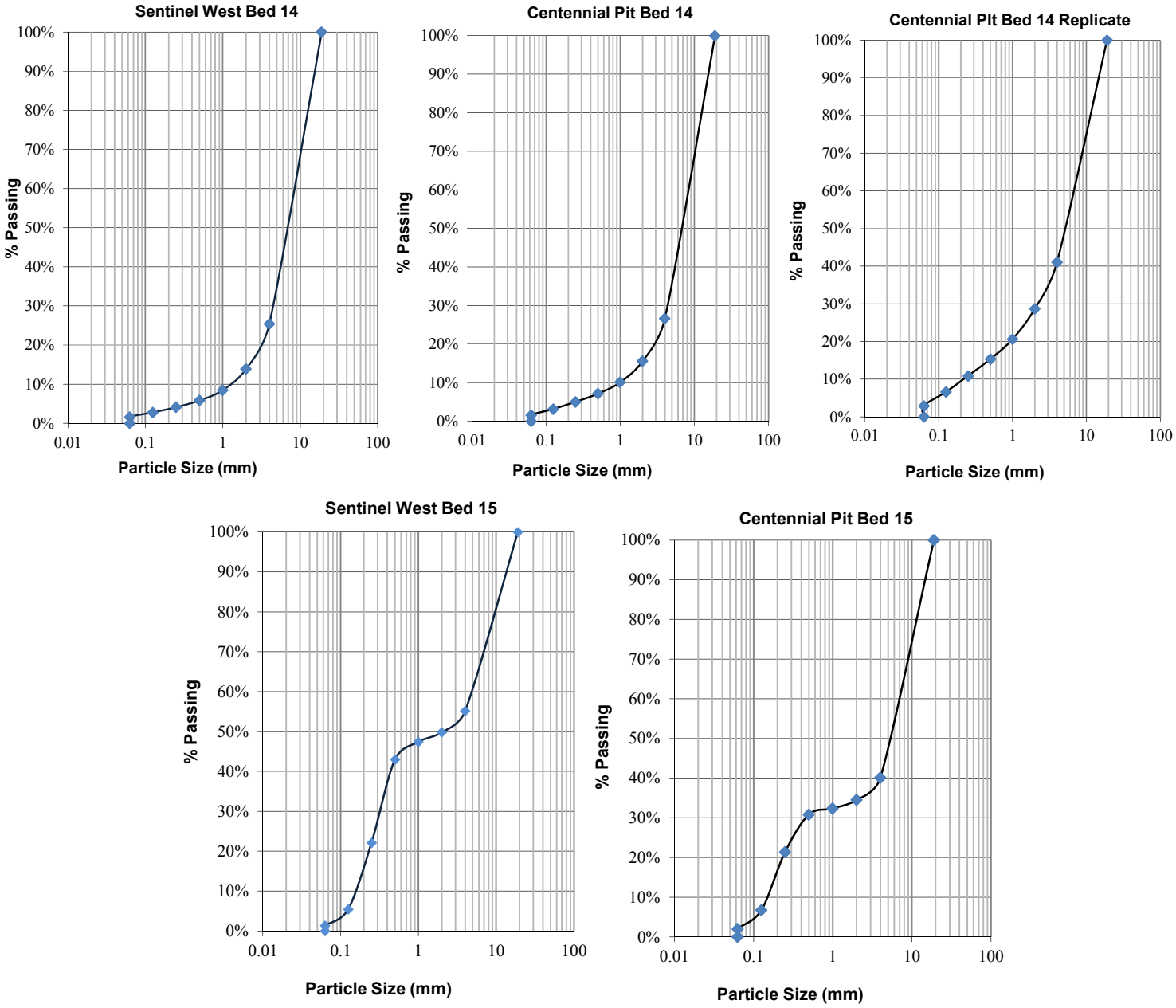

Figure 11. Particle Size Distribution Charts (% Passing)

(A)

(B)

Figure 12. Photograph Showing Angularity and Particle Size of Column Material for (A) Bed 14 and (B) Bed 15 Composite Samples

5.2 Acid-Base Accounting and Sulfur Forms

Four representative splits of the composite samples and one duplicate sample were sent to ACZ for ABA and sulfur forms. The samples were crushed in their entirety to minus 60-mesh and a 10-gram grab sample was analyzed using the Modified Sobek Method (Lawrence and Wang, 1997). Total sulfur content was determined by Leco Furnace. Sulfate sulfur was determined by SM4500 SO4-D where the sample was digested in 4.8 N HCl and sulfate was precipitated as $BaSO_4$, dried, and weighed. Sulfide sulfur was determined by EPA 9030B where sample is digested in 2 N HNO_3 and precipitated as ZnS. Residual sulfur was determined by subtracting HCl soluble sulfur from HNO_3 soluble sulfur.

ABA tests are used to evaluate the potential of soil or overburden to generate acid rock drainage (ARD) when exposed to atmospheric oxygen. ARD is produced when sulfide minerals (predominantly pyrite) react with oxygen and water to produce sulfuric acid and other reaction products. The dissolution of sulfate minerals such as alunite and jarosite can also release acidity, however, these reactions are less dominant and are typically related to previous oxidation of sulfide minerals (Lapakko, 2002). Many metals are more soluble under acidic conditions and the formation of ARD can result in increased metal mobility in water. Acid produced by the oxidation of sulfide minerals can be neutralized by a number of reactions involving carbonate minerals and basic silicates (Morin and Hutt, 1994). Neutralization reactions involving carbonate minerals are generally more effective than those involving silicates and occur rapidly.

ABA data are commonly evaluated using one of two approaches including using the ratio of the acid neutralizing potential (ANP) to the acid generating potential (AGP) and subtract AGP from ANP to calculate the net neutralizing potential (NNP). BLM guidelines indicate that samples with ANP:AGP ratios greater than 3 have low potential to produce acidic drainage and that samples with ANP:AGP ratios of less than 1 have high potential to produce ARD (BLM 1996). Likewise, EPA guidelines (EPA, 1996) indicate that samples with NNP values greater than 20 t $CaCO_3$ per kiloton (kt) have low potential to generate ARD and that samples with NNP values below -20 t $CaCO_3$/kt have high potential to generate acid drainage.

For this study, the laboratory reported AGP based on total sulfur. Other work at the Lisbon Valley Mine uses sulfide-based AGP (aka pyritic sulfur-base AGP). Using total sulfur analyses can overestimate AGP if non-acid producing sulfates such as gypsum and barite are present, so the ABA results presented below may conservatively overestimate AGP.

ABA data for the proposed backfill material indicate that the average ANP:AGP ratio for Bed 14 is 436.4 t $CaCO_3$/kt, ranging from 218.8 t $CaCO_3$/kt at the Centennial Pit to 654 t $CaCO_3$/kt at the Sentinel West Pit (Table 8). These ANP:AGP ratios indicate that the Bed 14 samples provide significant excess buffering capacity. The ANP:AGP ratios for the Bed 15 samples range from 0.1 t $CaCO_3$/kt at the Centennial Pit to 5 t $CaCO_3$/kt at the Sentinel West Pit, averaging 2.55 t $CaCO_3$/kt. However, the AGP of these low-sulfur sandstones were low, ranging from <0.1 to 0.9. Although the ANP:AGP ratio of Bed 15 is lower than the BLM criteria for non-acid generating rock, the sulfide-sulfur content is very low, as shown in the elemental analysis (Section 5.3) and petrographic analysis (Section 5.4). The mean NNP value of 219 t CaCO3/kt for the five composite samples of proposed backfill suggests that water that comes in contact with the backfill will remain neutral to basic.

Table 8. Acid Base Accounting Results

Sample ID Sample Date	Units	CENT-14 12/5/2013	CENT-14 Dup 12/5/2013	CENT-15 12/5/2013	SW-14 12/5/2013	SW-15 12/5/2013
Acid Generation Potential (AGP)	tons/Kt	1.3	1.3	0.9	<0.1 U	<0.1 U
Acid Neutralization Potential (ANP)	tons/Kt	220	191	1	654	5
Net Neutralization Potential (NNP)	tons/Kt	218.8	189.8	0.1	654	5
Neutralization Potential as $CaCO_3$	%	22	19.1	0.1 B	65.4	0.5
ABA Sulfur, HCl Residue	%	0.06 B	0.05 B	0.03 B	<0.01 U	<0.01 U
ABA Sulfur, HNO_3 Residue	%	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ABA Sulfur, Organic Residual	%	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ABA Sulfur, Pyritic Sulfide	%	0.06 B	0.05 B	0.03 B	<0.01 U	<0.01 U
ABA Sulfur, Sulfate	%	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ABA Sulfur, Total	%	0.04 B	0.04 B	0.03 B	<0.01 U	<0.01 U
ABA Sulfur (T) minus Sulfate	%	0.04 B	0.04 B	0.03 B	<0.01 U	<0.01 U

Notes: The Centennial Pit Bed 14 duplicate was submitted under sample ID "CENT-16".

5.3 Elemental Analyses

Whole rock elemental analysis was performed by ACZ using EPA method 3050B. Representative splits of the selected samples (≈100 grams) were submitted to the analytical laboratory for preparation and analysis. The splits were crushed in their entirety to minus 10-mesh and a grab of the crushed material (1 to 2 grams) was digested using repeated additions of nitric acid (HNO_3) and hydrogen peroxide (H_2O_2) over heat (EPA 3050B). An analytical split of the digestate was diluted, filtered, and analyzed with ICP-MS (EPA 6020), while the remaining split was refluxed with hydrochloric acid (HCl), diluted, filtered, and analyzed with ICP-AES (EPA 6010). Note that Method 3050B is a very strong acid digestion that dissolves almost all elements that could be released under natural conditions. It is not a total digestion, however, and some elements bound in silicate structures may not be dissolved by the procedure.

Analytical methods and method detection limits for whole rock analysis are presented in Table 9.

Table 9. Elemental Analysis Results

			SampleID	CENT-14		CENT-15		SW-14		SW-15	
			Column ID	CE-14-S1		CE-15-S1		SW-14-S1		SW-15-S1	
			Sample Date	12/5/2013		12/5/2013		12/5/2013		12/5/2013	
Parameter	Units	Extraction Method	Analytical Method								
Aluminum, total	mg/k	3050B	EPA 6010B	17,800		4,680		14,600		1,390	
Antimony, total	mg/k	3050B	EPA 6020A	0.2	B	<0.2	U	<0.2	U	<0.2	U
Arsenic, total	mg/k	3050B	EPA 6020A	2.2		2.2		1.6		3.7	
Barium, total	mg/k	3050B	EPA 6010B	432		13.6		361		290	
Beryllium, total	mg/k	3050B	EPA 6020A	0.68		0.12		0.46		0.04	B
Boron, total	mg/k	3050B	EPA 6010B	12		3	B	11	B	<1.	U
Cadmium, total	mg/k	3050B	EPA 6020A	12.5		0.11	B	0.73		5.09	
Calcium, total	mg/k	3050B	EPA 6010B	31,800		670		163,000		2,580	
Chromium, total	mg/k	3050B	EPA 6010B	5.3		4.3		7.2		1.5	
Copper, total	mg/k	3050B	EPA 6010B	79		40		10		91	
Iron, total	mg/k	3050B	EPA 6010B	10,800		2,440		8,180		1,120	
Lead, total	mg/k	3050B	EPA 6020A	9.56		2.16		6.9		22.3	
Magnesium, total	mg/k	3050B	EPA 6010B	3,810		490		3,200		180	
Manganese, total	mg/k	3050B	EPA 6010B	217		12.3		366		72.7	
Mercury,total	ng/g	direct	combustion AA	28	H	5.33	B H	12.8	H	5.86	B H
Molybdenum, total	mg/k	3050B	EPA 6020A	<2.	U	<2.	U	<2.	U	<2.	U
Nickel, total	mg/k	3050B	EPA 6010B	4		1.8	B	3.6	B	<0.8	U
Potassium, total	mg/k	3050B	EPA 6010B	9,690		850		8,180		510	
Phosphorus, total	mg/k	3050B	EPA 6010B	120		40	B	90		50	
Selenium, total	mg/k	3050B	EPA 6020A	0.24		0.15		<0.05	U	0.09	B
Silver, total	mg/k	3050B	EPA 6020A	0.11		0.08	B	0.04		0.11	
Strontium, total	mg/k	3050B	EPA 6010B	97.8		14.6		158		7.2	
Thallium, total	mg/k	3050B	EPA 6020A	0.39		<0.05	U	0.48		0.06	B
Uranium, total, total	mg/k	3050B	EPA 6020A	0.36		0.38		0.59		0.36	
Vanadium, total	mg/k	3050B	EPA 6010B	14.3		12.5		10.9		4.8	
Zinc, total	mg/k	3050B	EPA 6010B	48		10		20		16	
Solids, Percent	%			95.9		99.6		96.8		99.9	

5.4 Petrographic Analysis

Four samples were submitted to GeoSystems for petrographic analysis by transmitted light microscopy and XRD. The samples included Bed 14 and Bed 15 material from both the Centennial and Sentinel West Pits (Table 10). The complete report describing the petrographic analysis by GeoSystems is included in Attachment 2.

Table 10. Samples Submitted for Petrographic Analysis

SAMPLE ID	SAMPLE DESCRIPTION
Cent 14	Centennial Pit, Bed 14 Composite
Cent 15	Centennial Pit, Bed 15 Composite
SW 14	Sentinel West Pit, Bed 14 Composite
SW 15	Sentinel West Pit, Bed 15 Composite

5.4.1 Transmitted Light Microscopy

Transmitted light microscopy (thin-section analysis) was used to provide information about the texture, mineralogy (non-opaque), weathering, cementation, and porosity of the samples. Samples for the analysis

were oriented with respect to bedding, impregnated with epoxy resin, mounted on glass slides, and ground to 30 μm thickness. The thin sections were examined using a Zeiss Axioskop 40 petrographic microscope equipped with an electromechanical stage and Leica digital camera. A summary of the observations from the thin-section examination are presented in Table 11.

Thin section examination indicates that Bed 14 in the Centennial Pit is a sandy, argillaceous limestone with minor detrital quartz and no identifiable allochems (Figure 13). The samples have no intergranular microporosity and little or no identifiable secondary porosity. Replacement minerals include trace pyrite (FeS) and apatite ($Ca_{10}(PO_4)_6(OH, F, Cl)$). The thin-section microscopy results from Bed 14 in the Sentinel West Pit indicate a sandy limestone with similar properties to the Centennial Pit samples (Figure 15).

Thin section examination indicates that Bed 15 in the Centennial Pit is a massive, moderately well-sorted, clean, fine-grained sandstone with intergranular macroporosity (Figure 14). Quartz significantly exceeded feldspar in the sample matrix, with trace apatite and pyrite identifiable in thin section as overgrowths and replacements. Weathering was apparent in grains coated by films of clay cement (identified as illite and illite-smectite in the XRD analysis), with the interiors of some pores filled by masses of kaolinite clay cement. The grain-rimming clay was identified as possibly illuviated rather than authigenic, a further indication of weathering. The samples showed well developed intergranular macroporosity.

Thin section examination indicates that Bed 15 in the Sentinel West Pit is fine grained, moderately well sorted sandstone with faint textural lamination (Figure 16). Quartz significantly exceeded feldspar in the sample matrix, and the quartz grains are somewhat finer and more angular than in the Centennial Pit samples. The samples showed well developed intergranular macroporosity, and some of the intergranular space is filled by calcite cement and kaolinite clay cement.

Table 11. Summary of Petrographic Analysis Using Transmitted Light Microscopy

SAMPLE ID	LITHOLOGY	TEXTURE	GRAIN/ CRYSTAL SIZE	SORTING	GRAINS/ ALLOCHEMS	CEMENTS/ REPLACE-MENTS	POROSITY	DIAGENETIC FEATURES
Cent 14	Sandy, argillaceous limestone	Laminated argillaceous and calcareous layers. Lime layers are mudstone.	Mudstone	Poor	Detrital quartz. No identifiable allochems	Pyrite, apatite	None	Compaction
Cent 15	Sandstone	Massive	Fine grained sandstone	Moderate	Quartz >> Feldspar	Trace apatite, pyrite	Intergranular macroporosity	Possible illuviated clay rims. Inhibited quartz overgrowth development. Later stage kaolinite cement.
SW 14	Sandy limestone	Massive – lime mudstone matrix supports quartz sand grains	Mudstone	Poor	Detrital quartz. No identifiable allochems	Pyrite, apatite	None	Compaction
SW 15	Sandstone	Vague laminar fabric	Fine grained sandstone	Moderate	Quartz >> Feldspar	Trace apatite, pyrite	Intergranular macroporosity	Quartz overgrowths. Later calcite pore fill cement. Kaolinite pore fill cement.

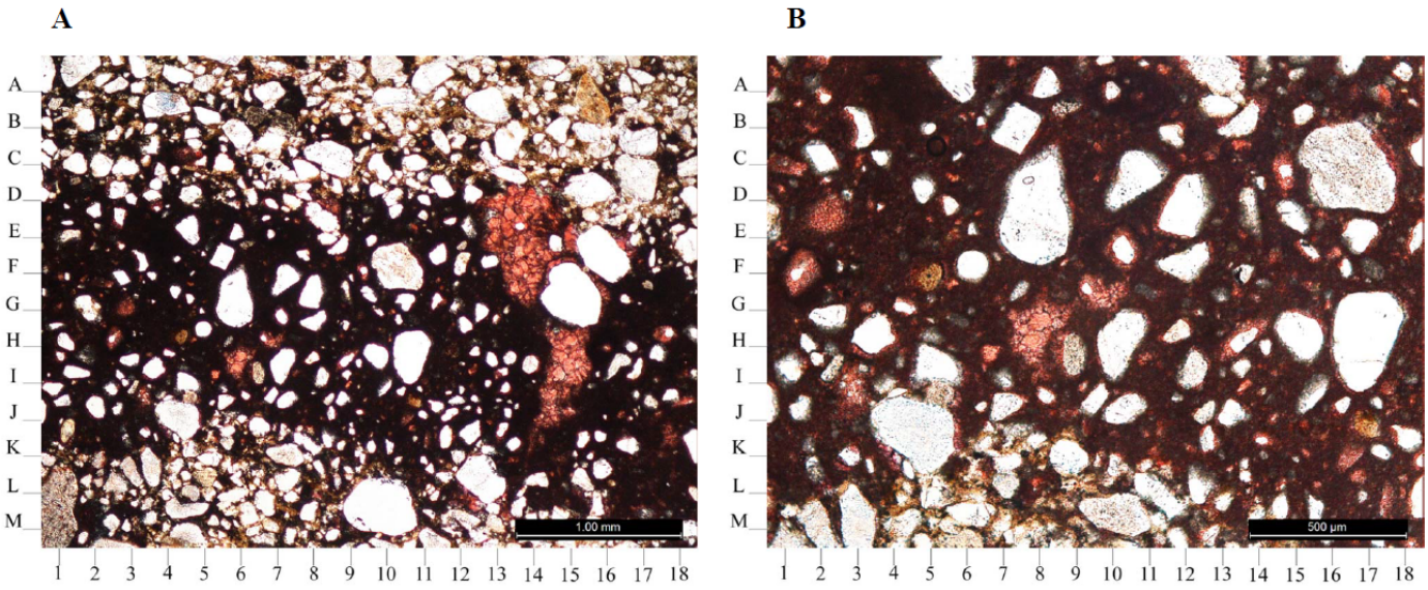

Figure 13. Thin Section Photomicrograph of the Bed 14 in the Centennial Pit

Photomicrographs display a sandy, argillaceous limestone. Layers of sandy calcareous shale (brown) alternate with sandy lime mudstone (Photo A, center). The rock is very poorly sorted. Sand grains are supported by a matrix of detrital shale (brown) and lime mud (pink). Detrital grains consist predominantly of quartz with very small amounts of potassium feldspar. Apatite grains occur in very small quantities. Minor displacive growths of pyrite (black).

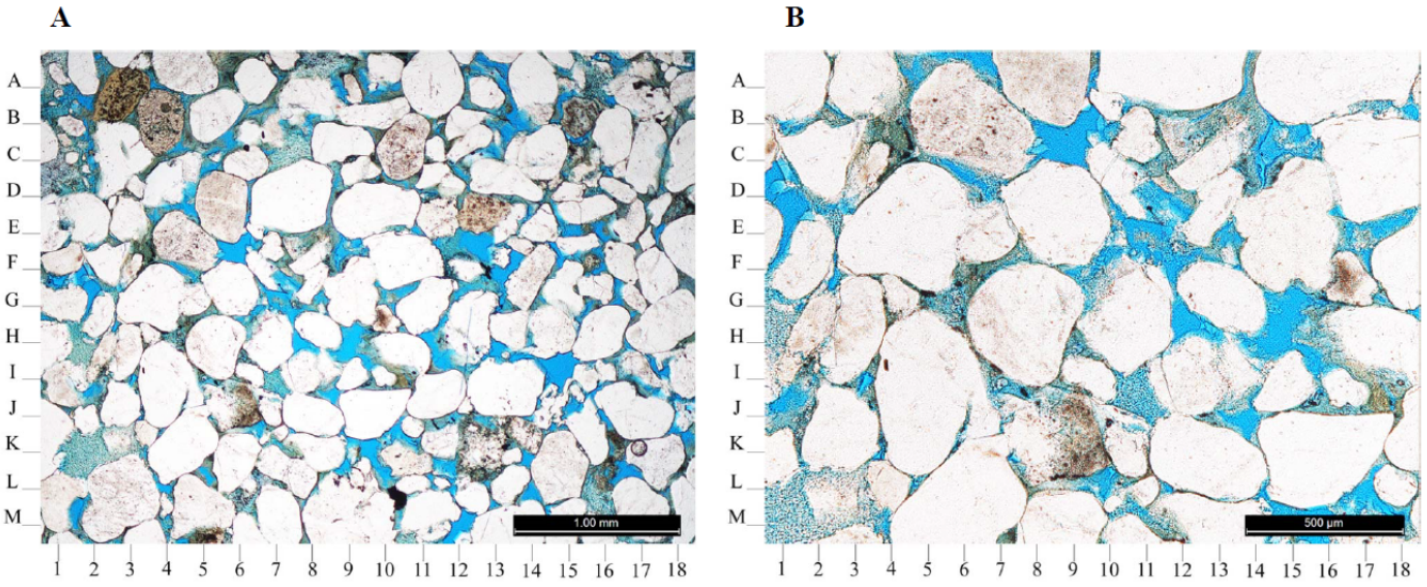

Figure 14. Thin Section Photomicrograph of the Bed 15 in the Centennial Pit

Photomicrographs display a fine grained, moderately well sorted sandstone. Framework sand grains have tangential to long contacts indicative of moderate burial compaction and grain packing adjustment. Grains are rounded to subrounded in shape. Quartz is the dominant grain constituent. Potassium and plagioclase feldspar as well as feldspathoids are present in very small quantities. Grains are coated by films of clay cement (apparently illite and illite-smectite from XRD analysis). The interiors of some pores are also filled by masses of kaolinite clay cement (blue-white area in lower left of Photo B). The grain rimming clay may be illuviated rather than authigenic. Some kaolinite appears to occur in the form of pedoliths. Intergranular porosity (blue) is well developed.

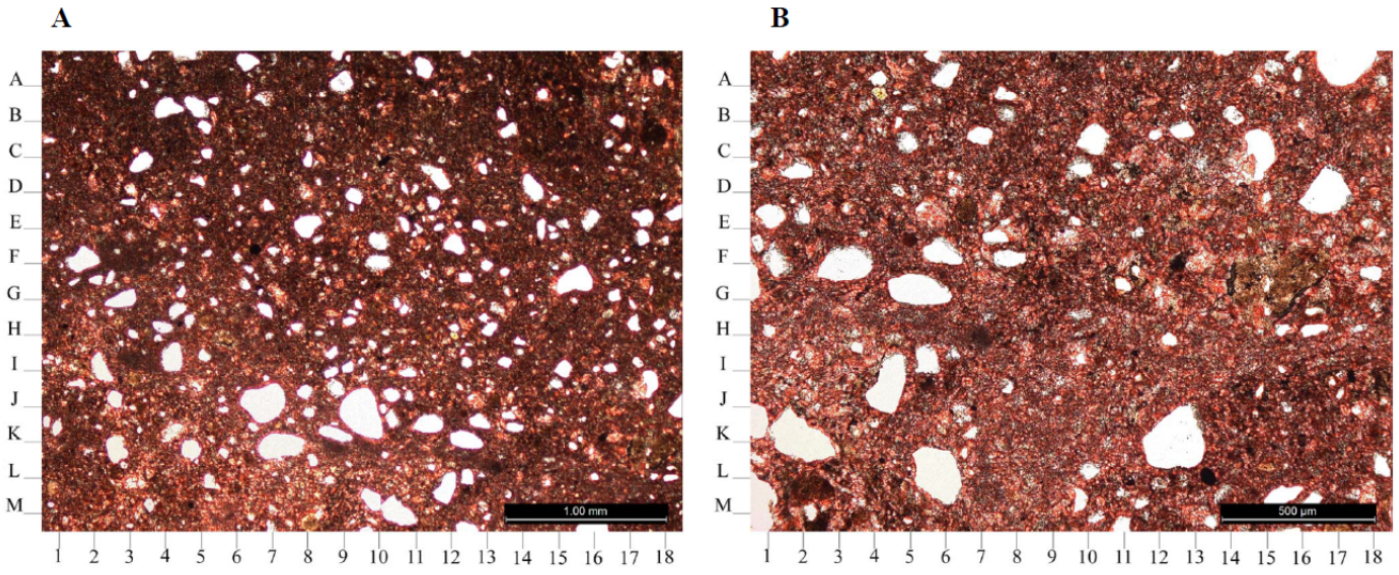

Figure 15. Thin Section Photomicrograph of the Bed 14 in the Sentinel West Pit

Photomicrographs display a sandy/silty limestone. The rock is very poorly sorted, matrix-rich and has a matrix supported fabric. The rock matrix of recrystallized lime mud (pink) supports scattered detrital sand and silt grains (white). Grains consist predominantly of quartz. Potassium feldspar occurs in very small quantities. The rock contains very small amounts of nodular apatite (brown, center right in Photo B). Minor displacive growths of pyrite (black).

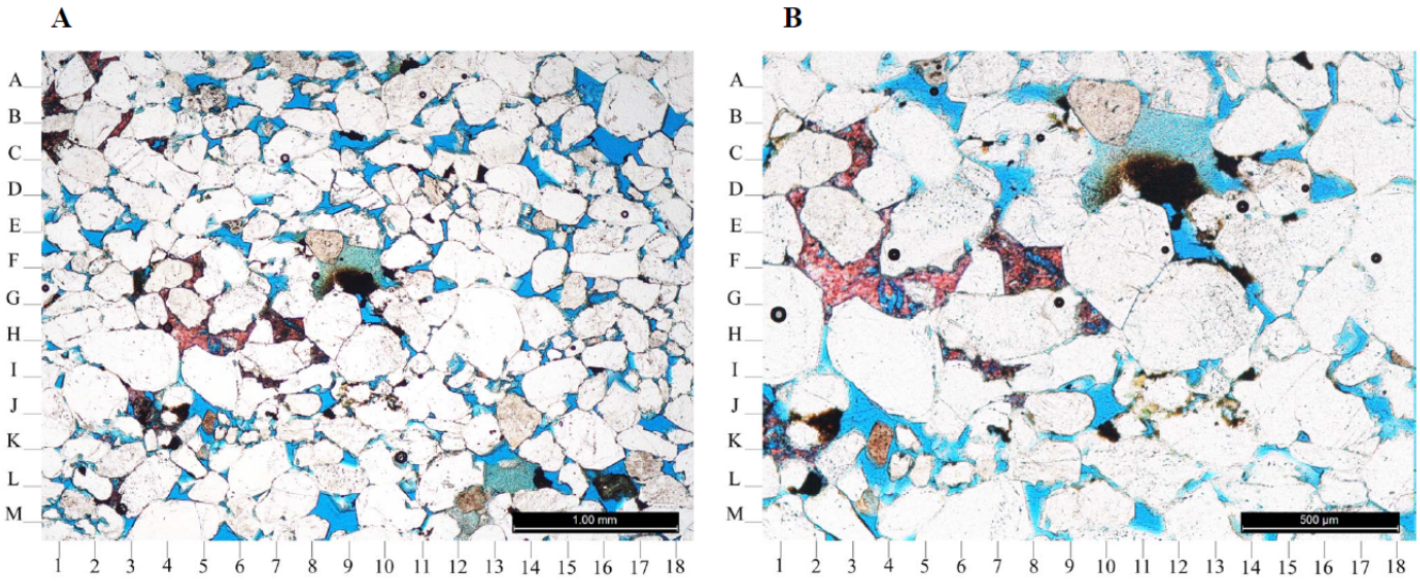

Figure 16. Thin Section Photomicrograph of the Bed 15 in the Sentinel West Pit

Photomicrographs display a fine grained, moderately well sorted sandstone. Note variations in grain size in Photo A distinguishing faint textural lamination. Grains are somewhat finer and more angular than in CENT 15. Quartz is the most abundant detrital grain. The rocks contain small amounts of potassium and plagioclase feldspar as well as feldspathoids. Clay rim cement apparent in CENT 15 is lacking. Unlike CENT 15, quartz cementation was not inhibited and well developed quartz overgrowths are common throughout the sample. Intergranular space (blue) is also filled by calcite cement (red). Kaolinite clay cement (blue-white speckled pore fill, upper right of Photo B) is much more poorly developed.

5.4.2 X-ray Diffraction

X-ray diffraction (XRD) of bulk powdered rock material was performed for quantitative assessment of the mineralogical content of the tested samples. Quantitative XRD yields weight percent abundance of the different mineral phases present, down to approximately 1% by weight. The XRD analysis was primarily used to confirm major mineral phases (e.g., carbonate and sulfide minerals) and distinguish and quantify clay minerals (such as smectite, illite, chlorite, kaolinite, etc).

Samples for XRD analysis were ground in a McCrone mill to a particle size of less than 10 μm. The bulk and clay fractions of each sample were analyzed using a PANalytical X'Pert Pro x-ray diffractometer equipped with a PIXcel detector. Samples were scanned from 2 to 60 degrees 2-theta. Phase identification was performed using PANalytical HighScore Plus software and the digital International Centre for Diffraction Data (ICDD) database. Quantitative mineralogy was performed using full powder pattern Rietveld analysis. Results of the XRD analysis are summarized in Table 12.

Table 12. Quantitative Mineralogy of Samples Analyzed by XRD

Sample	Clay Minerals						Carbonate Minerals		Other Minerals							Totals		
	Smectite (%)	Illite -Smectite (%)	Illite (%)	Kaolinite (%)	Reichweite Ordering	Illite Smectite Expandability (%)	Calcite (%)	Dolomite (%)	Quartz (%)	Potassium Feldspar (%)	Plagioclase (%)	Pyrite (%)	Ilmenite (%)	Lazurite (%)	CFA (%)	Total Clay (%)	Total Carbonate (%)	Total Other (%)
Cent 14		1	13		R1	25	48		37	Tr		1			Tr	14	48	38
Cent 15		Tr	1	6	R3	15	Tr		91	Tr	Tr	Tr		2	Tr	7	0	93
SW 14		1	3		R1	30	76		18	Tr		Tr			Tr	5	77	18
SW 15		Tr	1	1	R1	25	Tr		95	Tr	1			2		2	0	98

Note: Reichweite is the probability that in a mixed layer clay, given a layer of clay A, the adjacent layer is clay B; R0 is random mixing of layers, R1 is short-range ordering, R3 is long-range ordering

XRD analysis indicates that calcite (48%) and quartz (37%) are the primary mineralogical components of the Bed 14 limestone sample from the Centennial Pit. The sample also contained 14% total clays, dominantly illite (13%). Sulfide mineralogy included only pyrite (1%). The expandability of the interstratified illite clays was reported to be 25%. The calcium-fluorapatite (CFA) grains visible in very small quantities in thin section accounted for less than 1% of the sample by weight percent.

XRD analysis indicates that Bed 15 samples from the Centennial Pit are dominantly quartz (91%). Clays, primarily kaolinite (6%) with subordinate illite (1%) made up 7% percent of the rock mass. Lazurite, a sulfate-sulfur-chloride tectosilicate, comprised 2% of the sample, an example of a sulfur-containing mineral that does not generate acid. Pyrite was present in trace amounts. The expandability of the interstratified clays was reported to be 15%.

XRD analysis indicates that calcite (76%) and quartz (18%) are the primary mineralogical components of the Bed 14 limestone sample from the Sentinel West Pit. The sample contained 5% total clays, dominantly illite and minor illite-smectite. Sulfide mineralogy included trace pyrite (1%). The expandability of the interstratified illite clays was reported to be 30%. The potassium feldspar and very small amounts of nodular (CFA) grains visible in the thin section were reported as trace quantities (<1% of the sample by weight percent).

XRD analysis indicates that Bed 15 samples from the Sentinel West Pit are dominantly quartz (95%). Plagioclase feldspar occurred at 1% by weight. Clays made up 2% percent of the rock mass. The copper mineral lazurite comprised 2% of the sample while pyrite was absent. The expandability of the interstratified clays was reported to be 25%.

In summary, the thin section and XRD analysis indicate very little pyrite (0 - 1%) and dominantly quartz (Bed 15), calcite (Bed 14), and clay minerals in the samples of the proposed backfill.

5.5 MWMP Testing

Representative split samples of the five composites were submitted to ACZ Laboratories for modified Nevada MWMP testing based on ASTM method E2242-13 (ASTM, 2013). The State of Nevada and the Nevada Mining Association obtained ASTM standardization for the MWMP column test method, which involves placing 5 kg of minus 2-inch material in a column and flushing it with an equivalent weight of distilled water over a period of 24 – 48 hours. The 1:1 water:rock weight ratio is considered appropriate for Nevada. The MWMP test method is designed to mobilize potential contaminants present in the solids, so that the resulting extract can be used to assess leachate that could potentially be produced from mine rock in the field (ASTM, 2013).

The first flush of solutes from a weathered and oxidized material is typically high in concentration of soluble elements, so that the sample will produce a relatively conservative estimate of the long-term impacts of oxidation reactions in backfill. This weathering, oxidation, and flushing result is achieved by the MWMP test, although its authors are careful to note that the test is "not intended to quantify the amount of each chemical constituent that will be released under site conditions".

The extraction water used in the five MWMP tests was reagent-grade deionized water, for consistency with the modified Nevada MWMP method used for previous MWMP tests performed on waste rock from the Lisbon Valley Mine. The Nevada MWMP does not specify a pH, instead it specifies that the solution should mimic the pH of local precipitation. Depending on elevation, rainfall or deionized water that is equilibrated with atmospheric CO_2 occurs at a pH of 5.5 – 5.9. Rainfall at the Lisbon Valley Mine could occur at higher pH (5.7 to 6.0 or possibly higher) if it comes into contact with carbonaceous dust in the air. Both rainfall and MWMP head solutions contain few dissolved solids and therefore have little or no buffering capacity, so small additions of acids or bases may result in large changes in pH.

Earlier MWMP tests for the site have been performed using pH values ranging from 5 to 7. In 1997, BLM requested that the Lisbon Valley Copper Project conduct MWMP tests at pH values designed to simulate groundwater conditions (Bill White, BLM, 1997) and the tests were run at pH 7, 8, and 9. More recent MWMP tests for the site have been conducted at pH 7 and 5.5 - 5.9. The difference may not be significant for most of the waste rock from the site because the MWMP head solution is unbuffered and the carbonate rocks will consume the small quantity of acid required for pH adjustment.

Results of the MWMP testing are provided in Section 6.6.3 and 6.6.4.

6. COLUMN TESTING METHOD

Five columns were prepared to provide quantitative estimates of the leaching characteristics of waste rock proposed for backfilling in the Centennial and Sentinel West Pits. Monolithologic columns were performed for this study, as opposed to run-of-mine (ROM) columns packed with a mixture of rock types that are proportioned to represent the material balances of the proposed backfill scenarios. The primary advantage of monolithologic columns is the ability to obtain the individual drainage chemistry information associated with Bed 14 and Bed 15 waste rock, which can be visually identified as individual rock types that may be selectively handled.

6.1 Summary of Test Method

The column testing method was designed to evaluate the kinetic leaching characteristics of a 20 kg sample of waste rock under saturated conditions. Specifically, the test was designed to simulate Burro Canyon Aquifer groundwater coming in contact with the pit backfill. The Burro Canyon Aquifer is currently dewatered to well below the pit floor and will rise after mining when the pumps are shut off. As the aquifer recharges, groundwater levels will rise to a level within the pit backfill (and below the surface of the proposed backfill). The columns simulate flooding of the backfill from below. The Burro Canyon Aquifer has been designated as a Class III Aquifer by the Utah Department of Environmental Quality (UDEQ, 1998), which indicates that total dissolved solids (TDS) are greater than 3,000 mg/l and less than 10,000 mg/l, or one or more constituents exceed the ground water quality standards.

The test was performed in 6-inch diameter cylindrical columns (Figure 17). Five columns were configured in parallel to permit simultaneous testing of several samples. The test procedure involved repeated leaching cycles consisting of a solution application period and a reaction period. The leaching head solution was groundwater from the Burro Canyon Aquifer (Section 4.2). The column was operated under upward flow conditions by applying the head solution to the bottom of the column and collecting the effluent from the top. The testing method produced approximately 3,600 ml of effluent during each leaching cycle (Section 6.3), which was analyzed for solubilized nonvolatile constituents to determine the release characteristics of the solid material under the given test conditions.

6.2 Analytical Suite for Column Leaching Tests

The analyte list for column leaching studies included major ions, constituents of potential concern (COPCs), and other solution parameters needed to evaluate compliance with water quality standards contained in Utah Administrative Code (UAC) R317-6-2 and to assess long-term water quality. The analyte list for column test leachates is shown in Table 13.

Figure 17. Photograph of Saturated Columns

Table 13. Laboratory Analytical Suite for LVMC Column Leaching Tests

Parameter	Analytical Method	Method Detection Limit	Units
Major Ions and Solution Parameters			
pH	SM 4500H+B	0.1	s.u.
Alkalinity, Total as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Carbonate as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Bicarbonate as $CaCO_3$	SM 2320B	2	mg/L
Alkalinity, Hydroxide as $CaCO_3$	SM 2320B	2	mg/L
Hardness as $CaCO_3$	SM 2340B	1.5	Calculation
Calcium	EPA 6010B	0.2	mg/L
Magnesium	EPA 6010B	0.2	mg/L
Potassium	EPA 6010B	0.3	mg/L
Sodium	EPA 6010B	0.3	mg/L
Chloride	EPA 300.0	0.5	mg/L
Fluoride	EPA 300.0	0.1	mg/L
Sulfate	EPA 300.0	0.5	mg/L
Phosphorus	SM365.1	0.01	mg/L
Silica	M200.7	0.428	mg/L
Residue, Filterable (TDS) @180C	SM 2540C	10	mg/L
TDS, Calculated	Calculation	--	--
Specific Conductance @25C	SM 2510B	1	umhos/cm
Anion-Cation Balance	Calculation	--	--
Metals – Dissolved			
Aluminum	EPA 6010B	0.03	mg/L
Antimony	EPA 6020A	0.0004	mg/L
Arsenic	EPA 6020A	0.0002	mg/L
Barium	EPA 6010B	0.003	mg/L
Beryllium	EPA 6020A	0.00005	mg/L
Cadmium	EPA 6020A	0.0001	mg/L
Chromium	EPA 6020A	0.0005	mg/L
Copper	EPA 6020A	0.0005	mg/L
Iron	EPA 6010B	0.02	mg/L
Lead	EPA 6020A	0.0001	mg/L
Manganese	EPA 6020A	0.0005	mg/L
Mercury	EPA 7470A	0.0002	mg/L
Molybdenum	EPA 6010B	0.01	mg/L
Nickel	EPA 6010B	0.01	mg/L
Selenium	EPA 6020A	0.0001	mg/L
Silver	EPA 6020A	0.00005	mg/L
Thallium	EPA 6020A	0.0001	mg/L
Uranium	EPA 6020A	0.0001	mg/L
Vanadium	EPA 6020A	0.0002	mg/L
Zinc	EPA 6020A	0.002	mg/L
Metals – Total			
Uranium	EPA 6020A	0.0001	mg/L
Radionuclides			
Gross alpha activity(1)	M9310	2	pCi/L
"Field" Parameters			
Temperature		0.1	°C
pH		0.1	s.u.
Specific Conductance (E.C.)		1	µS/cm
ORP		1	mV
Dissolved oxygen (D.O.)		0.01	%, mg/L

Notes: Whetstone lab monitors "field parameters" on every PV cycle (or half cycle, as required)

(1) Gross alpha particle activity will be analyzed only if sample volume is sufficient to complete the analysis

6.3 Pore Volume Determination

The pore volume and water:rock ratio were determined based on the ratio of the density of a filled and settled 6-inch column of prepared sample to the density of intact rock. The density of intact mine rock was determined by Lisbon Valley Mine engineers and chemists to be 2.29 gm/cm^3 (Chamanifard, 2013) (Table 14). The density of a prepared composite sample was 1.63 gm/cm^3 (Table 15). Using these densities, the 20-kg column had a rock volume (V_r) of 8,734 cm^3 and a total volume (V_c) of 12,292 cm^3. One pore volume (PV) was 3,600 mL, equating to a porosity (n) of 29% and a water:rock ratio of 0.18 v/v, where:

$$PV = V_c - V_r$$

$$n = (V_c - V_r)/V_c$$

Table 14. Rock Density at Lisbon Valley Mine

Rock Density - Lisbon Valley Mine			
Rock	**Density** ton/ft^3	**Density** lbs/ft^3	**Density** g/cc
Intact:	0.07143	142.86	2.29
Blasted:	0.05355	107.1	1.72

Note: Density in tons per cubic foot provided by Amir Chamanifard, LVMC Mine Engineer (2013)

Table 15. Pore Volume and Water:Rock Ratio

Column Properties			Rock Properties		Pore Volume		
Mass of Filled Column (g)	Volume of Filled Column (cm^3)	Density of Filled Column (gm/cm^3)	Intact Rock Density (gm/cm^3)	Volume of 20 kg Rock (cm^3)	Volume of Secondary Pore Spaces (cm^3)	Pore Volume, rounded (mL)	Water:Rock Ratio (v:v)
20,000	12,292	1.63	2.29	8,734	3,558	3,600	0.18

6.4 Procedure

6.4.1 Column Set Up

The column body was constructed of clear polyvinyl chloride (PVC), approximately 36 inches in length, with an inside diameter of 6 inches and a minimum wall thickness of 0.280 inches[1] (Figure 18). An opaque PVC end cap with centered solution application port and 1/4-inch diameter 316 stainless steel ball valve was fixed to the bottom of the column body using PVC cement to ensure that the connection was watertight. Because PVC cement and other sealants have the potential to affect leachate chemistry, an equipment blank sample was prepared and evaluated for the column prior to loading[2]. An opaque PVC end cap with centered sample collection port and 1/4-inch diameter 316 stainless steel barbed tubing fitting was installed at the top of the column body after the column was loaded with the solid sample material. The top cap was sealed around the exterior bottom edge with silicone caulk to prevent leakage. PVC cement or

[1] Measured wall thickness was 7.6mm (0.299 inches)

[2] In many cases, contamination issues for total organic carbon (TOC) may be avoided if PVC cement and sealants are allowed sufficient time to cure and de-gas before the column is put into service.

other sealants applied to the interior of the cap were avoided to minimize the risk of contamination of column leachates by volatile organic carbon (VOCs) vapors.

Ottowa inert clean silica sand packing material was placed at the top and bottom of each column to elevate the sample above the opaque PVC cap. The silica sand was decontaminated with a de-ionized water wash and allowed to dry completely before use in the column. Based on previous column experiments conducted using the Ottowa silica sand, the leachate concentrations associated with the silica sand are low compared to concentrations in the head solution. The packing material was well-graded.

Quality control samples for the equipment and silica sand packing material are discussed in Section 6.5.2.

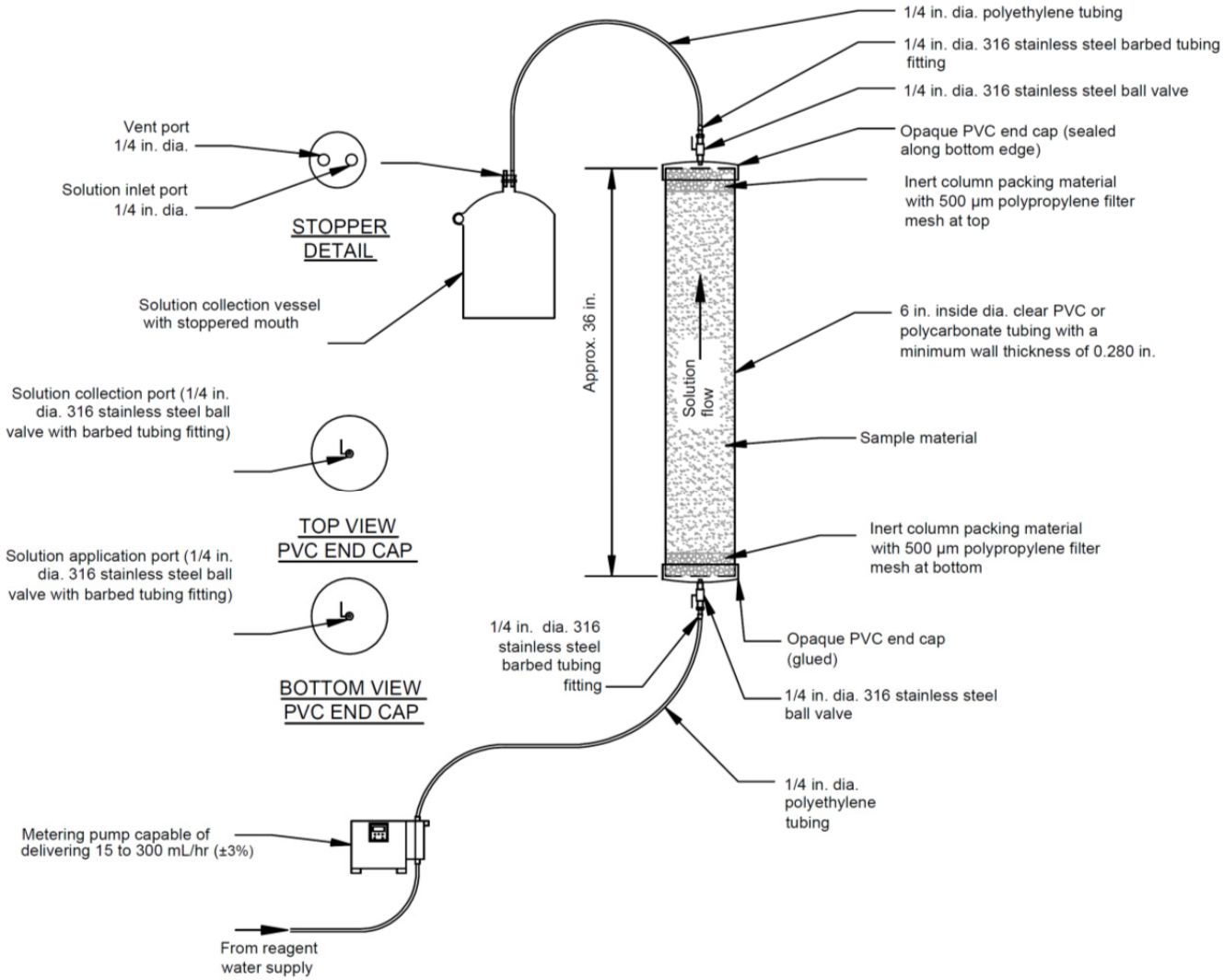

Figure 18. Saturated Column Testing Apparatus

The column apparatus was thoroughly decontaminated prior to sample placement. The column and associated fittings were scrubbed with a non-ionic surfactant detergent (Liquinox®) and tap water to remove gross contamination from surfaces, followed by an acid wash with a 10% solution of reagent-grade nitric acid and de-ionized water, and a final triple rinse with de-ionized water. The apparatus was permitted to air dry and an equipment blank sample was prepared for each column. An equipment blank sample consisted

of 3,600 ml of reagent water poured down the interior wall of the column to contact as much of the surface as possible. The sample was allowed to stand in the column for 24 hours before collection and analysis of the full suite of parameters established in the Work Plan for column testing (Whetstone, 2014).

The columns were loaded in the following order. A 6-inch diameter disk of polypropylene filter mesh with a pore opening of 500 microns was placed in the bottom of each column, followed by a layer (approximately four inches) of decontaminated inert Ottowa silica sand to elevate the samples above the opaque caps. Following the silica sand, the columns were packed with 20 kg of composite samples. The samples were placed in random lifts of approximately 1- to 2-inches thick and compacted by gently tapping the sides of the column with a rubber mallet. A layer of inert Ottowa silica sand (approximately four inches) was added on top of the composite samples. A 6-inch diameter polypropylene filter mesh disk with a pore opening of 500 microns was placed on top of the sand, and the columns were capped with an opaque 6-inch PVC cap.

6.4.2 Head Solution

A metering pump capable of accurately delivering 15 to 200 ml/hr (± 3%) was used to apply head solution water to the bottom of the column. Each column had a separate metering pump connected to a common head solution supply. Tubing and vessels that were used to convey or store head solution were constructed of inert material such as glass, polyethylene, Teflon®, or Tygon®. Valves and other tubing fittings were 316 stainless steel, polyethylene, or other inert material. All tapered threads on valve bodies and tubing connections were sealed with Teflon® tape to prevent leakage.

A common water supply reservoir was used for multiple columns that were configured to permit simultaneous testing. The reagent solution (groundwater from Burro Canyon Aquifer well PW-3) was kept free of contact with atmospheric oxygen. Head solution used in the tests was submitted for laboratory analysis of the parameters in Table 13. The columns were maintained at room temperature (21˚C ± 3˚) during the testing period, and the laboratory kept dark except during leachate collection and column maintenance to minimize the potential for photo-oxidation of metallic constituents.

The head solution was delivered to Whetstone's geochemistry lab in twelve[3] 5-gallon cubitainers (Section 4.2). During column testing, the head solution was stored in a common 55 gallon plastic drum (Figure 19). To prevent contact with atmospheric oxygen, the drum was purged with 9 volumes (495 gallons) of inert nitrogen gas to ensure that all atmospheric oxygen was expelled prior to the introduction of head solution. To ensure that no atmospheric oxygen leaked into the head solution container, a slight positive pressure was applied to an external bag of nitrogen connected to the head solution container. As the head solution level was decreased by the metering pumps (-75mL/hr), the bag of nitrogen applied nitrogen gas at the same rate (+75mL/hr). This system was deemed sufficient to prevent head solution contacting atmospheric oxygen.

Samples of head solution were submitted for laboratory analysis during column testing (January 12, 2014) and compared to the laboratory results from well PW-3 on the day the solution was collected (December 5, 2013). The results indicate that major ion chemistry of the head solution was stable throughout the testing period (Table 16). Although major ion chemistry remained stable, the redox conditions of the head solution could not reproduce or maintain the highly reducing conditions of in-situ groundwater (Section 4.2). DO was measured in the remaining head solution at the end of testing (February 11, 2014) using a flow-through cell. The DO measured from the flow-through cell stabilized at 1.68 mg/L (17.7%) compared to 0.11 mg/L (1.1%) in groundwater (Table 16). Dissolved iron (Fe^{2+}) was 4.97 mgL in groundwater and below detection (<0.02 mg/L) in the remaining head solution.

[3] Eleven of the twelve cubitainers arrived full (no headspace) and intact (no evident leakage). The twelfth cubitainer lost a portion of its volume during transit, possibly due to leakage from the cap, a puncture, or defect in the plastic cubitainer. Groundwater collected in this compromised cubitainer was not used in the study.

Figure 19. Photograph of Head Solution with Nitrogen Charge

Table 16. Analytical Results for Groundwater from PW-3 and Head Solution

Station Name		PW-3		PW-3		HS-S1		HS-S1	
Sample ID		PW-3-13-3		PW-3-13-4		GEO-S1-C0.5		HS-S1	
Leach Cycle (PV)		3rd Qtr Sampling		4th Qtr Sampling		Head Solution Dupl.		Head Solution	
Sample Date		8/26/2013		12/5/2013		1/12/2014		1/12/2014	
Major Ions & Inorganics									
pH, Lab	s.u.	8.0	H	8.0	H	8.2	H	8.2	H
E.C., Lab	µS/cm	1,730		2,120		1,600		1,600	
Calcium, diss.	mg/l	231		232		240		243	
Magnesium, diss.	mg/l	80.0		78.5		82.1		82.6	
Sodium, diss.	mg/l	53.0		51.0		53.5		54	
Potassium, diss.	mg/l	12.0		12.0		12.5		12.7	
Hardness (as CaCO3)	mg/l	906		903		937		947	
Alkalinity (as CaCO3)	mg/l	319		344		351		332	
Bicarbonate	mg/l	319		344		351		332	
Carbonate	mg/l	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	21		22		18.7	B	18.8	B
Fluoride	mg/l	0.0	B	0.4	B	<1.	U	<1.	U
Phosphorus, tot as P	mg/l	0	B	0.01	B	<0.01	U	<0.01	U
Silica	mg/l	10.0		10.1		10.1		10.2	
Sulfate	mg/l	670		650		617		633	
Nitrate/Nitrite as N	mg/l	<0.02	U	<0.02	U	NA		NA	
Total Diss. Solids	mg/l	1,310		1,290		1,300		1,300	
Metals									
Aluminum, diss.	mg/l	<0.03	U	<0.03	U	<0.03	U	<0.03	U
Antimony, diss.	mg/l	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, diss.	mg/l	0	B	0.0004	B	<0.0002	U	<0.0002	U
Barium, diss.	mg/l	0.01	B	0.010	B	0.007	B	0.008	B
Beryllium, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Chromium, diss.	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	<0.01	U	<0.01	U	<0.0005	U	<0.0005	U
Iron, diss.	mg/l	3.1		4.97		<0.02	U	<0.02	U
Lead, diss.	mg/l	<0.0001	U	0.0015		<0.0001	U	<0.0001	U
Manganese, diss.	mg/l	0.170		0.188		0.1737		0.1738	
Mercury, diss.	mg/l	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Nickel, diss.	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Selenium, diss.	mg/l	<0.001	U	<0.001	U	0.0002	B	0.0002	B
Silver, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Uranium, diss.	mg/l	NA		NA		0.0165		0.0167	
Uranium, total	mg/l	0.025		0.0163		0.0172		0.0171	
Vanadium, diss.	mg/l	<0.005	U	<0.005	U	<0.0002	U	<0.0002	U
Zinc, diss.	mg/l	0		<0.01	U	0.012		0.012	
Radiological									
Gross Alpha, total	pCi/l	17		19		NA		NA	
QC									
Cation-Anion Bal.	%	0		0		0		2.3	
Sum of Anions	meq/l	21		21		21		21	
Sum of Cations	meq/l	21		21		21		22	
TDS (calculated)	mg/l	1,270		1,270		1,240		1,250	
TDS (ratio m/calc)	unitless	1.03		1.02		1.05		1.04	
Field Parameters									
Dissolved oxygen	%			1.1		17.7 (1)		17.7 (1)	
Dissolved oxygen	mg/l			0.11		1.68 (1)		1.68 (1)	
E.C., Field, 25C	µS/cm			1,740		1,693		1,693	
ORP, Field	millivolts			NA		231.5		231.5	
pH, Field	s.u.			7.82		7.47		7.47	
Temperature, Field	deg C			17.0		18.7		18.7	

Notes: (1) DO was measured at the end of the column testing (2/11/14). An earlier measurement on 1/12/14 was not representative because a flow-through cell was not used, to conserve solution during testing.

6.4.3 Column Operation

The head solution was applied at a rate of 15 ml/hr (± 3%) = 0.25ml/min. This is the lowest practical application for the metering pumps, which was required to prevent column plugging. After initial column wetting, a three-day static contact period occurred. After the three-day static contact period, the head solution was applied to the base of the columns (upflow) and leachate was collected from tubing at the top of the columns. Total volume through the columns was monitored, and composite samples containing the following pore volumes were collected and analyzed: 0 to 0.5 PVs; 0.51 to 1.0 PVs; 1.01 to 2.0 PVs; and 2.01 to 3.0 PVs. A three-day static contact period occurred at the end of each full pore volume, before the start of the next pore volume.

Additional groundwater in excess of the 3,600 ml target effluent volume was applied to the bottom of the column during the first leaching cycle to compensate for the volume of water retained by the column during saturation of the sample and inert packing material. The required additional volume was variable between columns and depended on the characteristics of the sample. Experimental data indicates that columns may retain between 7,000 and 8,000 ml of the solution applied during the first cycle (Whetstone, 2010).

Column leachates were collected in manufacturer-certified pre-cleaned containers. Each container was purged with nitrogen at the beginning of each cycle, and fitted with an air-lock device to prevent exposure to the atmosphere. Leachates were sampled at the end of each full or half cycle, as required.

Prior to leachate sampling, field instruments were calibrated according to the Standard Operating Procedures (SOPs) contained in the laboratory SOP manual. Instruments were calibrated no more than four hours prior to measuring field parameters in the laboratory. The DO meter (model YSI Pro20) was calibrated using one-touch percent (%) saturation. The Oakton pH meter was calibrated using the point-slope calibration with 4.1, 7.0, and 10.0 buffer solutions. The Oakton EC meter was calibrated using a three point calibration with 84 µS, 1,413 µS, and 12,880 µS calibration solutions. The ORP meter was calibrated by measuring the offset from a standard solution and temperature, then adding or subtracting the offset to/from the instrument reading. The ORP readings and offset corrections were recorded in the laboratory notebook for the project.

The volume, temperature, pH, DO, ORP, and EC of the effluent solution were measured at the time of collection and the leachates were filtered (0.45 µm) and preserved as appropriate for the analytical suite and prior to shipment to the analytical laboratory. The columns were visually monitored daily for evidence of channelized flow, bacterial activity, and iron or manganese oxide formation. A written record of column maintenance, performance, and observations was kept in the laboratory record.

Figure 20. Photograph of Collection Vessels

6.4.3.1 First Cycle Operation

The first leaching cycle was designed to produce 3,600 ml (± 5%), or approximately one pore volume, of effluent and required approximately 14 days to complete. It included an initial solution application period of approximately one day to saturate the column, a 3-day reaction period, and a 10-day solution application period to generate effluent for chemical analysis. The column effluent was collected in two aliquots representing the first (PV-0.5) and second (PV-1) half pore volumes of solution released from the column.

The initial solution application period to saturate the column required approximately one day to complete. Groundwater was added to the column through the solution application port at a rate of 200 ml/hr (±1%). The column was observed frequently to track the saturation level as it rose, and the application period was stopped as close as practical to the point when the first drop of effluent was released from the column into the solution collection vessel. The total volume of solution applied was recorded in the experimental record along with the date and time of the first effluent and other observations made during column saturation.

Following saturation, the column was allowed to stand idle for 3 days (72 hrs) to permit the solution to react with the solid sample. The duration of the reaction period was adjusted ± 6 hours as necessary to facilitate scheduling of multiple columns for the next phase of operation. If the reaction period duration was adjusted, it was noted in the experimental record.

The duration of the solution application period to generate effluent for chemical analysis was 10 days (240 hours), during which 3,600 ml of reagent water was added to the column through the solution application port at a rate of 15 ml/hr (±3%). The column was observed daily for evidence of preferential flow, bacterial activity (biofilms), or mineral precipitates, and none were observed in the first cycle.

Observations relevant to column operation and adjustments to the solution application rate were recorded in the experimental record. The effluent from the first cycle was collected in two aliquots. Effluent volume, temperature, pH, DO, ORP, and EC were measured for each aliquot and the samples were filtered (0.45 μm) and preserved as appropriate prior to shipping to the analytical laboratory for the analytes listed in Table 13. The first aliquot of 1,800 ml (0.5 PV) was collected at 5 days (120 hrs) from the start of the solution application period. The second aliquot of 1,800 ml was collected at end of the solution application period. A new, pre-cleaned solution collection vessel replaced the previous collection vessel in preparation for the next leaching cycle.

6.4.3.2 Subsequent Cycle Operation

Each leaching cycle after the first cycle required 10 days to complete and included a reaction period (3 days) and a solution application period (10 days).

The columns were allowed to stand idle for 3 days (72 hrs) after the first leaching cycle to permit the solution to react with the solid sample.

The groundwater solution application period started at the end of the reaction period had a duration of 10 days (240 hours). An application rate of 15 ml/hr (±3%) added a total of 3,600 ml of reagent water to the column during each leaching cycle. The columns were observed daily for evidence of preferential flow, bacterial activity (biofilms), or mineral precipitates. No preferential flow paths or biological activity was observed in any of the columns. Four of the five columns showed no visual evidence mineral precipitates. However, column CE-15-S1 showed an orange precipitate (likely ferrihydrite) in the discharge tube starting on 2/8/14 which remained there until the columns were shut off on 2/11/14.

Observations relevant to column operation and adjustments to the solution application rate were recorded in the experimental record. At the end of the application period, effluent volume, temperature, pH, DO, ORP, and EC were measured and the samples were filtered (0.45 μm) and preserved as appropriate prior to shipping to the analytical laboratory for the analytes listed in Table 13. A new, pre-cleaned solution collection vessel replaced the previous collection vessel in preparation for the next leaching cycle.

6.4.4 Duration of Testing

Column tests were performed for three leaching cycles (approximately 40 days). The schedule for column testing is summarized in Table 17.

Table 17. Schedule for LVMC Column Testing Program

Began loading columns	12/30/2013
Finished loading columns	12/31/2014
Started initial saturation period	1/2/2014
Ended initial saturation period, start reaction period	1/3/2014
Ended reaction period, start Cycle 1	1/6/2014
Collected first 1/2 cycle	1/12/2014
Collected first full cycle, start reaction period	1/16/2014
End reaction period, started Cycle 2	1/19/2014
Collected Cycle 2, started reaction period	1/24/2014
Received results for Cycle 0.5 from ACZ	1/27/2014
Ended reaction period, started Cycle 3	1/29/2014
Received results for Cycle 1 from ACZ	2/1/2014
Collected Cycle 3	2/11/2014
Received results for Cycle 2 from ACZ	2/18/2014
Received results for Cycle 3 from ACZ	2/28/2014

6.5 Quality Control for Column Leaching Tests

In addition to standard laboratory QA/QC procedures associated with the analytical methods listed in Table 13, the column leaching study incorporated replicate columns, equipment blanks, and blind duplicate split samples as described below.

6.5.1 Replicate Columns

Replicate columns provide QC for the evaluation of experimental precision and reproducibility. A replicate column is an exact duplicate of another column and is operated under identical conditions. One replicate column was prepared and leachates from the replicate column were analyzed for the same suite of constituents as the original column. The results for column CE-14-S1 and CE-14-S2 showed excellent agreement, as shown in Section 6.6.

6.5.2 Equipment Blank Samples

Equipment blank samples are used to assess potential contamination from the testing apparatus and from the sample preparation and analytical procedures. Equipment blank samples were prepared for each column prior to the start of testing and are listed in Table 18. The column apparatus was scrubbed with a non-ionic surfactant detergent solution to remove gross contamination, followed by an acid wash with a 10% solution of reagent-grade nitric acid and de-ionized water and triple rinsing with de-ionized water. After decontamination, the equipment blank sample was prepared by adding 3,600 ml of reagent water to the column and allowing it to react for 24 hours before collection. The equipment blank samples were analyzed for the same suite of constituents as the column leachates.

An equipment blank was also prepared for the packing material (Ottowa silica sand) that was used to elevate the sample above the bottom end cap and prevent migration of material into the collection vessels at the top of the columns. The packing material was decontaminated by washing in tap water to remove gross contamination followed by triple rinsing with de-ionized water. The packing materials were allowed to dry completely before preparing the equipment blank. The equipment blank was prepared by placing 10 kg of packing material in contact with 4,000 ml of reagent water and allowing it to react for 24 hours before collection. The equipment blank results are shown in Table 19.

Table 18. Quality Control Samples: Column Equipment Blanks

Blank Sample ID	Column
COL-24-EB	CE-14-S2
COL-16-EB	CE-14-S1
COL-28-EB	SW-14-S1
COL-26-EB	SW-15-S1

Table 19. Equipment Blank Sample Results

Station Name		CE-14-S1		CE-14-S2		SW-14-S1		SW-15-S1		3338PAP4		3338PAP4	
SampleID		COL-16-EB Equipment Blank		COL-24-EB Equipment Blank		COL-28-EB Equipment Blank		COL-26-EB Equipment Blank		3338PAP4 Bottle Blank		GEO-BB-C1.0 Bottle Blnk Dup	
Sample Date		12/12/2013		12/12/2013		12/12/2013		12/12/2013		1/16/2014		1/16/2014	
Major Ions & Inorganics													
pH, Lab	s.u.	6.1	H	6.4	H	6	H	5.9	H	6.4	H	6.1	H
E.C., Lab	umhos/cm	1	B	1	B	1	B	1	B	2	B	1	B
Calcium, dissolved	mg/l	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U
Magnesium, dissolved	mg/l	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U
Sodium, dissolved	mg/l	<0.3	U	<0.3	U	<0.3	U	<0.3	U	<0.3	U	<0.3	U
Potassium, dissolved	mg/l	<0.3	U	<0.3	U	<0.3	U	<0.3	U	<0.3	U	<0.3	U
Hardness (as CaCO3)	mg/l	<1.	U	<1.	U	<1.	U	<1.	U	<1.	U	<1.	U
Alkalinity (as CaCO3)	mg/l	2	B	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Bicarbonate (as CaCO3)	mg/l	2	B	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Carbonate (as CaCO3)	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide (as CaCO3)	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	<0.5	U	<0.5	U	<0.5	U	<0.5	U	<0.5	U	<0.5	U
Fluoride	mg/l	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U
Phosphorus, total as P	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Silica	mg/l	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U
Sulfate	mg/l	<0.5	U	<0.5	U	<0.5	U	<0.5	U	<0.5	U	<0.5	U
Total Dissolved Solids	mg/l	<10.	U	20		10	B	<10.	U	<10.	U	<10.	U
Metals													
Aluminum, dissolved	mg/l	<0.03	U	<0.03	U	<0.03	U	<0.03	U	<0.03	U	<0.03	U
Antimony, dissolved	mg/l	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, dissolved	mg/l	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Barium, dissolved	mg/l	0.004	B	0.003	B	0.003	B	0.003	B	<0.003	U	<0.003	U
Beryllium, dissolved	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, dissolved	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Chromium, dissolved	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, dissolved	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Iron, dissolved	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Lead, dissolved	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Manganese, dissolved	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Mercury, dissolved	mg/l	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, dissolved	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Nickel, dissolved	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Selenium, dissolved	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Silver, dissolved	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, dissolved	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Uranium, dissolved	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Uranium, total	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Vanadium, dissolved	mg/l	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Zinc, dissolved	mg/l	0.002	B	<0.002	U	<0.002	U	<0.002	U	<0.002	U	0.002	B
QC													
Cation-Anion Balance	%	NA		NA		NA		NA		NA		NA	
Sum of Anions	meq/l	<0.1	U	NA		NA		NA		NA		NA	
Sum of Cations	meq/l	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U
TDS (calculated)	mg/l	<10.	U	<10.	U	<10.	U	<10.	U	<10.	U	<10.	U
TDS (ratio – meas./calc.)	Unitless	NA		NA		NA		NA		NA		NA	

6.5.3 Blind Duplicate Samples

Blind duplicate samples are used to assess analytical precision and consistency of the sample preparation process. One blind duplicate sample was prepared for a randomly selected sample during each leaching cycle and submitted for laboratory analysis (Table 20). A blind duplicate sample was prepared by splitting a leachate or head solution sample into two or more aliquots prior to sample preparation. The samples were then carried through the preparation and analytical process. Blind duplicate samples were submitted to the laboratory under an alias sample name and analyzed for the same suite of constituents as the original sample.

One blind duplicate sample was submitted to ACZ during each leaching cycle except cycle 0.5, which yielded insufficient sample volume to fill duplicate sample bottles. The blind duplicates were splits of leachates from randomly selected columns that were submitted under an alias sample ID for analysis of the parameters in Table 13.

Table 20. Quality Control Samples: Blind Duplicate Samples

Sample	Date	Duplicate Sample ID	Original Sample ID
Column Equipment Blank	12/12/13 12:10	GEO-S1-EB	COL-28-EB
Head Solution	1/12/14 12:39	GEO-S1-C0.5	HS-S1
Bottle Blank	1/16/14 17:00	GEO-BB-C1.0	3338PAP4-C1.0
Column Leachate	1/29/14 11:50	GEO-S1-C2.0	CE-15-S1-C2.0
Column Leachate	2/11/14 12:38	GEO-S1-C3.0	SW-14-S1-C3.0

The agreement between original samples and corresponding duplicates were evaluated in terms of the relative percent difference (RPD) between the two samples as calculated by the following equation:

$$RPD = \left[\frac{C_r - C_d}{(C_r + C_d)/2} \right] \times 100$$

Where: C_r = Concentration in real sample
C_d = Concentration in duplicate sample

The RPDs for each analyte were calculated and compared to the acceptance criteria of 25%. RPDs that are ≤-25% or ≥25%, if any, are indicated in bold in Table 21 through Table 23. If the RPD agreement between real and duplicate samples exceeded +/-25%, the results of the applicable QC sample set were qualified as follows:

1. If one result (real or duplicate) was non-detect and the other result was detected at the method detection limit (MDL), then no qualifier flag was applied on the basis of RPD agreement.
2. If one result (real or duplicate) was non-detect and the other result was detected below the practical quantitation limit (PQL), then a qualifier cutoff value (QCV) was calculated as five time the detected value. Results for the given parameter in the lab batch that were detected above the MDL and below the QCV were qualified as estimated ("J") on the basis of field duplicate agreement. Non-detected values were not qualified.
3. If both results (real and duplicate) were detected below the PQL, detected results for that parameter that were below PQL should be considered estimated values. Because the laboratory already flags results below the PQL with a "B" for "estimated value below the PQL", no additional data qualifier was added based on the agreement between real and duplicate values detected below the PQL. Non-detected values were not qualified.
4. If both results (real and duplicate) were detected above the PQL, all detected results for that parameter in the lab batch were qualified as estimated. Non-detected values were not qualified.

The real and duplicate results showed very good agreement for all blind duplicates submitted during the column study. The duplicate RPD comparison and data flagging are summarized as follows:

- All blind duplicate RPDs leach cycle 2 (CE-15-S1-C2.0) were below the 25% acceptance criteria and no data required flagging on the basis of duplicate agreement (Table 21).

- The blind duplicate RPDs leach cycle 3 (SW-14-S1-C3.0) met the 25% acceptance criteria for all detected constituents except zinc, which was detected at 0.005 mg/L in the real sample and 0.007 mg/L in the duplicate (RPD = 33.3%) (Table 22). A qualifier cutoff value of 0.04 mg/L was calculated, and zinc results from all Cycle 3 leachates were flagged as "J" on the basis of duplicate agreement.
- The blind duplicate RPDs leach cycle 0.5 were determined using sample HS-S1 and duplicate sample GEO-S1-C0.5. The agreement between real and duplicate results met the 25% acceptance criteria for all detected constituents and no data required flagging on the basis of duplicate agreement (Table 23).

Table 21. Blind Duplicate RPDs for CE-15-S1-C2.0

Parameter	Units	Real Sample CE-15-S1-C2.0 1/29/2014		Duplicate Sample GEO-S1-C2.0 1/29/2014		RPD Duplicate Comparison
Major Ions & Inorganics						
pH, Lab	s.u.	8.1	H	7.9	H	-2.5%
E.C., Lab	umhos/cm	2,150		2,170		0.9%
Calcium, dissolved	mg/l	312		310		-0.6%
Magnesium, dissolved	mg/l	104		103		-1.0%
Sodium, dissolved	mg/l	76.7		75.7		-1.3%
Potassium, dissolved	mg/l	26.5		26.3		-0.8%
Hardness (as CaCO3)	mg/l	1,210		1,200		-0.8%
Alkalinity (as CaCO3)	mg/l	341		308		-10.2%
Bicarbonate (as CaCO3)	mg/l	341		308		-10.2%
Carbonate (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%
Hydroxide (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%
Chloride	mg/l	22	B	22.2	B	0.9%
Fluoride	mg/l	<2.	U	<2.	U	0.0%
Phosphorus, total as P	mg/l	<0.01	U	<0.01	U	0.0%
Silica	mg/l	11		11		0.0%
Sulfate	mg/l	1,020		1,010		-1.0%
Nitrate/Nitrite as N, MWMP	mg/l	NA		NA		NA
Total Dissolved Solids	mg/l	1,930		1,880		-2.6%
Metals						
Aluminum, dissolved	mg/l	0.05	B	0.04	B	-22.2%
Antimony, dissolved	mg/l	<0.0004	U	<0.0004	U	0.0%
Arsenic, dissolved	mg/l	0.0006	B	0.0006	B	0.0%
Barium, dissolved	mg/l	0.028		0.027		-3.6%
Beryllium, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%
Cadmium, dissolved	mg/l	0.0006		0.0006		0.0%
Chromium, dissolved	mg/l	<0.0005	U	<0.0005	U	0.0%
Copper, dissolved	mg/l	0.001	B	0.0009	B	-10.5%
Iron, dissolved	mg/l	<0.02	U	<0.02	U	0.0%
Lead, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%
Manganese, dissolved	mg/l	0.294		0.254		-14.6%
Mercury, dissolved	mg/l	<0.0002	U	<0.0002	U	0.0%
Molybdenum, dissolved	mg/l	<0.02	U	<0.02	U	0.0%
Nickel, dissolved	mg/l	<0.01	U	0.01	B	0.0%
Selenium, dissolved	mg/l	0.0463		0.0406		-13.1%
Silver, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%
Thallium, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%
Uranium, dissolved	mg/l	0.1854		0.1577		-16.1%
Uranium, total	mg/l	0.1943		0.1822		-6.4%
Vanadium, dissolved	mg/l	0.0028		0.0028		0.0%
Zinc, dissolved	mg/l	0.007		0.007		0.0%
Radiological						
Gross Alpha, total	pCi/l	82		NA		NA

Table 22. Blind Duplicate RPDs for SW-14-S1-C3.0

Parameter	Units	Real Sample SW-14-S1-C3.0 2/11/2014		Duplicate Sample GEO-S1-C3.0 2/11/2014		RPD Duplicate Comparison	Qualifier Cutoff Value	Flag
Major Ions & Inorganics								
pH, Lab	s.u.	8.1	H	8.1	H	0.0%		
E.C., Lab	umhos/cm	1,570		1,580		0.6%		
Calcium, dissolved	mg/l	254		250		-1.6%		
Magnesium, dissolved	mg/l	50.4		49.9		-1.0%		
Sodium, dissolved	mg/l	47.2		46.8		-0.9%		
Potassium, dissolved	mg/l	19		18.8		-1.1%		
Hardness (as CaCO3)	mg/l	842		830		-1.4%		
Alkalinity (as CaCO3)	mg/l	252		252		0.0%		
Bicarbonate (as CaCO3)	mg/l	252		252		0.0%		
Carbonate (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%		
Hydroxide (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%		
Chloride	mg/l	19.8	B	19	B	-4.1%		
Fluoride	mg/l	<2.	U	<1.	U	-66.7%	None (ND)	
Phosphorus, total as P	mg/l	<0.01	U	<0.01	U	0.0%		
Silica	mg/l	19.6		19.3		-1.5%		
Sulfate	mg/l	661		658		-0.5%		
Nitrate/Nitrite as N, MWMP	mg/l			NA		NA		
Total Dissolved Solids	mg/l	1,280		1,280		0.0%		
Metals								
Aluminum, dissolved	mg/l	<0.03	U	<0.03	U	0.0%		
Antimony, dissolved	mg/l	<0.0004	U	<0.0004	U	0.0%		
Arsenic, dissolved	mg/l	0.0005	B	0.0005	B	0.0%		
Barium, dissolved	mg/l	0.065		0.064		-1.6%		
Beryllium, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%		
Cadmium, dissolved	mg/l	0.0002	B	0.0002	B	0.0%		
Chromium, dissolved	mg/l	<0.0005	U	<0.0005	U	0.0%		
Copper, dissolved	mg/l	0.0005	B	0.0006	B	18.2%		
Iron, dissolved	mg/l	<0.02	U	<0.02	U	0.0%		
Lead, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%		
Manganese, dissolved	mg/l	0.0853		0.0861		0.9%		
Mercury, dissolved	mg/l	<0.0002	U	<0.0002	U	0.0%		
Molybdenum, dissolved	mg/l	<0.02	U	<0.02	U	0.0%		
Nickel, dissolved	mg/l	<0.008	U	<0.008	U	0.0%		
Selenium, dissolved	mg/l	0.0003		0.0003		0.0%		
Silver, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%		
Thallium, dissolved	mg/l	0.0001	B	0.0001	B	0.0%		
Uranium, dissolved	mg/l	0.035		0.0353		0.9%		
Uranium, total	mg/l	0.0356		0.0367		3.0%		
Vanadium, dissolved	mg/l	0.0002	B	0.0002	B	0.0%		
Zinc, dissolved	mg/l	0.005		0.007		33.3%	0.04	J
Radiological								
Gross Alpha, total	pCi/l	16		17		6.1%		

Table 23. Blind Duplicate RPDs for HS-S1 (Applies to Cycle 0.5)

Parameter	Units	HS-S1 1/12/2014		GEO-S1-C0.5 1/12/2014		RPD Duplicate Comparison	Qualifier Cutoff Value	Flag
Major Ions & Inorganics								
pH, Lab	s.u.	8.2	H	8.2	H	0.0%		
E.C., Lab	umhos/cm	1,600		1,600		0.0%		
Calcium, dissolved	mg/l	243		240		-1.2%		
Magnesium, dissolved	mg/l	82.6		82.1		-0.6%		
Sodium, dissolved	mg/l	54		53.5		-0.9%		
Potassium, dissolved	mg/l	12.7		12.5		-1.6%		
Hardness (as CaCO3)	mg/l	947		937		-1.1%		
Alkalinity (as CaCO3)	mg/l	332		351		5.6%		
Bicarbonate (as CaCO3)	mg/l	332		351		5.6%		
Carbonate (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%		
Hydroxide (as CaCO3)	mg/l	<2.	U	<2.	U	0.0%		
Chloride	mg/l	18.8	B	18.7	B	-0.5%		
Fluoride	mg/l	<1.	U	<1.	U	0.0%		
Phosphorus, total as P	mg/l	<0.01	U	<0.01	U	0.0%		
Silica	mg/l	10.2		10.1		-1.0%		
Sulfate	mg/l	633		617		-2.6%		
Nitrate/Nitrite as N	mg/l	NA		NA		NA		
Total Dissolved Solids	mg/l	1,300		1,300		0.0%		
Metals								
Aluminum, dissolved	mg/l	<0.03	U	<0.03	U	0.0%		
Antimony, dissolved	mg/l	<0.0004	U	<0.0004	U	0.0%		
Arsenic, dissolved	mg/l	<0.0002	U	<0.0002	U	0.0%		
Barium, dissolved	mg/l	0.008	B	0.007	B	-13.3%		
Beryllium, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%		
Cadmium, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%		
Chromium, dissolved	mg/l	<0.0005	U	<0.0005	U	0.0%		
Copper, dissolved	mg/l	<0.0005	U	<0.0005	U	0.0%		
Iron, dissolved	mg/l	<0.02	U	<0.02	U	0.0%		
Lead, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%		
Manganese, dissolved	mg/l	0.1738		0.1737		-0.1%		
Mercury, dissolved	mg/l	<0.0002	U	<0.0002	U	0.0%		
Molybdenum, dissolved	mg/l	<0.02	U	<0.02	U	0.0%		
Nickel, dissolved	mg/l	<0.01	U	<0.01	U	0.0%		
Selenium, dissolved	mg/l	0.0002	B	0.0002	B	0.0%		
Silver, dissolved	mg/l	<0.00005	U	<0.00005	U	0.0%		
Thallium, dissolved	mg/l	<0.0001	U	<0.0001	U	0.0%		
Uranium, dissolved	mg/l	0.0167		0.0165		-1.2%		
Uranium, total	mg/l	0.0171		0.0172		0.6%		
Vanadium, dissolved	mg/l	<0.0002	U	<0.0002	U	0.0%		
Zinc, dissolved	mg/l	0.012		0.012		0.0%		
Radiological								
Gross Alpha, total	pCi/l	NA		NA		NA		

6.5.4 Operating Temperature

The ambient temperature within the column room during the leaching study was maintained at an average of 19.5 °C and ranged from 18 °C to 20 °C throughout the column testing (Figure 21). Temperature was monitored using a Lascar Electronics EL-USB-2-LCD Temperature Data Logger, which was set to read at 1-hour intervals. Column room temperatures were checked and recorded manually from the data logger digital display, and the digital logger data was downloaded at the end of the testing period.

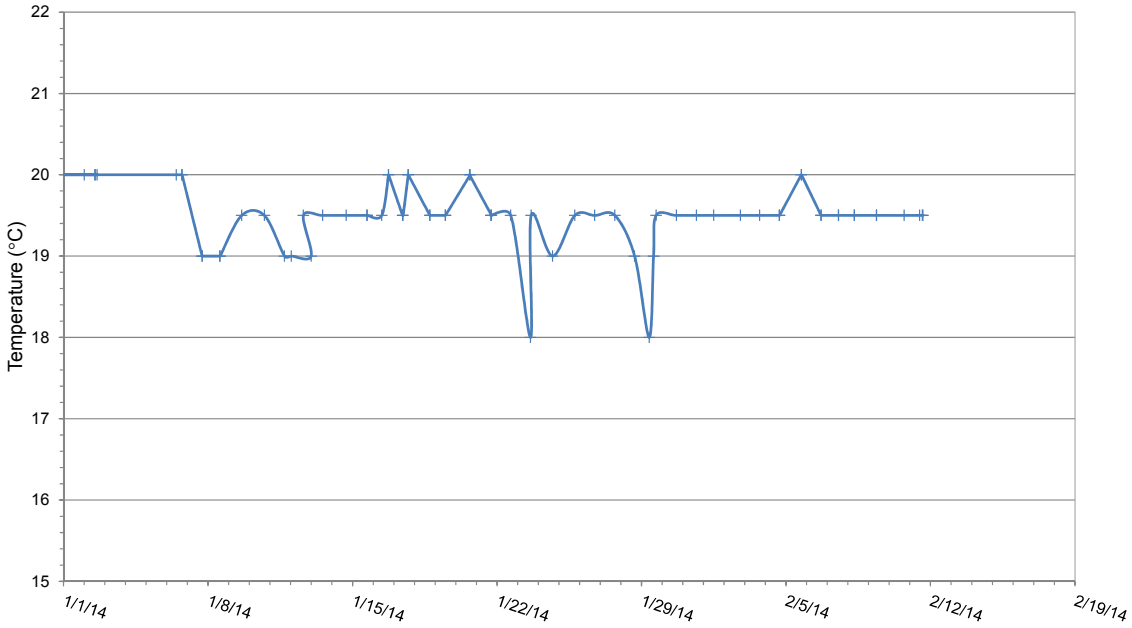

Figure 21. Operating Temperature of Geochem Column Room During LVMC Column Testing

6.6 Column Test Results

6.6.1 Comparison to Background Water Quality

The column test results are compared to background water quality in the Burro Canyon Aquifer near the Centennial and Sentinel Pits. Background water quality has been established for monitoring wells at the Lisbon Valley Mine and the groundwater protection levels are listed in LVMC's Ground Water Quality Discharge Permit UGW370005 (UDEQ 1997, 2001, 2002, 2004, 2007) and shown in Table 24. Well MW96-7A is a designated compliance well, while PW-3 is an ambient monitoring well, under the permit. The background concentrations in the permit were calculated as the mean plus two standard deviations of the baseline pre-mining (1997 – 2004) water quality results. The background levels for PW-3 are based on historical data for nearby pumping well SLV-3, which has been dry since 2006.

Groundwater protection limits were established for designated compliance monitoring wells (including MW96-7A) according to administrative rules for Class III aquifers. Groundwater at the Lisbon Valley site was designated as a Class III aquifer by the Utah Division of Environmental Quality (UDEQ) in 1997. UDEQ designated the groundwater at the existing monitoring wells at the Lisbon Valley Mine as Class III based on levels of gross alpha and gross beta activity which naturally exceed the groundwater standards defined in UAC R317-6-2. Protection levels for Class III aquifers are defined in Utah Administrative Code (UAC) R317-6-4.6 as follows:

- Class III groundwater will be protected as a potential source of drinking water, after substantial treatment, and as a source of water for industry and agriculture.
- Total dissolved solids may not exceed the greater of 1.25 times the background concentration level or background plus two standard deviations.

- When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed the greater of 0.5 times the groundwater quality standard, or the limit of detection.

The rules require that, when a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed the greater of 1.5 times the background concentration or 0.5 times the groundwater quality standard or background plus two standard deviations; however, in no case will the concentration of a pollutant be allowed to exceed the groundwater quality standard. If the background concentration exceeds the groundwater quality standard no increase will be allowed (UAC R317-6-4.6).

Table 24. Utah Groundwater Quality Standards and Established Groundwater Protection Levels for Monitoring Wells PW-3 and MW96-7A

Station Name		Utah	Background Levels SLV3/PW-3			Background Levels MW96-7A		
SampleID Leach Cycle (PV) Sample Date		Groundwater Quality Standard[1]	Mean[2] (x)	Standard Deviation (std)[2]	Maximum Background[3] Concentration	Mean[2] (x)	Standard Deviation (std)[2]	Maximum Background[3] Concentration
Major Ions & Inorganics								
pH, Lab	s.u.	6.5 - 8.5	7.69	0.28	8.25	6.98	0.30	6.5 - 8.5
E.C., Lab	umhos/cm	-----	-----	-----	-----	-----	-----	-----
Calcium, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Magnesium, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Sodium, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Potassium, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Hardness (as CaCO3)	mg/l	-----	-----	-----	-----	-----	-----	-----
Alkalinity (as CaCO3)	mg/l	-----	-----	-----	-----	-----	-----	-----
Bicarbonate (as CaCO3)	mg/l	-----	-----	-----	-----	-----	-----	-----
Carbonate (as CaCO3)	mg/l	-----	-----	-----	-----	-----	-----	-----
Hydroxide (as CaCO3)	mg/l	-----	-----	-----	-----	-----	-----	-----
Chloride	mg/l	-----	-----	-----	-----	-----	-----	-----
Fluoride	mg/l	4.0	0.457	0.115	0.686	0.412	0.105	2.0
Phosphorus, total as P	mg/l	0.05	N/A	N/A	N/A	N/A	N/A	N/A
Silica	mg/l	-----	-----	-----	-----	-----	-----	-----
Sulfate	mg/l	-----	-----	-----	-----	-----	-----	-----
Nitrate/Nitrite as N, MWMP	mg/l	-----	-----	-----	-----	-----	-----	-----
Total Dissolved Solids	mg/l	10000	512	188	889	1322	170	1652.3
Metals								
Aluminum, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Antimony, dissolved	mg/l	0.006	0.003	0.003	0.008	0.0028	0.0034	0.0060
Arsenic, dissolved	mg/l	0.05	0.004	0.004	0.011	0.005	0.003	0.025
Barium, dissolved	mg/l	2.0	0.126	0.232	0.590	0.096	0.183	1.0
Beryllium, dissolved	mg/l	0.004	0.001	0.001	0.003	0.0004	0.0003	0.002
Cadmium, dissolved	mg/l	0.005	0.001	0.001	0.002	0.0005	0.0005	0.0025
Chromium, dissolved	mg/l	0.1	0.002	0.002	0.005	0.0024	0.0017	0.050
Copper, dissolved	mg/l	1.3	0.01	0.013	0.034	0.0058	0.0021	0.650
Iron, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Lead, dissolved	mg/l	0.015	0.003	0.004	0.011	0.0032	0.0031	0.015
Manganese, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Mercury, dissolved	mg/l	0.002	0.00020	0.00005	0.00022	0.00026	0.00058	0.002
Molybdenum, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Nickel, dissolved	mg/l	-----	-----	-----	-----	-----	-----	-----
Selenium, dissolved	mg/l	0.05	0.004	0.003	0.009	0.003	0.003	0.025
Silver, dissolved	mg/l	0.1	0.024	0.069	0.163	0.062	0.132	0.100
Thallium, dissolved	mg/l	0.002	0.001	0.0006	0.0018	0.0008	0.0012	0.002
Uranium, dissolved	mg/l							
Uranium, total	mg/l	0.03	0.014	0.003	0.020	0.013	0.0041	0.0261
Vanadium, dissolved	mg/l	-----	-----	-----	-----			
Zinc, dissolved	mg/l	5.0	0.121	0.163	0.447	0.365	0.628	2.5
Radiological								
Gross Alpha, total	pCi/l	15 pCi/L	86.5	49	185	50.3	59	154

Notes: (1) If no value is given, a groundwater standard has not been established for that parameter.
(2) The mean background concentration and standard deviation numbers are shown in the Permit (Table 1, Part II of the State of Utah Ground Water Quality Discharge Permit No. UGW370005) for ambient monitoring wells.

(3) The maximum background concentration was calculated as the mean background concentration plus two standard deviations, based on the available pre-mining data up to and including October 2004.

6.6.2 Field Parameters and Head Solution D.O.

Field parameters measured in the column leachates are shown in Table 25. The pH, DO, EC, ORP, and temperature were measured during leachate sample collection at the end of each leach cycle. The pH remained near neutral in all samples, with only one of the 20 leachates having pH below 7. The pH exhibited minor variations, ranging from 6.49 to 7.70, averaging 7.38, and no definitive trends of increasing or decreasing pH were observed. Dissolved oxygen in the leachate collection vessels typically ranged from about 34% to 49% (3.29 to 4.91 mg/L, averaging 3.87 mg/L) while ORP ranged from 205.5 to 381 mV, averaging 251 mV, indicating that while slightly reducing conditions were maintained in the columns, the leachates in the collection vessels (Figure 20) became moderately oxidized with exposure to atmospheric oxygen outside of the columns. As discussed in Section 6.4.2, dissolved iron in the head solution was <0.02 mg/L compared to 4.97 mg/L in in-situ groundwater, further indication that the head solution became moderately oxidizing (22% saturation) during the testing.

Table 25. Field Parameters Measured During Column Testing

		Centennial Pit Bed 14 (CE-14-S1)				Centennial Pit Bed 14 (CE-14-S2)			
		C0.5	C1.0	C2.0	C3.0	C0.5	C1.0	C2.0	C3.0
Parameter	**Units**	1/12/14	1/16/14	1/29/14	2/11/14	1/12/14	1/16/14	1/29/14	2/11/14
Leach Cycle		0.5	1.0	2.0	3.0	0.5	1.0	2.0	3.0
Mass of leachate	grams	1,755.7	1,788.1	3,608.6	3,571.9	1,789.0	1,807.6	3,612.3	2,924.9
pH	s.u.	7.43	7.70	7.41	7.30	7.25	7.52	7.49	7.46
Dissolved Oxygen[4]	%	AC	49.7	41.0	39.2	AC	42.5	39.8	40.3
Dissolved Oxygen	mg/L	AC	4.91	3.76	3.60	AC	4.09	3.65	3.69
ORP	millivolts	256.5	243.5	316.0	212.5	217.5	239.5	293.0	229.5
Electrical Conductivity	µS/cm	2,450	1,957	1,890	1,720	2,520	1,972	1,880	1,684
Temperature	deg C	19.8	19.5	19.8	19.7	19.8	19.7	19.9	20.1

		Centennial Pit Bed 15 (CE-15-S1)				Sentinel Pit Bed 14 (SW-14-S1)			
		C0.5	C1.0	C2.0	C3.0	C0.5	C1.0	C2.0	C3.0
Parameter	**Units**	1/12/14	1/16/14	1/29/14	2/11/14	1/12/14	1/16/14	1/29/14	2/11/14
Leach Cycle		0.5	1.0	2.0	3.0	0.5	1.0	2.0	3.0
Mass of leachate	grams	1,805.2	1,808.5	3,616.9	3,611.6	1,760.4	1,804.5	3,617.5	3,581.3
pH	s.u.	7.39	7.26	6.49	7.39	7.53	7.40	7.21	7.29
Dissolved Oxygen	%	AC	34.1	42.0	41.5	AC	39.6	40.6	40.9
Dissolved Oxygen	mg/L	AC	3.29	3.87	4.01	AC	3.77	3.73	3.81
ORP	millivolts	279.5	230.5	318.0	205.5	237.5	231.5	308.0	224.5
Electrical Conductivity	µS/cm	3,610	2,900	2,350	1,877	1,681	1,563	1,575	1,549
Temperature	deg C	19.8	20.0	19.7	19.9	19.6	19.7	19.8	19.5

		SW-15-S1			
		C0.5	C1.0	C2.0	C3.0
Parameter	**Units**	1/12/14	1/16/14	1/29/14	2/11/14
Leach Cycle		0.5	1.0	2.0	3.0
Mass of leachate	grams	1,783.0	1,804.2	3,621.8	3,456.6
Ph	s.u.	7.69	7.32	7.47	7.55
Dissolved Oxygen	%	AC	45.4	40.0	41.8
Dissolved Oxygen	mg/L	AC	4.40	3.67	3.85
ORP	millivolts	258.5	226.5	281.0	211.5
Electrical Conductivity	µS/cm	3,790	2,800	2,170	1,736
Temperature	deg C	20.0	19.8	20.0	19.9

NOTES: AC = Sample for field parameters experienced longer contact with atmospheric oxygen before DO was measured, which affected the DO reading[5].

[4] A flow-through cell was used to measure DO for PV1 through PV3 and for the head solution. For the head solution DO measurements, the YSI Pro20 dissolved oxygen meter was first calibrated with one-touch percent (%) saturation method based on an elevation of 7,600 ft. The offset of the YSI pH100 ORP meter was measured and accounted for during measurement. The flow-through cell consisted of two pump output lines from the head solution vessel that were placed in the bottom of a 1L graduated cylinder, the YSI Pro20 probe was placed on top of the output hoses, then the YSI pH100 ORP probe on top of the DO probe. Each pump was run at 6L/hr (12L/hr total) until the DO and ORP readings stabilized.

[5] Dissolved oxygen readings for PV0.5 were not representative, because field parameters were measured after the sample was extracted from the collection vessel, bottles were filled, filtered and preserved as appropriate. The remaining sample was transferred into a retention container, and DO was measured by placing the YSIPro20 probe directly into the open collection vessel, and recording the measurement once stable. Due to limited leachate volume, a flow-through cell was not constructed to measure dissolved oxygen. Solutions from other cycles contacted somewhat less atmospheric oxygen, as the parameters were measured immediately upon emptying the leachate collection vessels (Figure 20).

6.6.3 Solution Parameters and Major Ion Chemistry

The laboratory results for the column leachates are shown in Table 26 through Table 30. Values that exceeded Utah Groundwater Standards are bolded and grayed. Column leachates met Utah water quality standards (Table 24) for all constituents except uranium and selenium (Centennial Pit), as discussed below.

Time series plots of column data are show in Figure 22 through Figure 26. The results from both the Bed 14 and Bed 15 columns show an initial flushing effect in which leachates for the first half and first full cycles had higher concentrations of total dissolved solids, sulfate, and selenium than leachates from subsequent cycles. While selenium exceeded the groundwater standard in the first two leach cycles of (PV0.5 – PV1) of the Centennial Pit columns, the concentrations decreased substantially with subsequent pore volumes and fell well below the water quality standard by PV2 (Table 26 – Table 28, Figure 22 – Figure 24). Material from the Sentinel West Pit Bed 14 and Bed 15 met the water quality standard for selenium.

Leachates from Bed 15 materials and from Bed 14 in the Centennial and Sentinel West pits exceeded water quality standard for uranium of 0.03 mg/L (Table 28 – Table 30). Uranium and its alpha-emitting daughter products are the cause of the Class III aquifer designation at the site. Dissolved and total uranium concentrations in the column leachates were nearly identical, indicating that most uranium occurred in the dissolved phase. Leachates from Centennial Pit Bed 15 and Sentinel West Bed 14 showed no distinct trend in uranium concentrations, while leachates from Sentinel West Pit Bed 15 showed decreasing uranium concentrations with subsequent leach cycles (pore volumes). The Bed 14 columns from the Centennial Pit (which represent the bulk of the proposed backfill material) met the Utah water quality standard for uranium.

The column leachates were well-buffered solutions with calcium-sulfate compositions (Figure 27 – Figure 30). The major ion composition of the leachates was consistent throughout the leaching cycles, although the total dissolved ions generally decreased with subsequent leaching cycles.

Table 26. Column Leaching Results for Centennial Pit Bed 14

Station Name		CE-14-S1		CE-14-S1		CE-14-S1		CE-14-S1		CE-14-S1	
Sample ID		CENT-14 MWMP		CE-14-S1-C0.5		CE-14-S1-C1.0		CE-14-S1-C2.0		CE-14-S1-C3.0	
Leach Cycle (PV)		MWMP		Cycle 0.5		Cycle 1.0		Cycle 2.0		Cycle 3.0	
Sample Date		12/5/2013		1/12/2014		1/16/2014		1/29/2014		2/11/2014	
Major Ions & Inorganics											
pH, Lab	s.u.	7.1		8.2	H	8.1	H	8	H	8.1	H
E.C., Lab	µS/cm	653		2,010		2,100		1,860		1,750	
Calcium, diss.	mg/l	72.9		331		311		276		244	
Magnesium, diss.	mg/l	19.8		88.7		85.1		76.3		69.3	
Sodium, diss.	mg/l	17.9		48.7		47.6		47.4		46.6	
Potassium, diss.	mg/l	26.6		56.1		53.2		50.9		48.4	
Hardness (as CaCO3)	mg/l	264		1,190		1,130		1,000		895	
Alkalinity (as CaCO3)	mg/l	113		153		134		129		156	
Bicarbonate	mg/l	113		153		134		129		156	
Carbonate	mg/l	<2.		<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.		<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	1.96	B	32.1	B	26.2	B	23.1	B	21.4	B
Fluoride	mg/l	1.71		<2.	U	<2.	U	<2.	U	<2.	U
Phosphorus, tot as P	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Silica	mg/l	11		8.2		7.5		7.7		8.0	
Sulfate	mg/l	213		1,100		1,090		999		878	
Nitrate/Nitrite as N	mg/l	1.05		NA		NA		NA		NA	
Total Diss. Solids	mg/l	NA		1,840		1,770		1,630		1,430	
Metals											
Aluminum, diss.	mg/l	<0.03	U	0.04	B	0.04	B	0.05	B	0.04	B
Antimony, diss.	mg/l	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, diss.	mg/l	0.0003	B	0.0005	B	0.0003	B	0.0003	B	0.0003	B
Barium, diss.	mg/l	0.027		0.06		0.043		0.036		0.031	
Beryllium, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	0.0003	B	0.001		0.0017		0.0015		0.0011	
Chromium, diss.	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	0.0031		0.0016	B	0.0015	B	0.0007	B	0.0005	U
Iron, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Lead, diss.	mg/l	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Manganese, diss.	mg/l	0.0128		0.0821		0.0881		0.0871		0.0724	
Mercury, diss.	mg/l	NA		<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Nickel, diss.	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.008	U
Selenium, diss.	mg/l	**0.0543**		**0.1844**		**0.1187**		0.0258		0.0018	
Silver, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	<0.0001	U	0.0003	B	0.0002	B	0.0002	B	0.0002	B
Uranium, diss.	mg/l	NA		0.0125		0.0065		0.0063		0.007	
Uranium, total	mg/l	0.0034		0.0128		0.007		0.0063		0.0072	
Vanadium, diss.	mg/l	0.0008	B	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Zinc, diss.	mg/l	0.004	B	0.005		0.005		0.005		0.007	
Radiological											
Gross Alpha, total	pCi/l	5.8		NA		2.9		6.4		5.6	
QC											
Cation-Anion Bal.	%	NA		0		0		0		-2.3	
Sum of Anions	meq/l	NA		27		26		24		22	
Sum of Cations	meq/l	NA		27		26		24		21	
TDS (calculated)	mg/l	NA		1,760		1,700		1,560		1,410	
TDS (ratio m/calc)	unitless	NA		1.05		1.04		1.04		1.01	
Field Parameters											
Mass	grams	NA		1,755.7		1,788.1		3,608.6		3,571.9	
Dissolved oxygen	%	NA		50.7		49.7		41		39.2	
Dissolved oxygen	mg/l	NA		4.59		4.91		3.76		3.6	
E.C., Field, 25C	µS/cm	NA		2500		1957		1890		1720	
ORP, Field	millivolts	NA		256.5		243.5		316		212.5	
pH, Field	s.u.	NA		7.43		7.7		7.41		7.3	
Temperature, Field	deg C	NA		19.8		19.5		19.8		19.7	

Notes: Bolded and shaded values exceed Utah groundwater standards

Table 27. Column Leaching Results for Centennial Pit Bed 14 Replicate

Station Name		CE-14-S2		CE-14-S2		CE-14-S2		CE-14-S2		CE-14-S2	
Sample ID		CENT-16 MWMP		CE-14-S2-C0.5		CE-14-S2-C1.0		CE-14-S2-C2.0		CE-14-S2-C3.0	
Leach Cycle (PV)		MWMP		Cycle 0.5		Cycle 1.0		Cycle 2.0		Cycle 3.0	
Sample Date		12/5/2013		1/12/2014		1/16/2014		1/29/2014		2/11/2014	
Major Ions & Inorganics											
pH, Lab	s.u.	7.2		8.1	H	8.2	H	8.1	H	8.2	H
E.C., Lab	µS/cm	671		2,040		2,050		1,830		1,710	
Calcium, diss.	mg/l	74.9		341		310		269		238	
Magnesium, diss.	mg/l	20.2		91		83.9		73.9		67.2	
Sodium, diss.	mg/l	17.7		47.7		46.8		46.1		46.5	
Potassium, diss.	mg/l	26.4		56.7		53		49.6		48.1	
Hardness (as CaCO3)	mg/l	270		1,230		1,120		976		871	
Alkalinity (as CaCO3)	mg/l	115		146		114		130		157	
Bicarbonate	mg/l	115		146		114		130		157	
Carbonate	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	1.73	B	30.6		26.9	B	22.7	B	20.8	B
Fluoride	mg/l	1.7		<1.	U	<2.	U	<2.	U	<2.	U
Phosphorus, tot as P	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Silica	mg/l	10.3		7.7		7.1		7.3		7.7	
Sulfate	mg/l	220		1,150		1,140		966		818	
Nitrate/Nitrite as N	mg/l	1.03		NA		NA		NA		NA	
Total Diss. Solids	mg/l	NA		1,830		1,780		1,580		1,400	
Metals											
Aluminum, diss.	mg/l	<0.03	U	0.06	B	0.06	B	0.07	B	0.05	B
Antimony, diss.	mg/l	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, diss.	mg/l	0.0004	B	0.0004	B	0.0003	B	0.0004	B	0.0003	B
Barium, diss.	mg/l	0.028		0.056		0.04		0.034		0.03	
Beryllium, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	0.0005		0.0012		0.0015		0.0008		0.001	
Chromium, diss.	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	0.0026	B	0.0021	B	0.002	B	0.0007	B	<0.0005	U
Iron, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Lead, diss.	mg/l	0.0004	B	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Manganese, diss.	mg/l	0.014		0.0863		0.0794		0.0757		0.0648	
Mercury, diss.	mg/l	NA		<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Nickel, diss.	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.008	U
Selenium, diss.	mg/l	**0.0529**		**0.2194**		**0.1084**		0.0088		0.0008	
Silver, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	<0.0001	U	0.0003	B	0.0002	B	0.0002	B	0.0002	B
Uranium, diss.	mg/l	NA		0.0116		0.0057		0.0058		0.0068	
Uranium, total	mg/l	0.0036		0.0121		0.0062		0.0059		0.007	
Vanadium, diss.	mg/l	0.0008	B	<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Zinc, diss.	mg/l	0.004	B	0.006		0.01		0.006		0.01	
Radiological											
Gross Alpha, total	pCi/l	3.2		NA		11		9.2		8.5	
QC		NA									
Cation-Anion Bal.	%	NA		0		-1.9		-2.1		0	
Sum of Anions	meq/l	NA		28		27		24		21	
Sum of Cations	meq/l	NA		28		26		23		21	
TDS (calculated)	mg/l	NA		1810		1740		1510		1340	
TDS (ratio m/calc)	unitless	NA		1.01		1.02		1.05		1.04	
Field Parameters											
Mass	grams	NA		1,789.0		1,807.6		3,612.3		2,924.9	
Dissolved oxygen	%	NA		63.9		42.5		39.8		40.3	
Dissolved oxygen	mg/l	NA		6.11		4.09		3.65		3.69	
E.C., Field, 25C	µS/cm	NA		2500		1972		1880		1684	
ORP, Field	millivolts	NA		217.5		239.5		293		229.5	
pH, Field	s.u.	NA		7.25		7.52		7.49		7.46	
Temperature, Field	deg C	NA		19.8		19.7		19.9		20.1	

Notes: Bolded and shaded values exceed Utah groundwater standards

Table 28. Column Leaching Results for Centennial Pit Bed 15

Station Name		CE-15-S1		CE-15-S1		CE-15-S1		CE-15-S1		CE-15-S1	
Sample ID		CENT-15 MWMP		CE-15-S1-C0.5		CE-15-S1-C1.0		CE-15-S1-C2.0		CE-15-S1-C3.0	
Leach Cycle (PV)		MWMP		Cycle 0.5		Cycle 1.0		Cycle 2.0		Cycle 3.0	
Sample Date		12/5/2013		1/12/2014		1/16/2014		1/29/2014		2/11/2014	
Major Ions & Inorganics											
pH, Lab	s.u.	6.9		8.1	H	8	H	8.1	H	8.1	H
E.C., Lab	µS/cm	747		3,000		2,700		2,150		1,940	
Calcium, diss.	mg/l	82.3		460		382		312		276	
Magnesium, diss.	mg/l	27.6		165		131		104		90.9	
Sodium, diss.	mg/l	24.7		141		102		76.7		62.6	
Potassium, diss.	mg/l	12.8		37		30.7		26.5		23.2	
Hardness (as CaCO3)	mg/l	319		1,830		1,490		1,210		1,060	
Alkalinity (as CaCO3)	mg/l	64		308		296		341		336	
Bicarbonate	mg/l	64		308		296		341		336	
Carbonate	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	1.63	B	33.5	B	24.2	B	22	B	20.6	B
Fluoride	mg/l	1.42		<2.	U	<2.	U	<2.	U	<2.	U
Phosphorus, tot as P	mg/l	0.01	B	0.01	B	<0.01	U	<0.01	U	0.01	B
Silica	mg/l	8.7		12.5		11.5		11		10.6	
Sulfate	mg/l	324		1,860		1,310		1,020		856	
Nitrate/Nitrite as N	mg/l	3.38		NA		NA		NA		NA	
Total Diss. Solids	mg/l	NA		2,350		2,360		1,930		1,570	
Metals											
Aluminum, diss.	mg/l	<0.03	U	<0.06	U	0.03	B	0.05	B	<0.03	U
Antimony, diss.	mg/l	<0.0004	U	<0.0008	U	<0.0004	U	<0.0004	U	0.0004	B
Arsenic, diss.	mg/l	0.0014		0.0007	B	0.0007	B	0.0006	B	0.0009	B
Barium, diss.	mg/l	0.019	B	0.06		0.034		0.028		0.024	
Beryllium, diss.	mg/l	<0.00005	U	<0.0001	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	0.0005		0.0012		0.001		0.0006		0.0003	B
Chromium, diss.	mg/l	<0.0005	U	<0.001	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	0.0054		0.002	B	0.0016	B	0.001	B	<0.0005	U
Iron, diss.	mg/l	<0.02	U	<0.04	U	<0.02	U	<0.02	U	<0.02	U
Lead, diss.	mg/l	<0.0001	U	<0.0002	U	<0.0001	U	<0.0001	U	<0.0001	U
Manganese, diss.	mg/l	0.1194		0.564		0.391		0.294		0.247	
Mercury, diss.	mg/l	NA		<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	<0.02	U	<0.04	U	<0.02	U	<0.02	U	<0.02	U
Nickel, diss.	mg/l	<0.01	U	0.05	B	0.02	B	<0.01	U	<0.008	U
Selenium, diss.	mg/l	**0.0674**		**0.2606**		**0.1525**		0.0463		0.0043	
Silver, diss.	mg/l	<0.00005	U	<0.0001	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	<0.0001	U	0.0003	B	0.0002	B	<0.0001	U	<0.0001	U
Uranium, diss.	mg/l	NA		**0.1376**		**0.1979**		**0.1854**		**0.156**	
Uranium, total	mg/l	0.0059		**0.1727**		**0.2072**		**0.1943**		**0.1616**	
Vanadium, diss.	mg/l	0.0025		0.0005	B	0.0017		0.0028		0.0013	
Zinc, diss.	mg/l	0.006		0.018		0.012		0.007		0.006	
Radiological											
Gross Alpha, total	pCi/l	3.4		NA		110		82		67	
QC											
Cation-Anion Bal.	%	NA		-2.2		1.4		-1.8		0	
Sum of Anions	meq/l	NA		46		34		29		25	
Sum of Cations	meq/l	NA		44		35		28		25	
TDS (calculated)	mg/l	NA		2,890		2,170		1,780		1,540	
TDS (ratio m/calc)	unitless	NA		0.81		1.09		1.08		1.02	
Field Parameters											
Mass	grams	NA		1,805.2		1,808.5		3,616.9		3,611.6	
Dissolved oxygen	%	NA		51.4		34.1		42		41.5	
Dissolved oxygen	mg/l	NA		4.94		3.29		3.87		4.01	
E.C., Field, 25C	µS/cm	NA		3,600		2,900		2,400		1,877	
ORP, Field	millivolts	NA		279.5		230.5		318		205.5	
pH, Field	s.u.	NA		7.39		7.26		6.49		7.39	
Temperature, Field	deg C	NA		19.8		20		19.7		19.9	

Notes: Bolded and shaded values exceed Utah groundwater standards

Table 29. Column Leaching Results for Sentinel West Pit Bed 14

Station Name		SW-14-S1		SW-14-S1		SW-14-S1		SW-14-S1		SW-14-S1	
Sample ID		SW-14 MWMP		SW-14-S1-C0.5		SW-14-S1-C1.0		SW-14-S1-C2.0		SW-14-S1-C3.0	
Leach Cycle (PV)		MWMP		Cycle 0.5		Cycle 1.0		Cycle 2.0		Cycle 3.0	
Sample Date		12/5/2013		1/12/2014		1/16/2014		1/29/2014		2/11/2014	
Major Ions & Inorganics											
pH, Lab	s.u.	7		8.2	H	8.1	H	8	H	8.1	H
E.C., Lab	µS/cm	276		1,610		1,640		1,560		1,570	
Calcium, diss.	mg/l	31.3		281		265		256		254	
Magnesium, diss.	mg/l	6.7		56.5		51.7		49.8		50.4	
Sodium, diss.	mg/l	10.2		42.6		40.9		43.7		47.2	
Potassium, diss.	mg/l	8.4		21.3		19		18.8		19	
Hardness (as CaCO3)	mg/l	106		935		875		845		842	
Alkalinity (as CaCO3)	mg/l	79		218		183		219		252	
Bicarbonate	mg/l	79		218		183		219		252	
Carbonate	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	1.77	B	27.7	B	24.7	B	21.6	B	19.8	B
Fluoride	mg/l	2.01		<2.	U	<2.	U	<2.	U	<2.	U
Phosphorus, tot as P	mg/l	0.01	B	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Silica	mg/l	14.7		16.7		17.3		18.6		19.6	
Sulfate	mg/l	53.6		768		743		690		661	
Nitrate/Nitrite as N	mg/l	0.46		NA		NA		NA			
Total Diss. Solids	mg/l	NA		1,830		1,310		1,310		1,280	
Metals											
Aluminum, diss.	mg/l	<0.03	U	<0.03	U	0.03	B	0.04	B	<0.03	U
Antimony, diss.	mg/l	<0.0004	U	0.0009	B	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, diss.	mg/l	0.0003	B	0.0007	B	0.0003	B	0.0003	B	0.0005	B
Barium, diss.	mg/l	0.042		0.063		0.086		0.08		0.065	
Beryllium, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	<0.0001	U	0.0003	B	0.0002	B	0.0003	B	0.0002	B
Chromium, diss.	mg/l	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	0.0009	B	0.0011	B	0.0016	B	0.0009	B	0.0005	B
Iron, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Lead, diss.	mg/l	0.0002	B	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Manganese, diss.	mg/l	0.004		0.0382		0.0285		0.0375		0.0853	
Mercury, diss.	mg/l	NA		<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Nickel, diss.	mg/l	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.008	U
Selenium, diss.	mg/l	0.0003		0.0026		0.0019		0.001		0.0003	
Silver, diss.	mg/l	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	<0.0001	U	0.0002	B	0.0002	B	0.0002	B	0.0001	B
Uranium, diss.	mg/l	NA		**0.0312**		0.0268		**0.0316**		**0.035**	
Uranium, total	mg/l	0.0021		**0.0321**		0.0276		**0.0307**		**0.0356**	
Vanadium, diss.	mg/l	0.0012		0.0003	B	0.0003	B	0.0002	B	0.0002	B
Zinc, diss.	mg/l	0.003	B	0.006		0.005		0.005		0.005	
Radiological											
Gross Alpha, total	pCi/l	3.3		NA		22		17		16	
QC											
Cation-Anion Bal.	%	NA		0		0		-2.6		-2.6	
Sum of Anions	meq/l	NA		21		20		20		20	
Sum of Cations	meq/l	NA		21		20		19		19	
TDS (calculated)	mg/l	NA		1,340		1,270		1,230		1,220	
TDS (ratio m/calc)	unitless	NA		1.37		1.03		1.07		1.05	
Field Parameters											
Mass	grams	NA		1,760.4		1,804.5		3,617.5		3,581.3	
Dissolved oxygen	%	NA		51		39.6		40.6		40.9	
Dissolved oxygen	mg/l	NA		4.81		3.77		3.73		3.81	
E.C., Field, 25C	µS/cm	NA		1,681		1,563		1,575		1,549	
ORP, Field	millivolts	NA		237.5		231.5		308		224.5	
pH, Field	s.u.	NA		7.53		7.40		7.21		7.29	
Temperature, Field	deg C	NA		19.6		19.7		19.8		19.5	

Notes: Bolded and shaded values exceed Utah groundwater standards

Table 30. Column Leaching Results for Sentinel West Pit Bed 15

Station Name		SW-15-S1		SW-15-S1		SW-15-S1		SW-15-S1		SW-15-S1	
Sample ID		CENT-14 MWMP		SW-15-S1-C0.5		SW-15-S1-C1.0		SW-15-S1-C2.0		SW-15-S1-C3.0	
Leach Cycle (PV)		MWMP		Cycle 0.5		Cycle 1.0		Cycle 2.0		Cycle 3.0	
Sample Date		12/5/2013		1/12/2014		1/16/2014		1/29/2014		2/11/2014	
Major Ions & Inorganics											
pH, Lab	s.u.	6.7		8.1	H	8.1	H	8	H	8.2	H
E.C., Lab	µS/cm	565		3,130		2,570		2,050		1,750	
Calcium, diss.	mg/l	65.8		492		385		314		263	
Magnesium, diss.	mg/l	7.8		92.8		77.4		71.9		71.9	
Sodium, diss.	mg/l	23.8		178		104		68.6		55.6	
Potassium, diss.	mg/l	12.4		60.4		41.9		28.4		19.6	
Hardness (as CaCO3)	mg/l	196		1,610		1,280		1,080		953	
Alkalinity (as CaCO3)	mg/l	35		298		296		319		312	
Bicarbonate	mg/l	35		298		296		319		312	
Carbonate	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Hydroxide	mg/l	<2.	U	<2.	U	<2.	U	<2.	U	<2.	U
Chloride	mg/l	43.7		293		131		51.5		24.8	B
Fluoride	mg/l	0.38	B	<2.	U	<2.	U	<2.	U	<2.	U
Phosphorus, tot as P	mg/l	0.02	B	<0.01	U	<0.01	U	0.01	B	0.01	B
Silica	mg/l	15.1		24		27.3		28.3		26.3	
Sulfate	mg/l	151		1,190		1,040		856		731	
Nitrate/Nitrite as N	mg/l	4.33		NA		NA		NA		NA	
Total Diss. Solids	mg/l	NA		2,830		2,110		1,730		1,430	
Metals											
Aluminum, diss.	mg/l	<0.03	U	<0.06	U	<0.03	U	0.03	B	0.03	B
Antimony, diss.	mg/l	<0.0004	U	<0.0008	U	<0.0004	U	<0.0004	U	<0.0004	U
Arsenic, diss.	mg/l	0.0081		0.0035		0.0027		0.002		0.0019	
Barium, diss.	mg/l	0.043		0.059		0.035		0.028		0.025	
Beryllium, diss.	mg/l	<0.00005	U	<0.0001	U	<0.00005	U	<0.00005	U	<0.00005	U
Cadmium, diss.	mg/l	0.0013		0.0098		0.0116		0.0105		0.0095	
Chromium, diss.	mg/l	<0.0005	U	<0.001	U	<0.0005	U	<0.0005	U	<0.0005	U
Copper, diss.	mg/l	0.0042		0.012		0.0099		0.0079		0.0052	
Iron, diss.	mg/l	<0.02	U	<0.04	U	<0.02	U	<0.02	U	<0.02	U
Lead, diss.	mg/l	0.0002	B	0.0006	B	0.0004	B	0.0002	B	0.0001	B
Manganese, diss.	mg/l	0.0039		0.108		0.1291		0.1292		0.246	
Mercury, diss.	mg/l	NA		<0.0002	U	<0.0002	U	<0.0002	U	<0.0002	U
Molybdenum, diss.	mg/l	0.05	B	0.05	B	0.04	B	0.03	B	0.03	B
Nickel, diss.	mg/l	<0.01	U	<0.02	U	<0.01	U	<0.01	U	<0.008	U
Selenium, diss.	mg/l	0.0087		0.029		0.0194		0.0089		0.0024	
Silver, diss.	mg/l	<0.00005	U	<0.0001	U	<0.00005	U	<0.00005	U	<0.00005	U
Thallium, diss.	mg/l	0.0001	B	0.0004	B	0.0004	B	0.0004	B	0.0003	B
Uranium, diss.	mg/l	NA		**0.0654**		**0.0778**		**0.0678**		**0.0496**	
Uranium, total	mg/l	0.0029		**0.0877**		**0.0828**		**0.0687**		**0.0509**	
Vanadium, diss.	mg/l	0.0012		<0.0004	U	0.0004	B	0.0003	B	0.0003	B
Zinc, diss.	mg/l	0.003	B	0.012		0.019		0.025		0.023	
Radiological											
Gross Alpha, total	pCi/l	3.2		NA		36		26		23	
QC											
Cation-Anion Bal.	%	NA		3.7		0		-2		0	
Sum of Anions	meq/l	NA		39		31		26		22	
Sum of Cations	meq/l	NA		42		31		25		22	
TDS (calculated)	mg/l	NA		2,510		1,980		1,610		1,380	
TDS (ratio m/calc)	unitless	NA		1.13		1.07		1.07		1.04	
Field Parameters											
Mass	grams	NA		1,783.0		1,804.2		3,621.8		3,456.6	
Dissolved oxygen	%	NA		54.1		45.4		40		41.8	
Dissolved oxygen	mg/l	NA		5.11		4.4		3.67		3.85	
E.C., Field, 25C	µS/cm	NA		3,800		2,800		2,200		1,736	
ORP, Field	millivolts	NA		258.5		226.5		81		211.5	
pH, Field	s.u.	NA		7.69		7.32		7.47		7.55	
Temperature, Field	deg C	NA		20		19.8		20		19.9	

Notes: Bolded and shaded values exceed Utah groundwater standards

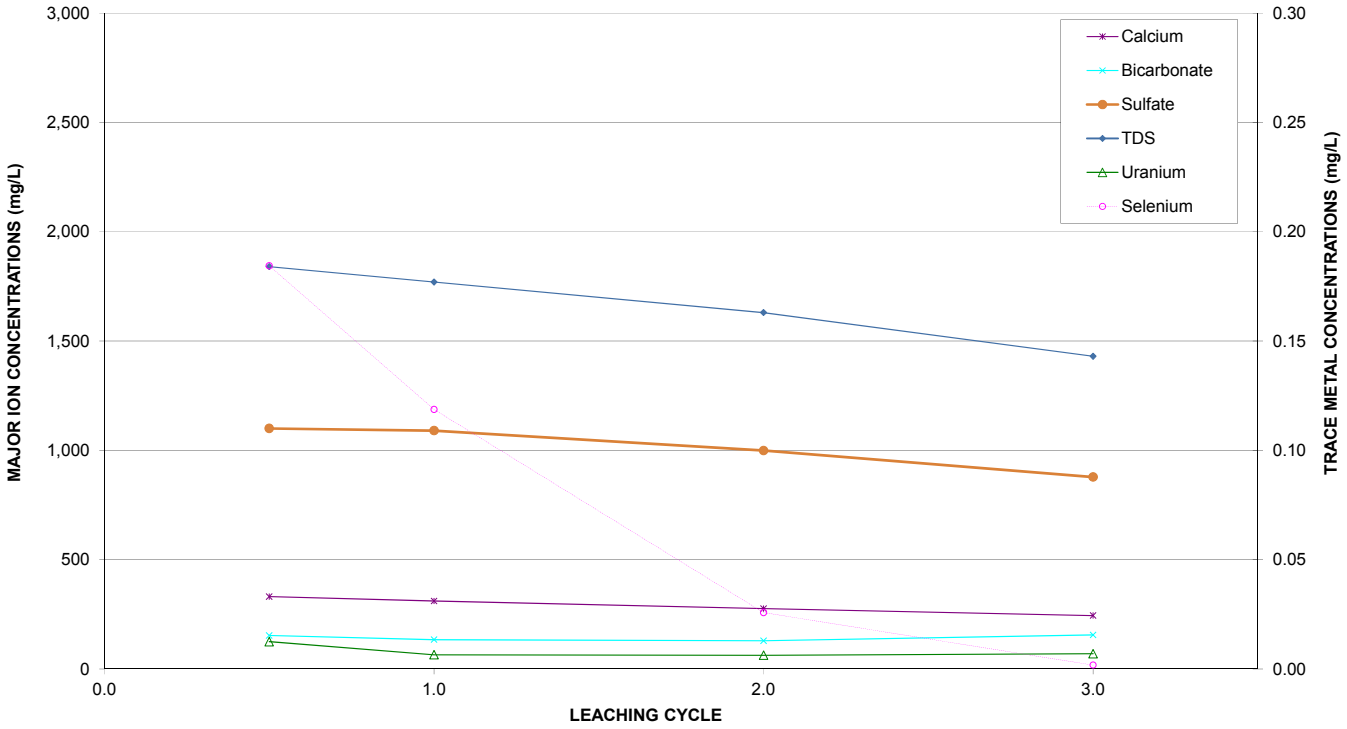

Figure 22. Major Ion, Selenium, and Uranium Concentrations in Centennial Pit Bed 14 Leachates

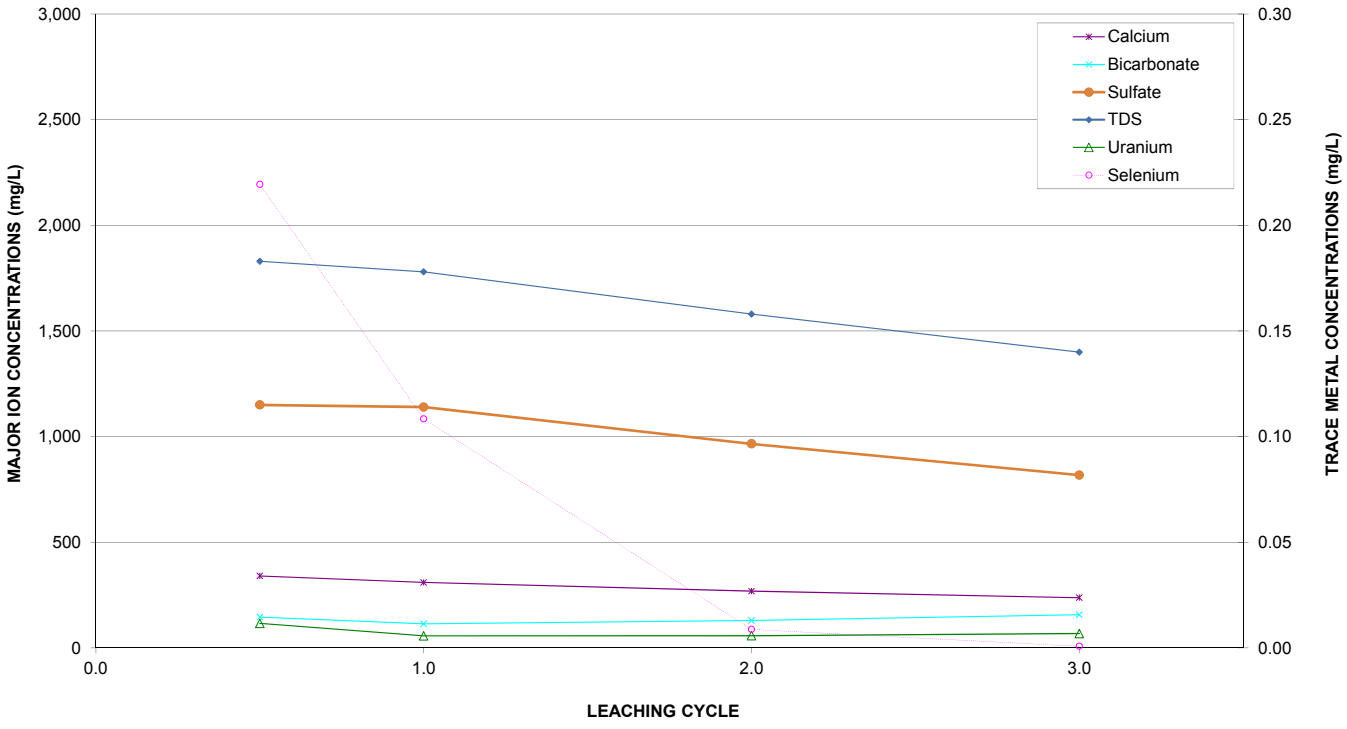

Figure 23. Major Ion, Selenium, and Uranium Concentrations in Centennial Pit Bed 14 Replicate Column Leachates

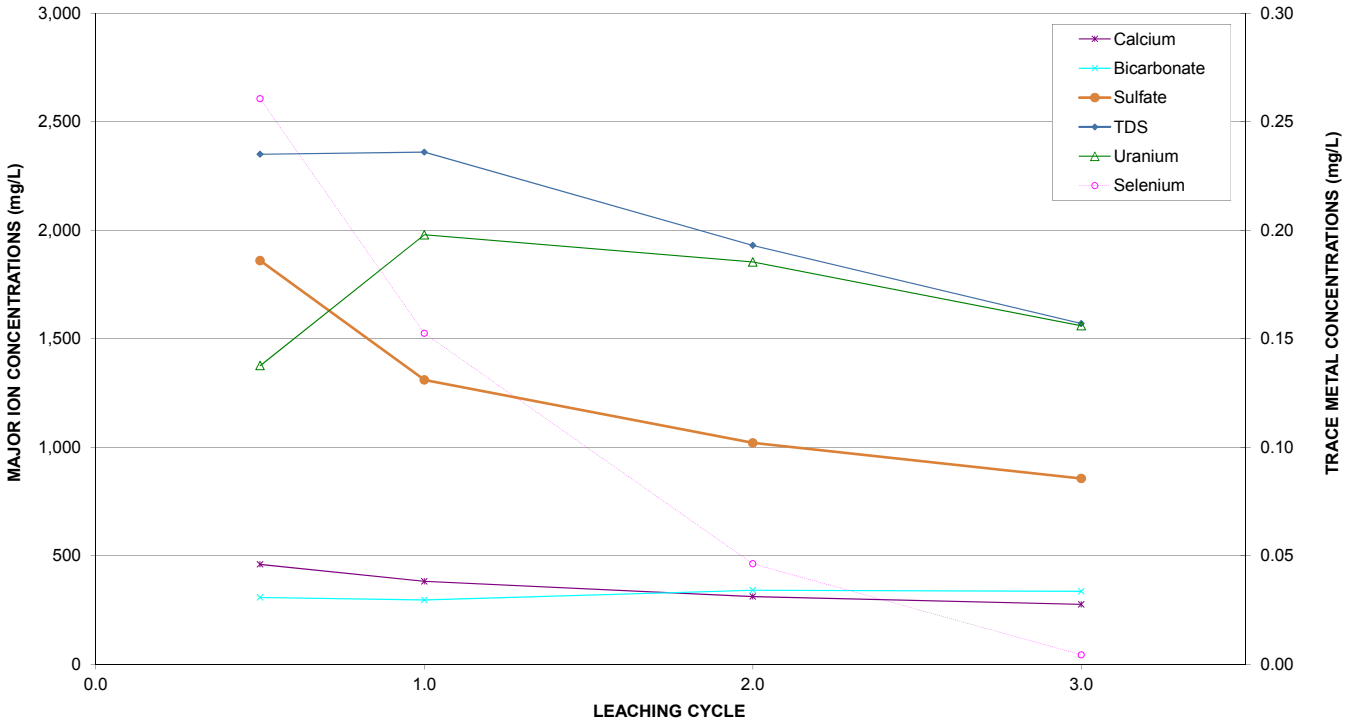

Figure 24. Major Ion, Selenium, and Uranium Concentrations in Centennial Pit Bed 15 Leachates

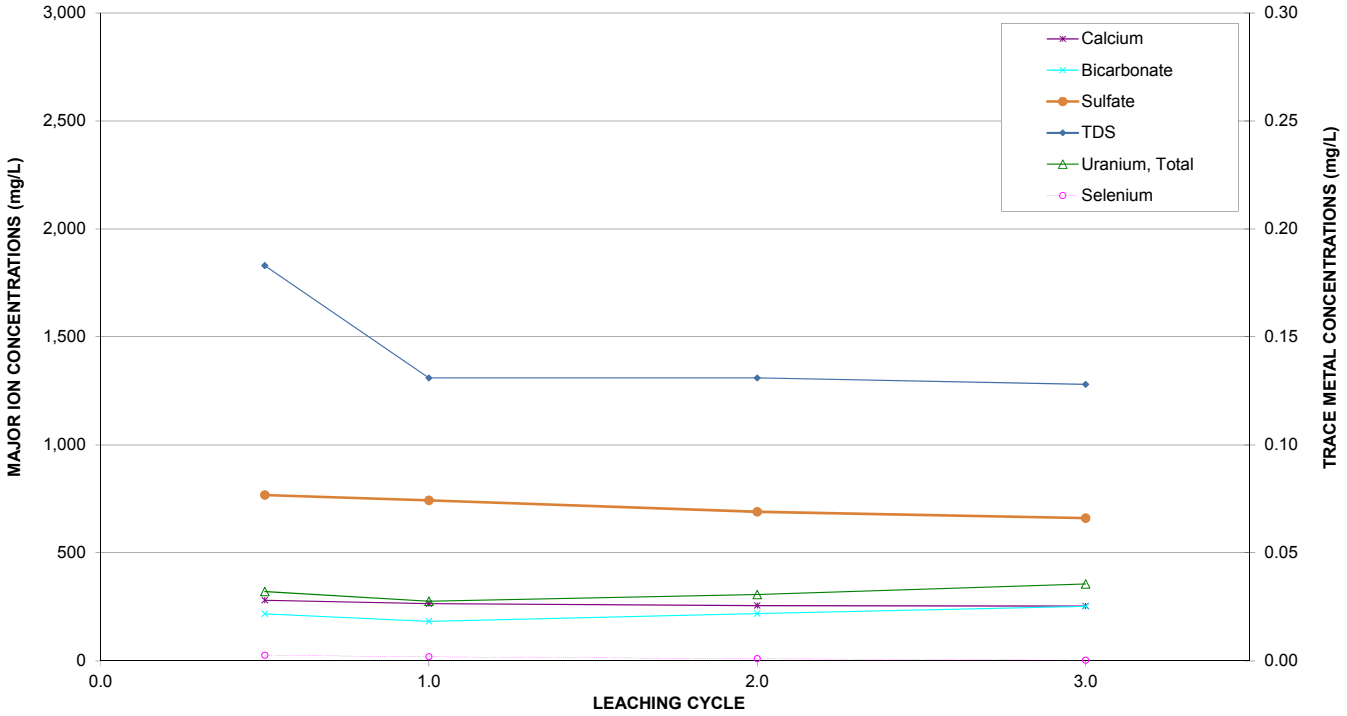

Figure 25. Major Ion, Selenium, and Uranium Concentrations in Sentinel West Pit Bed 14 Column Leachates

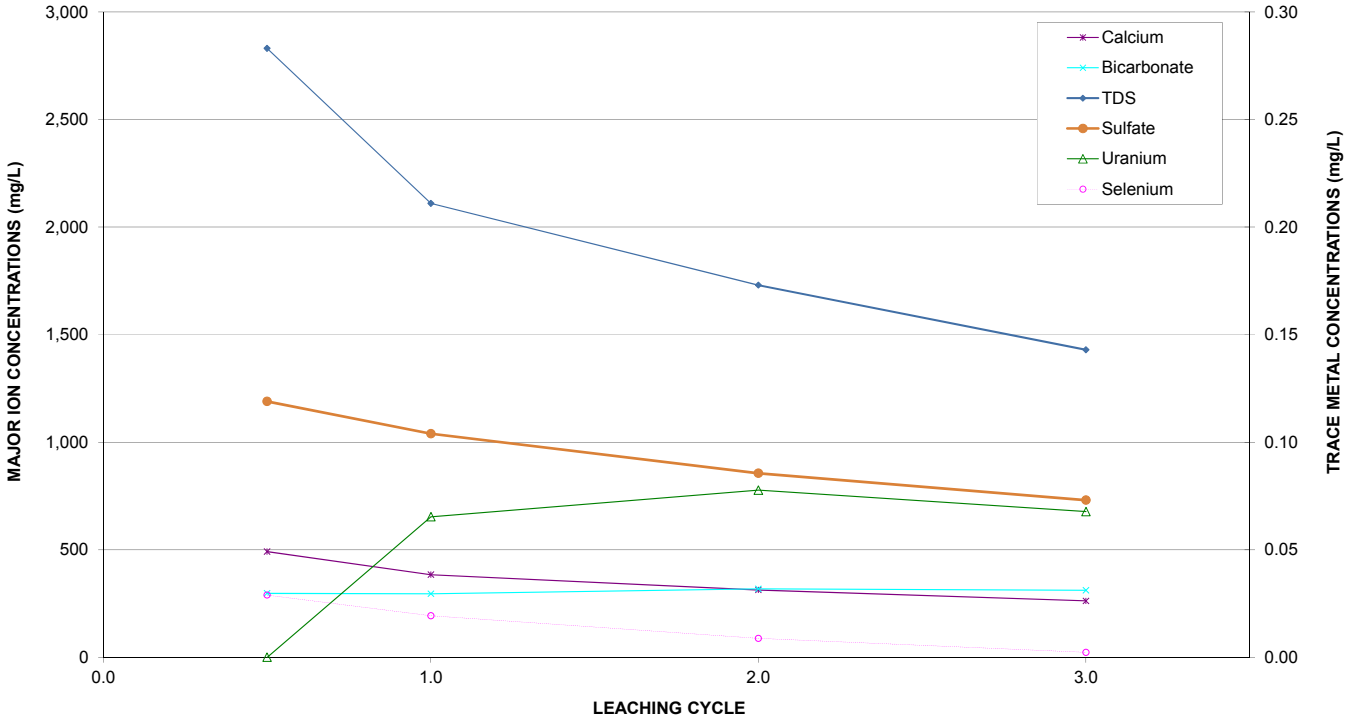

Figure 26. Major Ion, Selenium, and Uranium Concentrations in Sentinel West Pit Bed 15 Column Leachates

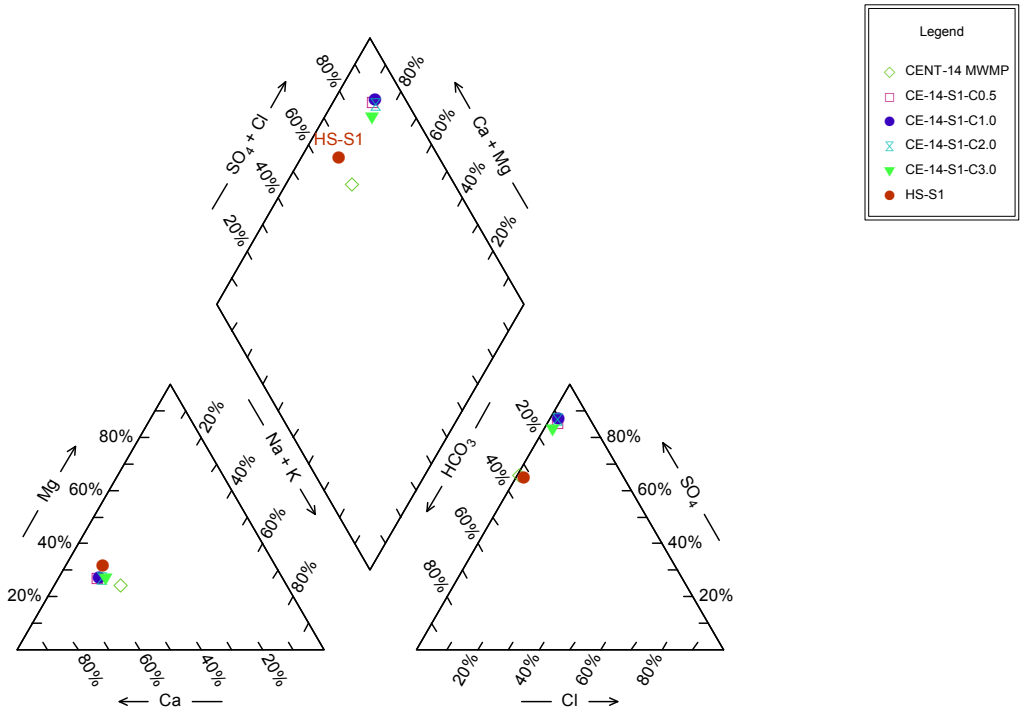

Figure 27. Piper Diagram Showing Major Ion Chemistry of Centennial Pit Bed 14 Leachates and Head Solution

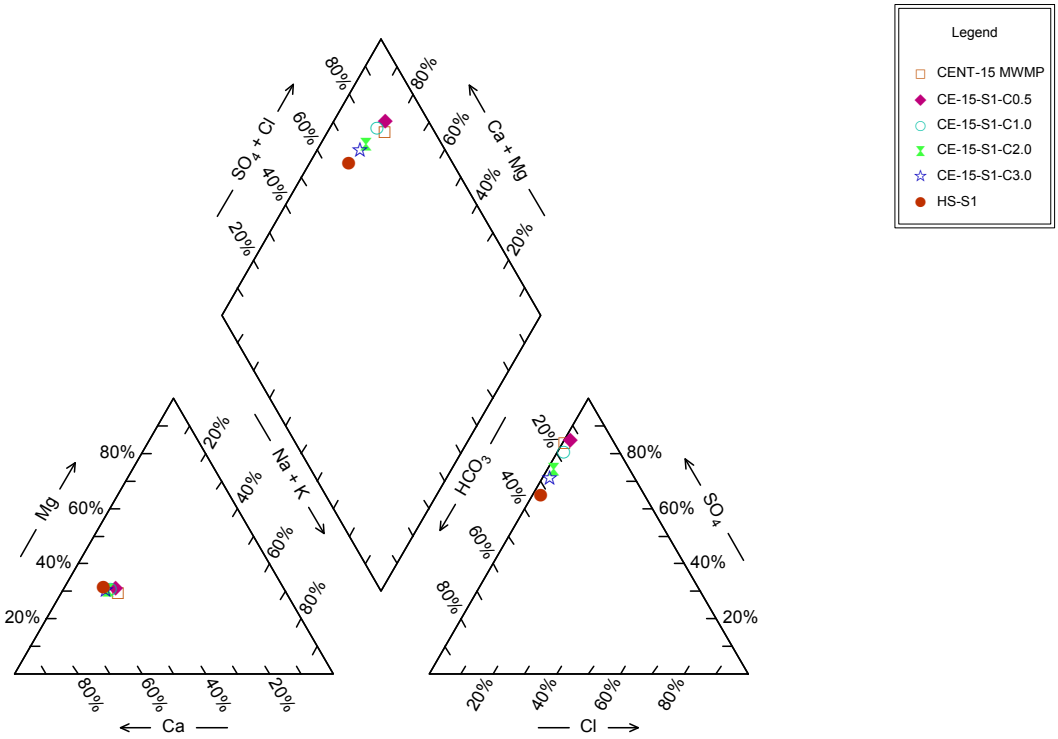

Figure 28. Piper Diagram Showing Major Ion Chemistry of Centennial Pit Bed 15 Leachates and Head Solution

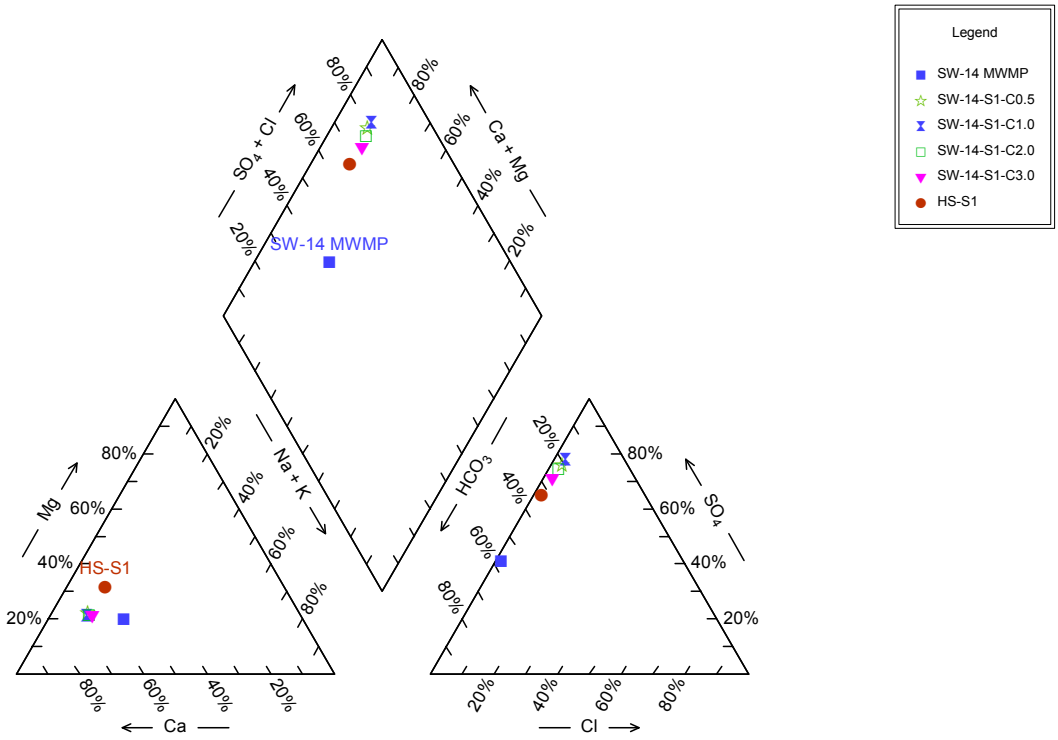

Figure 29. Piper Diagram Showing Major Ion Chemistry of Sentinel West Bed 14 Leachates and Head Solution

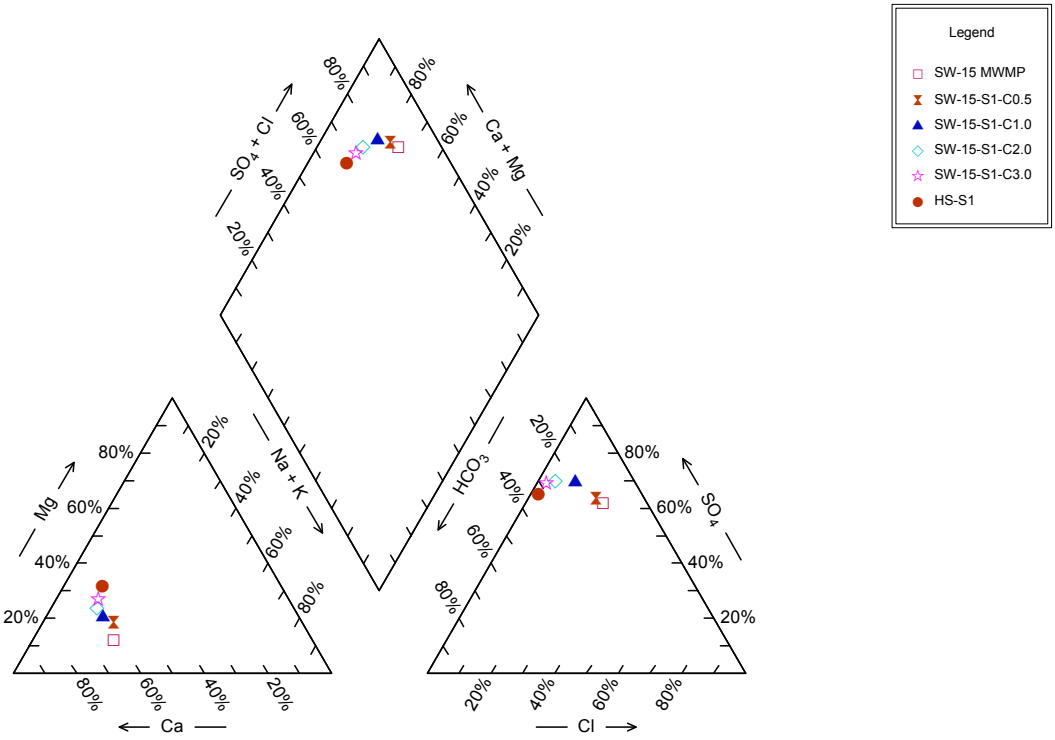

Figure 30. Piper Diagram Showing Major Ion Chemistry of Sentinel West Bed 15 Leachates and Head Solution

6.6.4 Comparison of MWMP and Column Leachates

The MWMP results are not expected to correspond directly to the saturated column testing results because the MWMP tests were performed using a deionized water leach solution (TDS ≈0 mg/L) while the column tests were performed using groundwater from the Burro Canyon Aquifer (TDS = 1,300 mg/L). The MWMP tests are well-suited to evaluate releases associated with infiltrating precipitation while the saturated column tests were specifically designed to evaluate releases from submerged/saturated backfill in contact with the Burro Canyon Aquifer.

The MWMP leachates from Bed 15 had major ion ratios very similar to the major ion ratios in the saturated columns (Figure 33, Figure 34), with lower total ion concentrations in the MWMP leachates. The similarity of the Bed 14 MWMP and column leachates occurs because the Burro Canyon Aquifer water used as the head solution for the saturated columns is derived primarily from Bed 15. That is, the saturated aquifer occurs primarily in Bed 15 and the in-situ water chemistry reflects a solution in equilibrium with Bed 15 solids.

The MWMP leachates from Bed 14 had a major ion composition markedly different from the saturated columns (Figure 31, Figure 32). The difference is due to the head solution: MWMP testing used deionized water while the saturated columns used Burro Canyon Aquifer water.

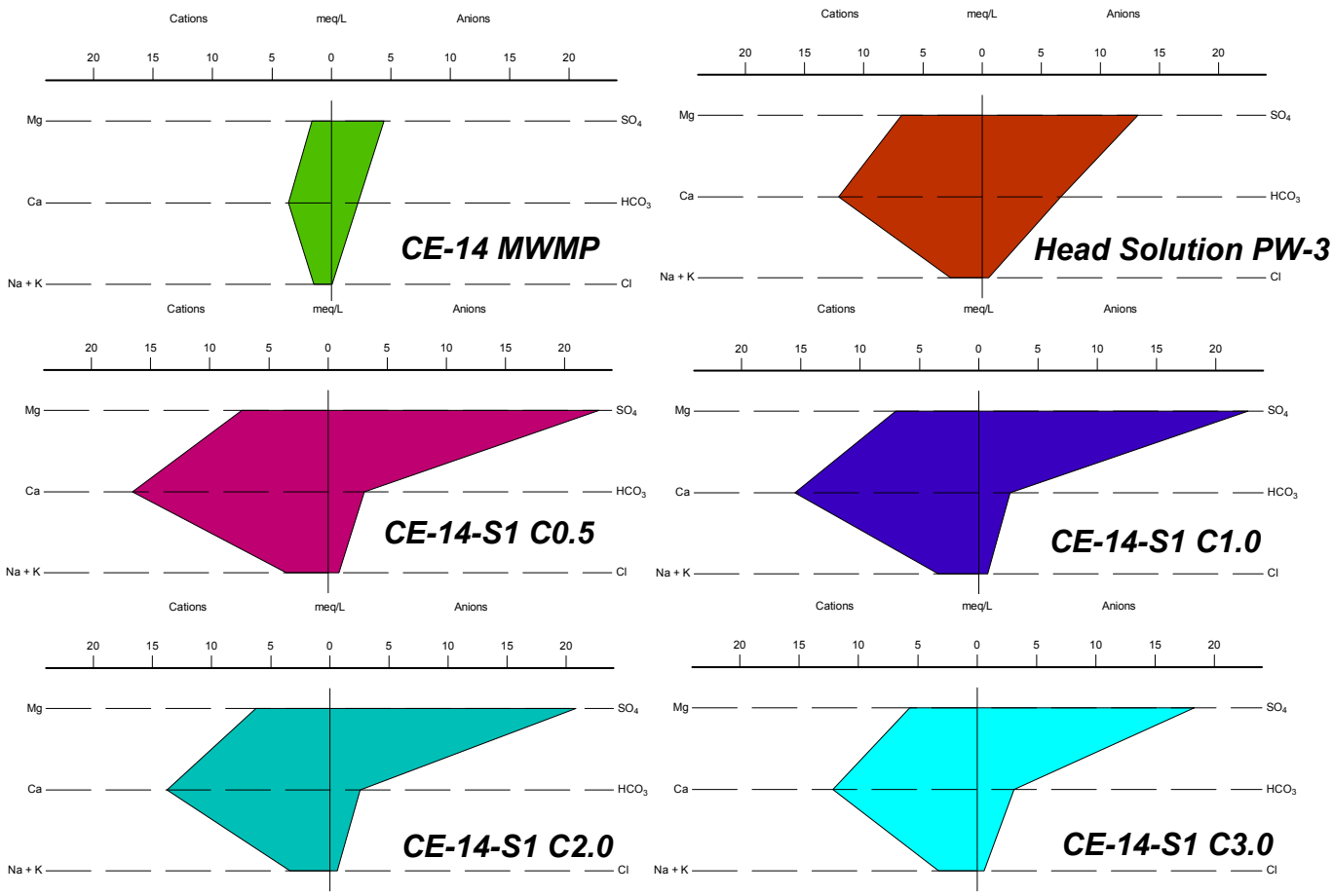

Figure 31. Stiff Diagrams Showing Major Ion Chemistry of Centennial Pit Bed 14 MWMP and Column Leachates

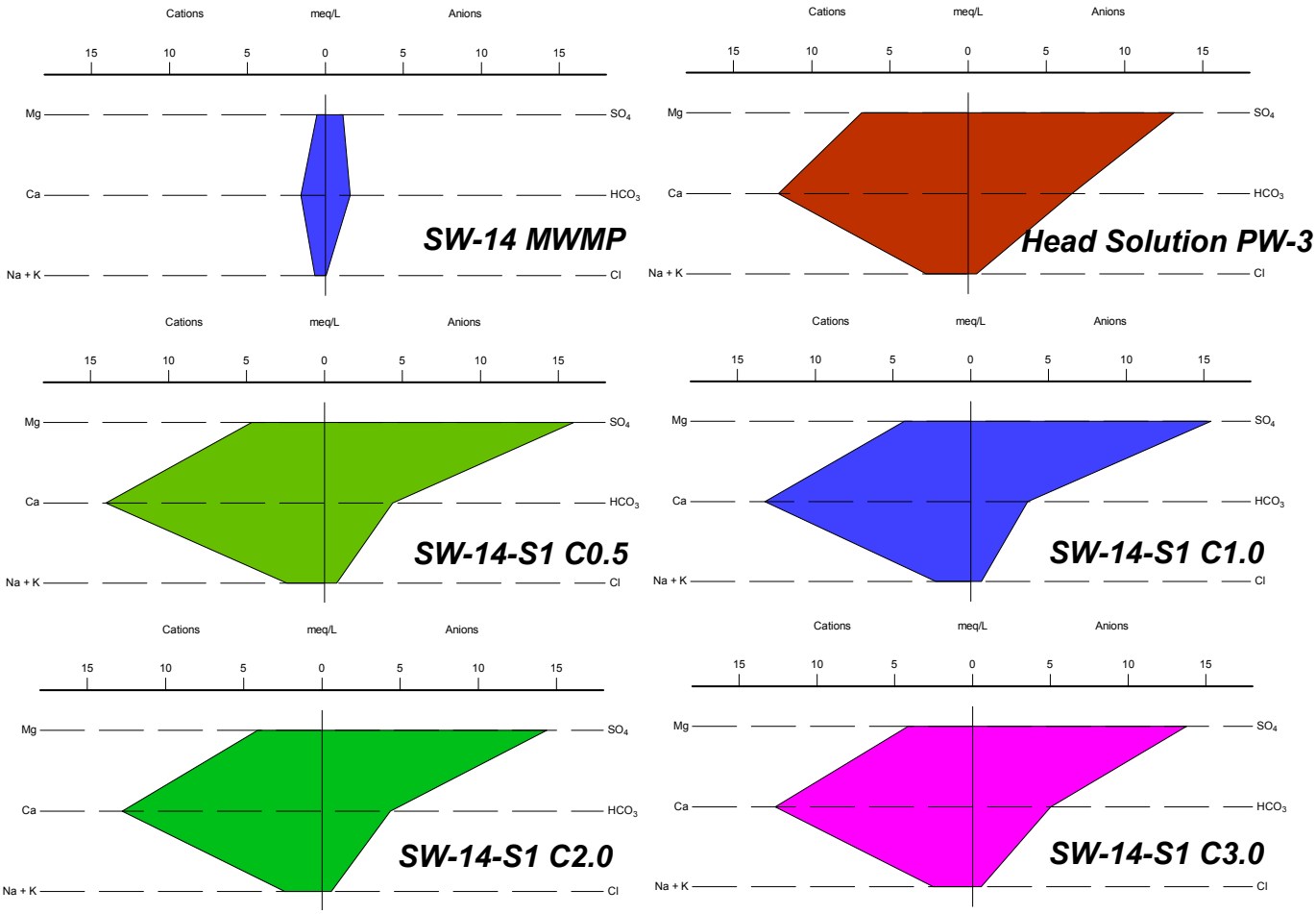

Figure 32. Stiff Diagrams Showing Major Ion Chemistry of Sentinel West Pit Bed 14 MWMP and Column Leachates

(Same scales)

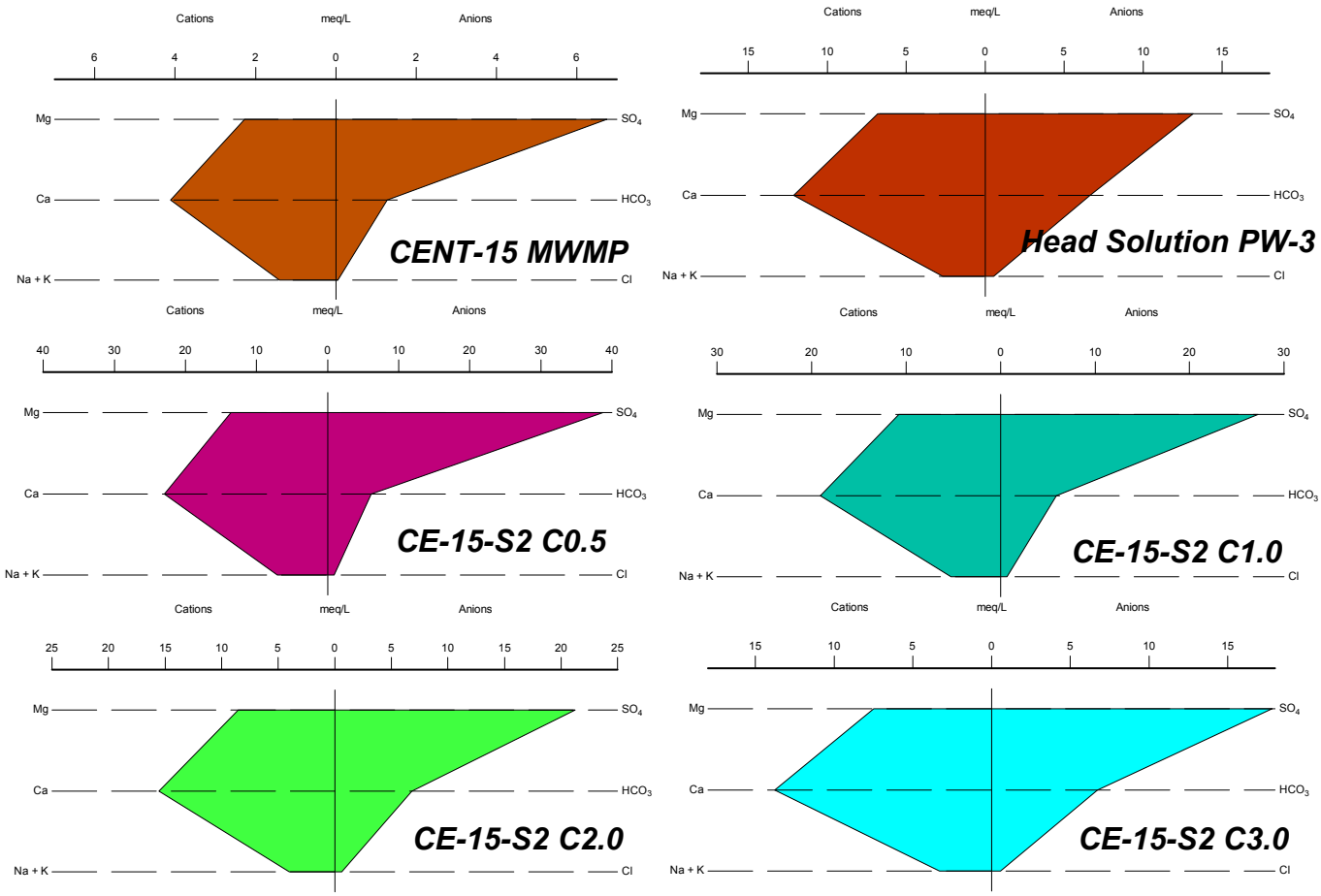

Figure 33. Stiff Diagrams Showing Similar Ratios of Major Ion Chemistry of Centennial Pit Bed 15 MWMP and Column Leachates

(Note difference in scales.)

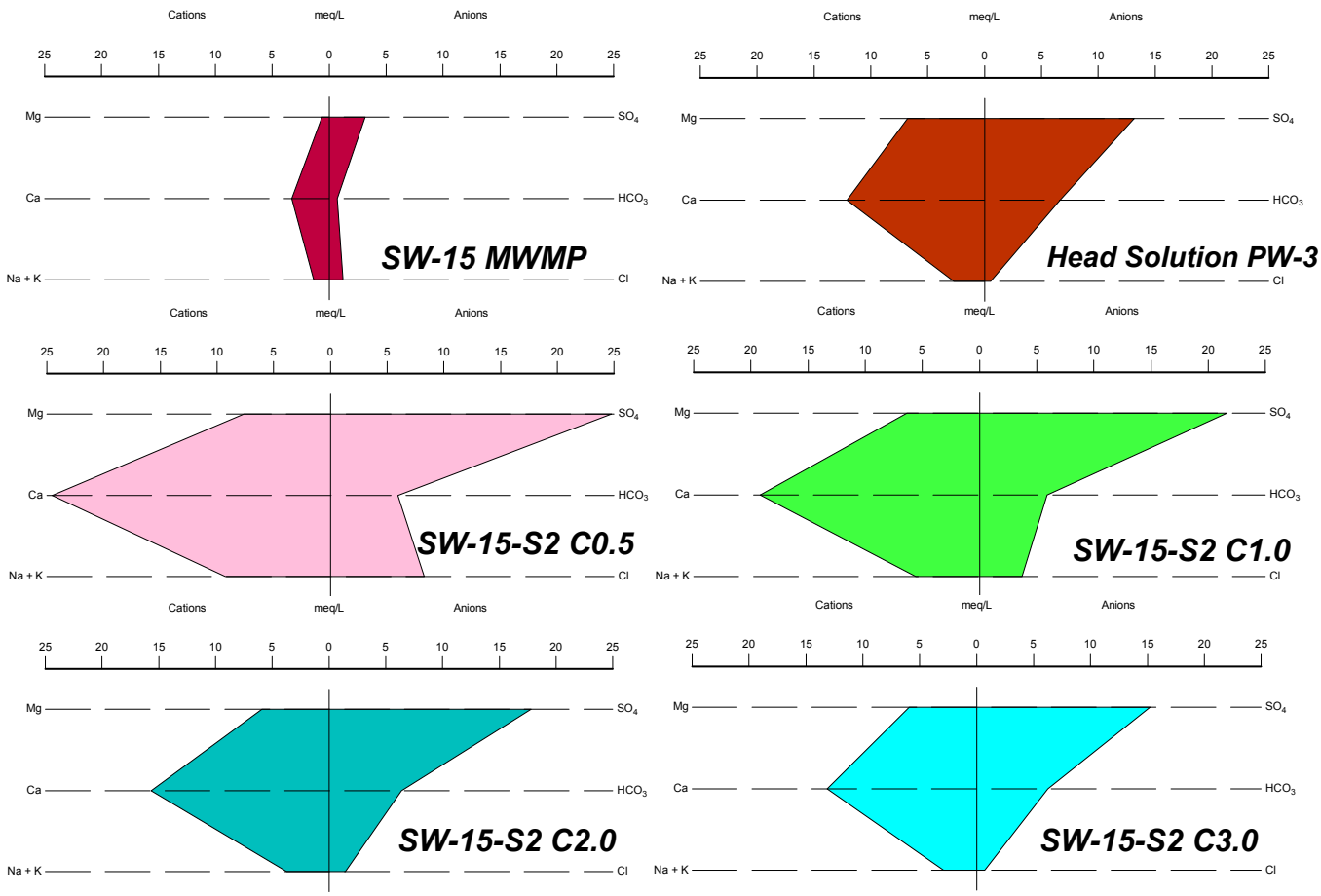

Figure 34. Stiff Diagrams Showing Similar Ratios of Major Ion Chemistry of Sentinel West Pit Bed 15 MWMP and Column Leachates

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ATTACHMENT 1
ACZ LABORATORY CERTIFICATIONS

Certifications

ACZ Laboratories, Inc. performs environmental testing for companies across the U.S. and abroad. Below are links to copies of ACZ's current licenses, permits and regional and state certifications. To inquire if ACZ is certified in your state, please contact us.

Current Certifications Include:

- NELAP Utah, Primacy Certification
- Clinical Laboratory Certification (CLIA)
- EPA Region 8 - Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming
- Radioactivity License
- USDA Foreign Soils Permit
- Alaska
- Arizona
- Arkansas
- California
- Colorado Drinking Water
- Hawaii Radiochemistry Drinking Water
- Montana Radiochemistry Drinking Water
- Nevada
- New Mexico
- Oklahoma
- Oregon
- South Carolina
- Texas
- Washington
- Wyoming (EPA Region 8)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

OCT 2 2 2012

Ref: 8TMS-L

Matt Sowards
QA/QC Officer
ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487

Dear Mr. Sowards:

In accordance with the authority stated in 40 CFR 141 and 142, EPA Region 8 staff has reviewed your request for reciprocal certification for drinking water contaminants along with the documentation that was attached. In accordance with the recommendation of my staff, I hereby grant reciprocal certification for the State of Wyoming and all tribal public water systems in EPA Region 8 to ACZ Laboratories located in Steamboat Springs, Colorado for the parameters listed below. This reciprocal certification is based on the certification of your laboratory by the State of Colorado and on the performance of your laboratory in the analysis of Proficiency Testing Samples.

Parameter	Method(s)	Certification		
		Begin Date	End Date	Status
Group: Copper & Lead				
Copper	200.8	9/1/2012	8/31/2013	Reciprocal
Lead	200.8	9/1/2012	8/31/2013	Reciprocal
Group: Nitrate & Nitrite				
Nitrate	353.2	9/1/2012	8/31/2013	Reciprocal
Nitrite	353.2	9/1/2012	8/31/2013	Reciprocal
Group: Metals				
Antimony	200.8	9/1/2012	8/31/2013	Reciprocal
Arsenic	200.8	9/1/2012	8/31/2013	Reciprocal
Barium	200.8	9/1/2012	8/31/2013	Reciprocal
Beryllium	200.8	9/1/2012	8/31/2013	Reciprocal
Cadmium	200.8	9/1/2012	8/31/2013	Reciprocal
Chromium	200.8	9/1/2012	8/31/2013	Reciprocal
Mercury	245.1	9/1/2012	8/31/2013	Reciprocal
Selenium	200.8	9/1/2012	8/31/2013	Reciprocal
Thallium	200.8	9/1/2012	8/31/2013	Reciprocal
Group: Inorganics				
Cyanide	335.4	9/1/2012	8/31/2013	Reciprocal
Fluoride	4500-F C	9/1/2012	8/31/2013	Reciprocal
Group: Radiochemical Contaminants				
Gross Alpha	900.0	9/1/2012	8/31/2013	Reciprocal
Gross Beta	900.0	9/1/2012	8/31/2013	Reciprocal
Radium-226	903.1	9/1/2012	8/31/2013	Reciprocal
Radium-228	904.0	9/1/2012	8/31/2013	Reciprocal
Total Uranium	200.8	9/1/2012	8/31/2013	Reciprocal

The expiration dates for each parameter are listed in the table above, for the State of Wyoming and all tribal public water systems in EPA Region 8. Certification will remain in effect for the specified period under the conditions that the laboratory remains certified by the State of Colorado for all of the above parameters, that the specified methods are followed, and that Water Supply Proficiency Testing samples are analyzed by the laboratory for each of the above parameters with acceptable results once per year. It is the laboratory's responsibility to request certification beyond the specified period.

If you have comments or questions please contact Marcie Tidd, Region 8 Drinking Water Laboratory Certification Program Manager, at 303-312-7764 (tidd.marcie@epa.gov).

Sincerely,

Judith Wong
Assistant Regional Administrator
Office of Technical & Management Services

State of Utah

Department of Health

Environmental Laboratory Certification Program

Certification is hereby granted to

ACZ Laboratories, Inc.

2773 Downhill Drive
Steamboat Springs, CO 80487

Has conformed with the
2009 TNI Standard
Scope of accreditiation is limited to the
State of Utah Accredited Fields of Accreditiation
Which accompanies this Certificate

EPA Number: CO00028
Expiration Date: 4/30/2014
Certificate Number: CO000282013-7

Robyn M. Atkinson, Ph.D, HCLD
Director, Unified State Laboratories: Public Health

NELAP RECOGNIZED TNI ACCREDITATION BODY

Continued accredited status depends on successful ongoing particitpation in the program.

UTAH DEPARTMENT OF HEALTH

Utah Department of Health
W. David Patton Ph.D
Executive Director

Disease Control and Prevention
Robyn M. Atkinson, Ph.D, HCLD
Director, Unified State Laboratories: Public Health

Bureau of Laboratory Improvement
David B Mendenhall, MPA, MT (ASCP)
Bureau Director

State of Utah
Gary R Herbert
Governor
Gregory S Bell
Lieutenant Governor

EPA Number: ***CO00028*** **Attachment to Certificate Number: CO000282013-7**

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***CWA (Non Potable Water)***			
Method ASTM D516-02			
Sulfate	5/1/2012	4/30/2014	UT
Method ASTM D516-07			
Sulfate	12/12/2012	4/30/2014	UT
Method ASTM D6888-04			
Cyanide	5/1/2012	4/30/2014	UT
Method ASTM D6888-09			
Cyanide	12/12/2012	4/30/2014	UT
Method ASTM D7065-06			
Nonyl phenol	5/1/2013	4/30/2014	UT
Nonylphenol diethoxylate	5/1/2013	4/30/2014	UT
Nonylphenol ethoxylate	5/1/2013	4/30/2014	UT
Method ASTM D7511-09e2			
Total cyanide	5/1/2013	4/30/2014	UT
Method EPA 160.4			
Residue-volatile	5/1/2012	4/30/2014	UT
Method EPA 1631E			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 1664A (HEM)			
Oil & Grease	5/1/2012	4/30/2014	UT
Method EPA 180.1			
Turbidity	5/1/2012	4/30/2014	UT
Method EPA 200.7			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Boron	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Calcium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT

	Start Date	Expires	AB
Program/Matrix: ***CWA (Non Potable Water)***			
Iron	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Lithium	5/1/2012	4/30/2014	UT
Magnesium	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Phosphorus, total	5/1/2012	4/30/2014	UT
Potassium	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silica as SiO2	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Sodium	5/1/2012	4/30/2014	UT
Strontium	5/1/2012	4/30/2014	UT
Tin	5/1/2012	4/30/2014	UT
Titanium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 200.8			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Mercury	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Thorium	5/1/2012	4/30/2014	UT
Uranium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 245.1			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 300.0			
Bromide	5/1/2012	4/30/2014	UT
Chloride	5/1/2012	4/30/2014	UT
Fluoride	5/1/2012	4/30/2014	UT
Sulfate	5/1/2012	4/30/2014	UT
Method EPA 335.4			

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	Start Date	Expires	AB
Program/Matrix: ***CWA (Non Potable Water)***			
Cyanide	5/1/2012	4/30/2014	UT
Method EPA 350.1			
Ammonia as N	5/1/2012	4/30/2014	UT
Method EPA 351.2			
Kjeldahl nitrogen - total	5/1/2012	4/30/2014	UT
Method EPA 353.2			
Nitrate	5/1/2012	4/30/2014	UT
Nitrate-nitrite	5/1/2012	4/30/2014	UT
Nitrite as N	5/1/2012	4/30/2014	UT
Method EPA 365.1			
Orthophosphate as P	5/1/2012	4/30/2014	UT
Phosphorus, total	5/1/2012	4/30/2014	UT
Method EPA 375.4			
Sulfate	5/1/2012	4/30/2014	UT
Method EPA 410.4			
Chemical oxygen demand	5/1/2012	4/30/2014	UT
Method EPA 420.4			
Total phenolics	5/1/2012	4/30/2014	UT
Method EPA 624			
1,1,1-Trichloroethane	5/1/2012	4/30/2014	UT
1,1,2,2-Tetrachloroethane	5/1/2012	4/30/2014	UT
1,1,2-Trichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethylene	5/1/2012	4/30/2014	UT
1,2-Dichlorobenzene (o-Dichlorobenzene)	5/1/2012	4/30/2014	UT
1,2-Dichloroethane (Ethylene dichloride)	5/1/2012	4/30/2014	UT
1,2-Dichloropropane	5/1/2012	4/30/2014	UT
1,3-Dichlorobenzene	5/1/2012	4/30/2014	UT
1,4-Dichlorobenzene	5/1/2012	4/30/2014	UT
2-Chloroethyl vinyl ether	5/1/2012	4/30/2014	UT
Benzene	5/1/2012	4/30/2014	UT
Bromodichloromethane	5/1/2012	4/30/2014	UT
Bromoform	5/1/2012	4/30/2014	UT
Carbon tetrachloride	5/1/2012	4/30/2014	UT
Chlorobenzene	5/1/2012	4/30/2014	UT
Chlorodibromomethane	5/1/2012	4/30/2014	UT
Chloroethane (Ethyl chloride)	5/1/2012	4/30/2014	UT
Chloroform	5/1/2012	4/30/2014	UT
cis-1,3-Dichloropropene	5/1/2012	4/30/2014	UT
Ethylbenzene	5/1/2012	4/30/2014	UT
Methyl bromide (Bromomethane)	5/1/2012	4/30/2014	UT
Methyl chloride (Chloromethane)	5/1/2012	4/30/2014	UT
Methylene chloride (Dichloromethane)	5/1/2012	4/30/2014	UT
m-Xylene	5/1/2012	4/30/2014	UT
o-Xylene	5/1/2012	4/30/2014	UT
p-Xylene	5/1/2012	4/30/2014	UT
Tetrachloroethylene (Perchloroethylene)	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***CWA (Non Potable Water)***			
Toluene	5/1/2012	4/30/2014	UT
trans-1,2-Dichloroethylene	5/1/2012	4/30/2014	UT
trans-1,3-Dichloropropylene	5/1/2012	4/30/2014	UT
Trichloroethene (Trichloroethylene)	5/1/2012	4/30/2014	UT
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	5/1/2012	4/30/2014	UT
Vinyl chloride	5/1/2012	4/30/2014	UT
Xylene (total)	5/1/2012	4/30/2014	UT
Method EPA 625			
1,2,4-Trichlorobenzene	5/1/2012	4/30/2014	UT
2,4,6-Trichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dimethylphenol	5/1/2012	4/30/2014	UT
2,4-Dinitrophenol	5/1/2012	4/30/2014	UT
2,4-Dinitrotoluene (2,4-DNT)	5/1/2012	4/30/2014	UT
2,6-Dinitrotoluene (2,6-DNT)	5/1/2012	4/30/2014	UT
2-Chloronaphthalene	5/1/2012	4/30/2014	UT
2-Chlorophenol	5/1/2012	4/30/2014	UT
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	5/1/2012	4/30/2014	UT
2-Nitrophenol	5/1/2012	4/30/2014	UT
3,3'-Dichlorobenzidine	5/1/2012	4/30/2014	UT
4-Bromophenyl phenyl ether	5/1/2012	4/30/2014	UT
4-Chloro-3-methylphenol	5/1/2012	4/30/2014	UT
4-Chlorophenyl phenylether	5/1/2012	4/30/2014	UT
4-Nitrophenol	5/1/2012	4/30/2014	UT
Acenaphthene	5/1/2012	4/30/2014	UT
Acenaphthylene	5/1/2012	4/30/2014	UT
Anthracene	5/1/2012	4/30/2014	UT
Benzo(a)anthracene	5/1/2012	4/30/2014	UT
Benzo(a)pyrene	5/1/2012	4/30/2014	UT
Benzo(b)fluoranthene	5/1/2012	4/30/2014	UT
Benzo(g,h,i)perylene	5/1/2012	4/30/2014	UT
Benzo(k)fluoranthene	5/1/2012	4/30/2014	UT
bis(2-Chloroethoxy)methane	5/1/2012	4/30/2014	UT
bis(2-Chloroethyl) ether	5/1/2012	4/30/2014	UT
bis(2-Chloroisopropyl) ether	5/1/2012	4/30/2014	UT
bis(2-Ethylhexyl) phthalate (DEHP)	5/1/2012	4/30/2014	UT
Butyl benzyl phthalate	5/1/2012	4/30/2014	UT
Chrysene	5/1/2012	4/30/2014	UT
Dibenz(a,h) anthracene	5/1/2012	4/30/2014	UT
Diethyl phthalate	5/1/2012	4/30/2014	UT
Dimethyl phthalate	5/1/2012	4/30/2014	UT
Di-n-butyl phthalate	5/1/2012	4/30/2014	UT
Di-n-octyl phthalate	5/1/2012	4/30/2014	UT
Fluoranthene	5/1/2012	4/30/2014	UT
Fluorene	5/1/2012	4/30/2014	UT
Hexachlorobenzene	5/1/2012	4/30/2014	UT
Hexachlorobutadiene	5/1/2012	4/30/2014	UT
Hexachlorocyclopentadiene	5/1/2012	4/30/2014	UT

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	Start Date	Expires	AB
Program/Matrix: ***CWA (Non Potable Water)***			
Hexachloroethane	5/1/2012	4/30/2014	UT
Indeno(1,2,3-cd) pyrene	5/1/2012	4/30/2014	UT
Isophorone	5/1/2012	4/30/2014	UT
Naphthalene	5/1/2012	4/30/2014	UT
Nitrobenzene	5/1/2012	4/30/2014	UT
n-Nitrosodimethylamine	5/1/2012	4/30/2014	UT
n-Nitrosodi-n-propylamine	5/1/2012	4/30/2014	UT
n-Nitrosodiphenylamine	5/1/2012	4/30/2014	UT
Pentachlorophenol	5/1/2012	4/30/2014	UT
Phenanthrene	5/1/2012	4/30/2014	UT
Phenol	5/1/2012	4/30/2014	UT
Pyrene	5/1/2012	4/30/2014	UT
Method EPA 900			
Gross-alpha	5/1/2012	4/30/2014	UT
Gross-beta	5/1/2012	4/30/2014	UT
Method EPA 901.1			
Cesium-134	5/1/2012	4/30/2014	UT
Cesium-137	5/1/2012	4/30/2014	UT
Method EPA 903			
Radium-226	5/1/2012	4/30/2014	UT
Total alpha radium	11/1/2012	4/30/2014	UT
Method EPA 903.1			
Radium-226	5/1/2012	4/30/2014	UT
Method EPA 904			
Radium-228	5/1/2012	4/30/2014	UT
Method OIA 1677-09			
Free cyanide	5/1/2013	4/30/2014	UT
Method SM 18/19thED 3114 B			
Selenium	5/1/2012	4/30/2014	UT
Method SM 2310 B			
Acidity, as CaCO3	5/1/2012	4/30/2014	UT
Method SM 2320 B			
Alkalinity as CaCO3	5/1/2012	4/30/2014	UT
Method SM 2340 B			
Total hardness as CaCO3	5/1/2012	4/30/2014	UT
Method SM 2510 B			
Conductivity	5/1/2012	4/30/2014	UT
Method SM 2540 B			
Residue-total	5/1/2012	4/30/2014	UT
Method SM 2540 C			
Residue-filterable (TDS)	5/1/2012	4/30/2014	UT
Method SM 2540 D			
Residue-nonfilterable (TSS)	5/1/2012	4/30/2014	UT
Method SM 2540 F			
Residue-settleable	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

Program/Matrix: ***CWA (Non Potable Water)***

	Start Date	Expires	AB
Method SM 3114 B-2009			
Selenium	12/12/2012	4/30/2014	UT
Method SM 3114 C-2009			
Selenium	12/12/2012	4/30/2014	UT
Method SM 3500-Cr B-2009			
Chromium VI	12/12/2012	4/30/2014	UT
Method SM 3500-Cr D			
Chromium VI	5/1/2012	4/30/2014	UT
Method SM 4500-Cl^- E			
Chloride	5/1/2012	4/30/2014	UT
Method SM 4500-CN^- I			
Cyanide	5/1/2012	4/30/2014	UT
Method SM 4500-F^- C			
Fluoride	5/1/2012	4/30/2014	UT
Method SM 4500-H+ B			
pH	5/1/2012	4/30/2014	UT
Method SM 4500-H+ B-2000			
pH	12/12/2012	4/30/2014	UT
Method SM 4500-$SO4^-$ D			
Sulfate	5/1/2012	4/30/2014	UT
Method SM 5210 B			
Biochemical oxygen demand	5/1/2012	4/30/2014	UT
Carbonaceous BOD, CBOD	5/1/2012	4/30/2014	UT
Method SM 5210 B-2001			
Biochemical oxygen demand	12/12/2012	4/30/2014	UT
Carbonaceous BOD, CBOD	12/12/2012	4/30/2014	UT
Method SM 5310 B			
Total organic carbon	5/1/2012	4/30/2014	UT
Method SM 5310 B-2000			
Total organic carbon	12/12/2012	4/30/2014	UT

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Program/Matrix: ***RCRA (Biological Tissue)***

	Start Date	Expires	AB
Method EPA 6010B			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Boron	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Calcium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Iron	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Lithium	5/1/2012	4/30/2014	UT
Magnesium	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Potassium	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Sodium	5/1/2012	4/30/2014	UT
Strontium	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Tin	5/1/2012	4/30/2014	UT
Titanium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 6020			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Uranium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Biological Tissue)***			
Zinc	5/1/2012	4/30/2014	UT

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Program/Matrix: ***RCRA (Non Potable Water)***

	Start Date	Expires	AB
Method EPA 1010A			
Ignitability	5/1/2012	4/30/2014	UT
Method EPA 1311			
Toxicity Characteristic Leaching Procedure Metals	5/1/2012	4/30/2014	UT
Toxicity Characteristic Leaching Procedure Semi-Volatiles	5/1/2012	4/30/2014	UT
Toxicity Characteristic Leaching Procedure Volatiles	5/1/2012	4/30/2014	UT
Method EPA 1312			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3005A			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3010A			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3510C			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3520C			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 5030C			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 6010B			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Boron	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Calcium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Iron	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Lithium	5/1/2012	4/30/2014	UT
Magnesium	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Phosphorus, total	5/1/2012	4/30/2014	UT
Potassium	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silica as SiO2	5/1/2012	4/30/2014	UT
Silicon	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Sodium	5/1/2012	4/30/2014	UT
Strontium	5/1/2012	4/30/2014	UT
Tin	5/1/2012	4/30/2014	UT
Titanium	5/1/2012	4/30/2014	UT

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	Start Date	Expires	AB
Program/Matrix: ***RCRA (Non Potable Water)***			
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 6020			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Uranium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 7196A			
Chromium VI	5/1/2012	4/30/2014	UT
Method EPA 7470A			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 8015D			
Diesel range organics (DRO)	5/1/2012	4/30/2014	UT
Gasoline range organics (GRO)	5/1/2012	4/30/2014	UT
Method EPA 8021B			
Benzene	5/1/2012	4/30/2014	UT
Ethylbenzene	5/1/2012	4/30/2014	UT
m-Xylene	5/1/2012	4/30/2014	UT
o-Xylene	5/1/2012	4/30/2014	UT
p-Xylene	5/1/2012	4/30/2014	UT
Toluene	5/1/2012	4/30/2014	UT
Xylene (total)	5/1/2012	4/30/2014	UT
Method EPA 8260B			
1,1,1,2-Tetrachloroethane	5/1/2012	4/30/2014	UT
1,1,1-Trichloroethane	5/1/2012	4/30/2014	UT
1,1,2,2-Tetrachloroethane	5/1/2012	4/30/2014	UT
1,1,2-Trichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethylene	5/1/2012	4/30/2014	UT
1,1-Dichloropropene	5/1/2012	4/30/2014	UT
1,2,3-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2,3-Trichloropropane	5/1/2012	4/30/2014	UT

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Program/Matrix: ***RCRA (Non Potable Water)***

	Start Date	Expires	AB
1,2,4-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2,4-Trimethylbenzene	5/1/2012	4/30/2014	UT
1,2-Dibromo-3-chloropropane (DBCP)	5/1/2012	4/30/2014	UT
1,2-Dibromoethane (EDB, Ethylene dibromide)	5/1/2012	4/30/2014	UT
1,2-Dichlorobenzene (o-Dichlorobenzene)	5/1/2012	4/30/2014	UT
1,2-Dichloroethane (Ethylene dichloride)	5/1/2012	4/30/2014	UT
1,2-Dichloropropane	5/1/2012	4/30/2014	UT
1,3,5-Trimethylbenzene	5/1/2012	4/30/2014	UT
1,3-Dichlorobenzene	5/1/2012	4/30/2014	UT
1,3-Dichloropropane	5/1/2012	4/30/2014	UT
1,4-Dichlorobenzene	5/1/2012	4/30/2014	UT
2,2-Dichloropropane	5/1/2012	4/30/2014	UT
2-Butanone (Methyl ethyl ketone, MEK)	5/1/2012	4/30/2014	UT
2-Chloroethyl vinyl ether	5/1/2012	4/30/2014	UT
2-Chlorotoluene	5/1/2012	4/30/2014	UT
2-Hexanone	5/1/2012	4/30/2014	UT
4-Chlorotoluene	5/1/2012	4/30/2014	UT
4-Methyl-2-pentanone (MIBK)	5/1/2012	4/30/2014	UT
Acetone	5/1/2012	4/30/2014	UT
Acrylonitrile	5/1/2012	4/30/2014	UT
Benzene	5/1/2012	4/30/2014	UT
Bromobenzene	5/1/2012	4/30/2014	UT
Bromochloromethane	5/1/2012	4/30/2014	UT
Bromodichloromethane	5/1/2012	4/30/2014	UT
Bromoform	5/1/2012	4/30/2014	UT
Carbon disulfide	5/1/2012	4/30/2014	UT
Carbon tetrachloride	5/1/2012	4/30/2014	UT
Chlorobenzene	5/1/2012	4/30/2014	UT
Chlorodibromomethane	5/1/2012	4/30/2014	UT
Chloroethane (Ethyl chloride)	5/1/2012	4/30/2014	UT
Chloroform	5/1/2012	4/30/2014	UT
cis-1,2-Dichloroethylene	5/1/2012	4/30/2014	UT
cis-1,3-Dichloropropene	5/1/2012	4/30/2014	UT
Dibromomethane (Methylene bromide)	5/1/2012	4/30/2014	UT
Dichlorodifluoromethane (Freon-12)	5/1/2012	4/30/2014	UT
Ethylbenzene	5/1/2012	4/30/2014	UT
Hexachlorobutadiene	5/1/2012	4/30/2014	UT
Isopropylbenzene	5/1/2012	4/30/2014	UT
Methyl bromide (Bromomethane)	5/1/2012	4/30/2014	UT
Methyl chloride (Chloromethane)	5/1/2012	4/30/2014	UT
Methyl tert-butyl ether (MTBE)	5/1/2012	4/30/2014	UT
Methylene chloride (Dichloromethane)	5/1/2012	4/30/2014	UT
m-Xylene	5/1/2012	4/30/2014	UT
Naphthalene	5/1/2012	4/30/2014	UT
n-Butylbenzene	5/1/2012	4/30/2014	UT
n-Propylbenzene	5/1/2012	4/30/2014	UT
o-Xylene	5/1/2012	4/30/2014	UT
p-Xylene	5/1/2012	4/30/2014	UT
sec-Butylbenzene	5/1/2012	4/30/2014	UT

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	Start Date	Expires	AB
Program/Matrix: ***RCRA (Non Potable Water)***			
Styrene	5/1/2012	4/30/2014	UT
tert-Butylbenzene	5/1/2012	4/30/2014	UT
Tetrachloroethylene (Perchloroethylene)	5/1/2012	4/30/2014	UT
Toluene	5/1/2012	4/30/2014	UT
trans-1,2-Dichloroethylene	5/1/2012	4/30/2014	UT
trans-1,3-Dichloropropylene	5/1/2012	4/30/2014	UT
Trichloroethene (Trichloroethylene)	5/1/2012	4/30/2014	UT
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	5/1/2012	4/30/2014	UT
Vinyl acetate	5/1/2012	4/30/2014	UT
Vinyl chloride	5/1/2012	4/30/2014	UT
Xylene (total)	5/1/2012	4/30/2014	UT
Method EPA 8270C			
1,2,4-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2-Dichlorobenzene (o-Dichlorobenzene)	5/1/2012	4/30/2014	UT
1,3-Dichlorobenzene	5/1/2012	4/30/2014	UT
1,4-Dichlorobenzene	5/1/2012	4/30/2014	UT
2,4,5-Trichlorophenol	5/1/2012	4/30/2014	UT
2,4,6-Trichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dimethylphenol	5/1/2012	4/30/2014	UT
2,4-Dinitrophenol	5/1/2012	4/30/2014	UT
2,4-Dinitrotoluene (2,4-DNT)	5/1/2012	4/30/2014	UT
2,6-Dinitrotoluene (2,6-DNT)	5/1/2012	4/30/2014	UT
2-Chloronaphthalene	5/1/2012	4/30/2014	UT
2-Chlorophenol	5/1/2012	4/30/2014	UT
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	5/1/2012	4/30/2014	UT
2-Methylnaphthalene	5/1/2012	4/30/2014	UT
2-Methylphenol (o-Cresol)	5/1/2012	4/30/2014	UT
2-Nitroaniline	5/1/2012	4/30/2014	UT
2-Nitrophenol	5/1/2012	4/30/2014	UT
3,3'-Dichlorobenzidine	5/1/2012	4/30/2014	UT
3-Methylphenol (m-Cresol)	5/1/2012	4/30/2014	UT
3-Nitroaniline	5/1/2012	4/30/2014	UT
4-Bromophenyl phenyl ether	5/1/2012	4/30/2014	UT
4-Chloro-3-methylphenol	5/1/2012	4/30/2014	UT
4-Chloroaniline	5/1/2012	4/30/2014	UT
4-Chlorophenyl phenylether	5/1/2012	4/30/2014	UT
4-Methylphenol (p-Cresol)	5/1/2012	4/30/2014	UT
4-Nitroaniline	5/1/2012	4/30/2014	UT
4-Nitrophenol	5/1/2012	4/30/2014	UT
Acenaphthene	5/1/2012	4/30/2014	UT
Acenaphthylene	5/1/2012	4/30/2014	UT
Anthracene	5/1/2012	4/30/2014	UT
Azobenzene (1,2-Diphenylhydrazine)	5/1/2012	4/30/2014	UT
Benzo(a)anthracene	5/1/2012	4/30/2014	UT
Benzo(a)pyrene	5/1/2012	4/30/2014	UT
Benzo(b)fluoranthene	5/1/2012	4/30/2014	UT
Benzo(g,h,i)perylene	5/1/2012	4/30/2014	UT

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	Start Date	Expires	AB
Program/Matrix: ***RCRA (Non Potable Water)***			
Benzo(k)fluoranthene	5/1/2012	4/30/2014	UT
Benzoic acid	5/1/2012	4/30/2014	UT
Benzyl alcohol	5/1/2012	4/30/2014	UT
bis(2-Chloroethoxy)methane	5/1/2012	4/30/2014	UT
bis(2-Chloroethyl) ether	5/1/2012	4/30/2014	UT
bis(2-Chloroisopropyl) ether	5/1/2012	4/30/2014	UT
bis(2-Ethylhexyl) phthalate (DEHP)	5/1/2012	4/30/2014	UT
Butyl benzyl phthalate	5/1/2012	4/30/2014	UT
Chrysene	5/1/2012	4/30/2014	UT
Dibenz(a,h) anthracene	5/1/2012	4/30/2014	UT
Dibenzofuran	5/1/2012	4/30/2014	UT
Diethyl phthalate	5/1/2012	4/30/2014	UT
Dimethyl phthalate	5/1/2012	4/30/2014	UT
Di-n-butyl phthalate	5/1/2012	4/30/2014	UT
Di-n-octyl phthalate	5/1/2012	4/30/2014	UT
Fluoranthene	5/1/2012	4/30/2014	UT
Fluorene	5/1/2012	4/30/2014	UT
Hexachlorobenzene	5/1/2012	4/30/2014	UT
Hexachlorobutadiene	5/1/2012	4/30/2014	UT
Hexachlorocyclopentadiene	5/1/2012	4/30/2014	UT
Hexachloroethane	5/1/2012	4/30/2014	UT
Indeno(1,2,3-cd) pyrene	5/1/2012	4/30/2014	UT
Isophorone	5/1/2012	4/30/2014	UT
Naphthalene	5/1/2012	4/30/2014	UT
Nitrobenzene	5/1/2012	4/30/2014	UT
n-Nitrosodimethylamine	5/1/2012	4/30/2014	UT
n-Nitrosodi-n-propylamine	5/1/2012	4/30/2014	UT
n-Nitrosodiphenylamine	5/1/2012	4/30/2014	UT
Pentachlorophenol	5/1/2012	4/30/2014	UT
Phenanthrene	5/1/2012	4/30/2014	UT
Phenol	5/1/2012	4/30/2014	UT
Pyrene	5/1/2012	4/30/2014	UT
Method EPA 9012B			
Amenable cyanide	5/1/2012	4/30/2014	UT
Total cyanide	5/1/2012	4/30/2014	UT
Method EPA 9040C			
pH	5/1/2012	4/30/2014	UT
Method EPA 9070A			
Oil & Grease	5/1/2012	4/30/2014	UT
Method EPA 9310			
Gross alpha-beta	5/1/2012	4/30/2014	UT
Method EPA 9315			
Total alpha radium	5/1/2012	4/30/2014	UT
Method EPA 9320			
Radium-228	5/1/2012	4/30/2014	UT
Method SM 4500-CN⁻ C-1999			
Total cyanide	5/1/2013	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Non Potable Water)***			
Method SM 4500-CN^- E-1999			
Total cyanide	5/1/2013	4/30/2014	UT
Method SM 4500-CN^- I			
Weak Acid Dissociable Cyanide	5/1/2013	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
Method EPA 1010A			
Ignitability	5/1/2012	4/30/2014	UT
Method EPA 1311			
Toxicity Characteristic Leaching Procedure Metals	5/1/2012	4/30/2014	UT
Toxicity Characteristic Leaching Procedure Semi-Volatiles	5/1/2012	4/30/2014	UT
Toxicity Characteristic Leaching Procedure Volatiles	5/1/2012	4/30/2014	UT
Method EPA 1312			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3050B			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3051A			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3052			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3060A			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3540C			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3546			
Preparation/Extraction	5/1/2013	4/30/2014	UT
Method EPA 3550C			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 3580A			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 5035			
Preparation/Extraction	5/1/2012	4/30/2014	UT
Method EPA 6010B			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Boron	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Calcium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Iron	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Lithium	5/1/2012	4/30/2014	UT
Magnesium	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Phosphorus, total	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
Potassium	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silica as SiO2	5/1/2012	4/30/2014	UT
Silicon	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Sodium	5/1/2012	4/30/2014	UT
Strontium	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Tin	5/1/2012	4/30/2014	UT
Titanium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 6020			
Aluminum	5/1/2012	4/30/2014	UT
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Cobalt	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Molybdenum	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Uranium	5/1/2012	4/30/2014	UT
Vanadium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 7196A			
Chromium VI	5/1/2012	4/30/2014	UT
Method EPA 7471A			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 7473			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 8015D			
Diesel range organics (DRO)	5/1/2012	4/30/2014	UT
Gasoline range organics (GRO)	5/1/2012	4/30/2014	UT
Method EPA 8021B			
Benzene	5/1/2012	4/30/2014	UT
Ethylbenzene	5/1/2012	4/30/2014	UT
m-Xylene	5/1/2012	4/30/2014	UT
o-Xylene	5/1/2012	4/30/2014	UT
p-Xylene	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
Toluene	5/1/2012	4/30/2014	UT
Xylene (total)	5/1/2012	4/30/2014	UT
Method EPA 8260B			
1,1,1,2-Tetrachloroethane	5/1/2012	4/30/2014	UT
1,1,1-Trichloroethane	5/1/2012	4/30/2014	UT
1,1,2,2-Tetrachloroethane	5/1/2012	4/30/2014	UT
1,1,2-Trichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethane	5/1/2012	4/30/2014	UT
1,1-Dichloroethylene	5/1/2012	4/30/2014	UT
1,1-Dichloropropene	5/1/2012	4/30/2014	UT
1,2,3-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2,3-Trichloropropane	5/1/2012	4/30/2014	UT
1,2,4-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2,4-Trimethylbenzene	5/1/2012	4/30/2014	UT
1,2-Dibromo-3-chloropropane (DBCP)	5/1/2012	4/30/2014	UT
1,2-Dibromoethane (EDB, Ethylene dibromide)	5/1/2012	4/30/2014	UT
1,2-Dichlorobenzene (o-Dichlorobenzene)	5/1/2012	4/30/2014	UT
1,2-Dichloroethane (Ethylene dichloride)	5/1/2012	4/30/2014	UT
1,2-Dichloropropane	5/1/2012	4/30/2014	UT
1,3,5-Trimethylbenzene	5/1/2012	4/30/2014	UT
1,3-Dichlorobenzene	5/1/2012	4/30/2014	UT
1,3-Dichloropropane	5/1/2012	4/30/2014	UT
1,4-Dichlorobenzene	5/1/2012	4/30/2014	UT
2,2-Dichloropropane	5/1/2012	4/30/2014	UT
2-Butanone (Methyl ethyl ketone, MEK)	5/1/2012	4/30/2014	UT
2-Chloroethyl vinyl ether	5/1/2012	4/30/2014	UT
2-Chlorotoluene	5/1/2012	4/30/2014	UT
2-Hexanone	5/1/2012	4/30/2014	UT
4-Chlorotoluene	5/1/2012	4/30/2014	UT
4-Methyl-2-pentanone (MIBK)	5/1/2012	4/30/2014	UT
Acetone	5/1/2012	4/30/2014	UT
Acrylonitrile	5/1/2012	4/30/2014	UT
Benzene	5/1/2012	4/30/2014	UT
Bromobenzene	5/1/2012	4/30/2014	UT
Bromochloromethane	5/1/2012	4/30/2014	UT
Bromodichloromethane	5/1/2012	4/30/2014	UT
Bromoform	5/1/2012	4/30/2014	UT
Carbon disulfide	5/1/2012	4/30/2014	UT
Carbon tetrachloride	5/1/2012	4/30/2014	UT
Chlorobenzene	5/1/2012	4/30/2014	UT
Chlorodibromomethane	5/1/2012	4/30/2014	UT
Chloroethane (Ethyl chloride)	5/1/2012	4/30/2014	UT
Chloroform	5/1/2012	4/30/2014	UT
cis-1,2-Dichloroethylene	5/1/2012	4/30/2014	UT
cis-1,3-Dichloropropene	5/1/2012	4/30/2014	UT
Dibromomethane (Methylene bromide)	5/1/2012	4/30/2014	UT
Dichlorodifluoromethane (Freon-12)	5/1/2012	4/30/2014	UT
Ethylbenzene	5/1/2012	4/30/2014	UT

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	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
Hexachlorobutadiene	5/1/2012	4/30/2014	UT
Isopropylbenzene	5/1/2012	4/30/2014	UT
Methyl bromide (Bromomethane)	5/1/2012	4/30/2014	UT
Methyl chloride (Chloromethane)	5/1/2012	4/30/2014	UT
Methyl tert-butyl ether (MTBE)	5/1/2012	4/30/2014	UT
Methylene chloride (Dichloromethane)	5/1/2012	4/30/2014	UT
m-Xylene	5/1/2012	4/30/2014	UT
Naphthalene	5/1/2012	4/30/2014	UT
n-Butylbenzene	5/1/2012	4/30/2014	UT
n-Propylbenzene	5/1/2012	4/30/2014	UT
o-Xylene	5/1/2012	4/30/2014	UT
p-Xylene	5/1/2012	4/30/2014	UT
sec-Butylbenzene	5/1/2012	4/30/2014	UT
Styrene	5/1/2012	4/30/2014	UT
tert-Butylbenzene	5/1/2012	4/30/2014	UT
Tetrachloroethylene (Perchloroethylene)	5/1/2012	4/30/2014	UT
Toluene	5/1/2012	4/30/2014	UT
trans-1,2-Dichloroethylene	5/1/2012	4/30/2014	UT
trans-1,3-Dichloropropylene	5/1/2012	4/30/2014	UT
Trichloroethene (Trichloroethylene)	5/1/2012	4/30/2014	UT
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	5/1/2012	4/30/2014	UT
Vinyl acetate	5/1/2012	4/30/2014	UT
Vinyl chloride	5/1/2012	4/30/2014	UT
Xylene (total)	5/1/2012	4/30/2014	UT
Method EPA 8270C			
1,2,4-Trichlorobenzene	5/1/2012	4/30/2014	UT
1,2-Dichlorobenzene (o-Dichlorobenzene)	5/1/2012	4/30/2014	UT
1,3-Dichlorobenzene	5/1/2012	4/30/2014	UT
1,4-Dichlorobenzene	5/1/2012	4/30/2014	UT
2,4,5-Trichlorophenol	5/1/2012	4/30/2014	UT
2,4,6-Trichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dichlorophenol	5/1/2012	4/30/2014	UT
2,4-Dimethylphenol	5/1/2012	4/30/2014	UT
2,4-Dinitrophenol	5/1/2012	4/30/2014	UT
2,4-Dinitrotoluene (2,4-DNT)	5/1/2012	4/30/2014	UT
2,6-Dinitrotoluene (2,6-DNT)	5/1/2012	4/30/2014	UT
2-Chloronaphthalene	5/1/2012	4/30/2014	UT
2-Chlorophenol	5/1/2012	4/30/2014	UT
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	5/1/2012	4/30/2014	UT
2-Methylnaphthalene	5/1/2012	4/30/2014	UT
2-Methylphenol (o-Cresol)	5/1/2012	4/30/2014	UT
2-Nitroaniline	5/1/2012	4/30/2014	UT
2-Nitrophenol	5/1/2012	4/30/2014	UT
3,3'-Dichlorobenzidine	5/1/2012	4/30/2014	UT
3-Methylphenol (m-Cresol)	5/1/2012	4/30/2014	UT
3-Nitroaniline	5/1/2012	4/30/2014	UT
4-Bromophenyl phenyl ether	5/1/2012	4/30/2014	UT
4-Chloro-3-methylphenol	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
4-Chloroaniline	5/1/2012	4/30/2014	UT
4-Chlorophenyl phenylether	5/1/2012	4/30/2014	UT
4-Methylphenol (p-Cresol)	5/1/2012	4/30/2014	UT
4-Nitroaniline	5/1/2012	4/30/2014	UT
4-Nitrophenol	5/1/2012	4/30/2014	UT
Acenaphthene	5/1/2012	4/30/2014	UT
Acenaphthylene	5/1/2012	4/30/2014	UT
Anthracene	5/1/2012	4/30/2014	UT
Azobenzene (1,2-Diphenylhydrazine)	5/1/2012	4/30/2014	UT
Benzo(a)anthracene	5/1/2012	4/30/2014	UT
Benzo(a)pyrene	5/1/2012	4/30/2014	UT
Benzo(b)fluoranthene	5/1/2012	4/30/2014	UT
Benzo(g,h,i)perylene	5/1/2012	4/30/2014	UT
Benzo(k)fluoranthene	5/1/2012	4/30/2014	UT
Benzoic acid	5/1/2012	4/30/2014	UT
Benzyl alcohol	5/1/2012	4/30/2014	UT
bis(2-Chloroethoxy)methane	5/1/2012	4/30/2014	UT
bis(2-Chloroethyl) ether	5/1/2012	4/30/2014	UT
bis(2-Chloroisopropyl) ether	5/1/2012	4/30/2014	UT
bis(2-Ethylhexyl) phthalate (DEHP)	5/1/2012	4/30/2014	UT
Butyl benzyl phthalate	5/1/2012	4/30/2014	UT
Chrysene	5/1/2012	4/30/2014	UT
Dibenz(a,h) anthracene	5/1/2012	4/30/2014	UT
Dibenzofuran	5/1/2012	4/30/2014	UT
Diethyl phthalate	5/1/2012	4/30/2014	UT
Dimethyl phthalate	5/1/2012	4/30/2014	UT
Di-n-butyl phthalate	5/1/2012	4/30/2014	UT
Di-n-octyl phthalate	5/1/2012	4/30/2014	UT
Fluoranthene	5/1/2012	4/30/2014	UT
Fluorene	5/1/2012	4/30/2014	UT
Hexachlorobenzene	5/1/2012	4/30/2014	UT
Hexachlorobutadiene	5/1/2012	4/30/2014	UT
Hexachlorocyclopentadiene	5/1/2012	4/30/2014	UT
Hexachloroethane	5/1/2012	4/30/2014	UT
Indeno(1,2,3-cd) pyrene	5/1/2012	4/30/2014	UT
Isophorone	5/1/2012	4/30/2014	UT
Naphthalene	5/1/2012	4/30/2014	UT
Nitrobenzene	5/1/2012	4/30/2014	UT
n-Nitrosodimethylamine	5/1/2012	4/30/2014	UT
n-Nitrosodi-n-propylamine	5/1/2012	4/30/2014	UT
n-Nitrosodiphenylamine	5/1/2012	4/30/2014	UT
Pentachlorophenol	5/1/2012	4/30/2014	UT
Phenanthrene	5/1/2012	4/30/2014	UT
Phenol	5/1/2012	4/30/2014	UT
Pyrene	5/1/2012	4/30/2014	UT
Method EPA 9012B			
Amenable cyanide	5/1/2012	4/30/2014	UT
Total cyanide	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***			
Method EPA 903.1			
Radium-226	5/1/2012	4/30/2014	UT
Method EPA 9045D			
pH	5/1/2012	4/30/2014	UT
Method EPA 9071B			
Oil & Grease	5/1/2012	4/30/2014	UT
Method EPA 9310			
Gross alpha-beta	5/1/2012	4/30/2014	UT
Method EPA 9315			
Total alpha radium	5/1/2012	4/30/2014	UT
Method EPA 9320			
Radium-228	5/1/2012	4/30/2014	UT
Method SM 4500-CN^- C-1999			
Total cyanide	5/1/2013	4/30/2014	UT
Method SM 4500-CN^- E-1999			
Total cyanide	5/1/2013	4/30/2014	UT
Method SM 4500-CN^- I			
Weak Acid Dissociable Cyanide	5/1/2013	4/30/2014	UT

ACZ Laboratories, Inc.

Program/Matrix: ***SDWA (Potable Water)***

	Start Date	Expires	AB
Method EPA 180.1			
Turbidity	5/1/2012	4/30/2014	UT
Method EPA 200.7			
Aluminum	5/1/2012	4/30/2014	UT
Calcium	5/1/2012	4/30/2014	UT
Iron	5/1/2012	4/30/2014	UT
Magnesium	5/1/2012	4/30/2014	UT
Manganese	5/1/2012	4/30/2014	UT
Silica as SiO2	5/1/2012	4/30/2014	UT
Sodium	5/1/2012	4/30/2014	UT
Strontium	5/1/2012	4/30/2014	UT
Zinc	5/1/2012	4/30/2014	UT
Method EPA 200.8			
Antimony	5/1/2012	4/30/2014	UT
Arsenic	5/1/2012	4/30/2014	UT
Barium	5/1/2012	4/30/2014	UT
Beryllium	5/1/2012	4/30/2014	UT
Cadmium	5/1/2012	4/30/2014	UT
Chromium	5/1/2012	4/30/2014	UT
Copper	5/1/2012	4/30/2014	UT
Lead	5/1/2012	4/30/2014	UT
Nickel	5/1/2012	4/30/2014	UT
Selenium	5/1/2012	4/30/2014	UT
Silver	5/1/2012	4/30/2014	UT
Thallium	5/1/2012	4/30/2014	UT
Uranium	5/1/2012	4/30/2014	UT
Method EPA 245.1			
Mercury	5/1/2012	4/30/2014	UT
Method EPA 300.0			
Bromide	5/1/2012	4/30/2014	UT
Chloride	5/1/2012	4/30/2014	UT
Fluoride	5/1/2012	4/30/2014	UT
Sulfate	5/1/2012	4/30/2014	UT
Method EPA 335.4			
Cyanide	5/1/2012	4/30/2014	UT
Method EPA 353.2			
Nitrate as N	5/1/2012	4/30/2014	UT
Nitrate-nitrite	5/1/2012	4/30/2014	UT
Nitrite as N	5/1/2012	4/30/2014	UT
Method EPA 900.0			
Gross-alpha	5/1/2012	4/30/2014	UT
Gross-beta	5/1/2012	4/30/2014	UT
Method EPA 903			
Radium-226	5/1/2012	4/30/2014	UT

ACZ Laboratories, Inc.

	Start Date	Expires	AB
Program/Matrix: ***SDWA (Potable Water)***			
Total alpha radium	11/1/2012	4/30/2014	UT
Method EPA 903.1			
Radium-226	5/1/2012	4/30/2014	UT
Method EPA 904			
Radium-228	5/1/2012	4/30/2014	UT
Method SM 2320 B			
Alkalinity as CaCO3	5/1/2012	4/30/2014	UT
Method SM 2340 B			
Total hardness as CaCO3	5/1/2012	4/30/2014	UT
Method SM 2510 B			
Conductivity	5/1/2012	4/30/2014	UT
Method SM 2540 C			
Residue-filterable (TDS)	5/1/2012	4/30/2014	UT
Method SM 4500-F^- C			
Fluoride	5/1/2012	4/30/2014	UT
Method SM 4500-H+ B			
pH	5/1/2012	4/30/2014	UT
Method SM 5310 B			
Total organic carbon	5/1/2012	4/30/2014	UT

The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

ATTACHMENT 2

GEOSYSTEMS REPORT ON THIN SECTION AND X-RAY DIFFRACTION ANALYSES, LISBON VALLEY PROJECT

THIN SECTION AND X-RAY DIFFRACTION ANALYSES LISBON VALLEY PROJECT SAN JUAN COUNTY, UTAH

Report Prepared For:

Ms. Susan Wyman
Whetstone Associates
104 W. Ruby Avenue
Gunnison, Colorado
81230

February 19, 2014

GeoSystems *LLP*
1410 Stonehollow Drive
Kingwood, Texas 77339
281-358-2662

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GeoSystems *LLP*

1410 Stonehollow Drive

Kingwood, Texas 77339

281-358-2662

THIN SECTION AND X-RAY DIFFRACTION ANALYSES LISBON VALLEY PROJECT SAN JUAN COUNTY, UTAH

INTRODUCTION

This report presents the results of thin section (petrographic) and x-ray diffraction analyses performed on four samples from the Lisbon Valley Project, San Juan County, Utah. Sample identification is presented in Table 1.

Upon arrival at our laboratory, samples were examined with a binocular microscope, oriented with respect to bedding, stabilized in epoxy resin, cut, faced, mounted on a glass slide and ground to a thickness of approximately 30 µm. Thin sections thus prepared were examined using a Zeiss Axioskop 40 petrographic microscope equipped with an electromechanical stage assembly and Leica digital camera. Petrographic analysis of thin sections yielded information concerning rock texture, composition, cementation and macro/mesopore geometry. The results of petrographic analyses are presented in Table 2. Photomicrographs documenting salient aspects of each sample, together with descriptions, are included as a series of color plates in the back of this report.

A second portion of each sample was prepared for x-ray diffraction analysis. Samples were ground in a McCrone mill to a particle size < 10 µm. The bulk and clay fractions of each sample were analyzed using a PANalytical X'Pert Pro x-ray diffractometer (MPD goniometer in Bragg-Brentano parafocusing theta-theta configuration) equipped with a PIXcel detector (a high dynamic range -25 million counts per second per pixel row - solid state linear/point detector). Samples were scanned from 2 to 60 degrees 2-theta. Phase identification was performed using PANalytical HighScore Plus software and the digital ICDD database. Quantitative mineralogy was performed using full powder pattern - Rietveld analysis. The results of x-ray diffraction analyses are presented in Table 3.

One copy of this report has been forwarded to Ms. Susan Wyman of Whetstone Associates. GeoSystems$_{LLP}$ retains one copy of the report for possible future use in telephone conversations with authorized personnel concerning specific details related to this study. All data, interpretations and conclusions are considered highly confidential and the sole proprietorship of Whetstone Associates.

All data and conclusions are presented in good faith based upon present day technology and information provided, but no expressed or implied warranty is intended or given. GeoSystems$_{LLP}$ assumes no liability for any use made of these data or conclusions or for any results obtained from the use of GeoSystems$_{LLP}$ services and products based thereon.

Richard K. Vessell, Ph.D.
President

TABLE 1

ANALYSES PERFORMED

Lisbon Valley

Job No. G2756

SAMPLE ID	SAMPLE TYPE	SAMPLE CONDITION	FORMATION/ ZONE	TS	XRD	SEM	BEI	SPECTRAL IMAGING	SAMPLE NUMBER
CENT-14	OT	Good	Unknown	X	X				001
CENT-15	OT	Good	Unknown	X	X				002
SW-14	OT	Good	Unknown	X	X				003
SW-15	OT	Good	Unknown	X	X				004

CCP Conventional Core Plug
CCS Conventional Core Sample
SWC Percussion Sidewall Core
RSWC Rotary Sidewall Core
CT Cuttings
OT Other

TABLE 2

THIN SECTION ANALYSIS

Lisbon Valley

Job No. G2756

SAMPLE ID	LITHOLOGY	TEXTURE	GRAIN/ CRYSTAL SIZE mm	SORTING	GRAINS/ALLOCHEMS	CEMENTS/ REPLACEMENTS	POROSITY	DIAGENETIC FEATURES
CENT-14	Sandy, argillaceous limestone	Laminated argillaceous and calcareous layers. Lime layers are mudstone.	Mudstone	Poor	Detrital quartz. No identifiable allochems.	Pyrite, apatite	None	Compaction
CENT-15	Sandstone	Massive	Fine grained sandstone	Moderate	Quartz >> feldspar	Trace apatite, pyrite	Intergranular macroporosity	Possible illuviated clay rims. Inhibited quartz overgrowth development. Later stage kaolinite cement.
SW-14	Sandy limestone	Massive - lime mudstone matrix supports quartz sand grains	Mudstone	Poor	Detrital quartz. No identifiable allochems.	Pyrite, apatite	None	Compaction
SW-15	Sandstone	Vague laminar fabric	Fine grained sandstone	Moderate	Quartz >> feldspar	Trace apatite, pyrite	Intergranular macroporosity	Quartz overgrowths. Later calcite pore fill cement. Kaolinite pore fill cement.

TABLE 3

X-RAY DIFFRACTION ANALYSIS

Lisbon Valley

Job No. G2756

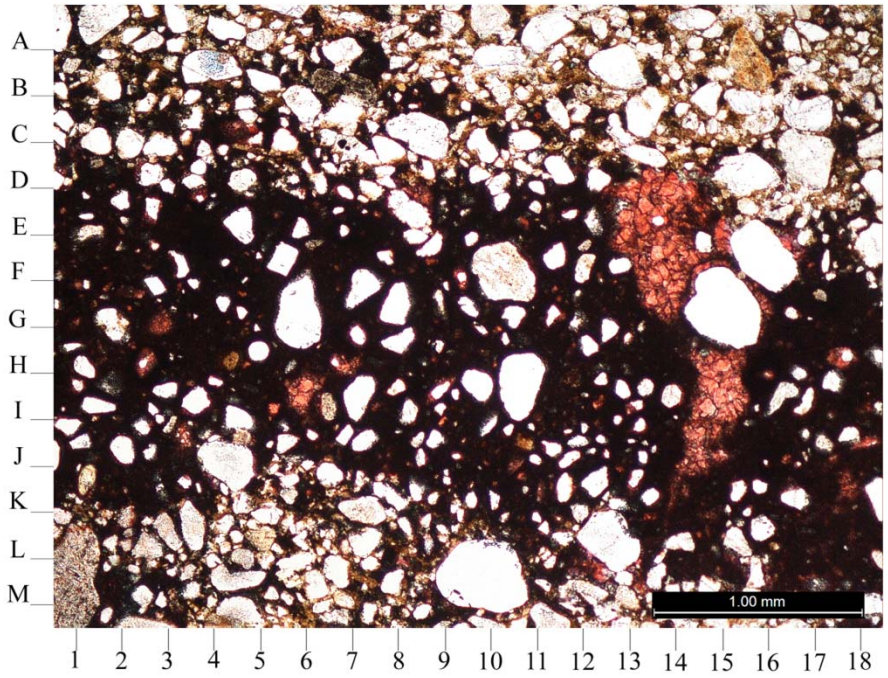
	CLAY M INERALS								OTHER MINERALS											CARBONATE MINERALS				TOTALS			
SAMPLE ID	SMECTITE	ILLITE-SMECTITE	ILLITE	KAOLINITE	CHLORITE	GLAUCONITE	REICHWEITE ORDERING	ILLITE-SMECTITE EXPANDABILITY %	QUARTZ	K-FELDSPAR	PLAGIOCLASE	PYRITE	PMARCASITE	ILMENTIE	ANHYDRITE	SPHALERITE	LAZURITE	APATITE	HEULANDITE	CALCITE	Mg-CALCITE	DOLOMITE	FERROAN DOLOMITE	TOTAL CLAY MINERALS	TOTAL OTHER MINERALS	TOTAL CARBONATES	SAMPLE NUMBER
CENT-14		1	13				R1	25	37	Tr		1						Tr		48				14	38	48	001
CENT-15		Tr	1	6			R3	15	91	Tr	Tr	Tr					2	Tr		Tr				7	93	Tr	002
SW-14		1	3		1		R1	30	18	Tr		Tr						Tr		77				5	18	77	003
SW-15		Tr	1	1			R1	25	95	Tr	1						2			Tr				2	98	Tr	004

Reichweite is the probability that in mixed layer clay, given a layer of clay A, the adjacent layer is clay B.

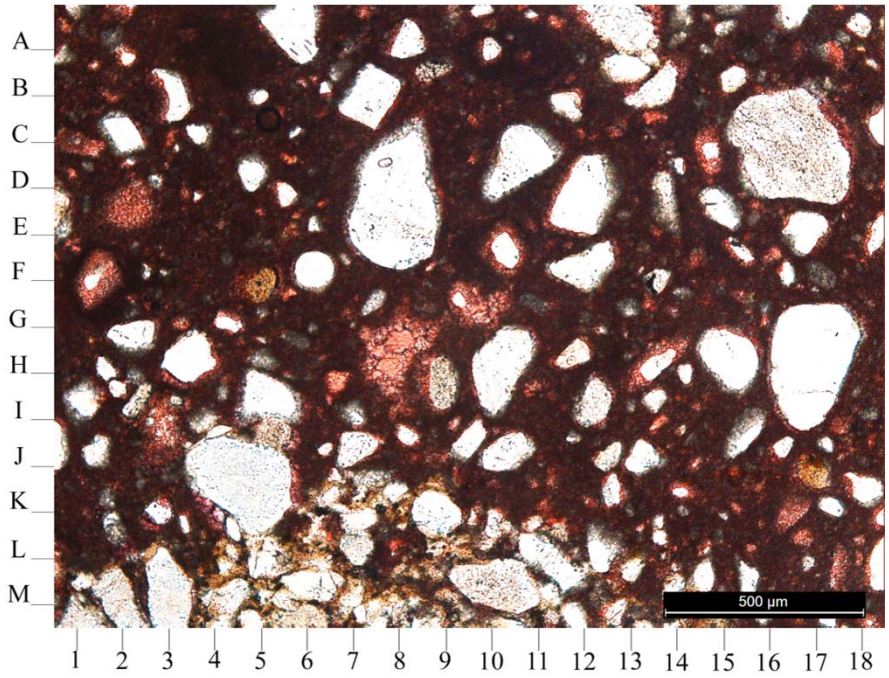
R = 0 is a random mixing of layers
R = 1 is short range ordering
R = 3 is long range ordering

PLATE 1
THIN SECTION PHOTOMICROGRAPHS
CENT-14

A



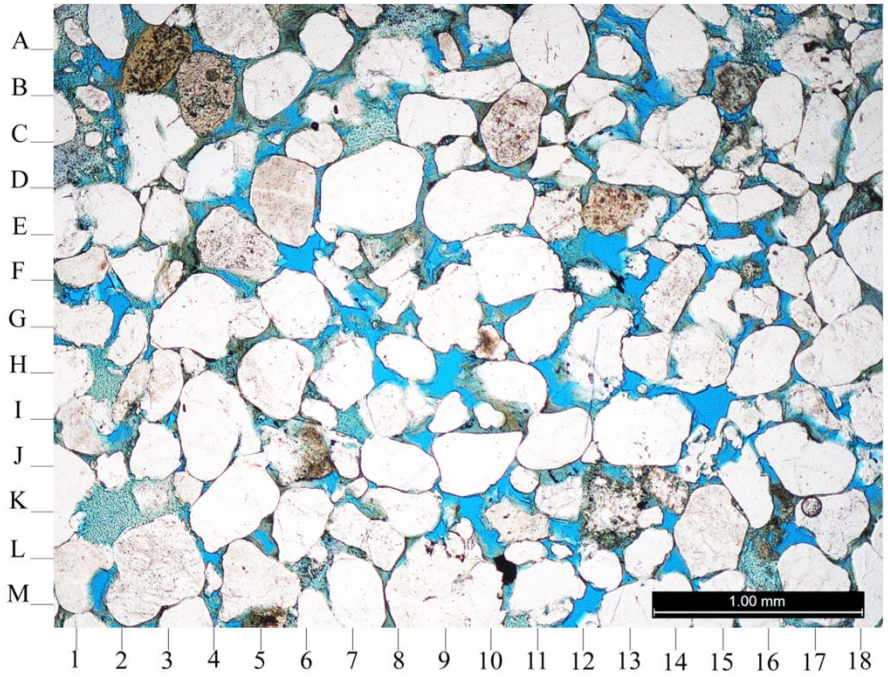
B



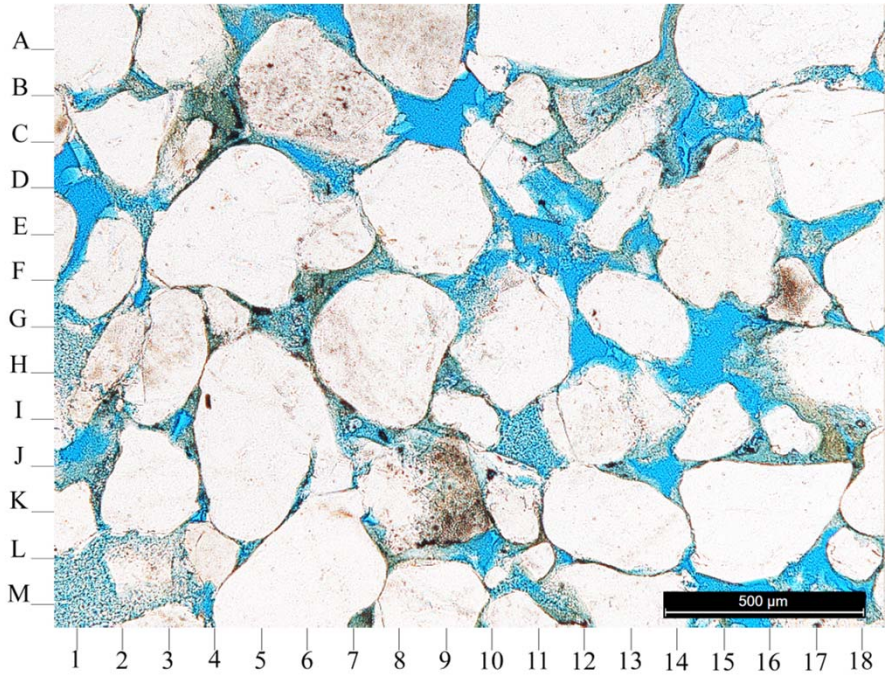
Photomicrographs display a sandy, argillaceous limestone. Layers of sandy calcareous shale (brown) alternate with sandy lime mudstone (Photo A, center). The rock is very poorly sorted. Sand grains are supported by a matrix of detrital shale (brown) and lime mud (pink). Detrital grains consist predominantly of quartz with very small amounts of potassium feldspar. Apatite grains occur in very small quantities. Minor displacive growths of pyrite (black).

PLATE 2
THIN SECTION PHOTOMICROGRAPHS
CENT-15

A



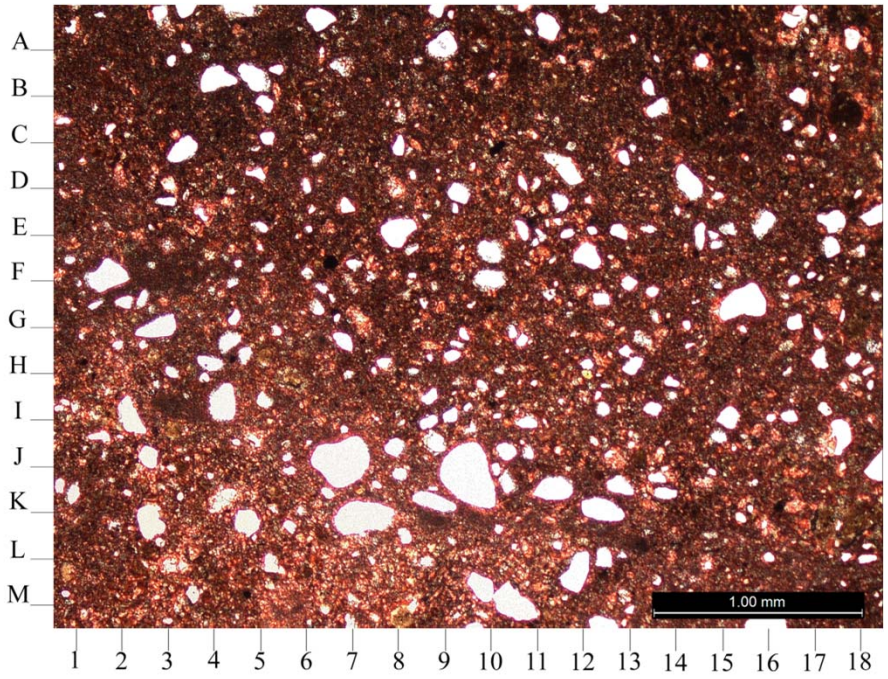
B



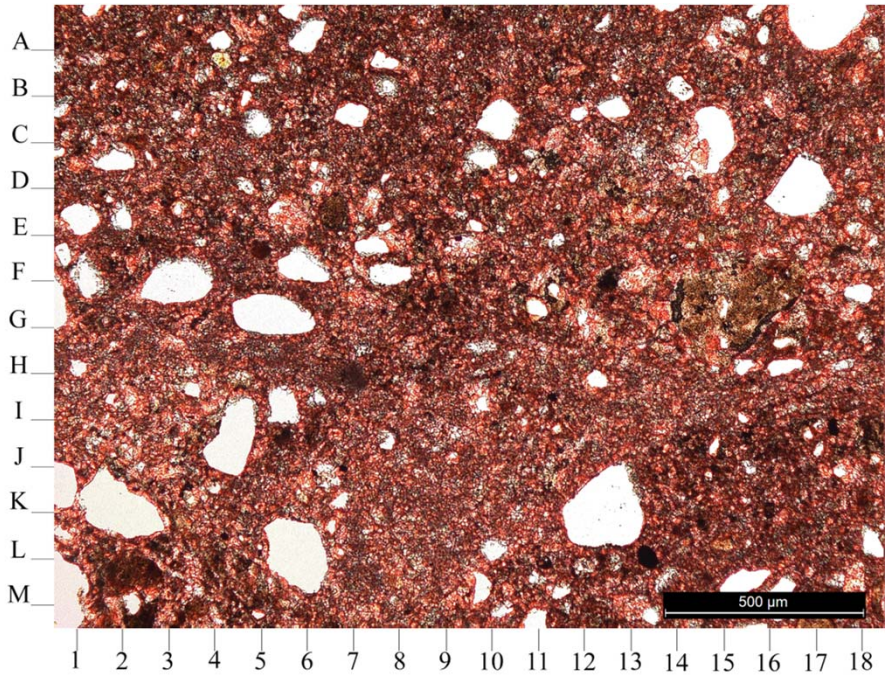
Photomicrographs display a fine grained, moderately well sorted sandstone. Framework sand grains have tangential to long contacts indicative of moderate burial compaction and grain packing adjustment. Grains are rounded to subrounded in shape. Quartz is the dominant grain constituent. Potassium and plagioclase feldspar as well as feldspathoids are present in very small quantities. Grains are coated by films of clay cement (apparently illite and illite-smectite from XRD analysis). The interiors of some pores are also filled by masses of kaolinite clay cement (blue-white area in lower left of Photo B). The grain rimming clay may be illuviated rather than authigenic. Some kaolinite appears to occur in the form of pedoliths. Intergranular porosity (blue) is well developed.

PLATE 3
THIN SECTION PHOTOMICROGRAPHS
SW-14

A



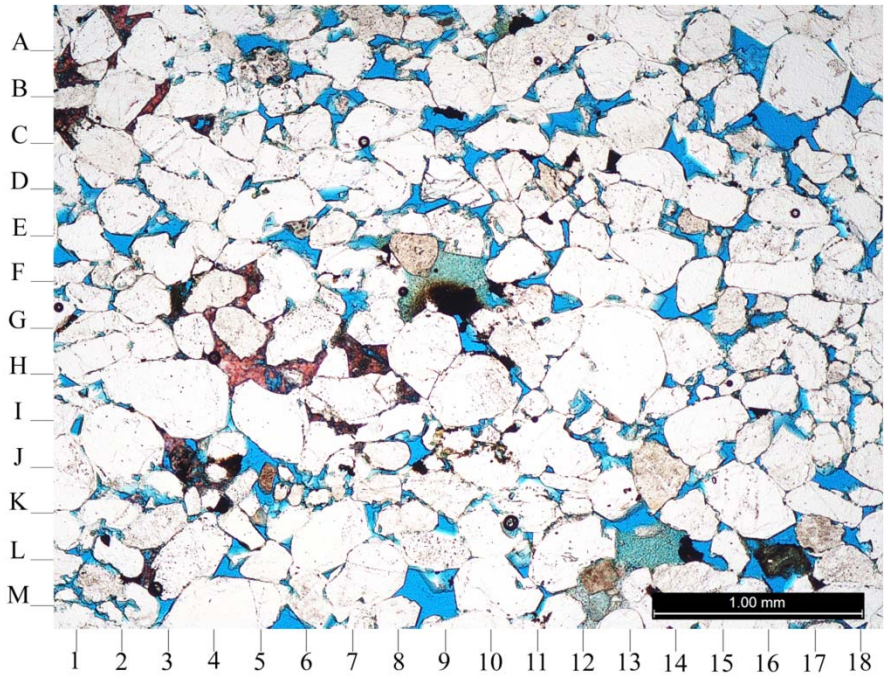
B



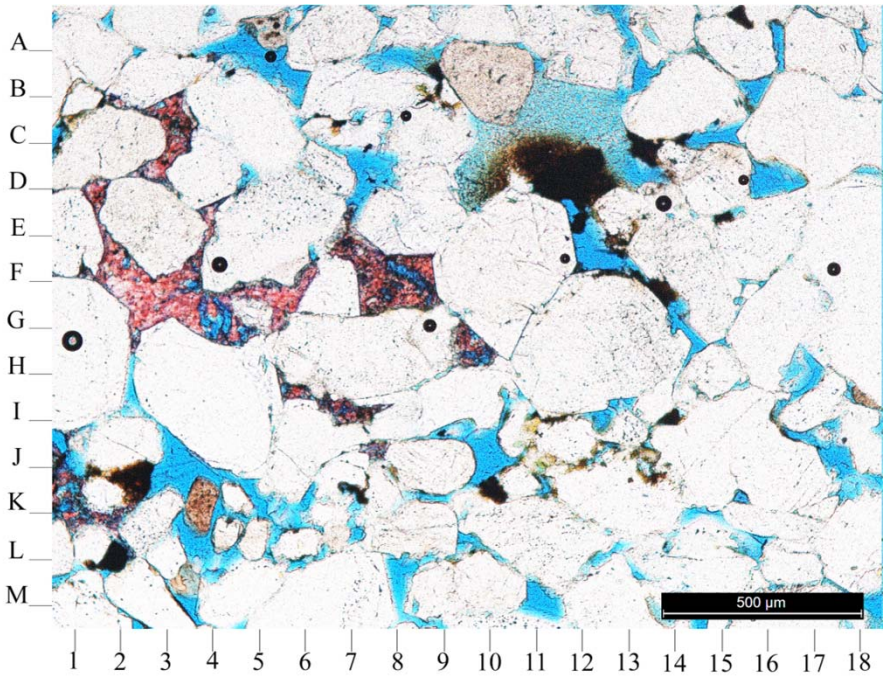
Photomicrographs display a sandy/silty limestone. The rock is very poorly sorted, matrix-rich and has a matrix supported fabric. The rock matrix of recrystallized lime mud (pink) supports scattered detrital sand and silt grains (white). Grains consist predominantly of quartz. Potassium feldspar occurs in very small quantities. The rock contains very small amounts of nodular apatite (brown, center right in Photo B). Minor displacive growths of pyrite (black).

PLATE 4
THIN SECTION PHOTOMICROGRAPHS
SW-15

A



B



Photomicrographs display a fine grained, moderately well sorted sandstone. Note variations in grain size in Photo A distinguishing faint textural lamination. Grains are somewhat finer and more angular than in CENT 15. Quartz is the most abundant detrital grain. The rocks contain small amounts of potassium and plagioclase feldspar as well as feldspathoids.

Clay rim cement apparent in CENT 15 is lacking. Unlike CENT 15, quartz cementation was not inhibited and well developed quartz overgrowths are common throughout the sample. Intergranular space (blue) is also filled by calcite cement (red). Kaolinite clay cement (blue-white speckled pore fill, upper right of Photo B) is much more poorly developed.

ATTACHMENT 3
LABORATORY ANALYTICAL DATA SHEETS

Laboratory Data Sheets Whole Rock

- Cent 14 (CE-14-S1)
- Cent 15 (CE-15-S1)
- SW-14 (SW-14-S1)
- SW-15 (SW-15-S1)

Laboratory Data Sheets MWMP

- Cent 14 (CE-14-S1)
- “Cent 16” (CE-14-S2) replicate
- Cent 15 (CE-15-S1)
- SW-14 (SW-14-S1)
- SW-15 (SW-15-S1)

Laboratory Data Sheets ABA

- Cent 14 (CE-14-S1)
- “Cent 16” (CE-14-S2) replicate
- Cent 15 (CE-15-S1)
- SW-14 (SW-14-S1)
- SW-15 (SW-15-S1)

Laboratory Data Sheets Saturated Columns Cycle 0.5

- CE-14-S1-C0.5
- CE-14-S2-C0.5 replicate
- CE-15-S1-C0.5
- SW-14-S1-C0.5
- SW-15-S1-C0.5

Laboratory Data Sheets Saturated Columns Cycle 1.0

- CE-14-S1-1.0
- CE-14-S2-1.0 replicate
- CE-15-S1-1.0
- SW-14-S1-C1.0
- SW-15-S1-C1.0

Laboratory Data Sheets Saturated Columns Cycle 2.0

- CE-14-S1-C2.0
- CE-14-S2-C2.0 replicate
- CE-15-S1-C2.0
- GEO-S1-C2.0 (blind duplicate for CE-15-S1-C2.0)
- SW-14-S1-C2.0
- SW-15-S1-C2.0

Laboratory Data Sheets Saturated Columns Cycle 3.0

- CE-14-S1-3.0
- CE-14-S2-3.0 replicate
- CE-15-S1-3.0
- SW-14-S1-C3.0
- GEO-S1-C3.0 (blind duplicate for SW-14-S1-C3.0)
- SW-15-S1-C3.0

Groundwater Samples and Head Solution

- PW-3-13-4 (get from Gaelan 4th Qtr GW monitoring)
- HS-S1
- GEO-S1-C0.5 (blind duplicate for HS-S1)

Laboratory Data Sheets QC Equipment Blanks

- COL-24-EB (CE-14-S2)
- COL-16-EB (CE-14-S1)
- COL-28-EB (SW-14-S1)
- GEO-S1-EB (blind duplicate for COL-28-EB)
- COL-26-EB (SW-15-S1)
- 3338PAP4
- GEO-BB-C1.0 (blind duplicate for 3338PAP4-C1.0)
- SAND-DI

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-14

ACZ Sample ID: ***L17258-03***
Date Sampled: *12/05/13 00:00*
Date Received: *03/18/14*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6010B ICP	105	17800		*	mg/Kg	3	20	03/19/14 10:03	aeb
Antimony, total (3050)	M6020 ICP-MS	525	0.2	B	*	mg/Kg	0.2	1	03/18/14 19:52	scp
Arsenic, total (3050)	M6020 ICP-MS	525	2.2		*	mg/Kg	0.1	0.5	03/18/14 19:52	scp
Barium, total (3050)	M6010B ICP	105	432		*	mg/Kg	0.3	2	03/19/14 10:03	aeb
Beryllium, total (3050)	M6020 ICP-MS	525	0.68			mg/Kg	0.03	0.1	03/18/14 19:52	scp
Boron, total (3050)	M6010B ICP	105	12		*	mg/Kg	1	5	03/19/14 11:31	aeb
Cadmium, total (3050)	M6020 ICP-MS	525	12.50			mg/Kg	0.05	0.3	03/18/14 19:52	scp
Calcium, total (3050)	M6010B ICP	105	31800		*	mg/Kg	10	50	03/19/14 10:03	aeb
Chromium, total (3050)	M6020 ICP-MS	525	5.3			mg/Kg	0.3	1	03/18/14 19:52	scp
Copper, total (3050)	M6010B ICP	105	79			mg/Kg	1	5	03/19/14 10:03	aeb
Iron, total (3050)	M6010B ICP	105	10800		*	mg/Kg	2	5	03/19/14 10:03	aeb
Lead, total (3050)	M6020 ICP-MS	525	9.56		*	mg/Kg	0.05	0.3	03/18/14 19:52	scp
Magnesium, total (3050)	M6010B ICP	105	3810		*	mg/Kg	20	100	03/19/14 10:03	aeb
Manganese, total (3050)	M6010B ICP	105	217			mg/Kg	0.5	3	03/19/14 10:03	aeb
Mercury by Direct Combustion AA	M7473	1	28	H	*	ng/g	1.9	9.5	03/19/14 15:23	mfm
Molybdenum, total (3050)	M6010B ICP	105		U		mg/Kg	2	10	03/19/14 10:03	aeb
Nickel, total (3050)	M6010B ICP	105	4			mg/Kg	0.8	4	03/19/14 10:03	aeb
Phosphorus, total (3050)	M6010B ICP	105	120		*	mg/Kg	10	50	03/19/14 10:03	aeb
Potassium, total (3050)	M6010B ICP	105	9690		*	mg/Kg	20	100	03/19/14 10:03	aeb
Selenium, total (3050)	M6020 ICP-MS	525	0.24		*	mg/Kg	0.05	0.1	03/18/14 19:52	scp
Silver, total (3050)	M6020 ICP-MS	525	0.11		*	mg/Kg	0.03	0.1	03/18/14 19:52	scp
Strontium, total (3050)	M6010B ICP	105	97.8			mg/Kg	0.5	3	03/19/14 10:03	aeb
Thallium, total (3050)	M6020 ICP-MS	525	0.39			mg/Kg	0.05	0.3	03/18/14 19:52	scp
Uranium, total (3050)	M6020 ICP-MS	525	0.36			mg/Kg	0.05	0.3	03/18/14 19:52	scp
Vanadium, total (3050)	M6010B ICP	105	14.3			mg/Kg	0.5	3	03/19/14 10:03	aeb
Zinc, total (3050)	M6010B ICP	105	48			mg/Kg	1	5	03/19/14 10:03	aeb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	1	95.9		*	%	0.1	0.5	03/19/14 1:24	brd

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								03/18/14 9:40	cdb
Digestion - Hot Plate	M3050B ICP								03/18/14 15:36	cdb
Digestion - Hot Plate	M3050B ICP-MS								03/18/14 15:36	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-15

ACZ Sample ID: ***L17258-04***
Date Sampled: *12/05/13 00:00*
Date Received: *03/18/14*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6010B ICP	101	4680		*	mg/Kg	3	20	03/19/14 10:12	aeb
Antimony, total (3050)	M6020 ICP-MS	505		U	*	mg/Kg	0.2	1	03/18/14 19:56	scp
Arsenic, total (3050)	M6020 ICP-MS	505	2.2		*	mg/Kg	0.1	0.5	03/18/14 19:56	scp
Barium, total (3050)	M6010B ICP	101	13.6		*	mg/Kg	0.3	2	03/19/14 10:12	aeb
Beryllium, total (3050)	M6020 ICP-MS	505	0.12			mg/Kg	0.03	0.1	03/18/14 19:56	scp
Boron, total (3050)	M6010B ICP	101	3	B	*	mg/Kg	1	5	03/19/14 11:34	aeb
Cadmium, total (3050)	M6020 ICP-MS	505	0.11	B		mg/Kg	0.05	0.3	03/18/14 19:56	scp
Calcium, total (3050)	M6010B ICP	101	670		*	mg/Kg	10	50	03/19/14 10:12	aeb
Chromium, total (3050)	M6020 ICP-MS	505	4.3			mg/Kg	0.3	1	03/18/14 19:56	scp
Copper, total (3050)	M6010B ICP	101	40			mg/Kg	1	5	03/19/14 10:12	aeb
Iron, total (3050)	M6010B ICP	101	2440		*	mg/Kg	2	5	03/19/14 10:12	aeb
Lead, total (3050)	M6020 ICP-MS	505	2.16		*	mg/Kg	0.05	0.3	03/18/14 19:56	scp
Magnesium, total (3050)	M6010B ICP	101	490		*	mg/Kg	20	100	03/19/14 10:12	aeb
Manganese, total (3050)	M6010B ICP	101	12.3			mg/Kg	0.5	3	03/19/14 10:12	aeb
Mercury by Direct Combustion AA	M7473	1	5.33	BH	*	ng/g	1.61	8.05	03/19/14 15:30	mfm
Molybdenum, total (3050)	M6010B ICP	101		U		mg/Kg	2	10	03/19/14 10:12	aeb
Nickel, total (3050)	M6010B ICP	101	1.8	B		mg/Kg	0.8	4	03/19/14 10:12	aeb
Phosphorus, total (3050)	M6010B ICP	101	40	B	*	mg/Kg	10	50	03/19/14 10:12	aeb
Potassium, total (3050)	M6010B ICP	101	850		*	mg/Kg	20	100	03/19/14 10:12	aeb
Selenium, total (3050)	M6020 ICP-MS	505	0.15		*	mg/Kg	0.05	0.1	03/18/14 19:56	scp
Silver, total (3050)	M6020 ICP-MS	505	0.08	B	*	mg/Kg	0.03	0.1	03/18/14 19:56	scp
Strontium, total (3050)	M6010B ICP	101	14.6			mg/Kg	0.5	3	03/19/14 10:12	aeb
Thallium, total (3050)	M6020 ICP-MS	505		U		mg/Kg	0.05	0.3	03/18/14 19:56	scp
Uranium, total (3050)	M6020 ICP-MS	505	0.38			mg/Kg	0.05	0.3	03/18/14 19:56	scp
Vanadium, total (3050)	M6010B ICP	101	12.5			mg/Kg	0.5	3	03/19/14 10:12	aeb
Zinc, total (3050)	M6010B ICP	101	10			mg/Kg	1	5	03/19/14 10:12	aeb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	1	99.6		*	%	0.1	0.5	03/19/14 5:12	brd

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								03/18/14 10:00	cdb
Digestion - Hot Plate	M3050B ICP								03/18/14 15:59	cdb
Digestion - Hot Plate	M3050B ICP-MS								03/18/14 15:59	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14

ACZ Sample ID: ***L17258-01***
Date Sampled: *12/05/13 00:00*
Date Received: *03/18/14*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6010B ICP	103	14600		*	mg/Kg	3	20	03/19/14 9:50	aeb
Antimony, total (3050)	M6020 ICP-MS	515		U	*	mg/Kg	0.2	1	03/18/14 19:32	scp
Arsenic, total (3050)	M6020 ICP-MS	515	1.6		*	mg/Kg	0.1	0.5	03/18/14 19:32	scp
Barium, total (3050)	M6010B ICP	103	361		*	mg/Kg	0.3	2	03/19/14 9:50	aeb
Beryllium, total (3050)	M6020 ICP-MS	515	0.46			mg/Kg	0.03	0.1	03/18/14 19:32	scp
Boron, total (3050)	M6010B ICP	515	11	B	*	mg/Kg	5	30	03/19/14 11:19	aeb
Cadmium, total (3050)	M6020 ICP-MS	515	0.73			mg/Kg	0.05	0.3	03/18/14 19:32	scp
Calcium, total (3050)	M6010B ICP	515	163000		*	mg/Kg	50	300	03/19/14 11:19	aeb
Chromium, total (3050)	M6020 ICP-MS	515	7.2			mg/Kg	0.3	1	03/18/14 19:32	scp
Copper, total (3050)	M6010B ICP	103	10			mg/Kg	1	5	03/19/14 9:50	aeb
Iron, total (3050)	M6010B ICP	103	8180		*	mg/Kg	2	5	03/19/14 9:50	aeb
Lead, total (3050)	M6020 ICP-MS	515	6.90		*	mg/Kg	0.05	0.3	03/18/14 19:32	scp
Magnesium, total (3050)	M6010B ICP	103	3200		*	mg/Kg	20	100	03/19/14 9:50	aeb
Manganese, total (3050)	M6010B ICP	103	366			mg/Kg	0.5	3	03/19/14 9:50	aeb
Mercury by Direct Combustion AA	M7473	1	12.8	H	*	ng/g	1.93	9.65	03/19/14 14:55	mfm
Molybdenum, total (3050)	M6010B ICP	103		U		mg/Kg	2	10	03/19/14 9:50	aeb
Nickel, total (3050)	M6010B ICP	103	3.6	B		mg/Kg	0.8	4	03/19/14 9:50	aeb
Phosphorus, total (3050)	M6010B ICP	103	90		*	mg/Kg	10	50	03/19/14 9:50	aeb
Potassium, total (3050)	M6010B ICP	103	8180		*	mg/Kg	20	100	03/19/14 9:50	aeb
Selenium, total (3050)	M6020 ICP-MS	515		U	*	mg/Kg	0.05	0.1	03/18/14 19:32	scp
Silver, total (3050)	M6020 ICP-MS	515	0.04	B	*	mg/Kg	0.03	0.1	03/18/14 19:32	scp
Strontium, total (3050)	M6010B ICP	103	158			mg/Kg	0.5	3	03/19/14 9:50	aeb
Thallium, total (3050)	M6020 ICP-MS	515	0.48			mg/Kg	0.05	0.3	03/18/14 19:32	scp
Uranium, total (3050)	M6020 ICP-MS	515	0.59			mg/Kg	0.05	0.3	03/18/14 19:32	scp
Vanadium, total (3050)	M6010B ICP	103	10.9			mg/Kg	0.5	3	03/19/14 9:50	aeb
Zinc, total (3050)	M6010B ICP	103	20			mg/Kg	1	5	03/19/14 9:50	aeb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	1	96.8		*	%	0.1	0.5	03/18/14 17:48	brd

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								03/18/14 9:00	cdb
Digestion - Hot Plate	M3050B ICP								03/18/14 13:14	cdb
Digestion - Hot Plate	M3050B ICP-MS								03/18/14 13:14	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15

ACZ Sample ID: ***L17258-02***
Date Sampled: *12/05/13 00:00*
Date Received: *03/18/14*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, total (3050)	M6010B ICP	100	1390		*	mg/Kg	3	20	03/19/14 10:00	aeb
Antimony, total (3050)	M6020 ICP-MS	500		U	*	mg/Kg	0.2	1	03/18/14 19:36	scp
Arsenic, total (3050)	M6020 ICP-MS	500	3.7		*	mg/Kg	0.1	0.5	03/18/14 19:36	scp
Barium, total (3050)	M6010B ICP	100	290		*	mg/Kg	0.3	2	03/19/14 10:00	aeb
Beryllium, total (3050)	M6020 ICP-MS	500	0.04	B		mg/Kg	0.03	0.1	03/18/14 19:36	scp
Boron, total (3050)	M6010B ICP	100		U	*	mg/Kg	1	5	03/19/14 11:28	aeb
Cadmium, total (3050)	M6020 ICP-MS	500	5.09			mg/Kg	0.05	0.3	03/18/14 19:36	scp
Calcium, total (3050)	M6010B ICP	100	2580		*	mg/Kg	10	50	03/19/14 10:00	aeb
Chromium, total (3050)	M6020 ICP-MS	500	1.5			mg/Kg	0.3	1	03/18/14 19:36	scp
Copper, total (3050)	M6010B ICP	100	91			mg/Kg	1	5	03/19/14 10:00	aeb
Iron, total (3050)	M6010B ICP	100	1120		*	mg/Kg	2	5	03/19/14 10:00	aeb
Lead, total (3050)	M6020 ICP-MS	500	22.30		*	mg/Kg	0.05	0.3	03/18/14 19:36	scp
Magnesium, total (3050)	M6010B ICP	100	180		*	mg/Kg	20	100	03/19/14 10:00	aeb
Manganese, total (3050)	M6010B ICP	100	72.7			mg/Kg	0.5	3	03/19/14 10:00	aeb
Mercury by Direct Combustion AA	M7473	1	5.86	BH	*	ng/g	1.83	9.15	03/19/14 15:09	mfm
Molybdenum, total (3050)	M6010B ICP	100		U		mg/Kg	2	10	03/19/14 10:00	aeb
Nickel, total (3050)	M6010B ICP	100		U		mg/Kg	0.8	4	03/19/14 10:00	aeb
Phosphorus, total (3050)	M6010B ICP	100	50		*	mg/Kg	10	50	03/19/14 10:00	aeb
Potassium, total (3050)	M6010B ICP	100	510		*	mg/Kg	20	100	03/19/14 10:00	aeb
Selenium, total (3050)	M6020 ICP-MS	500	0.09	B	*	mg/Kg	0.05	0.1	03/18/14 19:36	scp
Silver, total (3050)	M6020 ICP-MS	500	0.11		*	mg/Kg	0.03	0.1	03/18/14 19:36	scp
Strontium, total (3050)	M6010B ICP	100	7.2			mg/Kg	0.5	3	03/19/14 10:00	aeb
Thallium, total (3050)	M6020 ICP-MS	500	0.06	B		mg/Kg	0.05	0.3	03/18/14 19:36	scp
Uranium, total (3050)	M6020 ICP-MS	500	0.36			mg/Kg	0.05	0.3	03/18/14 19:36	scp
Vanadium, total (3050)	M6010B ICP	100	4.8			mg/Kg	0.5	3	03/19/14 10:00	aeb
Zinc, total (3050)	M6010B ICP	100	16			mg/Kg	1	5	03/19/14 10:00	aeb

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	1	99.9		*	%	0.1	0.5	03/18/14 21:36	brd

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								03/18/14 9:20	cdb
Digestion - Hot Plate	M3050B ICP-MS								03/18/14 14:25	cdb
Digestion - Hot Plate	M3050B ICP								03/18/14 14:25	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-14

ACZ Sample ID: ***L16467-03***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)								02/03/14 14:37	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	1		U		mg/L	0.03	0.2	01/31/14 14:32	aeb
Antimony (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/03/14 21:23	pmc
Arsenic (MWMT)	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/03/14 21:23	pmc
Barium (MWMT)	M6010B ICP	1	0.027			mg/L	0.003	0.02	01/31/14 14:32	aeb
Beryllium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/03/14 21:23	pmc
Cadmium (MWMT)	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	02/03/14 21:23	pmc
Calcium (MWMT)	M6010B ICP	1	72.9			mg/L	0.2	1	01/31/14 14:32	aeb
Chromium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/03/14 21:23	pmc
Copper (MWMT)	M6020 ICP-MS	1	0.0031			mg/L	0.0005	0.003	02/03/14 21:23	pmc
Iron (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.05	01/31/14 14:32	aeb
Lead (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:23	pmc
Magnesium (MWMT)	M6010B ICP	1	19.8			mg/L	0.2	1	01/31/14 14:32	aeb
Manganese (MWMT)	M6020 ICP-MS	1	0.0128		*	mg/L	0.0005	0.003	02/03/14 21:23	pmc
Mercury (MWMT)	M7470 CVAA	1		UH	*	mg/L	0.0002	0.001	01/31/14 16:04	mfm
Molybdenum (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.1	01/31/14 14:32	aeb
Nickel (MWMT)	M6010B ICP	1		U		mg/L	0.01	0.05	01/31/14 14:32	aeb
Potassium (MWMT)	M6010B ICP	1	26.6			mg/L	0.3	2	01/31/14 14:32	aeb
Selenium (MWMT)	M6020 ICP-MS	1	0.0543			mg/L	0.0001	0.0003	02/03/14 21:23	pmc
Silica (MWMT)	M6010B ICP	1	11		*	mg/L	0.4	2	01/31/14 14:32	aeb
Silver (MWMT)	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/03/14 21:23	pmc
Sodium (MWMT)	M6010B ICP	1	17.9		*	mg/L	0.3	2	01/31/14 14:32	aeb
Thallium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:23	pmc
Uranium (MWMT)	M6020 ICP-MS	1	0.0034			mg/L	0.0001	0.0005	02/03/14 21:23	pmc
Vanadium (MWMT)	M6020 ICP-MS	1	0.0008	B	*	mg/L	0.0002	0.001	02/03/14 21:23	pmc
Zinc (MWMT)	M6020 ICP-MS	1	0.004	B	*	mg/L	0.002	0.005	02/03/14 21:23	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7.1			units	0.1	0.1	01/30/14 0:00	cdb
pH measured at		1	21			C	0.1	0.1	01/30/14 0:00	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-14

ACZ Sample ID: ***L16467-03***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-12									
Dry Weight		1	3902.4			g			01/30/14 0:00	cdb
Extraction pH		1	6.04			units			01/30/14 0:00	cdb
Extraction Temperature		1	21			C	0.1	0.1	01/30/14 0:00	cdb
Extraction Time		1	28.75			hrs			01/30/14 0:00	cdb
Leachate Volume		1	3903.3			mL			01/30/14 0:00	cdb
Particle Size over 5 cm		1	0			%			01/30/14 0:00	cdb
Post Filter pH		1	7.22			units			01/30/14 0:00	cdb
Pre Filter pH		1	7.11			units			01/30/14 0:00	cdb
Retained Moisture		1	13.3			%			01/30/14 0:00	cdb
Time In		1							01/30/14 0:00	cdb
Time Out		1							01/30/14 0:00	cdb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	113		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	113		*	mg/L	2	20	02/04/14 0:00	abd
Chloride (MWMT)	M300.0 - Ion Chromatography	1	1.96	B	*	mg/L	0.5	2.5	02/03/14 13:41	tcd
Conductivity @25C (MWMT)	SM2510B	1	653		*	umhos/cm	1	10	02/04/14 10:59	abd
Fluoride (MWMT)	M300.0 - Ion Chromatography	1	1.71		*	mg/L	0.1	0.5	02/03/14 13:41	tcd
Hardness as CaCO3 (MWMT)	SM2340B - Calculation		264			mg/L	1	7	02/12/14 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	1.05		*	mg/L	0.02	0.1	01/31/14 22:30	pjb
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/03/14 17:10	bsu
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	450		*	mg/L	10	20	02/04/14 10:18	dcw
Sulfate (MWMT)	M300.0 - Ion Chromatography	10	213		*	mg/L	5	25	02/03/14 19:40	tcd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-15

ACZ Sample ID: ***L16467-04***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)								02/03/14 15:03	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	1		U		mg/L	0.03	0.2	01/31/14 14:35	aeb
Antimony (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/03/14 21:26	pmc
Arsenic (MWMT)	M6020 ICP-MS	1	0.0014			mg/L	0.0002	0.001	02/03/14 21:26	pmc
Barium (MWMT)	M6010B ICP	1	0.019	B		mg/L	0.003	0.02	01/31/14 14:35	aeb
Beryllium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/03/14 21:26	pmc
Cadmium (MWMT)	M6020 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	02/03/14 21:26	pmc
Calcium (MWMT)	M6010B ICP	1	82.3			mg/L	0.2	1	01/31/14 14:35	aeb
Chromium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/03/14 21:26	pmc
Copper (MWMT)	M6020 ICP-MS	1	0.0054			mg/L	0.0005	0.003	02/03/14 21:26	pmc
Iron (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.05	01/31/14 14:35	aeb
Lead (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:26	pmc
Magnesium (MWMT)	M6010B ICP	1	27.6			mg/L	0.2	1	01/31/14 14:35	aeb
Manganese (MWMT)	M6020 ICP-MS	1	0.1194		*	mg/L	0.0005	0.003	02/03/14 21:26	pmc
Mercury (MWMT)	M7470 CVAA	1		UH	*	mg/L	0.0002	0.001	01/31/14 16:06	mfm
Molybdenum (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.1	01/31/14 14:35	aeb
Nickel (MWMT)	M6010B ICP	1		U		mg/L	0.01	0.05	01/31/14 14:35	aeb
Potassium (MWMT)	M6010B ICP	1	12.8			mg/L	0.3	2	01/31/14 14:35	aeb
Selenium (MWMT)	M6020 ICP-MS	1	0.0674			mg/L	0.0001	0.0003	02/03/14 21:26	pmc
Silica (MWMT)	M6010B ICP	1	8.7		*	mg/L	0.4	2	01/31/14 14:35	aeb
Silver (MWMT)	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/03/14 21:26	pmc
Sodium (MWMT)	M6010B ICP	1	24.7		*	mg/L	0.3	2	01/31/14 14:35	aeb
Thallium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:26	pmc
Uranium (MWMT)	M6020 ICP-MS	1	0.0059			mg/L	0.0001	0.0005	02/03/14 21:26	pmc
Vanadium (MWMT)	M6020 ICP-MS	1	0.0025		*	mg/L	0.0002	0.001	02/03/14 21:26	pmc
Zinc (MWMT)	M6020 ICP-MS	1	0.006		*	mg/L	0.002	0.005	02/03/14 21:26	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	6.9			units	0.1	0.1	01/30/14 0:00	cdb
pH measured at		1	21			C	0.1	0.1	01/30/14 0:00	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-15

ACZ Sample ID: ***L16467-04***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-12									
Dry Weight		1	3986.8			g			01/30/14 0:00	cdb
Extraction pH		1	6.04			units			01/30/14 0:00	cdb
Extraction Temperature		1	21			C	0.1	0.1	01/30/14 0:00	cdb
Extraction Time		1	28.25			hrs			01/30/14 0:00	cdb
Leachate Volume		1	3992.6			mL			01/30/14 0:00	cdb
Particle Size over 5 cm		1	0			%			01/30/14 0:00	cdb
Post Filter pH		1	7.02			units			01/30/14 0:00	cdb
Pre Filter pH		1	6.89			units			01/30/14 0:00	cdb
Retained Moisture		1	11.8			%			01/30/14 0:00	cdb
Time In		1							01/30/14 0:00	cdb
Time Out		1							01/30/14 0:00	cdb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	64		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	64		*	mg/L	2	20	02/04/14 0:00	abd
Chloride (MWMT)	M300.0 - Ion Chromatography	1	1.63	B	*	mg/L	0.5	2.5	02/03/14 13:59	tcd
Conductivity @25C (MWMT)	SM2510B	1	747		*	umhos/cm	1	10	02/04/14 11:06	abd
Fluoride (MWMT)	M300.0 - Ion Chromatography	1	1.42		*	mg/L	0.1	0.5	02/03/14 13:59	tcd
Hardness as CaCO3 (MWMT)	SM2340B - Calculation		319			mg/L	1	7	02/12/14 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	3.38		*	mg/L	0.02	0.1	01/31/14 22:31	pjb
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	02/03/14 17:11	bsu
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	550		*	mg/L	10	20	02/04/14 10:20	dcw
Sulfate (MWMT)	M300.0 - Ion Chromatography	10	324		*	mg/L	5	25	02/03/14 19:58	tcd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-16

ACZ Sample ID: ***L16467-05***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)								02/03/14 15:30	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	1		U		mg/L	0.03	0.2	01/31/14 14:41	aeb
Antimony (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/03/14 21:30	pmc
Arsenic (MWMT)	M6020 ICP-MS	1	0.0004	B		mg/L	0.0002	0.001	02/03/14 21:30	pmc
Barium (MWMT)	M6010B ICP	1	0.028			mg/L	0.003	0.02	01/31/14 14:41	aeb
Beryllium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/03/14 21:30	pmc
Cadmium (MWMT)	M6020 ICP-MS	1	0.0005			mg/L	0.0001	0.0005	02/03/14 21:30	pmc
Calcium (MWMT)	M6010B ICP	1	74.9			mg/L	0.2	1	01/31/14 14:41	aeb
Chromium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/03/14 21:30	pmc
Copper (MWMT)	M6020 ICP-MS	1	0.0026	B		mg/L	0.0005	0.003	02/03/14 21:30	pmc
Iron (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.05	01/31/14 14:41	aeb
Lead (MWMT)	M6020 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	02/03/14 21:30	pmc
Magnesium (MWMT)	M6010B ICP	1	20.2			mg/L	0.2	1	01/31/14 14:41	aeb
Manganese (MWMT)	M6020 ICP-MS	1	0.0140		*	mg/L	0.0005	0.003	02/03/14 21:30	pmc
Mercury (MWMT)	M7470 CVAA	1		UH	*	mg/L	0.0002	0.001	01/31/14 16:08	mfm
Molybdenum (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.1	01/31/14 14:41	aeb
Nickel (MWMT)	M6010B ICP	1		U		mg/L	0.01	0.05	01/31/14 14:41	aeb
Potassium (MWMT)	M6010B ICP	1	26.4			mg/L	0.3	2	01/31/14 14:41	aeb
Selenium (MWMT)	M6020 ICP-MS	1	0.0529			mg/L	0.0001	0.0003	02/03/14 21:30	pmc
Silica (MWMT)	M6010B ICP	1	10.3		*	mg/L	0.4	2	01/31/14 14:41	aeb
Silver (MWMT)	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/03/14 21:30	pmc
Sodium (MWMT)	M6010B ICP	1	17.7		*	mg/L	0.3	2	01/31/14 14:41	aeb
Thallium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:30	pmc
Uranium (MWMT)	M6020 ICP-MS	1	0.0036			mg/L	0.0001	0.0005	02/03/14 21:30	pmc
Vanadium (MWMT)	M6020 ICP-MS	1	0.0008	B	*	mg/L	0.0002	0.001	02/03/14 21:30	pmc
Zinc (MWMT)	M6020 ICP-MS	1	0.004	B	*	mg/L	0.002	0.005	02/03/14 21:30	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7.2			units	0.1	0.1	01/30/14 0:00	cdb
pH measured at		1	21			C	0.1	0.1	01/30/14 0:00	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-16

ACZ Sample ID: ***L16467-05***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-12									
Dry Weight		1	3908.9			g			01/31/14 0:00	cdb
Extraction pH		1	6.04			units			01/31/14 0:00	cdb
Extraction Temperature		1	21			C	0.1	0.1	01/31/14 0:00	cdb
Extraction Time		1	29.25			hrs			01/31/14 0:00	cdb
Leachate Volume		1	3932.5			mL			01/31/14 0:00	cdb
Particle Size over 5 cm		1	0			%			01/31/14 0:00	cdb
Post Filter pH		1	7.3			units			01/31/14 0:00	cdb
Pre Filter pH		1	7.22			units			01/31/14 0:00	cdb
Retained Moisture		1	12.8			%			01/31/14 0:00	cdb
Time In		1							01/31/14 0:00	cdb
Time Out		1							01/31/14 0:00	cdb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	115		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	115		*	mg/L	2	20	02/04/14 0:00	abd
Chloride (MWMT)	M300.0 - Ion Chromatography	1	1.73	B	*	mg/L	0.5	2.5	02/03/14 14:17	tcd
Conductivity @25C (MWMT)	SM2510B	1	671		*	umhos/cm	1	10	02/04/14 11:13	abd
Fluoride (MWMT)	M300.0 - Ion Chromatography	1	1.70		*	mg/L	0.1	0.5	02/03/14 14:17	tcd
Hardness as CaCO3 (MWMT)	SM2340B - Calculation		270			mg/L	1	7	02/12/14 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	1.03		*	mg/L	0.02	0.1	01/31/14 22:32	pjb
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/03/14 17:12	bsu
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	460		*	mg/L	10	20	02/04/14 10:22	dcw
Sulfate (MWMT)	M300.0 - Ion Chromatography	10	220		*	mg/L	5	25	02/03/14 20:15	tcd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14

ACZ Sample ID: ***L16467-01***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)								02/03/14 12:52	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	1		U		mg/L	0.03	0.2	01/31/14 14:20	aeb
Antimony (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/03/14 21:13	pmc
Arsenic (MWMT)	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/03/14 21:13	pmc
Barium (MWMT)	M6010B ICP	1	0.042			mg/L	0.003	0.02	01/31/14 14:20	aeb
Beryllium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/03/14 21:13	pmc
Cadmium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:13	pmc
Calcium (MWMT)	M6010B ICP	1	31.3			mg/L	0.2	1	01/31/14 14:20	aeb
Chromium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/03/14 21:13	pmc
Copper (MWMT)	M6020 ICP-MS	1	0.0009	B		mg/L	0.0005	0.003	02/03/14 21:13	pmc
Iron (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.05	01/31/14 14:20	aeb
Lead (MWMT)	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/03/14 21:13	pmc
Magnesium (MWMT)	M6010B ICP	1	6.7			mg/L	0.2	1	01/31/14 14:20	aeb
Manganese (MWMT)	M6020 ICP-MS	1	0.0040		*	mg/L	0.0005	0.003	02/03/14 21:13	pmc
Mercury (MWMT)	M7470 CVAA	1		UH	*	mg/L	0.0002	0.001	01/31/14 15:55	mfm
Molybdenum (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.1	01/31/14 14:20	aeb
Nickel (MWMT)	M6010B ICP	1		U		mg/L	0.01	0.05	01/31/14 14:20	aeb
Potassium (MWMT)	M6010B ICP	1	8.4			mg/L	0.3	2	01/31/14 14:20	aeb
Selenium (MWMT)	M6020 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	02/03/14 21:13	pmc
Silica (MWMT)	M6010B ICP	1	14.7		*	mg/L	0.4	2	01/31/14 14:20	aeb
Silver (MWMT)	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/03/14 21:13	pmc
Sodium (MWMT)	M6010B ICP	1	10.2		*	mg/L	0.3	2	01/31/14 14:20	aeb
Thallium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/03/14 21:13	pmc
Uranium (MWMT)	M6020 ICP-MS	1	0.0021			mg/L	0.0001	0.0005	02/03/14 21:13	pmc
Vanadium (MWMT)	M6020 ICP-MS	1	0.0012		*	mg/L	0.0002	0.001	02/03/14 21:13	pmc
Zinc (MWMT)	M6020 ICP-MS	1	0.003	B	*	mg/L	0.002	0.005	02/03/14 21:13	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7			units	0.1	0.1	01/30/14 0:00	cdb
pH measured at		1	21			C	0.1	0.1	01/30/14 0:00	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14

ACZ Sample ID: ***L16467-01***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-12									
Dry Weight		1	3933.1			g			01/30/14 0:00	cdb
Extraction pH		1	6.04			units			01/30/14 0:00	cdb
Extraction Temperature		1	21			C	0.1	0.1	01/30/14 0:00	cdb
Extraction Time		1	27.25			hrs			01/30/14 0:00	cdb
Leachate Volume		1	3935.6			mL			01/30/14 0:00	cdb
Particle Size over 5 cm		1	0			%			01/30/14 0:00	cdb
Post Filter pH		1	7.18			units			01/30/14 0:00	cdb
Pre Filter pH		1	7			units			01/30/14 0:00	cdb
Retained Moisture		1	12.7			%			01/30/14 0:00	cdb
Time In		1							01/30/14 0:00	cdb
Time Out		1							01/30/14 0:00	cdb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	79		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	79		*	mg/L	2	20	02/04/14 0:00	abd
Chloride (MWMT)	M300.0 - Ion Chromatography	1	1.77	B	*	mg/L	0.5	2.5	02/03/14 12:29	tcd
Conductivity @25C (MWMT)	SM2510B	1	276		*	umhos/cm	1	10	02/04/14 10:43	abd
Fluoride (MWMT)	M300.0 - Ion Chromatography	1	2.01		*	mg/L	0.1	0.5	02/03/14 12:29	tcd
Hardness as CaCO3 (MWMT)	SM2340B - Calculation		106			mg/L	1	7	02/12/14 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.46		*	mg/L	0.02	0.1	01/31/14 22:26	pjb
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	02/03/14 17:13	bsu
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	180		*	mg/L	10	20	02/04/14 10:13	dcw
Sulfate (MWMT)	M300.0 - Ion Chromatography	1	53.6		*	mg/L	0.5	2.5	02/03/14 12:29	tcd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15

ACZ Sample ID: ***L16467-02***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)								02/03/14 13:45	bsu

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010B ICP	1		U		mg/L	0.03	0.2	01/31/14 14:29	aeb
Antimony (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/03/14 21:20	pmc
Arsenic (MWMT)	M6020 ICP-MS	1	0.0081			mg/L	0.0002	0.001	02/03/14 21:20	pmc
Barium (MWMT)	M6010B ICP	1	0.043			mg/L	0.003	0.02	01/31/14 14:29	aeb
Beryllium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/03/14 21:20	pmc
Cadmium (MWMT)	M6020 ICP-MS	1	0.0013			mg/L	0.0001	0.0005	02/03/14 21:20	pmc
Calcium (MWMT)	M6010B ICP	1	65.8			mg/L	0.2	1	01/31/14 14:29	aeb
Chromium (MWMT)	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/03/14 21:20	pmc
Copper (MWMT)	M6020 ICP-MS	1	0.0042			mg/L	0.0005	0.003	02/03/14 21:20	pmc
Iron (MWMT)	M6010B ICP	1		U		mg/L	0.02	0.05	01/31/14 14:29	aeb
Lead (MWMT)	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/03/14 21:20	pmc
Magnesium (MWMT)	M6010B ICP	1	7.8			mg/L	0.2	1	01/31/14 14:29	aeb
Manganese (MWMT)	M6020 ICP-MS	1	0.0039		*	mg/L	0.0005	0.003	02/03/14 21:20	pmc
Mercury (MWMT)	M7470 CVAA	1		UH	*	mg/L	0.0002	0.001	01/31/14 16:02	mfm
Molybdenum (MWMT)	M6010B ICP	1	0.05	B		mg/L	0.02	0.1	01/31/14 14:29	aeb
Nickel (MWMT)	M6010B ICP	1		U		mg/L	0.01	0.05	01/31/14 14:29	aeb
Potassium (MWMT)	M6010B ICP	1	12.4			mg/L	0.3	2	01/31/14 14:29	aeb
Selenium (MWMT)	M6020 ICP-MS	1	0.0087			mg/L	0.0001	0.0003	02/03/14 21:20	pmc
Silica (MWMT)	M6010B ICP	1	15.1		*	mg/L	0.4	2	01/31/14 14:29	aeb
Silver (MWMT)	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/03/14 21:20	pmc
Sodium (MWMT)	M6010B ICP	1	23.8		*	mg/L	0.3	2	01/31/14 14:29	aeb
Thallium (MWMT)	M6020 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	02/03/14 21:20	pmc
Uranium (MWMT)	M6020 ICP-MS	1	0.0029			mg/L	0.0001	0.0005	02/03/14 21:20	pmc
Vanadium (MWMT)	M6020 ICP-MS	1	0.0012		*	mg/L	0.0002	0.001	02/03/14 21:20	pmc
Zinc (MWMT)	M6020 ICP-MS	1	0.003	B	*	mg/L	0.002	0.005	02/03/14 21:20	pmc

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	6.7			units	0.1	0.1	01/30/14 0:00	cdb
pH measured at		1	21			C	0.1	0.1	01/30/14 0:00	cdb

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15

ACZ Sample ID: ***L16467-02***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-12									
Dry Weight		1	3996.1			g			01/30/14 0:00	cdb
Extraction pH		1	6.04			units			01/30/14 0:00	cdb
Extraction Temperature		1	21			C	0.1	0.1	01/30/14 0:00	cdb
Extraction Time		1	28			hrs			01/30/14 0:00	cdb
Leachate Volume		1	3996			mL			01/30/14 0:00	cdb
Particle Size over 5 cm		1	0			%			01/30/14 0:00	cdb
Post Filter pH		1	6.85			units			01/30/14 0:00	cdb
Pre Filter pH		1	6.72			units			01/30/14 0:00	cdb
Retained Moisture		1	11.8			%			01/30/14 0:00	cdb
Time In		1							01/30/14 0:00	cdb
Time Out		1							01/30/14 0:00	cdb

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	35		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	35		*	mg/L	2	20	02/04/14 0:00	abd
Chloride (MWMT)	M300.0 - Ion Chromatography	1	43.7		*	mg/L	0.5	2.5	02/03/14 13:05	tcd
Conductivity @25C (MWMT)	SM2510B	1	565		*	umhos/cm	1	10	02/04/14 10:50	abd
Fluoride (MWMT)	M300.0 - Ion Chromatography	1	0.38	B	*	mg/L	0.1	0.5	02/03/14 13:05	tcd
Hardness as CaCO3 (MWMT)	SM2340B - Calculation		196			mg/L	1	7	02/12/14 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	3	4.33		*	mg/L	0.06	0.3	01/31/14 22:35	pjb
Phosphorus, total (MWMT)	M365.1 - Auto Ascorbic Acid (digest)	1	0.02	B	*	mg/L	0.01	0.05	02/03/14 17:08	bsu
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	380		*	mg/L	10	20	02/04/14 10:16	dcw
Sulfate (MWMT)	M300.0 - Ion Chromatography	10	151		*	mg/L	5	25	02/03/14 19:04	tcd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-14

ACZ Sample ID: ***L16468-03***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	1	1.3		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:06	cra
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	220		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:06	cra
Acid-Base Potential (calc)	M600/2-78-054 1.3	1	218.8		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:06	cra
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1	22		*	%	0.1	0.5	02/04/14 20:47	cdb
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.06	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur HNO3 Residue		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Organic Residual		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Pyritic Sulfide		1	0.06	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Sulfate		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Total		1	0.04	B	*	%	0.01	0.1	02/04/14 0:00	cra
Total Sulfur minus Sulfate		1	0.04	B	*	%	0.01	0.1	02/04/14 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								01/22/14 10:07	tomf

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-15

ACZ Sample ID: ***L16468-04***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	1	0.9		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:09	cra
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	1		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:09	cra
Acid-Base Potential (calc)	M600/2-78-054 1.3	1	0.1		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:09	cra
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1	0.1	B	*	%	0.1	0.5	02/05/14 0:25	cdb
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.03	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur HNO3 Residue		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Organic Residual		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Pyritic Sulfide		1	0.03	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Sulfate		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Total		1	0.03	B	*	%	0.01	0.1	02/04/14 0:00	cra
Total Sulfur minus Sulfate		1	0.03	B	*	%	0.01	0.1	02/04/14 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								01/22/14 10:33	tomf

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CENT-16

ACZ Sample ID: ***L16468-05***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	1	1.3		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:12	cra
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	191		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:12	cra
Acid-Base Potential (calc)	M600/2-78-054 1.3	1	189.8		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:12	cra
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1	19.1		*	%	0.1	0.5	02/05/14 4:04	cdb
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.05	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur HNO3 Residue		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Organic Residual		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Pyritic Sulfide		1	0.05	B	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Sulfate		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Total		1	0.04	B	*	%	0.01	0.1	02/04/14 0:00	cra
Total Sulfur minus Sulfate		1	0.04	B	*	%	0.01	0.1	02/04/14 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								01/22/14 11:00	tomf

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14

ACZ Sample ID: ***L16468-01***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	1		U	*	t CaCO3/Kt	0.1	0.5	02/10/14 10:00	cra
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	654		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:00	cra
Acid-Base Potential (calc)	M600/2-78-054 1.3	1	654		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:00	cra
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1	65.4		*	%	0.1	0.5	02/04/14 9:51	cdb
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Sulfur HNO3 Residue		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Sulfur Organic Residual		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Sulfur Pyritic Sulfide		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Sulfur Sulfate		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Sulfur Total		1		U	*	%	0.01	0.1	02/03/14 0:00	cra
Total Sulfur minus Sulfate		1		U	*	%	0.01	0.1	02/03/14 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								01/22/14 9:15	tomf

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15

ACZ Sample ID: ***L16468-02***
Date Sampled: *12/05/13 00:00*
Date Received: *01/17/14*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	1		U	*	t CaCO3/Kt	0.1	0.5	02/10/14 10:03	cra
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	5		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:03	cra
Acid-Base Potential (calc)	M600/2-78-054 1.3	1	5		*	t CaCO3/Kt	0.1	0.5	02/10/14 10:03	cra
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1	0.5		*	%	0.1	0.5	02/04/14 17:08	cdb
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur HNO3 Residue		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Organic Residual		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Pyritic Sulfide		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Sulfate		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Sulfur Total		1		U	*	%	0.01	0.1	02/04/14 0:00	cra
Total Sulfur minus Sulfate		1		U	*	%	0.01	0.1	02/04/14 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								01/22/14 9:41	tomf

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C0.5

ACZ Sample ID: ***L16367-05***
Date Sampled: *01/12/14 13:23*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 9:57	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 10:14	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.03	0.2	01/16/14 12:47	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 0:41	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0005	B	*	mg/L	0.0002	0.001	01/23/14 0:41	pmc
Barium, dissolved	M6010B ICP	1	0.060			mg/L	0.003	0.02	01/16/14 12:47	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 0:41	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0010		*	mg/L	0.0001	0.0005	01/23/14 0:41	pmc
Calcium, dissolved	M6010B ICP	1	331			mg/L	0.2	1	01/16/14 12:47	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 0:41	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0016	B	*	mg/L	0.0005	0.003	01/23/14 0:41	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/16/14 12:47	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:41	pmc
Magnesium, dissolved	M6010B ICP	1	88.7			mg/L	0.2	1	01/16/14 12:47	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0821		*	mg/L	0.0005	0.003	01/23/14 0:41	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:07	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/16/14 12:47	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/16/14 12:47	jjc
Potassium, dissolved	M6010B ICP	1	56.1			mg/L	0.3	2	01/16/14 12:47	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.1844		*	mg/L	0.0001	0.0003	01/23/14 0:41	pmc
Silica, dissolved	M6010B ICP	1	8.2			mg/L	0.4	2	01/16/14 12:47	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 0:41	pmc
Sodium, dissolved	M6010B ICP	1	48.7			mg/L	0.3	2	01/16/14 12:47	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	01/23/14 0:41	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0125		*	mg/L	0.0001	0.0005	01/23/14 0:41	pmc
Uranium, total	M6020 ICP-MS	1	0.0128		*	mg/L	0.0001	0.0005	01/23/14 21:27	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 0:41	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.005		*	mg/L	0.002	0.005	01/23/14 0:41	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C0.5

ACZ Sample ID: ***L16367-05***
Date Sampled: *01/12/14 13:23*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	153		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	153		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/24/14 11:44	calc
Sum of Anions			27			meq/L	0.1	0.5	01/24/14 11:44	calc
Sum of Cations			27			meq/L	0.1	0.5	01/24/14 11:44	calc
Chloride	M300.0 - Ion Chromatography	20	32.1	B	*	mg/L	10	50	01/21/14 18:22	jlf
Conductivity @25C	SM2510B	1	2010		*	umhos/cm	1	10	01/14/14 22:22	dcw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/21/14 18:22	jlf
Hardness as CaCO3	SM2340B - Calculation		1190			mg/L	1	7	01/24/14 11:44	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 17:06	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	1	1840		*	mg/L	10	20	01/16/14 16:26	dcw
Sulfate	M300.0 - Ion Chromatography	20	1100		*	mg/L	10	50	01/21/14 18:22	jlf
TDS (calculated)	Calculation		1760			mg/L	10	50	01/24/14 11:44	calc
TDS (ratio - measured/calculated)	Calculation		1.05						01/24/14 11:44	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C0.5

ACZ Sample ID: ***L16367-01***
Date Sampled: *01/12/14 01:30*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 9:14	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 9:18	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.06	B		mg/L	0.03	0.2	01/16/14 12:28	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 0:22	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0004	B	*	mg/L	0.0002	0.001	01/23/14 0:22	pmc
Barium, dissolved	M6010B ICP	1	0.056			mg/L	0.003	0.02	01/16/14 12:28	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 0:22	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0012		*	mg/L	0.0001	0.0005	01/23/14 0:22	pmc
Calcium, dissolved	M6010B ICP	1	341			mg/L	0.2	1	01/16/14 12:28	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 0:22	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0021	B	*	mg/L	0.0005	0.003	01/23/14 0:22	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/16/14 12:28	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:22	pmc
Magnesium, dissolved	M6010B ICP	1	91			mg/L	0.2	1	01/16/14 12:28	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0863		*	mg/L	0.0005	0.003	01/23/14 0:22	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 12:53	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/16/14 12:28	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/16/14 12:28	jjc
Potassium, dissolved	M6010B ICP	1	56.7			mg/L	0.3	2	01/16/14 12:28	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.2194		*	mg/L	0.0001	0.0003	01/23/14 0:22	pmc
Silica, dissolved	M6010B ICP	1	7.7			mg/L	0.4	2	01/16/14 12:28	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 0:22	pmc
Sodium, dissolved	M6010B ICP	1	47.7			mg/L	0.3	2	01/16/14 12:28	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	01/23/14 0:22	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0116		*	mg/L	0.0001	0.0005	01/23/14 0:22	pmc
Uranium, total	M6020 ICP-MS	1	0.0121		*	mg/L	0.0001	0.0005	01/23/14 21:15	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 0:22	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.006		*	mg/L	0.002	0.005	01/23/14 0:22	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C0.5

ACZ Sample ID: ***L16367-01***
Date Sampled: *01/12/14 01:30*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	146		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	146		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/24/14 11:43	calc
Sum of Anions			28			meq/L	0.1	0.5	01/24/14 11:43	calc
Sum of Cations			28			meq/L	0.1	0.5	01/24/14 11:43	calc
Chloride	M300.0 - Ion Chromatography	10	30.6		*	mg/L	5	25	01/20/14 22:12	jlf
Conductivity @25C	SM2510B	1	2040		*	umhos/cm	1	10	01/14/14 21:37	dcw
Fluoride	M300.0 - Ion Chromatography	10		U	*	mg/L	1	5	01/20/14 22:12	jlf
Hardness as CaCO3	SM2340B - Calculation		1230			mg/L	1	7	01/24/14 11:43	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 16:59	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	1	1830		*	mg/L	10	20	01/16/14 16:15	dcw
Sulfate	M300.0 - Ion Chromatography	20	1150		*	mg/L	10	50	01/21/14 14:52	jlf
TDS (calculated)	Calculation		1810			mg/L	10	50	01/24/14 11:43	calc
TDS (ratio - measured/calculated)	Calculation		1.01						01/24/14 11:43	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C0.5

ACZ Sample ID: ***L16367-02***
Date Sampled: *01/12/14 05:45*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 9:28	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 9:32	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	2		U		mg/L	0.06	0.3	01/16/14 12:31	jjc
Antimony, dissolved	M6020 ICP-MS	2		U		mg/L	0.0008	0.004	01/23/14 0:25	pmc
Arsenic, dissolved	M6020 ICP-MS	2	0.0007	B	*	mg/L	0.0004	0.002	01/23/14 0:25	pmc
Barium, dissolved	M6010B ICP	2	0.060			mg/L	0.006	0.03	01/16/14 12:31	jjc
Beryllium, dissolved	M6020 ICP-MS	2		U		mg/L	0.0001	0.0005	01/23/14 0:25	pmc
Cadmium, dissolved	M6020 ICP-MS	2	0.0012		*	mg/L	0.0002	0.001	01/23/14 0:25	pmc
Calcium, dissolved	M6010B ICP	2	460			mg/L	0.4	2	01/16/14 12:31	jjc
Chromium, dissolved	M6020 ICP-MS	2		U		mg/L	0.001	0.004	01/23/14 0:25	pmc
Copper, dissolved	M6020 ICP-MS	2	0.002	B	*	mg/L	0.001	0.005	01/23/14 0:25	pmc
Iron, dissolved	M6010B ICP	2		U		mg/L	0.04	0.1	01/16/14 12:31	jjc
Lead, dissolved	M6020 ICP-MS	2		U		mg/L	0.0002	0.001	01/23/14 0:25	pmc
Magnesium, dissolved	M6010B ICP	2	165			mg/L	0.4	2	01/16/14 12:31	jjc
Manganese, dissolved	M6020 ICP-MS	5	0.564		*	mg/L	0.003	0.01	01/23/14 19:26	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:01	mfm
Molybdenum, dissolved	M6010B ICP	2		U		mg/L	0.04	0.2	01/16/14 12:31	jjc
Nickel, dissolved	M6010B ICP	2	0.05	B		mg/L	0.02	0.1	01/16/14 12:31	jjc
Potassium, dissolved	M6010B ICP	2	37			mg/L	0.6	3	01/16/14 12:31	jjc
Selenium, dissolved	M6020 ICP-MS	2	0.2606		*	mg/L	0.0002	0.0005	01/23/14 0:25	pmc
Silica, dissolved	M6010B ICP	2	12.5			mg/L	0.9	4	01/16/14 12:31	jjc
Silver, dissolved	M6020 ICP-MS	2		U	*	mg/L	0.0001	0.0005	01/23/14 0:25	pmc
Sodium, dissolved	M6010B ICP	2	141			mg/L	0.6	3	01/16/14 12:31	jjc
Thallium, dissolved	M6020 ICP-MS	2	0.0003	B		mg/L	0.0002	0.001	01/23/14 0:25	pmc
Uranium, dissolved	M6020 ICP-MS	2	0.1376		*	mg/L	0.0002	0.001	01/23/14 0:25	pmc
Uranium, total	M6020 ICP-MS	2	0.1727		*	mg/L	0.0002	0.001	01/23/14 21:17	pmc
Vanadium, dissolved	M6020 ICP-MS	2	0.0005	B		mg/L	0.0004	0.002	01/23/14 0:25	pmc
Zinc, dissolved	M6020 ICP-MS	2	0.018		*	mg/L	0.004	0.01	01/23/14 0:25	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C0.5

ACZ Sample ID: ***L16367-02***
Date Sampled: *01/12/14 05:45*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	308		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	308		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.2			%			01/24/14 11:43	calc
Sum of Anions			46			meq/L	0.1	0.5	01/24/14 11:43	calc
Sum of Cations			44			meq/L	0.1	0.5	01/24/14 11:43	calc
Chloride	M300.0 - Ion Chromatography	20	33.5	B	*	mg/L	10	50	01/21/14 17:29	jlf
Conductivity @25C	SM2510B	1	3000		*	umhos/cm	1	10	01/14/14 21:46	dcw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/21/14 17:29	jlf
Hardness as CaCO3	SM2340B - Calculation		1830			mg/L	1	7	01/24/14 11:43	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	23		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	01/16/14 17:01	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	5	2350		*	mg/L	50	100	01/16/14 16:18	dcw
Sulfate	M300.0 - Ion Chromatography	20	1860		*	mg/L	10	50	01/21/14 17:29	jlf
TDS (calculated)	Calculation		2890			mg/L	10	50	01/24/14 11:43	calc
TDS (ratio - measured/calculated)	Calculation		0.81						01/24/14 11:43	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C0.5

ACZ Sample ID: ***L16367-07***
Date Sampled: *01/12/14 23:20*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 10:12	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 10:42	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/16/14 12:53	jjc
Antimony, dissolved	M6020 ICP-MS	1	0.0009	B		mg/L	0.0004	0.002	01/23/14 0:51	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0007	B	*	mg/L	0.0002	0.001	01/23/14 0:51	pmc
Barium, dissolved	M6010B ICP	1	0.063			mg/L	0.003	0.02	01/16/14 12:53	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 0:51	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0003	B	*	mg/L	0.0001	0.0005	01/23/14 0:51	pmc
Calcium, dissolved	M6010B ICP	1	281			mg/L	0.2	1	01/16/14 12:53	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 0:51	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0011	B	*	mg/L	0.0005	0.003	01/23/14 0:51	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/16/14 12:53	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:51	pmc
Magnesium, dissolved	M6010B ICP	1	56.5			mg/L	0.2	1	01/16/14 12:53	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0382		*	mg/L	0.0005	0.003	01/23/14 0:51	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:16	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/16/14 12:53	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/16/14 12:53	jjc
Potassium, dissolved	M6010B ICP	1	21.3			mg/L	0.3	2	01/16/14 12:53	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0026		*	mg/L	0.0001	0.0003	01/23/14 0:51	pmc
Silica, dissolved	M6010B ICP	1	16.7			mg/L	0.4	2	01/16/14 12:53	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 0:51	pmc
Sodium, dissolved	M6010B ICP	1	42.6			mg/L	0.3	2	01/16/14 12:53	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 0:51	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0312		*	mg/L	0.0001	0.0005	01/23/14 0:51	pmc
Uranium, total	M6020 ICP-MS	1	0.0321		*	mg/L	0.0001	0.0005	01/23/14 21:35	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	01/23/14 0:51	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.006		*	mg/L	0.002	0.005	01/23/14 0:51	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C0.5

ACZ Sample ID: ***L16367-07***
Date Sampled: *01/12/14 23:20*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	218		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	218		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/24/14 11:44	calc
Sum of Anions			21			meq/L	0.1	0.5	01/24/14 11:44	calc
Sum of Cations			21			meq/L	0.1	0.5	01/24/14 11:44	calc
Chloride	M300.0 - Ion Chromatography	20	27.7	B	*	mg/L	10	50	01/21/14 18:58	jlf
Conductivity @25C	SM2510B	1	1610		*	umhos/cm	1	10	01/14/14 22:40	dcw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/21/14 18:58	jlf
Hardness as CaCO3	SM2340B - Calculation		935			mg/L	1	7	01/24/14 11:44	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 17:10	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	5	1830		*	mg/L	50	100	01/16/14 16:31	dcw
Sulfate	M300.0 - Ion Chromatography	20	768		*	mg/L	10	50	01/21/14 18:58	jlf
TDS (calculated)	Calculation		1340			mg/L	10	50	01/24/14 11:44	calc
TDS (ratio - measured/calculated)	Calculation		1.37						01/24/14 11:44	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C0.5

ACZ Sample ID: ***L16367-06***
Date Sampled: *01/12/14 14:35*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 10:04	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 10:28	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	2		U		mg/L	0.06	0.3	01/16/14 12:50	jjc
Antimony, dissolved	M6020 ICP-MS	2		U		mg/L	0.0008	0.004	01/23/14 0:44	pmc
Arsenic, dissolved	M6020 ICP-MS	2	0.0035		*	mg/L	0.0004	0.002	01/23/14 0:44	pmc
Barium, dissolved	M6010B ICP	2	0.059			mg/L	0.006	0.03	01/16/14 12:50	jjc
Beryllium, dissolved	M6020 ICP-MS	2		U		mg/L	0.0001	0.0005	01/23/14 0:44	pmc
Cadmium, dissolved	M6020 ICP-MS	2	0.0098		*	mg/L	0.0002	0.001	01/23/14 0:44	pmc
Calcium, dissolved	M6010B ICP	2	492			mg/L	0.4	2	01/16/14 12:50	jjc
Chromium, dissolved	M6020 ICP-MS	2		U		mg/L	0.001	0.004	01/23/14 0:44	pmc
Copper, dissolved	M6020 ICP-MS	2	0.012		*	mg/L	0.001	0.005	01/23/14 0:44	pmc
Iron, dissolved	M6010B ICP	2		U		mg/L	0.04	0.1	01/16/14 12:50	jjc
Lead, dissolved	M6020 ICP-MS	2	0.0006	B		mg/L	0.0002	0.001	01/23/14 0:44	pmc
Magnesium, dissolved	M6010B ICP	2	92.8			mg/L	0.4	2	01/16/14 12:50	jjc
Manganese, dissolved	M6020 ICP-MS	2	0.108		*	mg/L	0.001	0.005	01/23/14 0:44	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:10	mfm
Molybdenum, dissolved	M6010B ICP	2	0.05	B		mg/L	0.04	0.2	01/16/14 12:50	jjc
Nickel, dissolved	M6010B ICP	2		U		mg/L	0.02	0.1	01/16/14 12:50	jjc
Potassium, dissolved	M6010B ICP	2	60.4			mg/L	0.6	3	01/16/14 12:50	jjc
Selenium, dissolved	M6020 ICP-MS	2	0.0290		*	mg/L	0.0002	0.0005	01/23/14 0:44	pmc
Silica, dissolved	M6010B ICP	2	24			mg/L	0.9	4	01/16/14 12:50	jjc
Silver, dissolved	M6020 ICP-MS	2		U	*	mg/L	0.0001	0.0005	01/23/14 19:29	pmc
Sodium, dissolved	M6010B ICP	2	178			mg/L	0.6	3	01/16/14 12:50	jjc
Thallium, dissolved	M6020 ICP-MS	2	0.0004	B		mg/L	0.0002	0.001	01/23/14 0:44	pmc
Uranium, dissolved	M6020 ICP-MS	2	0.0654		*	mg/L	0.0002	0.001	01/23/14 0:44	pmc
Uranium, total	M6020 ICP-MS	2	0.0877		*	mg/L	0.0002	0.001	01/23/14 21:33	pmc
Vanadium, dissolved	M6020 ICP-MS	2		U		mg/L	0.0004	0.002	01/23/14 0:44	pmc
Zinc, dissolved	M6020 ICP-MS	2	0.012		*	mg/L	0.004	0.01	01/23/14 0:44	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C0.5

ACZ Sample ID: ***L16367-06***
Date Sampled: *01/12/14 14:35*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	298		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	298		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.7			%			01/24/14 11:44	calc
Sum of Anions			39			meq/L	0.1	0.5	01/24/14 11:44	calc
Sum of Cations			42			meq/L	0.1	0.5	01/24/14 11:44	calc
Chloride	M300.0 - Ion Chromatography	20	293		*	mg/L	10	50	01/21/14 18:40	jlf
Conductivity @25C	SM2510B	1	3130		*	umhos/cm	1	10	01/14/14 22:31	dcw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/21/14 18:40	jlf
Hardness as CaCO3	SM2340B - Calculation		1610			mg/L	1	7	01/24/14 11:44	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 17:07	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	1	2830		*	mg/L	10	20	01/16/14 16:28	dcw
Sulfate	M300.0 - Ion Chromatography	20	1190		*	mg/L	10	50	01/21/14 18:40	jlf
TDS (calculated)	Calculation		2510			mg/L	10	50	01/24/14 11:44	calc
TDS (ratio - measured/calculated)	Calculation		1.13						01/24/14 11:44	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C1.0

ACZ Sample ID: ***L16450-03***
Date Sampled: *01/16/14 11:51*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:26	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 11:53	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.03	0.2	01/20/14 14:25	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 19:42	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	01/23/14 19:42	pmc
Barium, dissolved	M6010B ICP	1	0.043			mg/L	0.003	0.02	01/20/14 14:25	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 19:42	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0017			mg/L	0.0001	0.0005	01/23/14 19:42	pmc
Calcium, dissolved	M6010B ICP	1	311			mg/L	0.2	1	01/20/14 14:25	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 19:42	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0015	B		mg/L	0.0005	0.003	01/23/14 19:42	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:25	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 19:42	pmc
Magnesium, dissolved	M6010B ICP	1	85.1			mg/L	0.2	1	01/20/14 14:25	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0881		*	mg/L	0.0005	0.003	01/23/14 19:42	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:16	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:25	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:25	jjc
Potassium, dissolved	M6010B ICP	1	53.2			mg/L	0.3	2	01/20/14 14:25	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.1187			mg/L	0.0001	0.0003	01/23/14 19:42	pmc
Silica, dissolved	M6010B ICP	1	7.5			mg/L	0.4	2	01/20/14 14:25	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 19:42	pmc
Sodium, dissolved	M6010B ICP	1	47.6			mg/L	0.3	2	01/20/14 14:25	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 19:42	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0065		*	mg/L	0.0001	0.0005	01/23/14 19:42	pmc
Uranium, total	M6020 ICP-MS	1	0.0070		*	mg/L	0.0001	0.0005	01/23/14 21:44	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 19:42	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.005		*	mg/L	0.002	0.005	01/23/14 19:42	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C1.0

ACZ Sample ID: ***L16450-03***
Date Sampled: *01/16/14 11:51*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	134		*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1	134		*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/27/14 14:56	calc
Sum of Anions			26			meq/L	0.1	0.5	01/27/14 14:56	calc
Sum of Cations			26			meq/L	0.1	0.5	01/27/14 14:56	calc
Chloride	M300.0 - Ion Chromatography	20	26.2	B	*	mg/L	10	50	01/22/14 0:57	jlf
Conductivity @25C	SM2510B	1	2100		*	umhos/cm	1	10	01/21/14 18:44	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/22/14 0:57	jlf
Hardness as CaCO3	SM2340B - Calculation		1130			mg/L	1	7	01/27/14 14:56	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	22		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:26	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1770		*	mg/L	10	20	01/22/14 14:41	abd
Sulfate	M300.0 - Ion Chromatography	20	1090		*	mg/L	10	50	01/22/14 0:57	jlf
TDS (calculated)	Calculation		1700			mg/L	10	50	01/27/14 14:56	calc
TDS (ratio - measured/calculated)	Calculation		1.04						01/27/14 14:56	calc

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RadioChemistry Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C1.0
Locator:

ACZ Sample ID: ***L16686-03***
Date Sampled: *01/16/14 11:51*
Date Received: *02/05/14*
Sample Matrix: *Leachate*

Gross Alpha
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	02/17/14 0:14		2.9	6.8	6.3	pCi/L	*	jrd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C1.0

ACZ Sample ID: ***L16450-01***
Date Sampled: *01/16/14 11:27*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:07	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 11:25	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.06	B		mg/L	0.03	0.2	01/20/14 14:09	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 19:32	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	01/23/14 19:32	pmc
Barium, dissolved	M6010B ICP	1	0.040			mg/L	0.003	0.02	01/20/14 14:09	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 19:32	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0015			mg/L	0.0001	0.0005	01/23/14 19:32	pmc
Calcium, dissolved	M6010B ICP	1	310			mg/L	0.2	1	01/20/14 14:09	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 19:32	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0020	B		mg/L	0.0005	0.003	01/23/14 19:32	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:09	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 19:32	pmc
Magnesium, dissolved	M6010B ICP	1	83.9			mg/L	0.2	1	01/20/14 14:09	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0794		*	mg/L	0.0005	0.003	01/23/14 19:32	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:08	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:09	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:09	jjc
Potassium, dissolved	M6010B ICP	1	53			mg/L	0.3	2	01/20/14 14:09	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.1084			mg/L	0.0001	0.0003	01/23/14 19:32	pmc
Silica, dissolved	M6010B ICP	1	7.1			mg/L	0.4	2	01/20/14 14:09	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 19:32	pmc
Sodium, dissolved	M6010B ICP	1	46.8			mg/L	0.3	2	01/20/14 14:09	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 19:32	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0057		*	mg/L	0.0001	0.0005	01/23/14 19:32	pmc
Uranium, total	M6020 ICP-MS	1	0.0062		*	mg/L	0.0001	0.0005	01/23/14 21:40	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 19:32	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.010		*	mg/L	0.002	0.005	01/23/14 19:32	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C1.0

ACZ Sample ID: ***L16450-01***
Date Sampled: *01/16/14 11:27*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	114		*	mg/L	2	20	01/21/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	abd
Total Alkalinity		1	114		*	mg/L	2	20	01/21/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.9			%			01/27/14 14:56	calc
Sum of Anions			27			meq/L	0.1	0.5	01/27/14 14:56	calc
Sum of Cations			26			meq/L	0.1	0.5	01/27/14 14:56	calc
Chloride	M300.0 - Ion Chromatography	20	26.9	B	*	mg/L	10	50	01/22/14 0:21	jlf
Conductivity @25C	SM2510B	1	2050		*	umhos/cm	1	10	01/21/14 0:57	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/22/14 0:21	jlf
Hardness as CaCO3	SM2340B - Calculation		1120			mg/L	1	7	01/27/14 14:56	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	01/21/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	01/21/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1780		*	mg/L	10	20	01/22/14 14:39	abd
Sulfate	M300.0 - Ion Chromatography	20	1140		*	mg/L	10	50	01/22/14 0:21	jlf
TDS (calculated)	Calculation		1740			mg/L	10	50	01/27/14 14:56	calc
TDS (ratio - measured/calculated)	Calculation		1.02						01/27/14 14:56	calc

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RadioChemistry Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C1.0
Locator:

ACZ Sample ID: ***L16686-01***
Date Sampled: *01/16/14 11:27*
Date Received: *02/05/14*
Sample Matrix: *Leachate*

Gross Alpha
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	02/17/14 0:11		11	8.6	7.1	pCi/L	*	jrd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C1.0

ACZ Sample ID: ***L16450-02***
Date Sampled: *01/16/14 10:45*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:16	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 11:39	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.03	0.2	01/20/14 14:19	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 19:36	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0007	B		mg/L	0.0002	0.001	01/23/14 19:36	pmc
Barium, dissolved	M6010B ICP	1	0.034			mg/L	0.003	0.02	01/20/14 14:19	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 19:36	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	01/23/14 19:36	pmc
Calcium, dissolved	M6010B ICP	1	382			mg/L	0.2	1	01/20/14 14:19	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 19:36	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0016	B		mg/L	0.0005	0.003	01/23/14 19:36	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:19	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 19:36	pmc
Magnesium, dissolved	M6010B ICP	1	131			mg/L	0.2	1	01/20/14 14:19	jjc
Manganese, dissolved	M6020 ICP-MS	5	0.391		*	mg/L	0.003	0.01	01/23/14 20:11	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:14	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:19	jjc
Nickel, dissolved	M6010B ICP	1	0.02	B		mg/L	0.01	0.05	01/20/14 14:19	jjc
Potassium, dissolved	M6010B ICP	1	30.7			mg/L	0.3	2	01/20/14 14:19	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.1525			mg/L	0.0001	0.0003	01/23/14 19:36	pmc
Silica, dissolved	M6010B ICP	1	11.5			mg/L	0.4	2	01/20/14 14:19	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 19:36	pmc
Sodium, dissolved	M6010B ICP	1	102			mg/L	0.3	2	01/20/14 14:19	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 19:36	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.1979		*	mg/L	0.0001	0.0005	01/23/14 19:36	pmc
Uranium, total	M6020 ICP-MS	2	0.2072		*	mg/L	0.0002	0.001	01/23/14 21:57	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0017			mg/L	0.0002	0.001	01/23/14 19:36	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.012		*	mg/L	0.002	0.005	01/23/14 19:36	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C1.0

ACZ Sample ID: ***L16450-02***
Date Sampled: *01/16/14 10:45*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	296		*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1	296		*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			1.4			%			01/27/14 14:56	calc
Sum of Anions			34			meq/L	0.1	0.5	01/27/14 14:56	calc
Sum of Cations			35			meq/L	0.1	0.5	01/27/14 14:56	calc
Chloride	M300.0 - Ion Chromatography	20	24.2	B	*	mg/L	10	50	01/22/14 0:39	jlf
Conductivity @25C	SM2510B	1	2700		*	umhos/cm	1	10	01/21/14 18:31	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/22/14 0:39	jlf
Hardness as CaCO3	SM2340B - Calculation		1490			mg/L	1	7	01/27/14 14:56	calc
pH (lab)	SM4500H+ B									
pH		1	8	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	22		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	2360		*	mg/L	10	20	01/22/14 14:40	abd
Sulfate	M300.0 - Ion Chromatography	20	1310		*	mg/L	10	50	01/22/14 0:39	jlf
TDS (calculated)	Calculation		2170			mg/L	10	50	01/27/14 14:56	calc
TDS (ratio - measured/calculated)	Calculation		1.09						01/27/14 14:56	calc

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RadioChemistry Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C1.0
Locator:

ACZ Sample ID: ***L16686-02***
Date Sampled: *01/16/14 10:45*
Date Received: *02/05/14*
Sample Matrix: *Leachate*

Gross Alpha
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	02/17/14 0:12		110	24	9	pCi/L	*	jrd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C1.0

ACZ Sample ID: ***L16450-05***
Date Sampled: *01/16/14 11:20*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:36	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 12:21	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.03	0.2	01/20/14 14:32	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 19:49	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	01/23/14 19:49	pmc
Barium, dissolved	M6010B ICP	1	0.086			mg/L	0.003	0.02	01/20/14 14:32	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 19:49	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 19:49	pmc
Calcium, dissolved	M6010B ICP	1	265			mg/L	0.2	1	01/20/14 14:32	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 19:49	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0016	B		mg/L	0.0005	0.003	01/23/14 19:49	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:32	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 19:49	pmc
Magnesium, dissolved	M6010B ICP	1	51.7			mg/L	0.2	1	01/20/14 14:32	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0285		*	mg/L	0.0005	0.003	01/23/14 19:49	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:21	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:32	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:32	jjc
Potassium, dissolved	M6010B ICP	1	19			mg/L	0.3	2	01/20/14 14:32	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0019			mg/L	0.0001	0.0003	01/23/14 19:49	pmc
Silica, dissolved	M6010B ICP	1	17.3			mg/L	0.4	2	01/20/14 14:32	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 19:49	pmc
Sodium, dissolved	M6010B ICP	1	40.9			mg/L	0.3	2	01/20/14 14:32	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	01/23/14 19:49	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0268		*	mg/L	0.0001	0.0005	01/23/14 19:49	pmc
Uranium, total	M6020 ICP-MS	1	0.0276		*	mg/L	0.0001	0.0005	01/23/14 21:47	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	01/23/14 19:49	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.005		*	mg/L	0.002	0.005	01/23/14 19:49	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C1.0

ACZ Sample ID: ***L16450-05***
Date Sampled: *01/16/14 11:20*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	183		*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1	183		*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/27/14 14:57	calc
Sum of Anions			20			meq/L	0.1	0.5	01/27/14 14:57	calc
Sum of Cations			20			meq/L	0.1	0.5	01/27/14 14:57	calc
Chloride	M300.0 - Ion Chromatography	20	24.7	B	*	mg/L	10	50	01/22/14 1:32	jlf
Conductivity @25C	SM2510B	1	1640		*	umhos/cm	1	10	01/21/14 19:02	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/22/14 1:32	jlf
Hardness as CaCO3	SM2340B - Calculation		875			mg/L	1	7	01/27/14 14:57	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	21		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:31	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1310		*	mg/L	10	20	01/22/14 14:44	abd
Sulfate	M300.0 - Ion Chromatography	20	743		*	mg/L	10	50	01/22/14 1:32	jlf
TDS (calculated)	Calculation		1270			mg/L	10	50	01/27/14 14:57	calc
TDS (ratio - measured/calculated)	Calculation		1.03						01/27/14 14:57	calc

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RadioChemistry Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C1.0
Locator:

ACZ Sample ID: ***L16686-05***
Date Sampled: *01/16/14 11:20*
Date Received: *02/05/14*
Sample Matrix: *Leachate*

Gross Alpha
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	02/17/14 0:17		22	10	6.2	pCi/L	*	jrd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C1.0

ACZ Sample ID: ***L16450-04***
Date Sampled: *01/16/14 11:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:31	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 12:07	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/20/14 14:28	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 19:45	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0027			mg/L	0.0002	0.001	01/23/14 19:45	pmc
Barium, dissolved	M6010B ICP	1	0.035			mg/L	0.003	0.02	01/20/14 14:28	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 19:45	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0116			mg/L	0.0001	0.0005	01/23/14 19:45	pmc
Calcium, dissolved	M6010B ICP	1	385			mg/L	0.2	1	01/20/14 14:28	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 19:45	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0099			mg/L	0.0005	0.003	01/23/14 19:45	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:28	jjc
Lead, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	01/23/14 19:45	pmc
Magnesium, dissolved	M6010B ICP	1	77.4			mg/L	0.2	1	01/20/14 14:28	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.1291		*	mg/L	0.0005	0.003	01/23/14 19:45	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:18	mfm
Molybdenum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.02	0.1	01/20/14 14:28	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:28	jjc
Potassium, dissolved	M6010B ICP	1	41.9			mg/L	0.3	2	01/20/14 14:28	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0194			mg/L	0.0001	0.0003	01/23/14 19:45	pmc
Silica, dissolved	M6010B ICP	1	27.3			mg/L	0.4	2	01/20/14 14:28	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 19:45	pmc
Sodium, dissolved	M6010B ICP	1	104			mg/L	0.3	2	01/20/14 14:28	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	01/23/14 19:45	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0778		*	mg/L	0.0001	0.0005	01/23/14 19:45	pmc
Uranium, total	M6020 ICP-MS	1	0.0828		*	mg/L	0.0001	0.0005	01/23/14 21:46	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0002	0.001	01/23/14 19:45	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.019		*	mg/L	0.002	0.005	01/23/14 19:45	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C1.0

ACZ Sample ID: ***L16450-04***
Date Sampled: *01/16/14 11:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	296		*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1	296		*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/27/14 14:57	calc
Sum of Anions			31			meq/L	0.1	0.5	01/27/14 14:57	calc
Sum of Cations			31			meq/L	0.1	0.5	01/27/14 14:57	calc
Chloride	M300.0 - Ion Chromatography	20	131		*	mg/L	10	50	01/22/14 1:14	jlf
Conductivity @25C	SM2510B	1	2570		*	umhos/cm	1	10	01/21/14 18:53	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	01/22/14 1:14	jlf
Hardness as CaCO3	SM2340B - Calculation		1280			mg/L	1	7	01/27/14 14:57	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	22		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:27	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	2110		*	mg/L	10	20	01/22/14 14:43	abd
Sulfate	M300.0 - Ion Chromatography	20	1040		*	mg/L	10	50	01/22/14 1:14	jlf
TDS (calculated)	Calculation		1980			mg/L	10	50	01/27/14 14:57	calc
TDS (ratio - measured/calculated)	Calculation		1.07						01/27/14 14:57	calc

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

RadioChemistry Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C1.0
Locator:

ACZ Sample ID: ***L16686-04***
Date Sampled: *01/16/14 11:00*
Date Received: *02/05/14*
Sample Matrix: *Leachate*

Gross Alpha
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	02/17/14 0:15		36	15	9	pCi/L	*	jrd

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C2.0

ACZ Sample ID: ***L16640-03***
Date Sampled: *01/29/14 13:05*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 10:20	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 12:31	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.05	B		mg/L	0.03	0.2	02/04/14 12:24	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:22	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/05/14 3:22	las
Barium, dissolved	M6010B ICP	1	0.036		*	mg/L	0.003	0.02	02/04/14 12:24	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:22	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0015			mg/L	0.0001	0.0005	02/05/14 3:22	las
Calcium, dissolved	M6010B ICP	1	276			mg/L	0.2	1	02/04/14 12:24	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:22	las
Copper, dissolved	M6020 ICP-MS	1	0.0007	B		mg/L	0.0005	0.003	02/05/14 3:22	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:24	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:22	las
Magnesium, dissolved	M6010B ICP	1	76.3			mg/L	0.2	1	02/04/14 12:24	aeb
Manganese, dissolved	M6020 ICP-MS	1	0.0871		*	mg/L	0.0005	0.003	02/05/14 3:22	las
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:11	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/04/14 12:24	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	02/04/14 12:24	aeb
Potassium, dissolved	M6010B ICP	1	50.9			mg/L	0.3	2	02/04/14 12:24	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0258			mg/L	0.0001	0.0003	02/05/14 3:22	las
Silica, dissolved	M6010B ICP	1	7.7			mg/L	0.4	2	02/04/14 12:24	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:22	las
Sodium, dissolved	M6010B ICP	1	47.4			mg/L	0.3	2	02/04/14 12:24	aeb
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/05/14 3:22	las
Uranium, dissolved	M6020 ICP-MS	1	0.0063		*	mg/L	0.0001	0.0005	02/06/14 1:54	pmc
Uranium, total	M6020 ICP-MS	1	0.0063		*	mg/L	0.0001	0.0005	02/08/14 2:02	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	02/05/14 3:22	las
Zinc, dissolved	M6020 ICP-MS	1	0.005			mg/L	0.002	0.005	02/05/14 3:22	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C2.0

ACZ Sample ID: ***L16640-03***
Date Sampled: *01/29/14 13:05*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	129		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	129		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/18/14 13:49	calc
Sum of Anions			24			meq/L	0.1	0.5	02/18/14 13:49	calc
Sum of Cations			24			meq/L	0.1	0.5	02/18/14 13:49	calc
Chloride	M300.0 - Ion Chromatography	20	23.1	B	*	mg/L	10	50	02/10/14 13:59	tcd
Conductivity @25C	SM2510B	1	1860		*	umhos/cm	1	10	02/01/14 14:50	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 13:59	tcd
Hardness as CaCO3	SM2340B - Calculation		1000			mg/L	1	7	02/18/14 13:49	calc
pH (lab)	SM4500H+ B									
pH		1	8	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/06/14 19:18	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1630		*	mg/L	10	20	02/03/14 14:20	dcw
Sulfate	M300.0 - Ion Chromatography	20	999		*	mg/L	10	50	02/10/14 13:59	tcd
TDS (calculated)	Calculation		1560			mg/L	10	50	02/18/14 13:49	calc
TDS (ratio - measured/calculated)	Calculation		1.04						02/18/14 13:49	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C2.0

ACZ Sample ID: ***L16640-01***
Date Sampled: *01/29/14 13:28*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 9:40	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 12:02	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.07	B		mg/L	0.03	0.2	02/04/14 12:12	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:08	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0002	0.001	02/05/14 3:08	las
Barium, dissolved	M6010B ICP	1	0.034		*	mg/L	0.003	0.02	02/04/14 12:12	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:08	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0008			mg/L	0.0001	0.0005	02/05/14 3:08	las
Calcium, dissolved	M6010B ICP	1	269			mg/L	0.2	1	02/04/14 12:12	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:08	las
Copper, dissolved	M6020 ICP-MS	1	0.0007	B		mg/L	0.0005	0.003	02/05/14 3:08	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:12	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:08	las
Magnesium, dissolved	M6010B ICP	1	73.9			mg/L	0.2	1	02/04/14 12:12	aeb
Manganese, dissolved	M6020 ICP-MS	1	0.0757		*	mg/L	0.0005	0.003	02/05/14 3:08	las
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:07	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/04/14 12:12	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	02/04/14 12:12	aeb
Potassium, dissolved	M6010B ICP	1	49.6			mg/L	0.3	2	02/04/14 12:12	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0088			mg/L	0.0001	0.0003	02/05/14 3:08	las
Silica, dissolved	M6010B ICP	1	7.3			mg/L	0.4	2	02/04/14 12:12	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:08	las
Sodium, dissolved	M6010B ICP	1	46.1			mg/L	0.3	2	02/04/14 12:12	aeb
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/05/14 3:08	las
Uranium, dissolved	M6020 ICP-MS	1	0.0058		*	mg/L	0.0001	0.0005	02/06/14 1:48	pmc
Uranium, total	M6020 ICP-MS	1	0.0059		*	mg/L	0.0001	0.0005	02/08/14 1:56	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	02/05/14 3:08	las
Zinc, dissolved	M6020 ICP-MS	1	0.006			mg/L	0.002	0.005	02/05/14 3:08	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C2.0

ACZ Sample ID: ***L16640-01***
Date Sampled: *01/29/14 13:28*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	130		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	130		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.1			%			02/18/14 0:00	calc
Sum of Anions			24			meq/L	0.1	0.5	02/18/14 0:00	calc
Sum of Cations			23			meq/L	0.1	0.5	02/18/14 0:00	calc
Chloride	M300.0 - Ion Chromatography	20	22.7	B	*	mg/L	10	50	02/10/14 13:23	tcd
Conductivity @25C	SM2510B	1	1830		*	umhos/cm	1	10	02/01/14 14:45	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 13:23	tcd
Hardness as CaCO3	SM2340B - Calculation		976			mg/L	1	7	02/18/14 0:00	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/06/14 19:13	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1580		*	mg/L	10	20	02/03/14 14:15	dcw
Sulfate	M300.0 - Ion Chromatography	20	966		*	mg/L	10	50	02/10/14 13:23	tcd
TDS (calculated)	Calculation		1510			mg/L	10	50	02/18/14 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.05						02/18/14 0:00	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C2.0

ACZ Sample ID: ***L16640-02***
Date Sampled: *01/29/14 11:35*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 10:00	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 12:17	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.05	B		mg/L	0.03	0.2	02/04/14 12:21	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:19	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0006	B		mg/L	0.0002	0.001	02/05/14 3:19	las
Barium, dissolved	M6010B ICP	1	0.028		*	mg/L	0.003	0.02	02/04/14 12:21	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:19	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	02/05/14 3:19	las
Calcium, dissolved	M6010B ICP	1	312			mg/L	0.2	1	02/04/14 12:21	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:19	las
Copper, dissolved	M6020 ICP-MS	1	0.0010	B		mg/L	0.0005	0.003	02/05/14 3:19	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:21	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:19	las
Magnesium, dissolved	M6010B ICP	1	104			mg/L	0.2	1	02/04/14 12:21	aeb
Manganese, dissolved	M6020 ICP-MS	2	0.294		*	mg/L	0.001	0.005	02/06/14 1:51	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:09	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/04/14 12:21	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	02/04/14 12:21	aeb
Potassium, dissolved	M6010B ICP	1	26.5			mg/L	0.3	2	02/04/14 12:21	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0463			mg/L	0.0001	0.0003	02/05/14 3:19	las
Silica, dissolved	M6010B ICP	1	11			mg/L	0.4	2	02/04/14 12:21	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:19	las
Sodium, dissolved	M6010B ICP	1	76.7			mg/L	0.3	2	02/04/14 12:21	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:19	las
Uranium, dissolved	M6020 ICP-MS	2	0.1854		*	mg/L	0.0002	0.001	02/06/14 1:51	pmc
Uranium, total	M6020 ICP-MS	1	0.1943		*	mg/L	0.0001	0.0005	02/08/14 1:59	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0028			mg/L	0.0002	0.001	02/05/14 3:19	las
Zinc, dissolved	M6020 ICP-MS	1	0.007			mg/L	0.002	0.005	02/05/14 3:19	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C2.0

ACZ Sample ID: ***L16640-02***
Date Sampled: *01/29/14 11:35*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	341		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	341		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-1.8			%			02/18/14 13:49	calc
Sum of Anions			29			meq/L	0.1	0.5	02/18/14 13:49	calc
Sum of Cations			28			meq/L	0.1	0.5	02/18/14 13:49	calc
Chloride	M300.0 - Ion Chromatography	20	22.0	B	*	mg/L	10	50	02/10/14 13:41	tcd
Conductivity @25C	SM2510B	1	2150		*	umhos/cm	1	10	02/01/14 14:46	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 13:41	tcd
Hardness as CaCO3	SM2340B - Calculation		1210			mg/L	1	7	02/18/14 13:49	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/06/14 19:16	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1930		*	mg/L	10	20	02/03/14 14:18	dcw
Sulfate	M300.0 - Ion Chromatography	20	1020		*	mg/L	10	50	02/10/14 13:41	tcd
TDS (calculated)	Calculation		1780			mg/L	10	50	02/18/14 13:49	calc
TDS (ratio - measured/calculated)	Calculation		1.08						02/18/14 13:49	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C2.0

ACZ Sample ID: ***L16640-06***
Date Sampled: *01/29/14 11:50*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 10:50	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 13:41	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.03	0.2	02/04/14 12:37	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:32	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0006	B		mg/L	0.0002	0.001	02/05/14 3:32	las
Barium, dissolved	M6010B ICP	1	0.027		*	mg/L	0.003	0.02	02/04/14 12:37	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:32	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0006			mg/L	0.0001	0.0005	02/05/14 3:32	las
Calcium, dissolved	M6010B ICP	1	310			mg/L	0.2	1	02/04/14 12:37	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:32	las
Copper, dissolved	M6020 ICP-MS	1	0.0009	B		mg/L	0.0005	0.003	02/05/14 3:32	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:37	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:32	las
Magnesium, dissolved	M6010B ICP	1	103			mg/L	0.2	1	02/04/14 12:37	aeb
Manganese, dissolved	M6020 ICP-MS	2	0.254		*	mg/L	0.001	0.005	02/06/14 2:10	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:21	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/04/14 12:37	aeb
Nickel, dissolved	M6010B ICP	1	0.01	B		mg/L	0.01	0.05	02/04/14 12:37	aeb
Potassium, dissolved	M6010B ICP	1	26.3			mg/L	0.3	2	02/04/14 12:37	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0406			mg/L	0.0001	0.0003	02/05/14 3:32	las
Silica, dissolved	M6010B ICP	1	11			mg/L	0.4	2	02/04/14 12:37	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:32	las
Sodium, dissolved	M6010B ICP	1	75.7			mg/L	0.3	2	02/04/14 12:37	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:32	las
Uranium, dissolved	M6020 ICP-MS	2	0.1577		*	mg/L	0.0002	0.001	02/06/14 2:10	pmc
Uranium, total	M6020 ICP-MS	1	0.1822		*	mg/L	0.0001	0.0005	02/08/14 2:18	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0028			mg/L	0.0002	0.001	02/05/14 3:32	las
Zinc, dissolved	M6020 ICP-MS	1	0.007			mg/L	0.002	0.005	02/05/14 3:32	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C2.0

ACZ Sample ID: ***L16640-06***
Date Sampled: *01/29/14 11:50*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	308		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	308		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/18/14 13:50	calc
Sum of Anions			28			meq/L	0.1	0.5	02/18/14 13:50	calc
Sum of Cations			28			meq/L	0.1	0.5	02/18/14 13:50	calc
Chloride	M300.0 - Ion Chromatography	20	22.2	B	*	mg/L	10	50	02/10/14 14:52	tcd
Conductivity @25C	SM2510B	1	2170		*	umhos/cm	1	10	02/01/14 14:54	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 14:52	tcd
Hardness as CaCO3	SM2340B - Calculation		1200			mg/L	1	7	02/18/14 13:50	calc
pH (lab)	SM4500H+ B									
pH		1	7.9	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/06/14 19:23	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1880		*	mg/L	10	20	02/04/14 12:24	khw
Sulfate	M300.0 - Ion Chromatography	20	1010		*	mg/L	10	50	02/10/14 14:52	tcd
TDS (calculated)	Calculation		1740			mg/L	10	50	02/18/14 13:50	calc
TDS (ratio - measured/calculated)	Calculation		1.08						02/18/14 13:50	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C2.0

ACZ Sample ID: ***L16640-05***
Date Sampled: *01/29/14 12:12*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 10:40	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 12:59	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.03	0.2	02/04/14 12:34	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:29	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/05/14 3:29	las
Barium, dissolved	M6010B ICP	1	0.080		*	mg/L	0.003	0.02	02/04/14 12:34	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:29	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	02/05/14 3:29	las
Calcium, dissolved	M6010B ICP	1	256			mg/L	0.2	1	02/04/14 12:34	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:29	las
Copper, dissolved	M6020 ICP-MS	1	0.0009	B		mg/L	0.0005	0.003	02/05/14 3:29	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:34	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/05/14 3:29	las
Magnesium, dissolved	M6010B ICP	1	49.8			mg/L	0.2	1	02/04/14 12:34	aeb
Manganese, dissolved	M6020 ICP-MS	1	0.0375		*	mg/L	0.0005	0.003	02/05/14 3:29	las
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:19	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/04/14 12:34	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	02/04/14 12:34	aeb
Potassium, dissolved	M6010B ICP	1	18.8			mg/L	0.3	2	02/04/14 12:34	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0010			mg/L	0.0001	0.0003	02/05/14 3:29	las
Silica, dissolved	M6010B ICP	1	18.6			mg/L	0.4	2	02/04/14 12:34	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:29	las
Sodium, dissolved	M6010B ICP	1	43.7			mg/L	0.3	2	02/04/14 12:34	aeb
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/05/14 3:29	las
Uranium, dissolved	M6020 ICP-MS	1	0.0316		*	mg/L	0.0001	0.0005	02/06/14 2:01	pmc
Uranium, total	M6020 ICP-MS	1	0.0307		*	mg/L	0.0001	0.0005	02/08/14 2:09	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0002	0.001	02/05/14 3:29	las
Zinc, dissolved	M6020 ICP-MS	1	0.005			mg/L	0.002	0.005	02/05/14 3:29	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C2.0

ACZ Sample ID: ***L16640-05***
Date Sampled: *01/29/14 12:12*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	219		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	219		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.6			%			02/18/14 13:50	calc
Sum of Anions			20			meq/L	0.1	0.5	02/18/14 13:50	calc
Sum of Cations			19			meq/L	0.1	0.5	02/18/14 13:50	calc
Chloride	M300.0 - Ion Chromatography	20	21.6	B	*	mg/L	10	50	02/10/14 14:35	tcd
Conductivity @25C	SM2510B	1	1560		*	umhos/cm	1	10	02/01/14 14:53	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 14:35	tcd
Hardness as CaCO3	SM2340B - Calculation		845			mg/L	1	7	02/18/14 13:50	calc
pH (lab)	SM4500H+ B									
pH		1	8	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/06/14 19:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1310		*	mg/L	10	20	02/03/14 14:26	dcw
Sulfate	M300.0 - Ion Chromatography	20	690		*	mg/L	10	50	02/10/14 14:35	tcd
TDS (calculated)	Calculation		1230			mg/L	10	50	02/18/14 13:50	calc
TDS (ratio - measured/calculated)	Calculation		1.07						02/18/14 13:50	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C2.0

ACZ Sample ID: ***L16640-04***
Date Sampled: *01/29/14 12:36*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/06/14 10:30	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/06/14 12:45	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.03	0.2	02/04/14 12:28	aeb
Antimony, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0004	0.002	02/05/14 3:25	las
Arsenic, dissolved	M6020 ICP-MS	1	0.0020			mg/L	0.0002	0.001	02/05/14 3:25	las
Barium, dissolved	M6010B ICP	1	0.028		*	mg/L	0.003	0.02	02/04/14 12:28	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/05/14 3:25	las
Cadmium, dissolved	M6020 ICP-MS	1	0.0105			mg/L	0.0001	0.0005	02/05/14 3:25	las
Calcium, dissolved	M6010B ICP	1	314			mg/L	0.2	1	02/04/14 12:28	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/05/14 3:25	las
Copper, dissolved	M6020 ICP-MS	1	0.0079			mg/L	0.0005	0.003	02/05/14 3:25	las
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/04/14 12:28	aeb
Lead, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/05/14 3:25	las
Magnesium, dissolved	M6010B ICP	1	71.9			mg/L	0.2	1	02/04/14 12:28	aeb
Manganese, dissolved	M6020 ICP-MS	1	0.1292		*	mg/L	0.0005	0.003	02/05/14 3:25	las
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/11/14 12:13	mfm
Molybdenum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.02	0.1	02/04/14 12:28	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	02/04/14 12:28	aeb
Potassium, dissolved	M6010B ICP	1	28.4			mg/L	0.3	2	02/04/14 12:28	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0089			mg/L	0.0001	0.0003	02/05/14 3:25	las
Silica, dissolved	M6010B ICP	1	28.3			mg/L	0.4	2	02/04/14 12:28	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/05/14 3:25	las
Sodium, dissolved	M6010B ICP	1	68.6			mg/L	0.3	2	02/04/14 12:28	aeb
Thallium, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0001	0.0005	02/05/14 3:25	las
Uranium, dissolved	M6020 ICP-MS	1	0.0678		*	mg/L	0.0001	0.0005	02/06/14 1:57	pmc
Uranium, total	M6020 ICP-MS	1	0.0687		*	mg/L	0.0001	0.0005	02/08/14 2:05	pmc
Vanadium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/05/14 3:25	las
Zinc, dissolved	M6020 ICP-MS	1	0.025			mg/L	0.002	0.005	02/05/14 3:25	las

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C2.0

ACZ Sample ID: ***L16640-04***
Date Sampled: *01/29/14 12:36*
Date Received: *01/31/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	319		*	mg/L	2	20	02/04/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/04/14 0:00	abd
Total Alkalinity		1	319		*	mg/L	2	20	02/04/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.0			%			02/18/14 13:50	calc
Sum of Anions			26			meq/L	0.1	0.5	02/18/14 13:50	calc
Sum of Cations			25			meq/L	0.1	0.5	02/18/14 13:50	calc
Chloride	M300.0 - Ion Chromatography	20	51.5		*	mg/L	10	50	02/10/14 14:17	tcd
Conductivity @25C	SM2510B	1	2050		*	umhos/cm	1	10	02/01/14 14:51	khw
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/10/14 14:17	tcd
Hardness as CaCO3	SM2340B - Calculation		1080			mg/L	1	7	02/18/14 13:50	calc
pH (lab)	SM4500H+ B									
pH		1	8	H	*	units	0.1	0.1	02/04/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/04/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	02/06/14 19:19	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1730		*	mg/L	10	20	02/03/14 14:23	dcw
Sulfate	M300.0 - Ion Chromatography	20	856		*	mg/L	10	50	02/10/14 14:17	tcd
TDS (calculated)	Calculation		1610			mg/L	10	50	02/18/14 13:50	calc
TDS (ratio - measured/calculated)	Calculation		1.07						02/18/14 13:50	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C3.0

ACZ Sample ID: ***L16784-03***
Date Sampled: *02/11/14 13:18*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 15:38	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 12:01	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.04	B		mg/L	0.03	0.2	02/13/14 19:47	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/13/14 17:33	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/13/14 17:33	pmc
Barium, dissolved	M6010B ICP	1	0.031		*	mg/L	0.003	0.02	02/13/14 19:47	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:33	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0011			mg/L	0.0001	0.0005	02/13/14 17:33	pmc
Calcium, dissolved	M6010B ICP	1	244			mg/L	0.1	0.5	02/13/14 19:47	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:33	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	02/13/14 17:33	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:47	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:33	pmc
Magnesium, dissolved	M6010B ICP	1	69.3			mg/L	0.2	1	02/13/14 19:47	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0724		*	mg/L	0.0005	0.003	02/13/14 17:33	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:25	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/13/14 19:47	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:47	jjc
Potassium, dissolved	M6010B ICP	1	48.4			mg/L	0.2	1	02/13/14 19:47	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0018			mg/L	0.0001	0.0003	02/13/14 17:33	pmc
Silica, dissolved	M6010B ICP	1	8			mg/L	0.2	1	02/13/14 19:47	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:33	pmc
Sodium, dissolved	M6010B ICP	1	46.6			mg/L	0.2	1	02/13/14 19:47	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/13/14 17:33	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0070		*	mg/L	0.0001	0.0005	02/13/14 17:33	pmc
Uranium, total	M6020 ICP-MS	1	0.0072		*	mg/L	0.0001	0.0005	02/20/14 17:33	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	02/13/14 17:33	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.007		J	mg/L	0.002	0.005	02/13/14 17:33	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S1-C3.0

ACZ Sample ID: ***L16784-03***
Date Sampled: *02/11/14 13:18*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	156		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	156		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.3			%			02/28/14 8:55	calc
Sum of Anions			22			meq/L	0.1	0.5	02/28/14 8:55	calc
Sum of Cations			21			meq/L	0.1	0.5	02/28/14 8:55	calc
Chloride	M300.0 - Ion Chromatography	20	21.4	B	*	mg/L	10	50	02/15/14 1:05	tcd
Conductivity @25C	SM2510B	1	1750		*	umhos/cm	1	10	02/14/14 17:20	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/15/14 1:05	tcd
Hardness as CaCO3	SM2340B - Calculation		895			mg/L	1	7	02/28/14 8:55	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/26/14 18:11	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1430		*	mg/L	10	20	02/17/14 15:40	id
Sulfate	M300.0 - Ion Chromatography	20	878		*	mg/L	10	50	02/15/14 1:05	tcd
TDS (calculated)	Calculation		1410			mg/L	10	50	02/28/14 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.01						02/28/14 8:55	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C3.0

ACZ Sample ID: ***L16784-01***
Date Sampled: *02/11/14 14:15*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 14:32	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 11:35	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.05	B		mg/L	0.03	0.2	02/13/14 19:31	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/13/14 17:11	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/13/14 17:11	pmc
Barium, dissolved	M6010B ICP	1	0.030		*	mg/L	0.003	0.02	02/13/14 19:31	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:11	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0010			mg/L	0.0001	0.0005	02/13/14 17:11	pmc
Calcium, dissolved	M6010B ICP	1	238			mg/L	0.1	0.5	02/13/14 19:31	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:11	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	02/13/14 17:11	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:31	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:11	pmc
Magnesium, dissolved	M6010B ICP	1	67.2			mg/L	0.2	1	02/13/14 19:31	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0648		*	mg/L	0.0005	0.003	02/13/14 17:11	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:21	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/13/14 19:31	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:31	jjc
Potassium, dissolved	M6010B ICP	1	48.1			mg/L	0.2	1	02/13/14 19:31	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0008			mg/L	0.0001	0.0003	02/13/14 17:11	pmc
Silica, dissolved	M6010B ICP	1	7.7			mg/L	0.2	1	02/13/14 19:31	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:11	pmc
Sodium, dissolved	M6010B ICP	1	46.5			mg/L	0.2	1	02/13/14 19:31	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/13/14 17:11	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0068		*	mg/L	0.0001	0.0005	02/13/14 17:11	pmc
Uranium, total	M6020 ICP-MS	1	0.0070		*	mg/L	0.0001	0.0005	02/20/14 17:26	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	02/13/14 17:11	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.010	J		mg/L	0.002	0.005	02/13/14 17:11	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-14-S2-C3.0

ACZ Sample ID: ***L16784-01***
Date Sampled: *02/11/14 14:15*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	157		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	157		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/28/14 8:55	calc
Sum of Anions			21			meq/L	0.1	0.5	02/28/14 8:55	calc
Sum of Cations			21			meq/L	0.1	0.5	02/28/14 8:55	calc
Chloride	M300.0 - Ion Chromatography	20	20.8	B	*	mg/L	10	50	02/15/14 0:29	tcd
Conductivity @25C	SM2510B	1	1710		*	umhos/cm	1	10	02/14/14 16:37	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/15/14 0:29	tcd
Hardness as CaCO3	SM2340B - Calculation		871			mg/L	1	7	02/28/14 8:55	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/26/14 18:07	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1400		*	mg/L	10	20	02/17/14 15:35	id
Sulfate	M300.0 - Ion Chromatography	20	818		*	mg/L	10	50	02/15/14 0:29	tcd
TDS (calculated)	Calculation		1340			mg/L	10	50	02/28/14 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.04						02/28/14 8:55	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C3.0

ACZ Sample ID: ***L16784-02***
Date Sampled: *02/11/14 12:20*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 15:05	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 11:48	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	02/13/14 19:41	jjc
Antimony, dissolved	M6020 ICP-MS	1	0.0004	B		mg/L	0.0004	0.002	02/13/14 17:20	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0009	B		mg/L	0.0002	0.001	02/13/14 17:20	pmc
Barium, dissolved	M6010B ICP	1	0.024		*	mg/L	0.003	0.02	02/13/14 19:41	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:20	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	02/13/14 17:20	pmc
Calcium, dissolved	M6010B ICP	1	276			mg/L	0.1	0.5	02/13/14 19:41	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:20	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	02/13/14 17:20	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:41	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:20	pmc
Magnesium, dissolved	M6010B ICP	1	90.9			mg/L	0.2	1	02/13/14 19:41	jjc
Manganese, dissolved	M6020 ICP-MS	2	0.247		*	mg/L	0.001	0.005	02/13/14 17:24	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:23	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/13/14 19:41	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:41	jjc
Potassium, dissolved	M6010B ICP	1	23.2			mg/L	0.2	1	02/13/14 19:41	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0043			mg/L	0.0001	0.0003	02/13/14 17:20	pmc
Silica, dissolved	M6010B ICP	1	10.6			mg/L	0.2	1	02/13/14 19:41	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:20	pmc
Sodium, dissolved	M6010B ICP	1	62.6			mg/L	0.2	1	02/13/14 19:41	jjc
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:20	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.1560		*	mg/L	0.0001	0.0005	02/13/14 17:20	pmc
Uranium, total	M6020 ICP-MS	1	0.1616		*	mg/L	0.0001	0.0005	02/20/14 17:29	msh
Vanadium, dissolved	M6020 ICP-MS	1	0.0013			mg/L	0.0002	0.001	02/13/14 17:20	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.006	J		mg/L	0.002	0.005	02/13/14 17:20	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: CE-15-S1-C3.0

ACZ Sample ID: ***L16784-02***
Date Sampled: *02/11/14 12:20*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	336		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	336		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/28/14 8:55	calc
Sum of Anions			25			meq/L	0.1	0.5	02/28/14 8:55	calc
Sum of Cations			25			meq/L	0.1	0.5	02/28/14 8:55	calc
Chloride	M300.0 - Ion Chromatography	20	20.6	B	*	mg/L	10	50	02/15/14 0:47	tcd
Conductivity @25C	SM2510B	1	1940		*	umhos/cm	1	10	02/14/14 16:45	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/15/14 0:47	tcd
Hardness as CaCO3	SM2340B - Calculation		1060			mg/L	1	7	02/28/14 8:55	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	02/26/14 18:09	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1570		*	mg/L	10	20	02/17/14 15:37	id
Sulfate	M300.0 - Ion Chromatography	20	856		*	mg/L	10	50	02/15/14 0:47	tcd
TDS (calculated)	Calculation		1540			mg/L	10	50	02/28/14 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.02						02/28/14 8:55	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C3.0

ACZ Sample ID: ***L16784-05***
Date Sampled: *02/11/14 12:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 16:10	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 12:55	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	02/13/14 19:53	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/13/14 17:43	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	02/13/14 17:43	pmc
Barium, dissolved	M6010B ICP	1	0.065		*	mg/L	0.003	0.02	02/13/14 19:53	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:43	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/13/14 17:43	pmc
Calcium, dissolved	M6010B ICP	1	254			mg/L	0.1	0.5	02/13/14 19:53	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:43	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0005	B		mg/L	0.0005	0.003	02/13/14 17:43	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:53	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:43	pmc
Magnesium, dissolved	M6010B ICP	1	50.4			mg/L	0.2	1	02/13/14 19:53	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0853		*	mg/L	0.0005	0.003	02/13/14 17:43	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:33	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/13/14 19:53	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:53	jjc
Potassium, dissolved	M6010B ICP	1	19			mg/L	0.2	1	02/13/14 19:53	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	02/13/14 17:43	pmc
Silica, dissolved	M6010B ICP	1	19.6			mg/L	0.2	1	02/13/14 19:53	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:43	pmc
Sodium, dissolved	M6010B ICP	1	47.2			mg/L	0.2	1	02/13/14 19:53	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	02/13/14 17:43	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0350		*	mg/L	0.0001	0.0005	02/13/14 17:43	pmc
Uranium, total	M6020 ICP-MS	1	0.0356		*	mg/L	0.0001	0.0005	02/20/14 17:46	msh
Vanadium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0002	0.001	02/13/14 17:43	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.005		J	mg/L	0.002	0.005	02/13/14 17:43	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-14-S1-C3.0

ACZ Sample ID: ***L16784-05***
Date Sampled: *02/11/14 12:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	252		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	252		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.6			%			02/28/14 8:55	calc
Sum of Anions			20			meq/L	0.1	0.5	02/28/14 8:55	calc
Sum of Cations			19			meq/L	0.1	0.5	02/28/14 8:55	calc
Chloride	M300.0 - Ion Chromatography	20	19.8	B	*	mg/L	10	50	02/24/14 14:24	tcd
Conductivity @25C	SM2510B	1	1570		*	umhos/cm	1	10	02/14/14 17:37	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/24/14 14:24	tcd
Hardness as CaCO3	SM2340B - Calculation		842			mg/L	1	7	02/28/14 8:55	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/26/14 18:14	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1280		*	mg/L	10	20	02/17/14 15:45	id
Sulfate	M300.0 - Ion Chromatography	20	661		*	mg/L	10	50	02/24/14 14:24	tcd
TDS (calculated)	Calculation		1220			mg/L	10	50	02/28/14 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.05						02/28/14 8:55	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C3.0

ACZ Sample ID: ***L16784-06***
Date Sampled: *02/11/14 12:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 16:27	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 13:08	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	02/13/14 19:56	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/13/14 17:46	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	02/13/14 17:46	pmc
Barium, dissolved	M6010B ICP	1	0.064		*	mg/L	0.003	0.02	02/13/14 19:56	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:46	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0001	0.0005	02/13/14 17:46	pmc
Calcium, dissolved	M6010B ICP	1	250			mg/L	0.1	0.5	02/13/14 19:56	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:46	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0006	B		mg/L	0.0005	0.003	02/13/14 17:46	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:56	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	02/13/14 17:46	pmc
Magnesium, dissolved	M6010B ICP	1	49.9			mg/L	0.2	1	02/13/14 19:56	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.0861		*	mg/L	0.0005	0.003	02/13/14 17:46	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:36	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	02/13/14 19:56	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:56	jjc
Potassium, dissolved	M6010B ICP	1	18.8			mg/L	0.2	1	02/13/14 19:56	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0003			mg/L	0.0001	0.0003	02/13/14 17:46	pmc
Silica, dissolved	M6010B ICP	1	19.3			mg/L	0.2	1	02/13/14 19:56	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:46	pmc
Sodium, dissolved	M6010B ICP	1	46.8			mg/L	0.2	1	02/13/14 19:56	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	02/13/14 17:46	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0353		*	mg/L	0.0001	0.0005	02/13/14 17:46	pmc
Uranium, total	M6020 ICP-MS	1	0.0367		*	mg/L	0.0001	0.0005	02/20/14 17:50	msh
Vanadium, dissolved	M6020 ICP-MS	1	0.0002	B		mg/L	0.0002	0.001	02/13/14 17:46	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.007	J		mg/L	0.002	0.005	02/13/14 17:46	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C3.0

ACZ Sample ID: ***L16784-06***
Date Sampled: *02/11/14 12:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	252		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	252		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/28/14 8:56	calc
Sum of Anions			19			meq/L	0.1	0.5	02/28/14 8:56	calc
Sum of Cations			19			meq/L	0.1	0.5	02/28/14 8:56	calc
Chloride	M300.0 - Ion Chromatography	10	19.0	B	*	mg/L	5	25	02/24/14 15:00	tcd
Conductivity @25C	SM2510B	1	1580		*	umhos/cm	1	10	02/14/14 17:45	abd
Fluoride	M300.0 - Ion Chromatography	10		U	*	mg/L	1	5	02/24/14 15:00	tcd
Hardness as CaCO3	SM2340B - Calculation		830			mg/L	1	7	02/28/14 8:56	calc
pH (lab)	SM4500H+ B									
pH		1	8.1	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	02/26/14 18:15	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1280		*	mg/L	10	20	02/17/14 15:48	id
Sulfate	M300.0 - Ion Chromatography	10	658		*	mg/L	5	25	02/24/14 15:00	tcd
TDS (calculated)	Calculation		1210			mg/L	10	50	02/28/14 8:56	calc
TDS (ratio - measured/calculated)	Calculation		1.06						02/28/14 8:56	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C3.0

ACZ Sample ID: ***L16784-04***
Date Sampled: *02/11/14 13:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								02/21/14 15:54	mss2
Total Hot Plate Digestion	M3010A ICP-MS								02/18/14 12:15	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.03	0.2	02/13/14 19:50	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	02/13/14 17:37	pmc
Arsenic, dissolved	M6020 ICP-MS	1	0.0019			mg/L	0.0002	0.001	02/13/14 17:37	pmc
Barium, dissolved	M6010B ICP	1	0.025		*	mg/L	0.003	0.02	02/13/14 19:50	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	02/13/14 17:37	pmc
Cadmium, dissolved	M6020 ICP-MS	1	0.0095			mg/L	0.0001	0.0005	02/13/14 17:37	pmc
Calcium, dissolved	M6010B ICP	1	263			mg/L	0.1	0.5	02/13/14 19:50	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	02/13/14 17:37	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0052			mg/L	0.0005	0.003	02/13/14 17:37	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	02/13/14 19:50	jjc
Lead, dissolved	M6020 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	02/13/14 17:37	pmc
Magnesium, dissolved	M6010B ICP	1	71.9			mg/L	0.2	1	02/13/14 19:50	jjc
Manganese, dissolved	M6020 ICP-MS	2	0.246		*	mg/L	0.001	0.005	02/13/14 17:40	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	02/18/14 13:31	mfm
Molybdenum, dissolved	M6010B ICP	1	0.03	B		mg/L	0.02	0.1	02/13/14 19:50	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.008	0.04	02/13/14 19:50	jjc
Potassium, dissolved	M6010B ICP	1	19.6			mg/L	0.2	1	02/13/14 19:50	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0024			mg/L	0.0001	0.0003	02/13/14 17:37	pmc
Silica, dissolved	M6010B ICP	1	26.3			mg/L	0.2	1	02/13/14 19:50	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	02/13/14 17:37	pmc
Sodium, dissolved	M6010B ICP	1	55.6			mg/L	0.2	1	02/13/14 19:50	jjc
Thallium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0001	0.0005	02/13/14 17:37	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0496		*	mg/L	0.0001	0.0005	02/13/14 17:37	pmc
Uranium, total	M6020 ICP-MS	1	0.0509		*	mg/L	0.0001	0.0005	02/20/14 17:36	msh
Vanadium, dissolved	M6020 ICP-MS	1	0.0003	B		mg/L	0.0002	0.001	02/13/14 17:37	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.023		J	mg/L	0.002	0.005	02/13/14 17:37	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: SW-15-S1-C3.0

ACZ Sample ID: ***L16784-04***
Date Sampled: *02/11/14 13:38*
Date Received: *02/12/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	312		*	mg/L	2	20	02/14/14 0:00	abd
Carbonate as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Hydroxide as CaCO3		1		U	*	mg/L	2	20	02/14/14 0:00	abd
Total Alkalinity		1	312		*	mg/L	2	20	02/14/14 0:00	abd
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			02/28/14 8:55	calc
Sum of Anions			22			meq/L	0.1	0.5	02/28/14 8:55	calc
Sum of Cations			22			meq/L	0.1	0.5	02/28/14 8:55	calc
Chloride	M300.0 - Ion Chromatography	20	24.8	B	*	mg/L	10	50	02/15/14 1:23	tcd
Conductivity @25C	SM2510B	1	1750		*	umhos/cm	1	10	02/14/14 17:30	abd
Fluoride	M300.0 - Ion Chromatography	20		U	*	mg/L	2	10	02/15/14 1:23	tcd
Hardness as CaCO3	SM2340B - Calculation		953			mg/L	1	7	02/28/14 8:55	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	02/14/14 0:00	abd
pH measured at		1	21		*	C	0.1	0.1	02/14/14 0:00	abd
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	02/26/14 18:13	mpb
Residue, Filterable (TDS) @180C	SM2540C	1	1430		*	mg/L	10	20	02/17/14 15:43	id
Sulfate	M300.0 - Ion Chromatography	20	731		*	mg/L	10	50	02/15/14 1:23	tcd
TDS (calculated)	Calculation		1380			mg/L	10	50	02/28/14 8:55	calc
TDS (ratio - measured/calculated)	Calculation		1.04						02/28/14 8:55	calc

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Mining Co.
Sample ID: PW-3-13-4

ACZ Sample ID: ***L15893-07***
Date Sampled: *12/05/13 09:55*
Date Received: *12/06/13*
Sample Matrix: *Ground Water*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 9:33	bsu
Total Hot Plate Digestion	M200.2 ICP-MS								12/23/13 9:36	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	1		U		mg/L	0.03	0.2	12/12/13 0:50	aeb
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	12/19/13 6:41	pmc
Arsenic, dissolved	M200.8 ICP-MS	1	0.0004	B		mg/L	0.0002	0.001	12/19/13 6:41	pmc
Barium, dissolved	M200.7 ICP	1	0.010	B		mg/L	0.003	0.02	12/12/13 0:50	aeb
Beryllium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/19/13 6:41	pmc
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/19/13 6:41	pmc
Calcium, dissolved	M200.7 ICP	1	232			mg/L	0.2	1	12/12/13 0:50	aeb
Chromium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0005	0.002	12/19/13 6:41	pmc
Copper, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/13 0:50	aeb
Iron, dissolved	M200.7 ICP	1	4.97		*	mg/L	0.02	0.05	12/12/13 19:05	jjc
Lead, dissolved	M200.8 ICP-MS	1	0.0015			mg/L	0.0001	0.0005	12/19/13 6:41	pmc
Magnesium, dissolved	M200.7 ICP	1	78.5			mg/L	0.2	1	12/12/13 0:50	aeb
Manganese, dissolved	M200.7 ICP	1	0.188			mg/L	0.005	0.03	12/12/13 0:50	aeb
Mercury, dissolved	M245.1 CVAA	1		U		mg/L	0.0002	0.001	12/19/13 12:33	mfm
Molybdenum, dissolved	M200.7 ICP	1		U		mg/L	0.02	0.1	12/12/13 0:50	aeb
Nickel, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/13 0:50	aeb
Potassium, dissolved	M200.7 ICP	1	12			mg/L	0.3	2	12/12/13 0:50	aeb
Selenium, dissolved	SM 3114 B, AA-Hydride	1		U		mg/L	0.001	0.005	12/11/13 16:13	mfm
Silica, dissolved	M200.7 ICP	1	10.1			mg/L	0.4	2	12/12/13 0:50	aeb
Silver, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	12/19/13 6:41	pmc
Sodium, dissolved	M200.7 ICP	1	51			mg/L	0.3	2	12/12/13 0:50	aeb
Thallium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	12/19/13 6:41	pmc
Uranium, total	M200.8 ICP-MS	1	0.0163			mg/L	0.0001	0.0005	12/27/13 11:46	msh
Vanadium, dissolved	M200.7 ICP	1		U		mg/L	0.005	0.03	12/12/13 0:50	aeb
Zinc, dissolved	M200.7 ICP	1		U		mg/L	0.01	0.05	12/12/13 0:50	aeb

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Mining Co.
Sample ID: PW-3-13-4

ACZ Sample ID: ***L15893-07***
Date Sampled: *12/05/13 09:55*
Date Received: *12/06/13*
Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	344			mg/L	2	20	12/08/13 0:00	khw
Carbonate as CaCO3		1		U		mg/L	2	20	12/08/13 0:00	khw
Hydroxide as CaCO3		1		U		mg/L	2	20	12/08/13 0:00	khw
Total Alkalinity		1	344		*	mg/L	2	20	12/08/13 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			12/31/13 8:48	calc
Sum of Anions			21			meq/L	0.1	0.5	12/31/13 8:48	calc
Sum of Cations			21			meq/L	0.1	0.5	12/31/13 8:48	calc
Chloride	SM4500Cl-E	1	22			mg/L	1	5	12/23/13 15:08	mpb
Conductivity @25C	SM2510B	1	2120		*	umhos/cm	1	10	12/07/13 6:13	khw
Fluoride	SM4500F-C	1	0.4	B	*	mg/L	0.1	0.5	12/12/13 15:31	khw
Hardness as CaCO3	SM2340B - Calculation		903			mg/L	1	7	12/31/13 8:48	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2			U		mg/L	0.02	0.1	12/31/13 8:48	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.02	0.1	12/06/13 19:35	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/13 19:35	pjb
Nitrogen, ammonia	M350.1 - Automated Phenate	1	0.22	B	*	mg/L	0.05	0.5	12/26/13 13:53	jlf
pH (lab)	SM4500H+ B									
pH		1	8	H		units	0.1	0.1	12/08/13 0:00	khw
pH measured at		1	21			C	0.1	0.1	12/08/13 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.01	B	*	mg/L	0.01	0.05	12/19/13 22:36	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1290			mg/L	10	20	12/10/13 12:35	dcw
Residue, Non-Filterable (TSS) @105C	SM2540D	1	10	B	*	mg/L	5	20	12/11/13 13:12	id
Sulfate	SM4500 SO4-D	1	650		*	mg/L	10	50	12/19/13 11:27	abm
TDS (calculated)	Calculation		1270			mg/L	10	50	12/31/13 8:48	calc
TDS (ratio - measured/calculated)	Calculation		1.02						12/31/13 8:48	calc

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

RadioChemistry Analytical Results

Lisbon Valley Mining Company, LLC
Project ID: Lisbon Valley Mining Co.
Sample ID: PW-3-13-4
Locator:

ACZ Sample ID: ***L15893-07***
Date Sampled: *12/05/13 9:55*
Date Received: *12/06/13*
Sample Matrix: *Ground Water*

Gross Alpha & Beta, total
M9310

Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha	12/18/13 14:46		19	8.8	5.1	pCi/L	*	mss3
Gross Beta	12/18/13 14:46		21	8.1	8.9	pCi/L		mss3

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: HS-S1

ACZ Sample ID: ***L16367-03***
Date Sampled: *01/12/14 12:27*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 9:43	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 9:46	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/16/14 12:34	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 0:28	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0002	0.001	01/23/14 0:28	pmc
Barium, dissolved	M6010B ICP	1	0.008	B		mg/L	0.003	0.02	01/16/14 12:34	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 0:28	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 0:28	pmc
Calcium, dissolved	M6010B ICP	1	243			mg/L	0.2	1	01/16/14 12:34	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 0:28	pmc
Copper, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	01/23/14 0:28	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/16/14 12:34	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:28	pmc
Magnesium, dissolved	M6010B ICP	1	82.6			mg/L	0.2	1	01/16/14 12:34	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.1738		*	mg/L	0.0005	0.003	01/23/14 0:28	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:03	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/16/14 12:34	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/16/14 12:34	jjc
Potassium, dissolved	M6010B ICP	1	12.7			mg/L	0.3	2	01/16/14 12:34	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0002	B	*	mg/L	0.0001	0.0003	01/23/14 0:28	pmc
Silica, dissolved	M6010B ICP	1	10.2			mg/L	0.4	2	01/16/14 12:34	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 0:28	pmc
Sodium, dissolved	M6010B ICP	1	54			mg/L	0.3	2	01/16/14 12:34	jjc
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:28	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0167		*	mg/L	0.0001	0.0005	01/23/14 0:28	pmc
Uranium, total	M6020 ICP-MS	1	0.0171		*	mg/L	0.0001	0.0005	01/23/14 21:21	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 0:28	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.012		*	mg/L	0.002	0.005	01/23/14 0:28	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: HS-S1

ACZ Sample ID: ***L16367-03***
Date Sampled: *01/12/14 12:27*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	332		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	332		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.3			%			01/24/14 11:44	calc
Sum of Anions			21			meq/L	0.1	0.5	01/24/14 11:44	calc
Sum of Cations			22			meq/L	0.1	0.5	01/24/14 11:44	calc
Chloride	M300.0 - Ion Chromatography	10	18.8	B	*	mg/L	5	25	01/21/14 17:47	jlf
Conductivity @25C	SM2510B	1	1600		*	umhos/cm	1	10	01/14/14 22:04	dcw
Fluoride	M300.0 - Ion Chromatography	10		U	*	mg/L	1	5	01/21/14 17:47	jlf
Hardness as CaCO3	SM2340B - Calculation		947			mg/L	1	7	01/24/14 11:44	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 17:03	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	1	1300		*	mg/L	10	20	01/16/14 16:20	dcw
Sulfate	M300.0 - Ion Chromatography	10	633		*	mg/L	5	25	01/21/14 17:47	jlf
TDS (calculated)	Calculation		1250			mg/L	10	50	01/24/14 11:44	calc
TDS (ratio - measured/calculated)	Calculation		1.04						01/24/14 11:44	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C0.5

ACZ Sample ID: ***L16367-04***
Date Sampled: *01/12/14 12:39*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/16/14 9:50	mss2/bs
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 10:00	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/16/14 12:37	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 0:31	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0002	0.001	01/23/14 0:31	pmc
Barium, dissolved	M6010B ICP	1	0.007	B		mg/L	0.003	0.02	01/16/14 12:37	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 0:31	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 0:31	pmc
Calcium, dissolved	M6010B ICP	1	240			mg/L	0.2	1	01/16/14 12:37	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 0:31	pmc
Copper, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	01/23/14 0:31	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/16/14 12:37	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:31	pmc
Magnesium, dissolved	M6010B ICP	1	82.1			mg/L	0.2	1	01/16/14 12:37	jjc
Manganese, dissolved	M6020 ICP-MS	1	0.1737		*	mg/L	0.0005	0.003	01/23/14 0:31	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/17/14 13:05	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/16/14 12:37	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/16/14 12:37	jjc
Potassium, dissolved	M6010B ICP	1	12.5			mg/L	0.3	2	01/16/14 12:37	jjc
Selenium, dissolved	M6020 ICP-MS	1	0.0002	B	*	mg/L	0.0001	0.0003	01/23/14 0:31	pmc
Silica, dissolved	M6010B ICP	1	10.1			mg/L	0.4	2	01/16/14 12:37	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 0:31	pmc
Sodium, dissolved	M6010B ICP	1	53.5			mg/L	0.3	2	01/16/14 12:37	jjc
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 0:31	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0165		*	mg/L	0.0001	0.0005	01/23/14 0:31	pmc
Uranium, total	M6020 ICP-MS	1	0.0172		*	mg/L	0.0001	0.0005	01/23/14 21:22	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 0:31	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.012		*	mg/L	0.002	0.005	01/23/14 0:31	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-C0.5

ACZ Sample ID: ***L16367-04***
Date Sampled: *01/12/14 12:39*
Date Received: *01/14/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	351		*	mg/L	2	20	01/14/14 0:00	dcw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/14/14 0:00	dcw
Total Alkalinity		1	351		*	mg/L	2	20	01/14/14 0:00	dcw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			0.0			%			01/24/14 11:44	calc
Sum of Anions			21			meq/L	0.1	0.5	01/24/14 11:44	calc
Sum of Cations			21			meq/L	0.1	0.5	01/24/14 11:44	calc
Chloride	M300.0 - Ion Chromatography	10	18.7	B	*	mg/L	5	25	01/21/14 18:04	jlf
Conductivity @25C	SM2510B	1	1600		*	umhos/cm	1	10	01/14/14 22:13	dcw
Fluoride	M300.0 - Ion Chromatography	10		U	*	mg/L	1	5	01/21/14 18:04	jlf
Hardness as CaCO3	SM2340B - Calculation		937			mg/L	1	7	01/24/14 11:44	calc
pH (lab)	SM4500H+ B									
pH		1	8.2	H	*	units	0.1	0.1	01/14/14 0:00	dcw
pH measured at		1	24		*	C	0.1	0.1	01/14/14 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/16/14 17:04	mss2/bs
Residue, Filterable (TDS) @180C	SM2540C	1	1300		*	mg/L	10	20	01/16/14 16:23	dcw
Sulfate	M300.0 - Ion Chromatography	10	617		*	mg/L	5	25	01/21/14 18:04	jlf
TDS (calculated)	Calculation		1240			mg/L	10	50	01/24/14 11:44	calc
TDS (ratio - measured/calculated)	Calculation		1.05						01/24/14 11:44	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-24-EB

ACZ Sample ID: ***L16009-01***
Date Sampled: *12/12/13 09:23*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 16:54	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 14:04	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	12/17/13 22:54	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:26	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:26	pmc
Barium, dissolved	M6010B ICP	1	0.003	B	*	mg/L	0.003	0.02	12/17/13 22:54	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:26	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:26	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 22:54	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:26	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	12/17/13 2:26	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	12/17/13 22:54	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:26	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 22:54	aeb
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	12/17/13 2:26	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/30/13 12:23	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 22:54	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 22:54	aeb
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 22:54	aeb
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/13 2:26	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	12/17/13 22:54	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:26	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 22:54	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:26	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/17/13 2:26	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/18/13 19:14	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:26	pmc
Zinc, dissolved	M6020 ICP-MS	1		U		mg/L	0.002	0.005	12/17/13 2:26	pmc

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

Inorganic Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-24-EB

ACZ Sample ID: ***L16009-01***
Date Sampled: *12/12/13 09:23*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/31/13 9:08	calc
Sum of Anions			N/A			meq/L	0.1	0.5	12/31/13 9:08	calc
Sum of Cations				U		meq/L	0.1	0.5	12/31/13 9:08	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/19/13 22:38	tcd
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	12/16/13 21:31	abm
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/19/13 22:38	tcd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	12/31/13 9:08	calc
pH (lab)	SM4500H+ B									
pH		1	6.4	H	*	units	0.1	0.1	12/16/13 0:00	abm
pH measured at		1	22		*	C	0.1	0.1	12/16/13 0:00	abm
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/19/13 23:21	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	20		*	mg/L	10	20	12/16/13 10:57	dcw
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/19/13 22:38	tcd
TDS (calculated)	Calculation			U		mg/L	10	50	12/31/13 9:08	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/31/13 9:08	calc

** Please refer to Qualifier Reports for details.*

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-16-EB

ACZ Sample ID: ***L16009-02***
Date Sampled: *12/12/13 09:38*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 16:59	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 14:18	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	12/17/13 23:03	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:29	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:29	pmc
Barium, dissolved	M6010B ICP	1	0.004	B	*	mg/L	0.003	0.02	12/17/13 23:03	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:29	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:29	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:03	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:29	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	12/17/13 2:29	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	12/17/13 23:03	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:29	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:03	aeb
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	12/17/13 2:29	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/30/13 12:25	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 23:03	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 23:03	aeb
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:03	aeb
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/13 2:29	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	12/17/13 23:03	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:29	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:03	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:29	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/17/13 2:29	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/18/13 19:17	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:29	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.002	B		mg/L	0.002	0.005	12/17/13 2:29	pmc

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

Inorganic Analytical Results

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-16-EB

ACZ Sample ID: ***L16009-02***
Date Sampled: *12/12/13 09:38*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	2	B	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1	2	B	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/31/13 9:08	calc
Sum of Anions				U		meq/L	0.1	0.5	12/31/13 9:08	calc
Sum of Cations				U		meq/L	0.1	0.5	12/31/13 9:08	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/19/13 23:50	tcd
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	12/16/13 21:37	abm
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/19/13 23:50	tcd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	12/31/13 9:08	calc
pH (lab)	SM4500H+ B									
pH		1	6.1	H	*	units	0.1	0.1	12/16/13 0:00	abm
pH measured at		1	22		*	C	0.1	0.1	12/16/13 0:00	abm
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/19/13 23:22	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	12/16/13 10:58	dcw
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/19/13 23:50	tcd
TDS (calculated)	Calculation			U		mg/L	10	50	12/31/13 9:08	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/31/13 9:08	calc

** Please refer to Qualifier Reports for details.*

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-28-EB

ACZ Sample ID: ***L16009-04***
Date Sampled: *12/12/13 12:05*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 17:10	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 14:46	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	12/17/13 23:09	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:36	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:36	pmc
Barium, dissolved	M6010B ICP	1	0.003	B	*	mg/L	0.003	0.02	12/17/13 23:09	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:36	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:36	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:09	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:36	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	12/17/13 2:36	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	12/17/13 23:09	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:36	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:09	aeb
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	12/17/13 2:36	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/30/13 12:34	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 23:09	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 23:09	aeb
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:09	aeb
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/13 2:36	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	12/17/13 23:09	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:36	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:09	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:36	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/17/13 2:36	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/18/13 19:24	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:36	pmc
Zinc, dissolved	M6020 ICP-MS	1		U		mg/L	0.002	0.005	12/17/13 2:36	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-28-EB

ACZ Sample ID: ***L16009-04***
Date Sampled: *12/12/13 12:05*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/31/13 9:09	calc
Sum of Anions			N/A			meq/L	0.1	0.5	12/31/13 9:09	calc
Sum of Cations				U		meq/L	0.1	0.5	12/31/13 9:09	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 0:26	tcd
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	12/16/13 21:54	abm
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/20/13 0:26	tcd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	12/31/13 9:09	calc
pH (lab)	SM4500H+ B									
pH		1	6	H	*	units	0.1	0.1	12/16/13 0:00	abm
pH measured at		1	22		*	C	0.1	0.1	12/16/13 0:00	abm
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/19/13 23:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	10	B	*	mg/L	10	20	12/16/13 16:38	khw
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 0:26	tcd
TDS (calculated)	Calculation			U		mg/L	10	50	12/31/13 9:09	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/31/13 9:09	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-EB

ACZ Sample ID: ***L16009-05***
Date Sampled: *12/12/13 12:10*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 17:15	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 15:00	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	12/17/13 23:12	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:39	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:39	pmc
Barium, dissolved	M6010B ICP	1	0.003	B	*	mg/L	0.003	0.02	12/17/13 23:12	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:39	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:39	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:12	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:39	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	12/17/13 2:39	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	12/17/13 23:12	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:39	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:12	aeb
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	12/17/13 2:39	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/30/13 12:36	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 23:12	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 23:12	aeb
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:12	aeb
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/13 2:39	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	12/17/13 23:12	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:39	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:12	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:39	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/17/13 2:39	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/18/13 19:28	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:39	pmc
Zinc, dissolved	M6020 ICP-MS	1		U		mg/L	0.002	0.005	12/17/13 2:39	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-S1-EB

ACZ Sample ID: ***L16009-05***
Date Sampled: *12/12/13 12:10*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/31/13 9:09	calc
Sum of Anions			N/A			meq/L	0.1	0.5	12/31/13 9:09	calc
Sum of Cations				U		meq/L	0.1	0.5	12/31/13 9:09	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 0:43	tcd
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	12/16/13 21:59	abm
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/20/13 0:43	tcd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	12/31/13 9:09	calc
pH (lab)	SM4500H+ B									
pH		1	6	H	*	units	0.1	0.1	12/16/13 0:00	abm
pH measured at		1	22		*	C	0.1	0.1	12/16/13 0:00	abm
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/19/13 23:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	10	B	*	mg/L	10	20	12/16/13 16:40	khw
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 0:43	tcd
TDS (calculated)	Calculation			U		mg/L	10	50	12/31/13 9:09	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/31/13 9:09	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-26-EB

ACZ Sample ID: ***L16009-06***
Date Sampled: *12/12/13 12:44*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 17:26	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 15:14	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	12/17/13 23:16	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:42	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:42	pmc
Barium, dissolved	M6010B ICP	1	0.003	B	*	mg/L	0.003	0.02	12/17/13 23:16	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:42	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:42	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:16	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:42	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	12/17/13 2:42	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	12/17/13 23:16	aeb
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:42	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	12/17/13 23:16	aeb
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	12/17/13 2:42	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/30/13 12:43	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 23:16	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 23:16	aeb
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:16	aeb
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	12/17/13 2:42	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	12/17/13 23:16	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:42	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	12/17/13 23:16	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:42	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/17/13 2:42	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	12/18/13 19:31	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:42	pmc
Zinc, dissolved	M6020 ICP-MS	1		U		mg/L	0.002	0.005	12/17/13 2:42	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: COL-26-EB

ACZ Sample ID: ***L16009-06***
Date Sampled: *12/12/13 12:44*
Date Received: *12/13/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			12/31/13 9:09	calc
Sum of Anions			N/A			meq/L	0.1	0.5	12/31/13 9:09	calc
Sum of Cations				U		meq/L	0.1	0.5	12/31/13 9:09	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 1:01	tcd
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	12/16/13 22:05	abm
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/20/13 1:01	tcd
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	12/31/13 9:09	calc
pH (lab)	SM4500H+ B									
pH		1	5.9	H	*	units	0.1	0.1	12/16/13 0:00	abm
pH measured at		1	22		*	C	0.1	0.1	12/16/13 0:00	abm
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	12/19/13 23:28	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	12/16/13 16:41	khw
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	12/20/13 1:01	tcd
TDS (calculated)	Calculation			U		mg/L	10	50	12/31/13 9:09	calc
TDS (ratio - measured/calculated)	Calculation		n/a						12/31/13 9:09	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: 3338PAP4

ACZ Sample ID: ***L16450-06***
Date Sampled: *01/16/14 17:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:40	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 12:35	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/20/14 14:35	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 20:05	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 20:05	pmc
Barium, dissolved	M6010B ICP	1		U		mg/L	0.003	0.02	01/20/14 14:35	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 20:05	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:05	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	01/20/14 14:35	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 20:05	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	01/23/14 20:05	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:35	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:05	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	01/20/14 14:35	jjc
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	01/23/14 20:05	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:23	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:35	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:35	jjc
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	01/20/14 14:35	jjc
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	01/23/14 20:05	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	01/20/14 14:35	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 20:05	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	01/20/14 14:35	jjc
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:05	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 20:05	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 21:49	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 20:05	pmc
Zinc, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.002	0.005	01/23/14 20:05	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: 3338PAP4

ACZ Sample ID: ***L16450-06***
Date Sampled: *01/16/14 17:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			01/27/14 14:57	calc
Sum of Anions			N/A			meq/L	0.1	0.5	01/27/14 14:57	calc
Sum of Cations				U		meq/L	0.1	0.5	01/27/14 14:57	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	01/22/14 2:08	jlf
Conductivity @25C	SM2510B	1	2	B	*	umhos/cm	1	10	01/21/14 19:09	khw
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	01/22/14 2:08	jlf
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	01/27/14 14:57	calc
pH (lab)	SM4500H+ B									
pH		1	6.4	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	22		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:32	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	01/22/14 14:46	abd
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	01/22/14 2:08	jlf
TDS (calculated)	Calculation			U		mg/L	10	50	01/27/14 14:57	calc
TDS (ratio - measured/calculated)	Calculation		n/a						01/27/14 14:57	calc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-BB-C1.0

ACZ Sample ID: ***L16450-07***
Date Sampled: *01/16/14 17:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								01/22/14 19:45	mpb
Total Hot Plate Digestion	M3010A ICP-MS								01/22/14 12:49	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1		U		mg/L	0.03	0.2	01/20/14 14:38	jjc
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	01/23/14 20:08	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 20:08	pmc
Barium, dissolved	M6010B ICP	1		U		mg/L	0.003	0.02	01/20/14 14:38	jjc
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	01/23/14 20:08	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:08	pmc
Calcium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	01/20/14 14:38	jjc
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	01/23/14 20:08	pmc
Copper, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.003	01/23/14 20:08	pmc
Iron, dissolved	M6010B ICP	1		U		mg/L	0.02	0.05	01/20/14 14:38	jjc
Lead, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:08	pmc
Magnesium, dissolved	M6010B ICP	1		U		mg/L	0.2	1	01/20/14 14:38	jjc
Manganese, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0005	0.003	01/23/14 20:08	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	01/20/14 17:30	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	01/20/14 14:38	jjc
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	01/20/14 14:38	jjc
Potassium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	01/20/14 14:38	jjc
Selenium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0003	01/23/14 20:08	pmc
Silica, dissolved	M6010B ICP	1		U		mg/L	0.4	2	01/20/14 14:38	jjc
Silver, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.00005	0.0003	01/23/14 20:08	pmc
Sodium, dissolved	M6010B ICP	1		U		mg/L	0.3	2	01/20/14 14:38	jjc
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	01/23/14 20:08	pmc
Uranium, dissolved	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 20:08	pmc
Uranium, total	M6020 ICP-MS	1		U	*	mg/L	0.0001	0.0005	01/23/14 21:55	pmc
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	01/23/14 20:08	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.002	B	*	mg/L	0.002	0.005	01/23/14 20:08	pmc

Whetstone Associates, Inc.
Project ID: 4124I
Sample ID: GEO-BB-C1.0

ACZ Sample ID: ***L16450-07***
Date Sampled: *01/16/14 17:00*
Date Received: *01/17/14*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Carbonate as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Hydroxide as CaCO3		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Total Alkalinity		1		U	*	mg/L	2	20	01/21/14 0:00	khw
Cation-Anion Balance	Calculation									
Cation-Anion Balance			n/a			%			01/27/14 14:57	calc
Sum of Anions			N/A			meq/L	0.1	0.5	01/27/14 14:57	calc
Sum of Cations				U		meq/L	0.1	0.5	01/27/14 14:57	calc
Chloride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	01/22/14 2:44	jlf
Conductivity @25C	SM2510B	1	1	B	*	umhos/cm	1	10	01/21/14 19:16	khw
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	01/22/14 2:44	jlf
Hardness as CaCO3	SM2340B - Calculation			U		mg/L	1	7	01/27/14 14:57	calc
pH (lab)	SM4500H+ B									
pH		1	6.1	H	*	units	0.1	0.1	01/21/14 0:00	khw
pH measured at		1	22		*	C	0.1	0.1	01/21/14 0:00	khw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1		U	*	mg/L	0.01	0.05	01/23/14 23:33	pjb
Residue, Filterable (TDS) @180C	SM2540C	1		U	*	mg/L	10	20	01/22/14 14:48	abd
Sulfate	M300.0 - Ion Chromatography	1		U	*	mg/L	0.5	2.5	01/22/14 2:44	jlf
TDS (calculated)	Calculation			U		mg/L	10	50	01/27/14 14:57	calc
TDS (ratio - measured/calculated)	Calculation		n/a						01/27/14 14:57	calc

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Inorganic Analytical Results

Whetstone Associates, Inc.
Project ID: 41241
Sample ID: SAND-DI

ACZ Sample ID: ***L15995-01***
Date Sampled: *12/11/13 15:10*
Date Received: *12/12/13*
Sample Matrix: *Leachate*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Phosphorus, total	M365.1 - Auto Ascorbic Acid Digestion								12/19/13 14:46	bsu
Total Hot Plate Digestion	M3010A ICP-MS								12/17/13 13:50	las

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M6010B ICP	1	0.11	B		mg/L	0.03	0.2	12/17/13 22:41	aeb
Antimony, dissolved	M6020 ICP-MS	1		U		mg/L	0.0004	0.002	12/17/13 2:16	pmc
Arsenic, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:16	pmc
Barium, dissolved	M6010B ICP	1	0.005	B	*	mg/L	0.003	0.02	12/17/13 22:41	aeb
Beryllium, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:16	pmc
Cadmium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:16	pmc
Calcium, dissolved	M6010B ICP	1	5.7			mg/L	0.2	1	12/17/13 22:41	aeb
Chromium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0005	0.002	12/17/13 2:16	pmc
Copper, dissolved	M6020 ICP-MS	1	0.0006	B		mg/L	0.0005	0.003	12/17/13 2:16	pmc
Iron, dissolved	M6010B ICP	1	0.02	B		mg/L	0.02	0.05	12/17/13 22:41	aeb
Lead, dissolved	M6020 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	12/17/13 2:16	pmc
Magnesium, dissolved	M6010B ICP	1	1.4			mg/L	0.2	1	12/17/13 22:41	aeb
Manganese, dissolved	M6020 ICP-MS	1	0.0010	B	*	mg/L	0.0005	0.003	12/17/13 2:16	pmc
Mercury, dissolved	M7470A CVAA	1		U		mg/L	0.0002	0.001	12/18/13 14:58	mfm
Molybdenum, dissolved	M6010B ICP	1		U		mg/L	0.02	0.1	12/17/13 22:41	aeb
Nickel, dissolved	M6010B ICP	1		U		mg/L	0.01	0.05	12/17/13 22:41	aeb
Potassium, dissolved	M6010B ICP	1	1.1	B		mg/L	0.3	2	12/17/13 22:41	aeb
Selenium, dissolved	M6020 ICP-MS	1	0.0013			mg/L	0.0001	0.0003	12/17/13 2:16	pmc
Silica, dissolved	M6010B ICP	1	0.9	B		mg/L	0.4	2	12/17/13 22:41	aeb
Silver, dissolved	M6020 ICP-MS	1		U		mg/L	0.00005	0.0003	12/17/13 2:16	pmc
Sodium, dissolved	M6010B ICP	1	1.3	B		mg/L	0.3	2	12/17/13 22:41	aeb
Thallium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0001	0.0005	12/17/13 2:16	pmc
Uranium, dissolved	M6020 ICP-MS	1	0.0002	B	*	mg/L	0.0001	0.0005	12/17/13 2:16	pmc
Uranium, total	M6020 ICP-MS	1	0.0003	B	*	mg/L	0.0001	0.0005	12/18/13 19:10	msh
Vanadium, dissolved	M6020 ICP-MS	1		U		mg/L	0.0002	0.001	12/17/13 2:16	pmc
Zinc, dissolved	M6020 ICP-MS	1	0.003	B		mg/L	0.002	0.005	12/17/13 2:16	pmc

** Please refer to Qualifier Reports for details.*

Whetstone Associates, Inc.
Project ID: 41241
Sample ID: SAND-DI

ACZ Sample ID: ***L15995-01***
Date Sampled: *12/11/13 15:10*
Date Received: *12/12/13*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	12	B	*	mg/L	2	20	12/16/13 0:00	abm
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/16/13 0:00	abm
Total Alkalinity		1	12	B	*	mg/L	2	20	12/16/13 0:00	abm
Cation-Anion Balance	Calculation									
Cation-Anion Balance			18.4			%			12/27/13 13:34	calc
Sum of Anions			0.344	B		meq/L	0.1	0.5	12/27/13 13:34	calc
Sum of Cations			0.499	B		meq/L	0.1	0.5	12/27/13 13:34	calc
Chloride	M300.0 - Ion Chromatography	1	0.73	B	*	mg/L	0.5	2.5	12/20/13 10:28	tcd
Conductivity @25C	SM2510B	1	59		*	umhos/cm	1	10	12/14/13 2:37	dcw
Fluoride	M300.0 - Ion Chromatography	1		U	*	mg/L	0.1	0.5	12/20/13 10:28	tcd
Hardness as CaCO3	SM2340B - Calculation		20			mg/L	1	7	12/27/13 13:34	calc
pH (lab)	SM4500H+ B									
pH		1	7.5	H	*	units	0.1	0.1	12/14/13 0:00	dcw
pH measured at		1	22		*	C	0.1	0.1	12/14/13 0:00	dcw
Phosphorus, total	M365.1 - Auto Ascorbic Acid (digest)	1	0.03	B	*	mg/L	0.01	0.05	12/19/13 22:46	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	40		*	mg/L	10	20	12/16/13 10:43	dcw
Sulfate	M300.0 - Ion Chromatography	1	3.98		*	mg/L	0.5	2.5	12/20/13 10:28	tcd
TDS (calculated)	Calculation		22	B		mg/L	10	50	12/27/13 13:34	calc
TDS (ratio - measured/calculated)	Calculation		1.82						12/27/13 13:34	calc

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Appendix B

Centennial Pit Groundwater Model Report

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APPENDIX B

Lisbon Valley Mine

Centennial Pit Groundwater Model Report

March 2014

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Executive Summary

A three-dimensional groundwater flow model was developed for the Lisbon Valley Mine (LVM) Centennial Pit to assess post-closure pit lake formation in the partially backfilled pit. The model was developed based on information included in the 2009 Annual Update of the Lisbon Valley Hydrogeologic System Evaluation (Whetstone 2010), updated pit geometry, and the primary backfill scenario, which includes partially backfilling the Centennial Pit to an elevation of 6,200 feet above mean sea level (ft amsl) with 4.6 million tons (MT) of waste rock.

Groundwater at LVM primarily occurs in two aquifers: the Burro Canyon aquifer which occurs at depths of less than 500 feet and the N-aquifer which occurs below about 850 feet (Whetstone, 2010). These two aquifer systems are separated by several hundred feet of low-permeability interbedded shale, siltstone, and silty sandstone (Morrison Formation and Summerville Formation). The horizontal extent of the Burro Canyon aquifer is controlled both by the subsurface topography of the Morrison Formation and by the major valley-bounding faults. Due to the lack of a horizontal water level gradient observed in monitor wells proximal to the Centennial Pit, the Burro Canyon aquifer system in the Lisbon Valley is considered a closed system, with all recharge moving downward through the Morrison Formation to the deep N-Aquifer.

The numerical code MODFLOW-SURFACT version 3 (HydroGeoLogic 1996) was used to solve the groundwater flow equation. The program Groundwater Vistas version 6.52 (Environmental Simulations 2011) was used as the pre and post-processor to construct the model, generate input files, run MODFLOW-SURFACT, and analyze model results.

Model calibration results for steady-state and transient conditions indicate the model reasonably simulates average and transient water levels associated with local aquifer pumping. Accordingly, the model was used to predict recovery of water levels and the potential for the development of a lake in the partially backfilled Centennial Pit for a period of 300 years post-closure. The model predicts that a pit lake will not form in the proposed ultimate Centennial Pit based on an estimated 5% of maximum potential precipitation runoff into the pit. A sensitivity analysis using 10% of the total potential runoff was simulated to determine the model sensitivity to increased runoff to the pit. Under this scenario, a pit lake is predicted to develop with water levels in the Centennial Pit rising to a maximum level of 6,061 ft amsl (approximately 40 ft deep). The vertical leakage from the simulated pit lake through the Morrison Formation is estimated as 0.4 gallons per minute (gpm) in the greater runoff scenario.

Additional proposed backfill scenarios include placement of waste rock to an elevation above the pre-mining static water level of 6,190 ft amsl for the Burro Canyon aquifer. Therefore, groundwater will not flow into the pit, eliminating the need to conduct a detailed water balance for these scenarios. Rather, the water balance for these scenarios is limited to precipitation, runoff from the pit walls, and evaporation, with evaporation greatly exceeding precipitation and runoff thereby preventing a pit lake from forming under these backfill scenarios.

1. Introduction

A three-dimensional groundwater flow model was developed for the Lisbon Valley Mine (LVM) Centennial Pit to assess post-closure pit lake formation in the partially backfilled pit. The following sub-sections provide a project description and the specific objectives of the groundwater flow model.

1.1 Project Description

The description of the project has been previously detailed in the 2009 Annual Update of the Lisbon Valley Hydrogeologic System Evaluation (Whetstone 2010). The current analysis differs from the previous 2009 work in that LVMC proposes to excavate the Centennial Pit to a depth of 6,020 feet above mean sea level (ft amsl), whereas the maximum excavation analyzed previously was 6,080 ft amsl. The proposed mine progression would involve first mining the southwestern portion of the Centennial Pit, referred to as the Penny phase to an elevation of 6,020 ft amsl, followed by mining of the northeastern portion (Keystone phase) to an elevation of 6,020 ft amsl. Waste rock from mining of the Keystone phase would be placed into the Penny phase to an elevation of 6,200 ft amsl.

1.2 Study Objectives

The Centennial Pit groundwater flow model was primarily developed to address the following items:

- Evaluate the potential for a pit lake to develop within the Centennial Pit.
- Estimate the rate of recovery of pit lake levels within the Centennial Pit and the maximum pit lake water level, if a pit lake develops.
- Evaluate groundwater inflows into the pit lake over time, if a pit lake develops.
- Evaluate the potential of groundwater seepage through the floor of the pit to the underlying Morrison Formation.

1.3 Report Organization

This report provides a description of the hydrogeologic conceptual model, flow model construction, calibration, and model predictions for the groundwater flow model, as detailed in the following sections:

- **Section 1 – Introduction –** Includes a project narrative, study objectives, and report organization.
- **Section 2 – Hydrogeologic Conceptual Model –** Provides a description of the physical groundwater flow system that forms the basis of the numerical model.
- **Section 3 – Numerical Code –** Outlines the software used to solve the partial differential equation that mathematically describes the flow of groundwater.
- **Section 4 – Groundwater Flow Model Construction –** Summarizes the approach used to transform the conceptual model into its mathematical equivalents.
- **Section 5 – Calibration –** Describes the steady-state and transient condition groundwater flow model calibrations.
- **Section 6 – Predictive Simulation –** Presents the predictive model simulation setup and findings.
- **Section 7 – Sensitivity Analysis –** Summarizes a predictive model simulation using higher runoff to the pit lake (10%).
- **Section 8 – Summary and Conclusions –** Summarizes the groundwater flow model results.
- **Section 9 – References**

2. Hydrogeologic Conceptual Model

The hydrogeologic conceptual model (conceptual model) is a description of the physical groundwater flow system that forms the basis for the numerical model. The components of the conceptual model include:

- Hydrostratigraphic units that define the aquifers and confining units;
- Aquifer hydraulic properties, including transmissivity, hydraulic conductivity, storativity, and specific yield;
- Horizontal and vertical hydraulic gradients within the system;
- Hydrologic boundaries that exist within the flow domain;
- Groundwater recharge and discharge;
- Aquifer potentiometric surface, including static water levels and transient water levels resulting from groundwater pumping

These components of the hydrogeologic conceptual model provide a foundational basis for understanding the groundwater system. The conceptual model was then translated into a numerical model that is representative of the physical processes that take place within the groundwater system.

The LVM Centennial Pit conceptual model is based on information included in the 2009 Annual Update of the Lisbon Valley Hydrogeologic System Evaluation (Whetstone 2010) such as hydrogeologic units, regional groundwater gradient, water level data, and aquifer hydraulic properties. These data were augmented by updated pit dimensions that depict the newly proposed pit depths and areas.

Figure B1 presents a plan view of the Centennial Pit and contour elevations used to develop the footprint and pit elevations within the model. The following sections outline the various components of the conceptual model.

2.1 Hydrostratigraphic Units

Groundwater at LVM primarily occurs in two aquifers: the Burro Canyon aquifer which occurs at depths of less than 500 feet and the N-aquifer which occurs below about 850

feet (Whetstone, 2010). These two aquifer systems are separated by several hundred feet of low-permeability interbedded shale, siltstone, and silty sandstone (Morrison Formation and Summerville Formation) as shown in **Figure B2**.

The Burro Canyon aquifer consists of high-permeability sandstone of the lower unit (Bed 15) of the Burro Canyon Formation, coupled in places with 10-30 feet of moderately high permeability material in the upper Brushy Basin member of the Morrison Formation. Bed 15 conforms to the structural contour map of the Morrison Formation (**Figure B3**) and is unsaturated at the margins of the aquifer. The saturated Burro Canyon aquifer ranges in thickness from 10-180 feet and is perched on top of the low-permeability units of the Morrison Formation, which form a leaky barrier to vertical downward flow (**Figure B2**).

The horizontal extent of the Burro Canyon aquifer is controlled both by the subsurface topography of the Morrison Formation and by the major valley-bounding faults, described in Section 2.3.

The N-aquifer consists of moderate to low-permeability sandstones and siltstones of the Entrada, Navajo, Kayenta, and Wingate formations, which generally behave as a single hydrostratigraphic zone (Avery, 1986; BLM, 1997). The top of the N-aquifer occurs below about 850 feet and its thickness varies depending on faulting and structural topography during deposition. The four wells completed in the N-aquifer in the vicinity of the Centennial Pit (MW96-7B, MW97-9, MW97-11, and PW-8) did not penetrate the entire thickness of the N-aquifer. Elsewhere at the site, well PW-7 and PW-11 penetrated 886 feet and 1,100 feet of saturated aquifer, respectively, without reaching the base of the Wingate Formation (**Figure B4**). The maximum total thickness of the N-aquifer in the vicinity of LVM is believed to be approximately 1,200 feet. Thus, an unsaturated zone exists between the upper Burro Canyon aquifer and lower N-aquifer. Water levels indicate that strong downward vertical gradients exist, and are described in Section 2.4.

2.2 Hydraulic Conductivity and Storativity

Pumping tests conducted at wells 95R1, SLV-3, PW-3, PW-4, PW-5, PW-6, and PW-9 indicate that the hydraulic conductivity of the Burro Canyon aquifer ranges from approximately 1×10^{-5} centimeters per second (cm/s) to 5×10^{-3} cm/s (Whetstone 2010).

2.3 Geologic Structure and Aquifer Boundary Conditions

Geologic structure controls the occurrence of groundwater in Lisbon Valley. Lisbon Valley is a collapsed salt anticline located in the Paradox fold and fault belt, a tectonic region on the northeast side of the Paradox Basin that is dominated by northwest-trending folds and faults. Lisbon Valley encompasses both the Lisbon Valley Anticline and the Disappointment Valley Syncline (USGS, [Dubiel and Brown] 1993). The Lisbon Valley Anticline is a doubly plunging, salt-cored anticline that was uplifted by plastic flow of the Paradox Salt Formation (Thorson, 1997).

Collapse of the Lisbon Valley anticline is related to a series of northwest-trending faults along the crest and flanks of the anticline, collectively known as the Lisbon Valley Fault Zone. The Lisbon Valley Fault Zone is cataloged by the Utah Geological Survey (UGS) as structure #2511S. UGS reports that the Lisbon Valley Fault Zone and Moab fault (#2476) are the longest and most prominent faults in the Paradox Basin.

The Lisbon Valley Fault Zone strikes northwest along the crest of the anticline and generally dips 60° NE (USGS 1993), shallowing to 30° to 55° NE in the vicinity of the mine (Whetstone, 2010). The fault occurs in a single plane in the central part of Lisbon Valley and occurs in a wide fault zone near the northwest- and southeast-plunging noses of the anticline (USGS, 1993). Thorson (1997), however, reported that "detailed mapping and interpretation of drilling results [at] the Lisbon Valley Project show that faulting is much more complex than has been illustrated in published USGS mapping" and reports. At the southeast end of the Lisbon Anticline where LVM is located, the axial graben faults splay out in a complex fan-like arrangement. These faults limit the areal extent of the Burro Canyon aquifer (**Figure B5**).

Faulting at depth has also limited the areal extent of the N-aquifer in Lisbon Valley, due to the significant vertical displacement and juxtaposed permeable units against relatively impermeable units (Whetstone, 2010). At the crest of the Lisbon Valley anticline, the displacement is about 1,200 m (nearly 4,000 feet) with Pennsylvanian Honaker Trail Formation faulted against Cretaceous Dakota Sandstone (Wood, 1968; Shawe, 1970; Morrison and Parry, 1986). Northwest of the anticline crest, displacement is 600 m (nearly 2,000 feet) with Chinle Formation faulted against Morrison Formation (Chan, et al., 2000). In addition, the Lisbon Valley Fault splays into numerous "horsetail" faults to the south (Whestone, 2010). This juxtaposition, along with gouge material along the fault surfaces, causes the fault zones to behave as barriers to groundwater flow. As a result, there is substantial compartmentalization of the N-aquifer.

2.4 Aquifer Flow Directions, Aquifer Recharge and Discharge

The directions of groundwater flow in the Burro Canyon aquifer and N-aquifer have been determined through an extensive network of pumping wells, monitoring wells, and exploration drill holes. The drilling programs encountered dry holes beyond the boundaries of the Burro Canyon aquifer and determined that the Burro Canyon aquifer is laterally bounded on all sides. No appreciable lateral groundwater flows into the aquifer, and recharge occurs from direct precipitation over the footprint of the Burro Canyon Formation. The primary direction of groundwater flow in the Burro Canyon aquifer is downward, evident by a strong vertical gradient, with flow through both fracture and formation permeability in the underlying Morrison Formation (ABC, 1998).

Due to the lack of a horizontal water level gradient observed in monitor wells proximal to the Centennial Pit, the Burro Canyon aquifer system in the Lisbon Valley is considered a closed system, with all recharge moving downward through the Morrison Formation to the deep N-Aquifer. The Morrison Formation downward vertical gradient was determined from pre-mine Burro Canyon aquifer water levels of 6,190 ft amsl and the top of average N-aquifer water levels of 5,600 ft amsl. A thickness of 390 ft for the Morrison Formation was used, based on the thickness at well MW96-7B, located north of the pit. The pre-mining observed vertical hydraulic gradient is downward through the confining Morrison Formation at 1.5 ft/ft.

Downward vertical gradients also exist in the N-aquifer and, to the extent possible, water will move downward through the N-aquifer. However, the horizontal permeability of the N-aquifer is higher than the vertical permeability of the confining units below, and groundwater can more easily move laterally except where open fractures exist (Whetstone, 2010). Regional groundwater flow in the N-aquifer is generally west toward the Colorado River; however, because the complex geologic structure in Lisbon Valley isolates the N-aquifer, the groundwater gradient follows the northwest to southeast trending valley, with flow in a northeast direction and toward Lisbon Canyon.

2.5 Precipitation, Evaporation, and Runoff

Annual average precipitation and free water surface (FWS) evaporation rates are 15.05 and 48.03 inches per year (inches/year), respectively. These rates are consistent with those used in previous pit modeling by Whetstone (2009, 2010). The annual precipitation rate represents data taken from the La Sal SE station from the 1980 to 1993 period. The evaporation rate of 48 inches per year is the annual free water

surface evaporation rate, which was calculated by Hydro-Triad based on mean monthly Class A pan evaporation from several regional weather stations.

Catchment area runoff into the pit will be limited by a berm which will be constructed around the pit rim at closure. It is assumed that the area inside the berm and pit rim is 176 acres. Within this area, precipitation will fall directly on the pit bottom and on the pit walls. A portion of the precipitation that falls on the pit walls will evaporate before it reaches the bottom of the pit. For consistency with previous modeling and site observations, 5% of the precipitation falling on the pit walls is estimated to reach the bottom of the pit or pit lake. This rate was calculated by Whetstone (2009, 2010) using the Soil Conservation Service method TR55 to determine the runoff curve number and the total runoff per storm event. Assuming a curve number of 87 for dirt roads and hydrologic soil group C and no runoff for storm events with less than 0.5 inches per day, the total runoff for all storm events was estimated to be 0.74 inches. This total runoff is equal to the expected runoff for all storm events up to the 100-year storm event, weighted by probability (Whetstone 2009, 2010). Total runoff of 0.74 inches per year is approximately 5% of the annual precipitation of 15 inches per year.

3. Numerical Code

The numerical code is the software that is used to solve the partial differential equation that mathematically describes the flow of groundwater. The information contained in the conceptual model is translated into its numerical equivalent which is solved by the numerical code to generate model results.

3.1 Code Selection

The numerical code selected for this application is MODFLOW-SURFACT version 3 (HydroGeoLogic 1996). MODFLOW-SURFACT was selected because of its ability to handle re-wetting of cells and high hydraulic gradients more successfully than standard MODFLOW (MacDonald and Harbaugh 1988). High hydraulic gradients occur as a result of the dewatering the Burro Canyon aquifer from PW-3. Cell re-wetting could occur as the pit lake fills and groundwater levels within the mine area are allowed to recover. In addition, the lake package used to simulate pit lake development is compatible only with MODFLOW-SURFACT.

3.2 Code Description

MODFLOW-SURFACT is a three-dimensional finite-difference code that can simulate variably saturated groundwater flow. This code is based on the widely popular USGS modular groundwater flow code MODLFOW. MODFLOW-SURFACT is fully compatible with standard MODLFOW but has several computational modules that overcome limitations associated with MODFLOW such as re-saturation of dry cells. Additional improvements include an efficient Newton-Rapshon solver for non-linear problems and a lake package which allows for a better representation of filling and rewetting of dry lake cells.

4. Groundwater Flow Model Construction

Model construction is the process of transforming the conceptual model components into its mathematical equivalents. This process includes building the data set that will be used by MODFLOW-SURFACT to simulate groundwater flow. The program Groundwater Vistas version 6.52 (Environmental Simulations 2011) was used as the pre and post-processor to construct the model, generate input files, run MODFLOW-SURFACT, and analyze model results. The following sections describe the main components of the data set that was built using Groundwater Vistas.

4.1 Model Grid

The Centennial Pit model grid is presented in **Figure B6**. The model grid covers an area of 6,700 by 8,400 ft and has a total of 13,086 active cells. The model cells are active within the extent of the Burro Canyon aquifer, and surrounded by inactive no-flow cells (that represent the hydraulic barriers of the faults bounding the aquifer). Grid spacing ranges from a minimum of 50 ft to a maximum of 100 ft. Finer discretization was used in the Centennial Pit area where higher resolution was needed to properly simulate the pit excavation, cell re-saturation, and larger vertical gradients between the pit and surrounding aquifer.

There are a total of three model layers, in which layer 1 represents the Burro Canyon aquifer, layer 2 represents the confining Morrison Unit, and layer 3 serves as the discharge area to the N-aquifer. Layer 1 contains the lake cells representing the Centennial Pit and has a thickness of 172 ft, based on the model top elevation of 6,200 ft amsl and Layer 1 bottom elevation of 6,028 ft amsl. Layer 2 represents the Morrison Formation with a thickness of 390 ft and bottom elevation of 5,638 ft amsl. Layer 3 has an arbitrary thickness to allow a constant head to be applied to represent the discharge to the N-aquifer, further discussed below. The elevation of the bottom of the model (bottom of layer 3) was assigned as 5,590 ft amsl, such that it is lower than the constant head assigned in layer 3.

The model top was assigned an elevation of 6,200 ft amsl, which is above the maximum expected elevation of a potential pit lake stage, and above the historical water table level in the Burro Canyon aquifer.

4.2 Hydraulic Parameters

Hydraulic parameters, such as hydraulic conductivity and storage coefficients, were assigned by using a single hydrogeologic zone for each model layer. Hydrogeologic zones are areas where hydraulic parameters are spatially constant. Initially, hydrogeologic zones were created for each hydrogeologic unit based on observed values. Hydrogeologic parameters were slightly modified as model calibration progressed to meet calibration criteria while still maintaining a value within a reasonable range of field test data.

Table B1 presents the hydrogeologic properties assigned to each model layer. The hydraulic parameters associated with each zone are compared to the observed range of values determined from aquifer testing and is described in greater detail in the model calibration section.

Table B1 Hydraulic Parameters of each Model Layer

Layer	Hydrogeologic Unit	Observed Value		Model Value			
		Horizontal Hydraulic Conductivity (Ft/day)	Storativity / Specific Yield	Horizontal Hydraulic Conductivity (Ft/day)	Vertical Hydraulic Conductivity (Ft/day)	Specific Storage (1/ft)	Specific Yield
1	Burro Canyon	0.03 – 14	NA	5	0.05	1.0e-07	0.010
2	Morrison	0.0002	NA	0.0002	0.0002	1.0e-07	0.035
3	N-aquifer	NA	NA	Constant Head Boundary			

NA – Not analyzed

4.3 Recharge

Recharge was assigned to the top layer of the model based on the theoretical hydraulic gradient (1.5 ft/ft) estimated through the Morrison Formation. The resulting net recharge to achieve the vertical hydraulic gradient is 0.000256 ft/day (1.12 inches/year), based on an assumed vertical hydraulic conductivity of 0.0002 ft/day. The lack of lateral flow observed in the Burro Canyon aquifer and Morrison Formation allows the recharge to be calculated based on the vertical gradient and hydraulic conductivity alone.

4.4 Boundary Conditions

Constant head boundary conditions were assigned across layer 3 to simulate the vertical leakage from the Burro Canyon aquifer into the N-aquifer system, such that the only discharge points from the model are the bottom layer. A head value of 5,600 ft was assigned to the constant head cells across Layer 3 to simulate the head gradient within the Morrison Formation, between the Burro Canyon aquifer and underlying N-aquifer system. This head value represents the water level at the top of the N-aquifer, based on pre-pumping water levels of 5,750 ft observed in monitor well MW97-11 and 5,540 ft observed in monitor well MW97-7b.

4.5 Selection of Steady-State Calibration Targets

Calibration targets for the model steady-state calibration were selected from site monitoring wells completed in the Burro Canyon aquifer with pre-mine water level readings in the vicinity of the Centennial Pit. **Table B2** presents the measured water level of each monitor well used in steady-state calibration and the associated coordinates. **Figure B7** presents the locations of the monitoring wells used for calibration.

Table B2 Steady-State Calibration Targets

Well ID	X Coordinate	Y Coordinate	Pre-Mining Water Level (ft amsl)	Model Layer
SLV-3	42924.48	40715.85	6190.25	1
MW96-7A	42061.38	41494.21	6189.84	1
PW-3	40509.47	42052.50	6190.67	1
00R63	40135.90	41562.20	6189.18	1
4R44	39587.36	42143.24	6191.24	1

5. Calibration

Model calibration is the process of adjusting hydraulic parameters and boundary conditions within reasonable ranges to achieve an acceptable match between model-simulated and measured calibration targets. Two separate model calibrations were performed with the groundwater flow model. The first calibration was for steady-state conditions followed by a transient calibration.

5.1 Steady-State Calibration

During the steady-state calibration, hydraulic conductivity was adjusted to match calibration targets that are representative of a long-term average hydrologic balance for which aquifer storage changes are not significant. Steady-state calibration does not take into account time dependent variables (i.e., seasonal water level and baseflow fluctuations) that are dependent on aquifer storage. The purpose of this calibration was to develop a reasonable hydraulic conductivity and recharge distribution across the model domain that produces simulated heads that match average hydrologic conditions.

The hydraulic conductivity values obtained from the steady-state calibration were previously presented and compared to observed values in **Table B1**. In general, these values are within field observed ranges, or literature values whenever field data were not available.

The results of the model steady-state calibration are presented in **Table B3** and compare the measured versus model-simulated heads for all wells. The calibration RMS for heads is 1.05 ft which is approximately 50% of the 2.06 foot-range in measured heads. The heads calibration RMS is outside the typical 10% target for an acceptable calibration, due to the small range of calibration targets. However, the range of water level residuals vary between 0.3 and 1.8 ft, demonstrating that computed steady-state water levels are similar to observed water levels.

Table B3 Steady-State Calibration Results

Well ID	Observed Water level (ft amsl)	Computed Water Level (ft amsl)	Water Level Residual (ft)
SLV-3	6190.25	6189.45	0.8
MW96-7A	6189.84	6189.45	0.4
PW-3	6190.67	6189.45	1.2
00R63	6189.18	6189.45	-0.3
4R44	6191.24	6189.45	1.8

5.2 Transient Calibration

After completing the steady-state calibration, the model was calibrated under transient conditions. During transient calibration, model storage parameters were adjusted to match water level data measured from the start of dewatering in 2004 through 2009 in Well MW96-7A, which is located adjacent to the Centennial Pit. Historical dewatering from the Centennial Pit was primarily from PW-3, in addition to SLV-3 and PW-2 (Whetstone 2010). Historical pumping input to the transient model is shown in **Table B4.** A summary of the model calibrated storage parameters was previously presented in **Table B1**. In general, these parameters are within the expected range for similar geologic units.

Table B4 Historical Pumping Represented in Model

Date	PW-3 (ft^3/day)	PW-2 (ft^3/day)	SLV-3 (ft^3/day)
2004	56	42*	188
2005	9004	432	4661
2006	8489	346	9
2007	11688	95	0
Jan-08	10044	0	0
Feb-08	67	0	0
Mar-08	71	0	0
Apr-08	2079	0	0
May-08	4174	0	0
Jun-08	14162	0	0
Jul-08	8233	0	0
Aug-08	10370	0	0

Date	PW-3 (ft^3/day)	PW-2 (ft^3/day)	SLV-3 (ft^3/day)
Sep-08	8497	0	0
Oct-08	1753	0	0
Nov-08	435	0	0
Dec-08	0	0	0
Jan-09	75	0	0
Feb-09	84	0	0
Mar-09	66	0	0
Apr-09	226	0	0
May-09	7421	0	0
Jun-09	9451	0	0
Jul-09	8284	0	0
Aug-09	0	0	0
Sep-09	0	1364	0
Oct-09	5	1449	0
Nov-09	0	0	0
Dec-09	0	0	0

* Pumping at PW-4 was added to PW-2 as wells are proximal to each other and PW-4 only operated in 2004

Two wells (PW-3 and MW96-7A) and one piezometer (4R44) are currently available to monitor water levels in the Burro Canyon aquifer near the Centennial Pit (**Figure B1**). The other wells shown on the map have been removed (or "mined out") as the pit expanded, or have gone dry as a result of pumping (**Table B5**). Of the three remaining wells, compliance monitoring well MW96-7A is considered the most reliable measure of overall water levels in the aquifer because it is less influenced by the instantaneous effects of pumping. Well PW-3 has been pumped since late 2004 for pit dewatering and mine water supply, and is subject to high fluctuations in water levels as the pump turns on and off, and as pumping rates vary throughout the year (**Figure B8**). Piezometer 4R44 is located near PW-3 and also shows the short-term transient effects of pumping. Compliance monitoring well MW96-7A is more reflective of water levels in the Burro Canyon aquifer overall.

Table B5 Well Summary

Hole ID	Type	Casing Total Depth (ft)	Status	Water Level Monitoring History
SLV-1A	MW	316.3	Mined out Sept 2007	Monitored 1994 - August 2007
SLV-3	MW	344.1	Dry since Feb 2006	Monitored 1994 - Jan 2006, dry due to pumping for pit dewatering and water supply
SLV-4	PZ	unknown	Mined out Nov 2006	Piezometer: water levels measured 1994 - Sept 2006
MW-2A	MW	323.2	Mined out Aug 2005	Monitored 1994 - 2004, removed by mining August 2005
MW96-7A	MW	411.6	existing	Monitored 1996 - present
PW-3	PW	476	existing	Pumped, northern pipeline alignment
00R63	PZ	204.3	Abandoned for road construction Sept 2007	Piezometer, water levels measured routinely 2000 - Sept 2007
4R44	PZ	444.38	existing	Piezometer, water levels measured routinely

Notes: MW = Monitoring Well; PW = Pumping / Production Well; PZ = Piezometer

A water level hydrograph was prepared for well MW96-7A comparing observed versus model simulated water levels from 2004 through 2009 and is presented in **Figure B9**. The amount of drawdown in MW96-7A from the start of dewatering to 2009 is well represented by the model.

6. Predictive Simulation

After an acceptable model calibration was achieved, the model was used as a predictive tool to assess passive inflow of water into the post-closure Centennial Pit.

Lake boundary conditions were assigned to model areas to represent the post-closure pit lake in layer 1 to simulate potential pit lake-groundwater interaction. The lake cell area increases as the pit lake elevation increases above 6,020 ft amsl with the uppermost lake boundary condition cells representing an area equal to a Centennial Pit area at 6,080 ft amsl. Lake stage may exceed an elevation of 6,080 ft amsl; however, the area of the lake within the model will not increase. The lake boundary condition contains routines to calculate water budgets for lake(s) that occupy model cells and subsequently updates the lake water levels (stage), volume, and area, as a result of the computed water budget (Council 1999).

A net evaporation rate value of -33 inches/year was assigned to the lake cells based on previously discussed values. The net evaporation is the difference between average precipitation (15 inches/year) and average evaporation (48 inches/year) and is applied to the wetted area of the lake cells, allowing net evaporation to increase as the area of the lake increases. The Centennial Pit was simulated using the proposed ultimate pit shown in **Figure B1** and the pit dimensions provided in **Table B6**.

Table B6 Simulated Centennial Pit Dimensions

Elevation (ft amsl)	Pit Area (acres)
6,020	6.9
6,040	7.8
6,060	13.6

Runoff to lake cells is calculated using the average runoff area between the top of the Centennial Pit (6,400 ft amsl) and pit elevations of 6,020, 6,040 and 6,060 ft amsl. The annual average precipitation is multiplied by the average runoff area to calculate a maximum potential runoff. Runoff from pit walls into the model lake cells was assumed to be 5% of the maximum potential runoff based on the runoff contribution determined by Adrian Brown Consultants (1998). Approximately 10.3 acre-ft/year (1,227 ft^3/day) of runoff was applied to lake boundary cells.

The simulation was run for 300 years with a starting water level of approximately 6,020 ft amsl and a starting water level elevation within the pit lake of 6,021.1 ft amsl. No pumping occurred during the simulation, allowing water levels to increase within the model domain.

The model predicts that a pit lake will not form within the Centennial Pit based on the proposed pit geometry and assuming 5% runoff within the pit area. No pit lake forms as the net evaporation acting upon the design pit area (6.9 acres at the pit bottom elevation of 6,020 ft amsl) is greater than the combination of runoff and groundwater seepage into the pit. The predicted flow balance in the Centennial Pit after reaching a steady state is shown in **Table B7**.

Table B7 Predicted Flow Balance in Centennial Pit

Component	Inflow (ft^3/day)	Outflow (ft^3/day)
Evaporation	0	-2277
Runoff	1227	0
Seepage from Groundwater	1049	0
Total	2276	-2277

7. Sensitivity Analysis

A sensitivity analysis of the model was conducted by increasing the runoff to the pit lake to 10%. Approximately 20.6 acre-ft/day (2,453 ft^3/day) was applied to the lake boundary condition cells during this simulation.

The greater runoff scenario results in a lake developing in the proposed Centennial Pit with a predicted maximum level of 6,061 ft amsl (approximately 40 ft above the pit bottom). A hydrograph of water level rise within the Centennial Pit lake is presented as **Figure B10**.

The amount of leakage from the Centennial Pit to the Morrison Formation was evaluated. An estimated 0.4 gallons per minute (gpm) is predicted to leak vertically downward from the bottom of the pit lake for the scenario with 10% runoff. The downward leakage was calculated using the final model pit lake area, difference between the final pit lake water level and N-aquifer water level, and the vertical hydraulic conductivity and thickness of the Morrison Formation. The following formula was used to calculate the downward leakage:

$$Final\ Pit\ Lake\ Area \times \frac{(Pit\ Lake\ WL - NAquifer\ WL) \times Vertical\ Hydraulic\ Cond.}{Morrison\ Thickness}$$

The model assumes average downward flow through the rock matrix and fractures.

8. Summary and Conclusions

A three-dimensional groundwater flow model was developed for the Centennial Pit to assess post-closure pit lake formation and water level rise over time in the partially backfilled pit. The model was developed based on information included in the 2009 Annual Update of the Lisbon Valley Hydrogeologic System Evaluation (Whetstone 2010) such as hydrogeologic units, recharge, water level data, and aquifer hydraulic properties, coupled with the pit geometry and proposed backfilling plan.

Model calibration results for steady-state and transient conditions indicated that the model can simulate average and transient water levels associated with local aquifer pumping. A predictive model simulation was run for a period of 300 years post-closure to evaluate the water level rise within the Centennial Pit. The model predicted that a pit lake would not form within the Centennial Pit, based on the ultimate pit geometry and an estimated 5% of maximum potential precipitation runoff into the pit.

A sensitivity analysis using 10% of the total potential runoff was simulated to determine the model sensitivity to increased runoff to the pit. Under this scenario, a pit lake is predicted to develop with water levels in the Centennial Pit rising to a maximum level of 6,061 ft amsl (approximately 40 ft deep). The vertical leakage from the simulated pit lake through the Morrison Formation is estimated as 0.4 gallons per minute (gpm) in the greater runoff scenario.

Additional proposed backfill scenarios include placement of waste rock to an elevation above the pre-mining static water level of 6,190 ft amsl for the Burro Canyon aquifer. Therefore, groundwater will not flow into the pit, eliminating the need to conduct a detailed water balance for these scenarios. Rather, the water balance for these scenarios is limited to precipitation, runoff from the pit walls, and evaporation, with evaporation greatly exceeding precipitation and runoff thereby preventing a pit lake from forming under these backfill scenarios.

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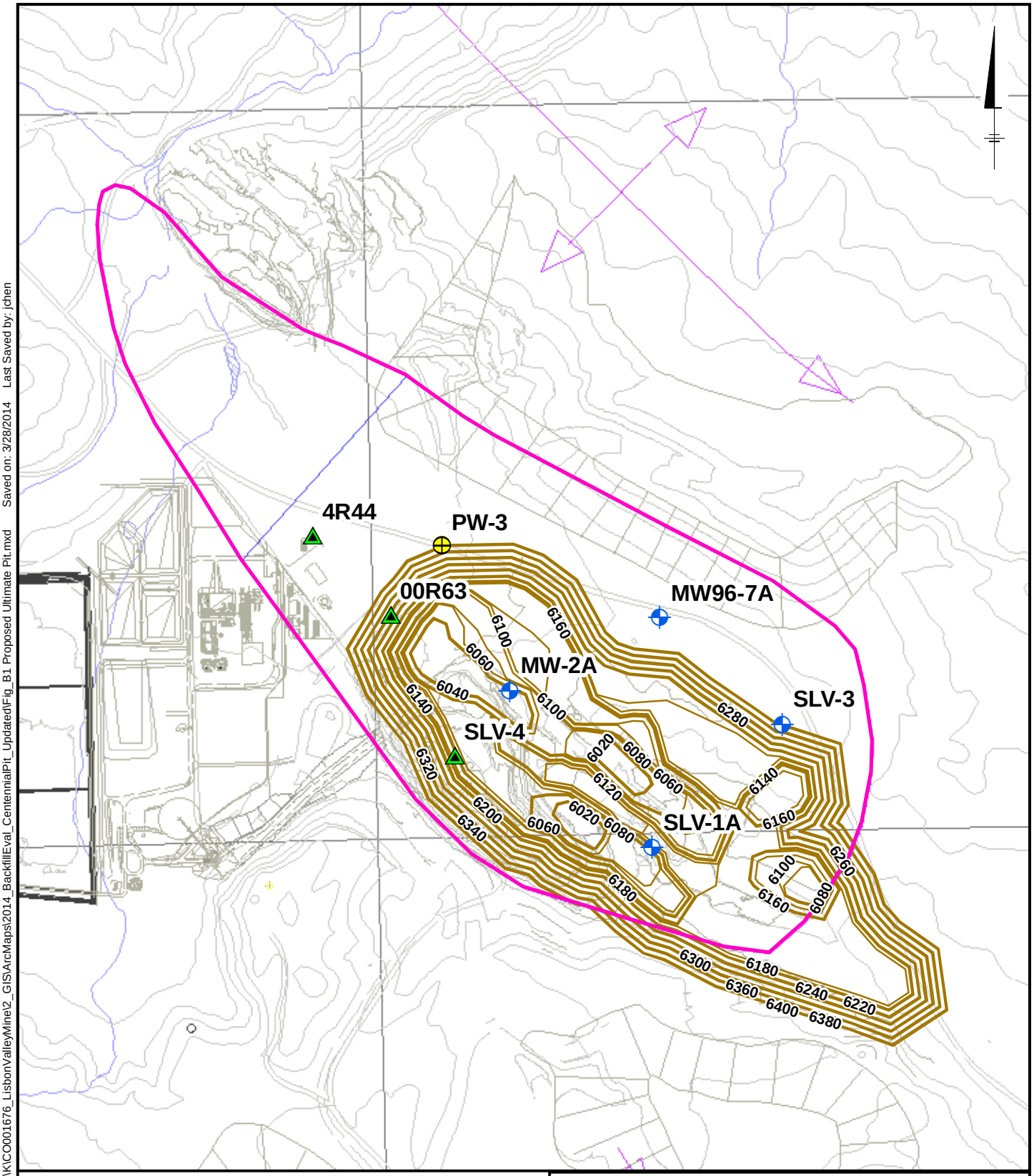
Figures



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LEGEND

- MONITORING WELL
- PUMP WELL
- PIEZOMETER
- BURRO CANYON AQUIFER
- CENTENNIAL PIT ELEVATION CONTOURS (FEET)

0 150 300
SCALE IN FEET

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Proposed Ultimate Centennial Pit and Well Locations

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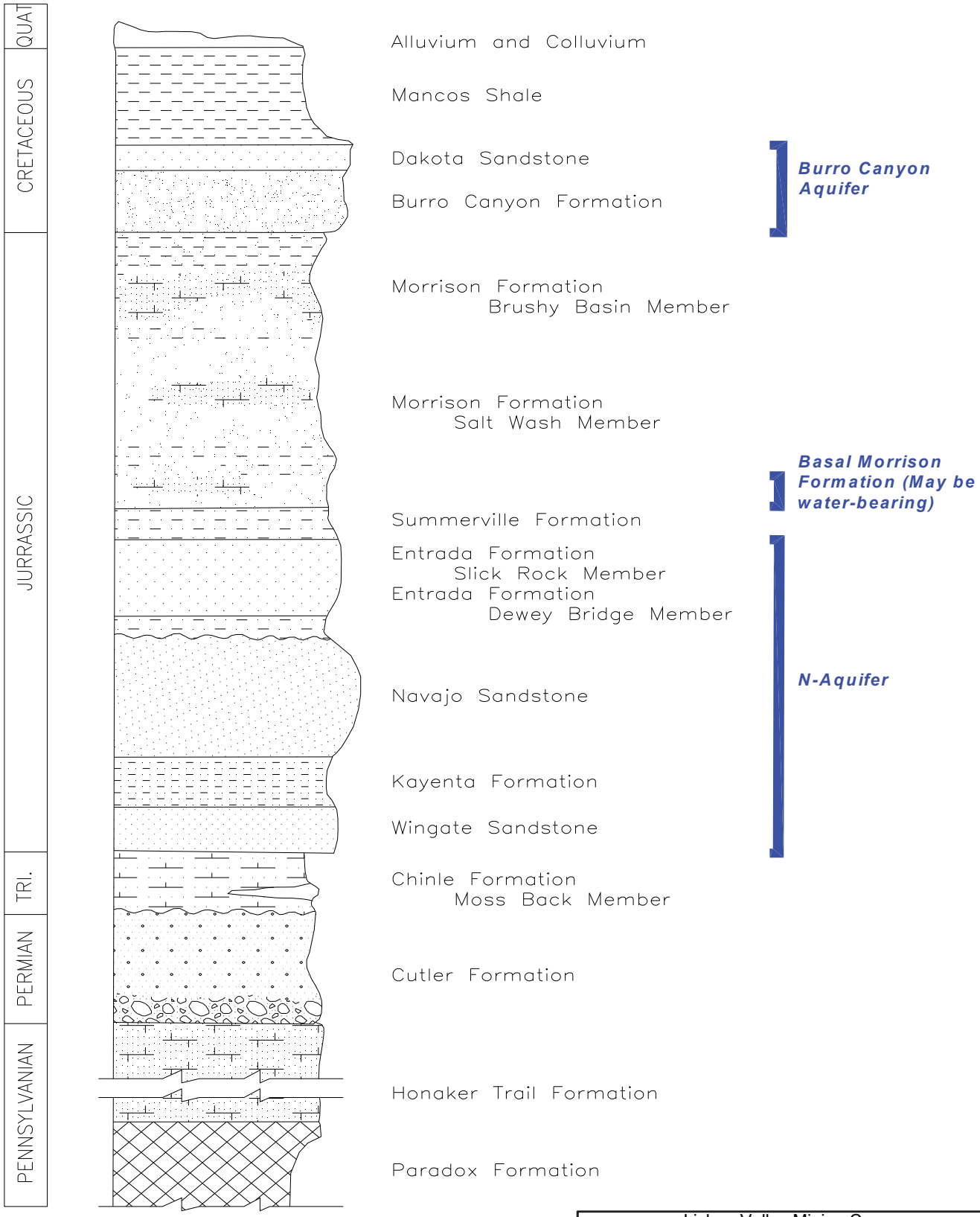
FIGURE
B1



Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Stratigraphic Column Showing Burro Canyon Aquifer And N-Aquifer

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FIGURE
B2

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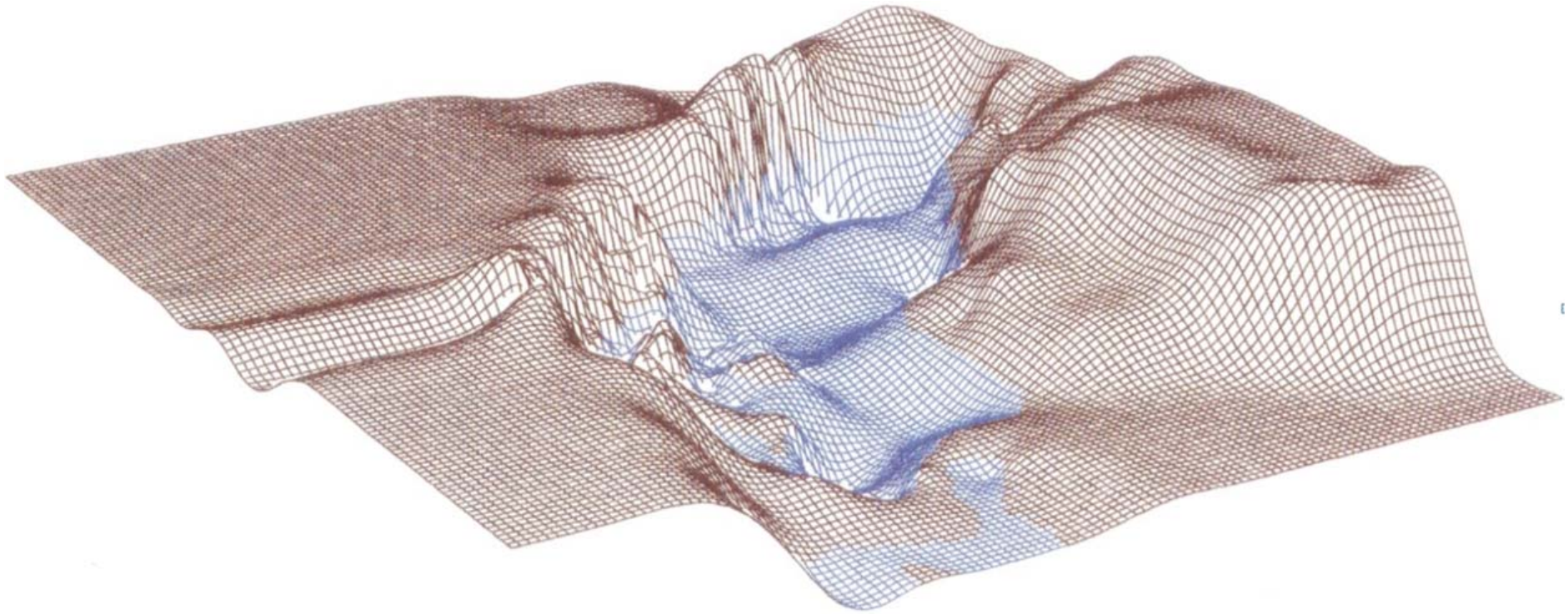
Structural Contour Surface of the Top of the Morrison Formation, Showing Extent of Saturated Burro Canyon Formation at Pre-Mining Static Water Level



SOURCE: SUMMO USA IN ABC [1998] FIGURE 20.

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Structural Contour Surface Of The Top Of The Morrison Formation

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FIGURE
B3

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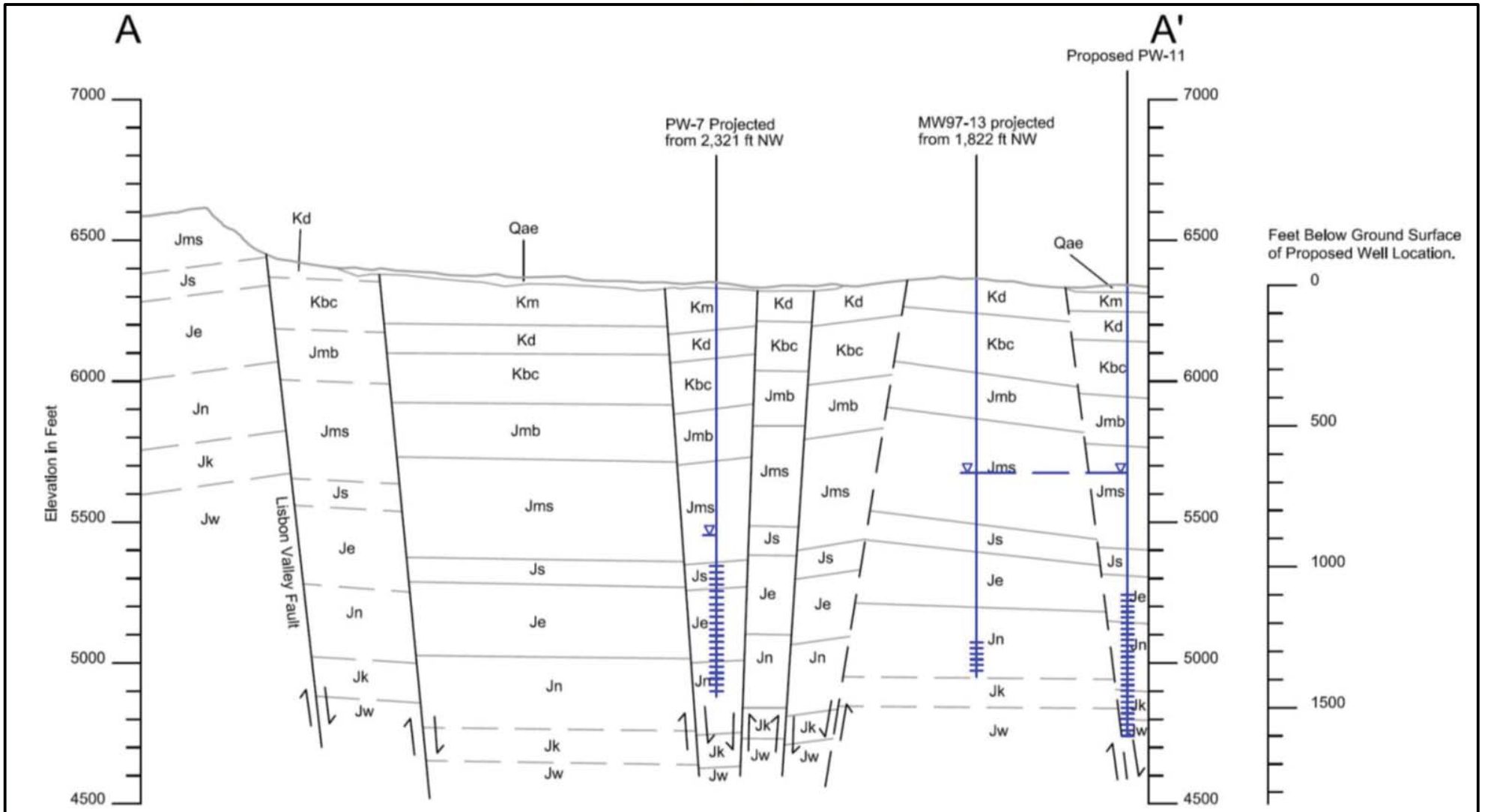

SOURCE: WHETSTONE 2012.

Lisbon Valley Mining Company
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Updated Centennial Pit Backfill Evaluation

Cross Section Showing N-Aquifer Thickness At PW-7, MW97-13, And PW-11

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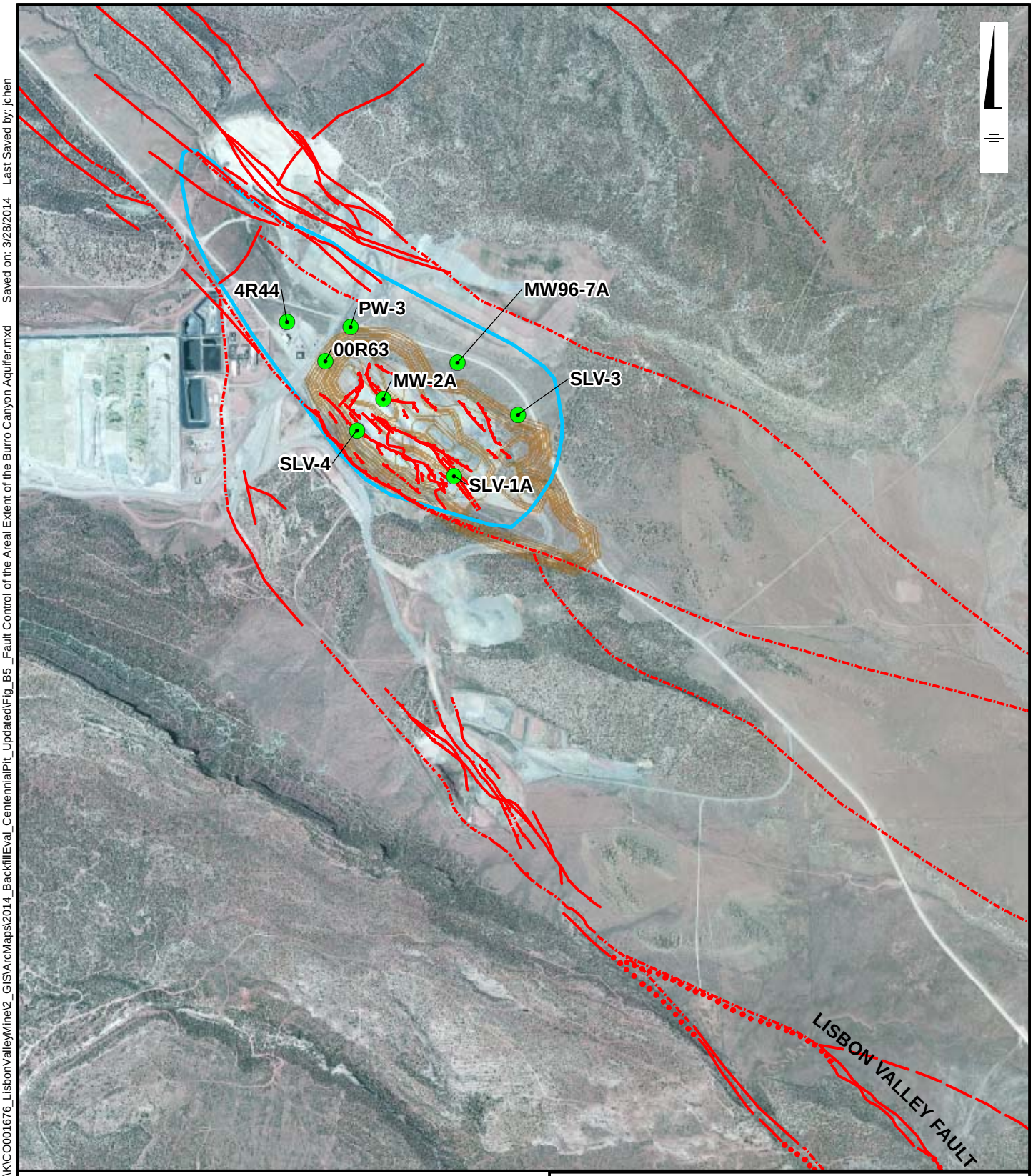
FIGURE
B4



LEGEND

- WELL LOCATION
- FAULT
- BURRO CANYON AQUIFER
- CENTENNIAL PIT ELEVATION CONTOURS

SOURCE:
BASE MAP USES ESRI ARCGIS ONLINE WORLD IMAGERY MAP SERVICE, ACCESSED VIA ARCMAP 10.1 DESKTOP ON 3/28/2014.

0 1,000 2,000
SCALE IN FEET

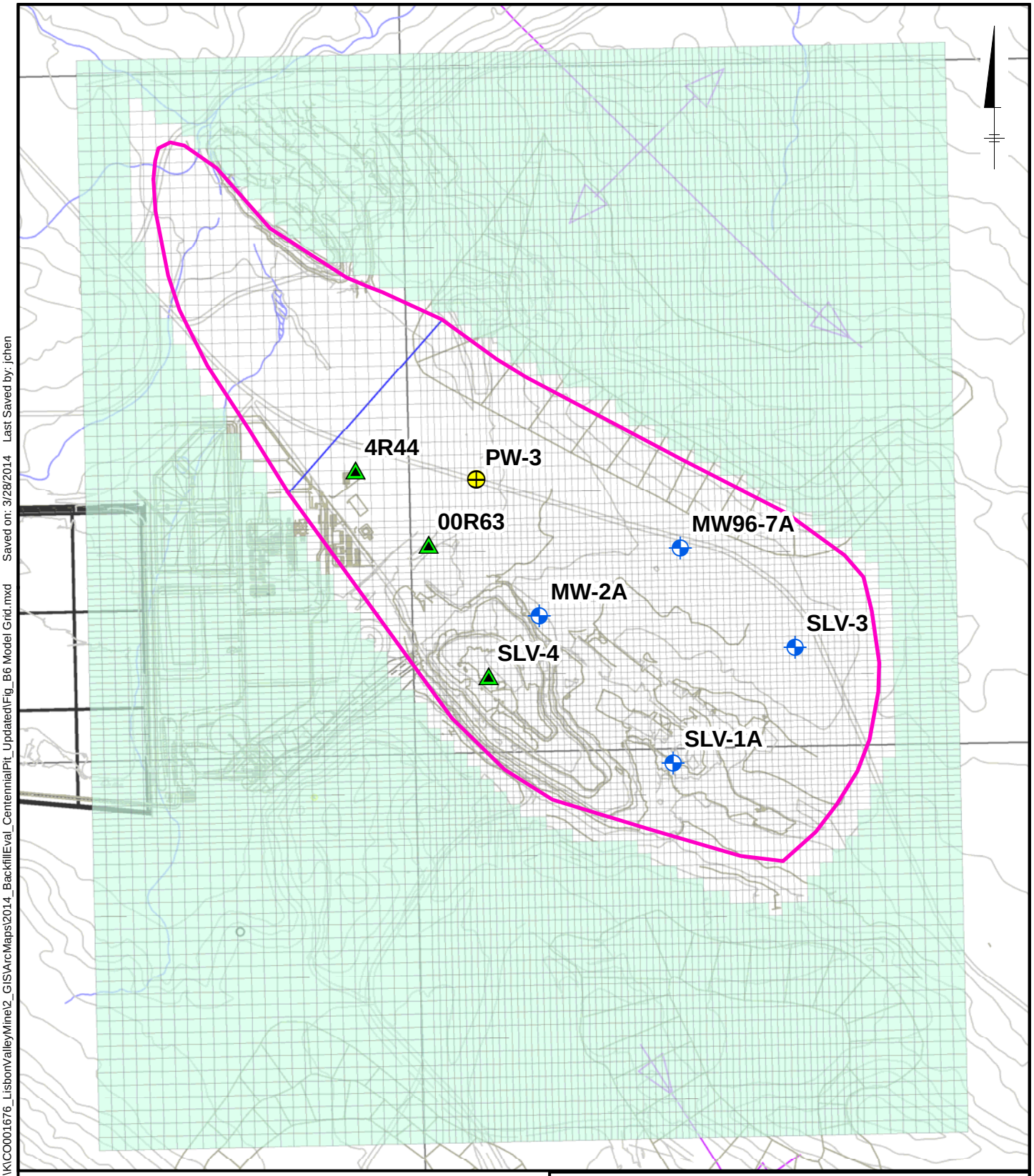
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Fault Control of the Areal Extent of the Burro Canyon Aquifer

ARCADIS

FIGURE
B5

Path: C:\Users\jchen\Documents_PROJECTS\KICO001676_LisbonValleyMine\2_GIS\ArcMaps\2014_BackfillEval_CentennialPit_Updated\Fig_B5 _Fault Control of the Areal Extent of the Burro Canyon Aquifer.mxd Saved on: 3/28/2014 Last Saved by: jchen



LEGEND

- MONITORING WELL
- PUMP WELL
- PIEZOMETER
- BURRO CANYON AQUIFER
- NO FLOW CELLS
- MODEL GRID

0 500 1,000
SCALE IN FEET

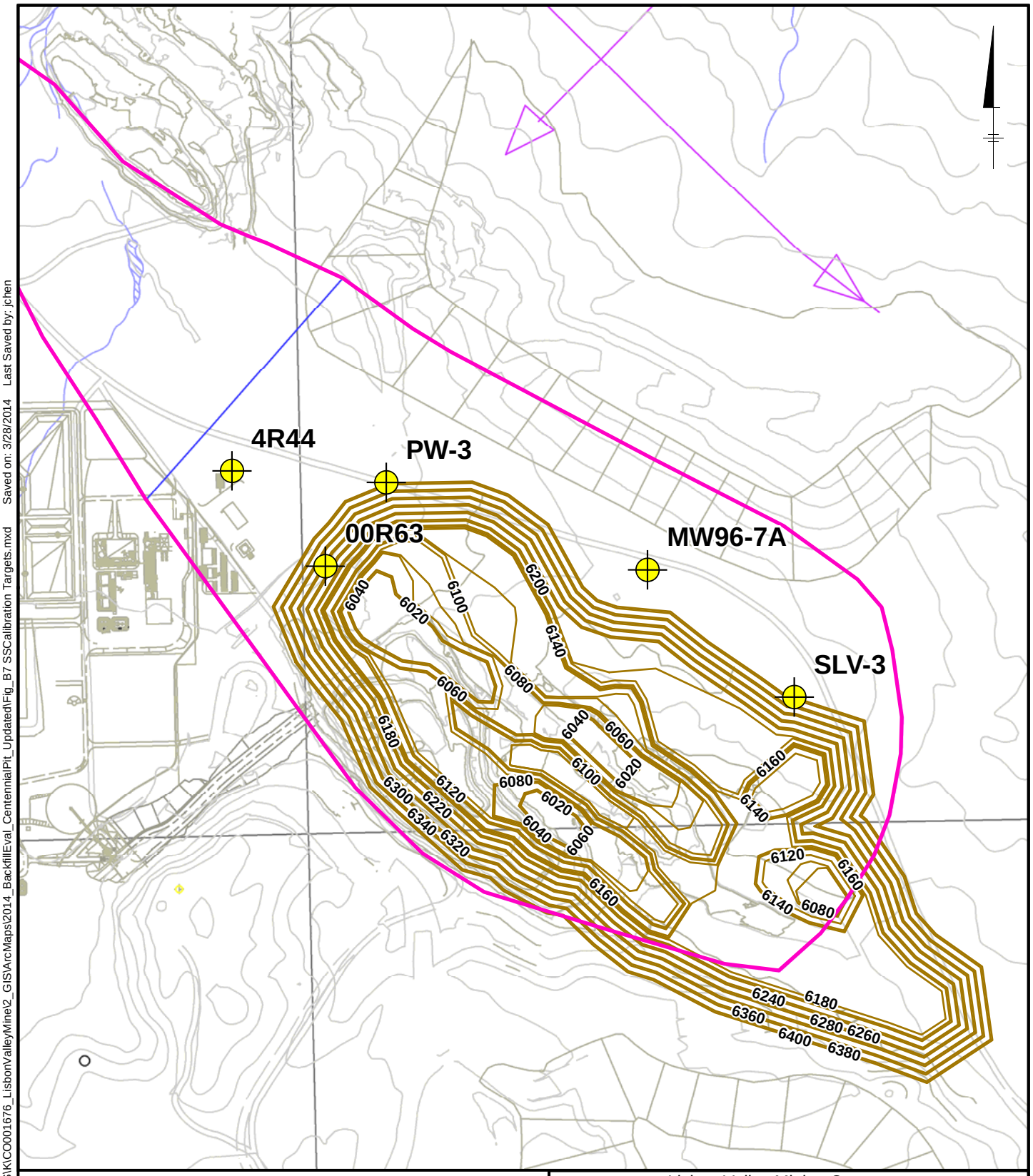
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Model Grid

ARCADIS

FIGURE
B6

Path: C:\Users\jchen\Documents_PROJECTS\K\CO001676_LisbonValleyMine\2_GIS\ArcMaps\2014_BackfillEval_CentennialPit_Updated\Fig_B6 Model Grid.mxd Saved on: 3/28/2014 Last Saved by: jchen



LEGEND

STEADY-STATE CALIBRATION WELLS

BURRO CANYON AQUIFER

CENTENNIAL PIT ELEVATION CONTOURS (FEET)

0 125 250

SCALE IN FEET

Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Steady-State Calibration Wells

ARCADIS

FIGURE
B7

Path: C:\Users\jchen\Documents_PROJECTS\K\CO001676_LisbonValleyMine\2_GIS\ArcMaps\2014_BackfillEval_CentennialPit_Updated\Fig_B7 SSCalibration Targets.mxd Saved on: 3/28/2014 Last Saved by: jchen

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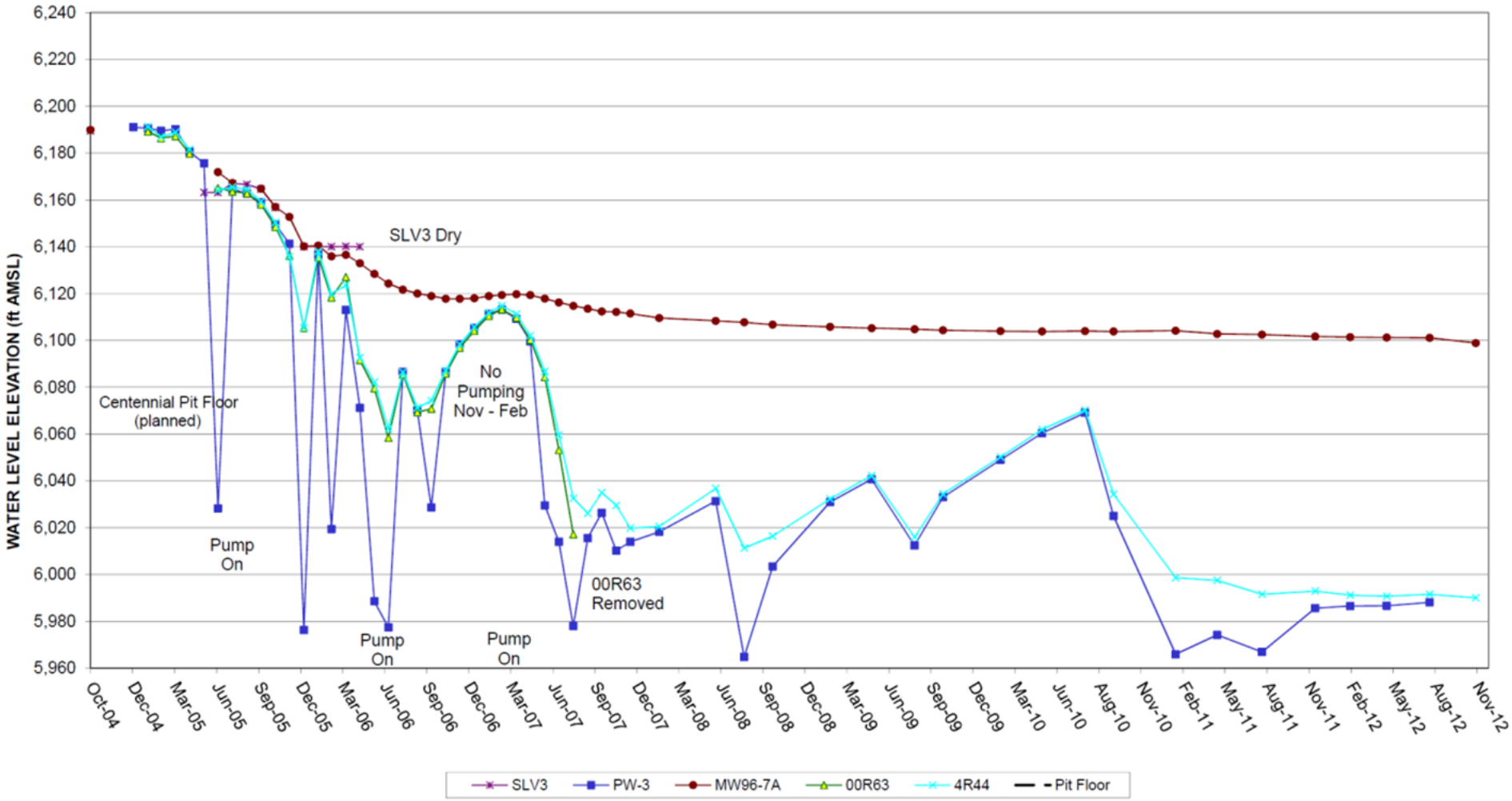


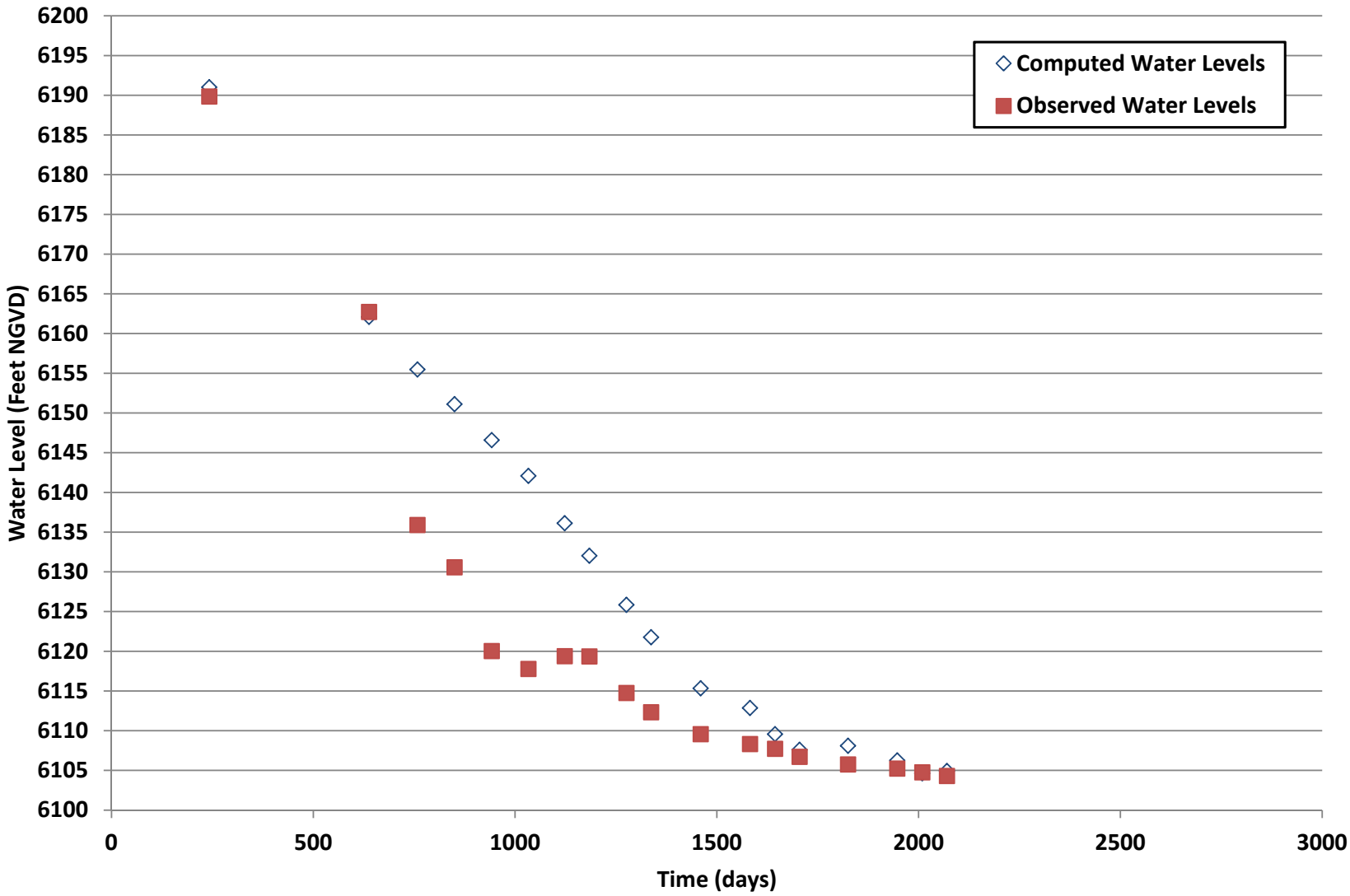
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Hydrograph Of Observed Water Levels In The Burro Canyon Aquifer

ARCADIS

FIGURE
B8

Path: K:\CO001676_LisbonValleyMine\3_IMAGES\2014\FigB9_Well MW96-7A Transient Calibration Hydrograph.ai Formatted by: JCHEN Saved on: 03/27/2014



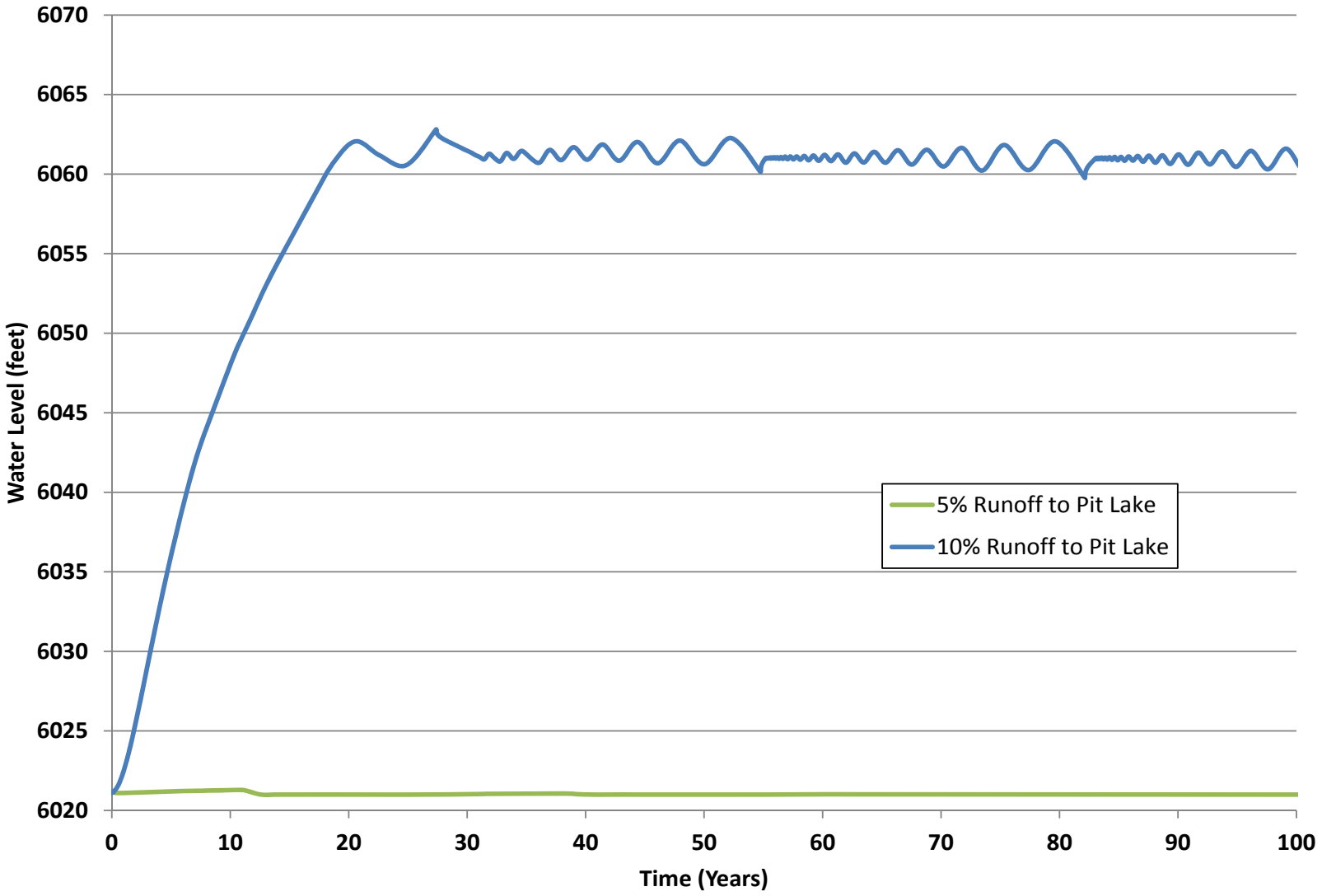
Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Well MW96-7A
Transient Calibration Hydrograph

ARCADIS

FIGURE
B9

Path: K:\CO001676_LisbonValleyMine\3_IMAGES\2014\FigB10_Pit Water Level for 5% and 10% Runoff Simulations.ai Formatted by: JCHEN Saved on: 03/27/2014



Lisbon Valley Mining Company
La Sal, Utah
Updated Centennial Pit Backfill Evaluation

Predicted Centennial Pit Water Level For 5% And 10% Runoff Scenarios

ARCADIS

FIGURE
B10

ARCADIS

Appendix C

Centennial Pit Predictive Modeling Sensitivity Analysis-Higher Pit Wall Runoff

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

APPENDIX C

Lisbon Valley Mine

Centennial Pit Predictive Modeling Sensitivity Analysis-Higher Pit Wall Runoff

October 26, 2012

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1. Introduction

This appendix presents the results of a sensitivity analysis for the Centennial Pit water balance. As described in the report *Backfill Evaluation for the Centennial Pit at the Lisbon Valley Mine, Utah* (Backfill Evaluation Report), components to the pit water balance consist of precipitation, runoff from the pit walls, groundwater inflow, evaporation, and vertical seepage of groundwater into the underlying Morrison Formation. Relative to other parameters for the water balance, the runoff coefficient was determined to have the highest uncertainty and model sensitivity. Therefore, a separate model simulation was conducted by doubling the runoff rate to 10 percent (%) of the annual average precipitation. Results of the water balance and predicted pit lake chemistry are provided in Section 2 and 3 of this appendix, respectively. Section 4 of this appendix provides an evaluation of potential water quality impacts for the 10% runoff simulation.

2. Water Balance Results

For the 10% runoff simulation, the pit water level stabilizes (inflows = outflows) at an elevation of approximately 6,070 feet (ft; approximate water depth of 50 ft). **Figure C1** presents a graph of water levels over time for the 10% runoff simulation. Pit inflow and outflow rates are presented on **Figure C2** for the 10% runoff simulation. The steady state groundwater inflow rate predicted by the numerical groundwater model (Appendix B) is approximately 6 gallons per minute (gpm). Appendix B, *Lisbon Valley Mine, Centennial Pit, Groundwater Model Report* presents the results of the 10% runoff simulation of the groundwater model. Other inflows to the pit consist of direct precipitation on the water surface, which increases as the lake grows, and runoff from the pit walls, which decreases as the exposed pit wall area decreases. Water losses from the pit consist of seepage into the pit floor and evaporation. The groundwater modeling predicts that seepage from the pit floor to the Morrison Formation is a minor flow component with an average outflow rate of approximately 0.6 gpm. Evaporation from the pit lake surface is initially 17 gpm (28 acre-feet per year (acre-ft/yr)) and increases to 26 gpm (42 acre-ft/yr) as the size of the pit lake increases.

Due to the high evaporation off the pit lake surface, the pit lake will continue to act as a terminal sink for the Burro Canyon groundwater system. The water in the pit is predicted to level off at an elevation of approximately 6,070 ft, and will continue to draw water from the recovering Burro Canyon groundwater system in perpetuity. Accordingly, there will be radial flow of Burro Canyon aquifer water towards the pit. Eventually the groundwater system reaches a steady-state condition. Water flowing into the Burro Canyon aquifer comes from recharging precipitation outside of the pit

walls. The water level in the Burro Canyon aquifer away from the pit is not predicted to recover back to its original elevation of 6,190 ft above mean sea level (ft amsl) due to this continual withdrawal of water due to evaporation; rather, it is predicted to reach a new steady-state equilibrium level a few feet above the pit lake level.

3. Predicted Pit Lake Chemistry

Although no pit lake is predicted for the base case model, pit water chemistry was estimated for the 10% runoff simulation. Water chemistry was estimated using the volumes of inflows and outflows, with each inflow assigned a water chemistry, as described in Sections 3.1 through 3.3. The modeling was conducted using the computer code PHREEQC, a reaction path chemical equilibrium model created by the USGS for simulating chemical reactions (Parkhurst and Appelo 1999). Model set-up and results are described in Sections 3.4 and 3.5, respectively.

3.1 Groundwater Inflow Chemistry

Groundwater flowing into the pit was represented by 141 samples from wells SLV-1A (34 samples), SLV-3 (29 samples), MW-2A (26 samples) and MW-96-7A (38 samples). The locations of these wells are presented in **Figure 2** of the Backfill Evaluation Report. Groundwater data used to represent the Burro Canyon aquifer were collected between 1995 and 2009.

The following assumptions were made regarding the groundwater data used to develop an average Burro Canyon aquifer water chemistry:

- Dissolved concentrations of iron and manganese were assumed to be Fe^{2+} and Mn^{2+}, which causes the groundwater to be slightly reducing.

- For samples in which uranium data were missing, the average uranium concentration for the well was used.

- Beryllium, mercury, silver, thallium, and vanadium have 75% or more non-detects, therefore they are assumed to be absent (concentration of zero). For all other non-detect parameters, one-half the detection limit was used for calculating the average Burro Canyon aquifer chemistry.

- Data for ammonia, nitrate, and nitrite showed inconsistencies when used to calculate redox conditions for the groundwater. Therefore, total nitrogen was entered in PHREEQC as the sum of ammonia, nitrate, and nitrite.

- One sample with a high charge balance error was removed from the data set (Well MW-2A from October 1994). This sample was not included in the total count of 141.

- Groundwater chemistries for the 141 samples were mixed at equal ratios in PHREEQC using sulfate to charge balance each sample.

The resultant mixed water was used to represent groundwater inflow from the Burro Canyon aquifer to the Centennial Pit. This average Burro Canyon aquifer water chemistry is shown in **Table C1**. The representative Burro Canyon aquifer water is near neutral (pH of 6.9), has a redox potential (Eh) of 127 millivolts (mV) (pe of 2.15) and a uranium concentration of 0.1 milligrams per liter (mg/L). The water is oversaturated or near saturation with respect to barite, calcite, ferrihydrite, gibbsite, alunite, rhodochrosite, and gypsum.

3.2 Pit Wall Runoff Chemistry

Water chemistry of runoff from the pit walls was estimated using Meteoric Water Mobility Procedure (MWMP) test results for the various rock types and the relative percentage of each rock type exposed in the final pit, as determined from a geologic block model map of the Centennial Pit provided by LVMC. **Table C2** presents the area percentage of each rock type and **Table C3** presents the MWMP results for Beds 11, 12, 9-10, 6-8, and 13. These rock types are not part of the backfill, but will be exposed on the walls of the final pit. Multiple-pass MWMP results for the backfill material (Beds 14 and 15) are presented in Table 3 of the Backfill Evaluation Report. The first-pass water chemistry from the multiple pass MWMP tests were used for estimating the pit wall runoff chemistry and provided a representation of the runoff chemistry due to contact with meteoric water.. PHREEQC was used to mix the MWMP leachates using the relative exposed areas. The following assumptions were made for estimating the runoff water chemistry:

- Concentrations of arsenic, chromium, and mercury were non-detect for MWMP leachate from Beds 11, 12, 9, 6-8, 13, 14, and 15. Therefore, concentrations of these metals were assumed to be zero. For all other non-detect parameters, one-half the detection limit was assumed.

- Sulfate was used to charge balance the MWMP results.

- MWMP data is not available for Bed 3, which represents 11.7% of the exposed pit walls. However, this rock type is similar to Bed 11, which was used to represent

Bed 3. Both Beds 3 and 11 are sandstones from the Dakota Formation. Pincock, Allen, & Holt (2005) describe Bed 3 as a buff to white sandstone, which may have shale at the base and Bed 11 as a white or buff sandstone with 1-10% shale or organics.

The water chemistry generated to represent pit wall runoff has a slightly acidic pH of 5.85, low alkalinity (39 mg/L as $CaCO_3$), and a sulfate concentration of approximately 400 mg/L (see **Table C1**). Concentrations of a few metals are an order of magnitude higher in the runoff than in the Burro Canyon aquifer. These metals include:

- Cadmium: concentration of 0.08 mg/L in pit wall runoff, compared to 0.003 in the Burro Canyon aquifer;

- Selenium: 0.02 mg/L in runoff, compared to 0.003 mg/L in the Burro Canyon aquifer; and

- Aluminum: 1.3 mg/L in the runoff, compared to 0.06 mg/L in the Burro Canyon aquifer. Concentrations of uranium are lower in the runoff (0.06 mg/L) than in the Burro Canyon aquifer (0.1 mg/L). Beds 6-8 contribute the highest metal concentrations to the wall rock runoff (see **Table C3)**. The pit wall runoff is oversaturated with respect to barite, ferrihydrite, and numerous aluminum minerals.

3.3 Direct Precipitation Chemistry

Precipitation chemistry was estimated based on data reported in Hem (1985) for snow samples from Nevada. Precipitation was modeled to have a pH of 5.6, and low concentrations of aluminum, sodium, magnesium, potassium, bicarbonate, sulfate and chloride (see **Table C1**).

3.4 Pit Lake Chemistry Model Set-up

For each time step, the following reactions were simulated using PHREEQC:

1. Inflows to the pit (groundwater, runoff, and precipitation) and pit water chemistry from the previous time step were mixed using ratios determined from the water balance.
2. The volume of the mixture was reduced slightly to account for the small amount of seepage of pit lake water into the underlying Morrison Formation.
3. Evaporation occurred from the pit water as determined from the water balance.

4. Evaporated water was fixed to a pe of 6.8 (Eh of 400 mV), equilibrated with atmospheric carbon dioxide (P_{CO_2} of $10^{-3.5}$ atmospheres, atm) and selected mineral phases were allowed to precipitate if oversaturated. A pe of 6.8 represents redox conditions of transitional environments such as lakes, which are neither isolated nor in direct contact with air (Baas-Becking et al. 1960). Mineral phases which were allowed to precipitate are listed in **Table C4**. These mineral phases were selected based on kinetics and professional judgment.
5. Sorption was allowed to occur based on the amount of ferrihydrite that precipitated in Step 4. Surface-complexation reactions in the Minteq.v4 database (USEPA 1999) were used, which were derived from Dzombak and Morel (1990). Uranium sorption was added to the model, as also defined by Dzombak and Morel (1990).

Over the 100 yr simulation period, geochemical calculations were conducted at 5-yr intervals, for a total of 20 timesteps. Calculations were conducted using the Minteq.v4 thermodynamic database.

3.5 Results of Pit Lake Chemistry Prediction

Results of the 10% runoff simulation are presented in **Table C5**. Concentrations are presented for 100 yrs after the end of mining. **Figure C3** and **Figure C4** present graphs of concentrations over time for selected parameters (uranium, selenium, zinc, and sulfate). The pit lake water quality is controlled by evapoconcentration, subsequent precipitation of mineral phases, and sorption. Mineral phases that precipitate in the model include: $Al_4(OH)_{10}SO_4$, , ferrihydrite ($Fe(OH)_3$), manganite (MnOOH), , gypsum ($CaSO_4$), fluorite (CaF_2), barite ($BaSO_4$), and tenorite (CuO). Sorption onto ferrihydrite reduces the concentrations of many metals in the pit lake, including arsenic, chromium, nickel, lead, selenium, and vanadium.

The pit lake water for the sensitivity analysis is predicted to be neutral to alkaline, with the model predicting a pH of 8. The water will have high TDS (approximately 6,000 mg/L), primarily due to high sulfate (approximately 3,900 mg/L). For comparison purposes, concentrations of several parameters are predicted to be greater than the Utah Groundwater Quality Standards (Standards), including cadmium, selenium, uranium, zinc, and fluoride. Cadmium is the only parameter detected at a concentration that is more than an order of magnitude higher than the groundwater standard. The predicted cadmium concentration is 0.4mg/L, compared to the standard of 0.005 mg/L. The predicted selenium concentration is 0.1 mg/L, compared to the standard of 0.05 mg/L, and the predicted uranium concentration is 0.6 mg/L, compared to the standard of 0.03 mg/L. For metals with high concentrations from the pit wall runoff, the predicted pit water chemistry is likely a conservatively high

estimation. Runoff from pit walls was estimated based on standard, single-pass MWMP testing. As demonstrated by the multiple-pass MWMP testing conducted on backfill material (Beds 14 and 15; See table 3 of the Backfill Evaluation Report), leached concentrations will decrease over time. Metals which have high concentrations due to pit wall runoff include cadmium, selenium, and zinc. Uranium levels predicted by the model may be overestimated for two reasons. First, uranium may coprecipitate with several minerals forming in the pit lake, such as calcite. This process is not simulated by the model and is not easily quantifiable. Additionally, groundwater concentrations of uranium used in the model were for total, unfiltered samples, which may also overestimate the uranium levels in the pit.

4. Potential Impacts to Aquifers

For the base case model simulation, a pit lake is not predicted to form and the Burro Canyon aquifer and N-aquifer are not expected to be impacted. For the 10% runoff simulation, a small pit lake forms (approximately 50 ft in depth, see Section 2). Because groundwater will be moving radially inward towards the pit lake in perpetuity, there is not expected to be an impact to the Burro Canyon groundwater system as a result of pit lake development. Due to the vertical gradient to the N-aquifer, pit lake water is predicted to seep into the Morrison Formation and N-aquifer at a slow rate of approximately 0.6 gpm. The potential effects of this leakage to the N-aquifer are discussed in the sections below.

4.1 Predicted Travel Time through the Morrison Formation

Estimated travel time for pit lake water to reach the N-aquifer is predicted to be approximately 50 and 230 yrs depending on the effective porosity. Using a vertical hydraulic conductivity (K_v) of 0.06 ft/yr (6 x 10^{-8} cm/s), an effective porosity of 5%, and a distance of 390 ft (approximate thickness of the Morrison Formation), pit lake leakage is expected to reach the N-aquifer after approximately 230 yrs. Using a lower effective porosity of 1%, the travel time for pit leakage to reach the N-aquifer is approximately 50 yrs.

The hydraulic conductivity used for this calculation was estimated based on the aquifer's volumetric recharge rate (Q), the hydraulic gradient through the Morrison Formation (i), and the shallow aquifer recharge area (A), which reduces to the following:

$$K_v = \text{1-dimensional recharge rate} / i$$

where the 1-dimensional recharge rate to the Burro Canyon aquifer is 1 inch per yr and the gradient through the Morrison Formation (i) is 1.42 (unitless). The gradient through the Morrison Formation was calculated as the difference between the water level in the Burro Canyon aquifer (average of 6,190 ft) and the top of the N-aquifer (Entrada Formation) at well MW-96-7B (5638 ft), divided by the thickness of the Morrison Formation (390 ft at well MW96-7B). Note that the Summerville Formation was not encountered at well MW96-7B.

4.2 Predicted Water Quality of Leakage to N-Aquifer

As pit lake water seeps into the underlying Morrison Formation and eventually mixes with the N-aquifer, several factors will affect the chemistry of the water. These factors include change in redox chemistry and subsequent mineral precipitation, mixing and dilution with the N-aquifer, and sorption onto precipitated mineral phases and aquifer matrix.

Groundwater in the Morrison Formation is likely anoxic for two reasons: 1) the rock type of shale and mudstone, which likely contains organic carbon, and 2) the depth of the formation from ground surface (greater than 300 ft bgs at wells MW97-9 and MW96-7B). Additionally, data from a water sample collected from well PW-7M, temporarily completed in the Morrison Formation, indicate relatively high concentrations of dissolved manganese (0.087 mg/L) and dissolved iron (5.1 mg/L), which are consistent with anoxic conditions. As oxidized pit water travels vertically through the Morrison Formation, changes in redox conditions will cause several metals to precipitate, particularly uranium and selenium.

PHREEQC was used to predict the changes in groundwater chemistry as the water flows through the Morrison Formation. To simulate this change, the pe of the water was changed from an oxidized pit lake value of 6.8 (Eh of approximately 400 mV) to a reduced value of -3 (Eh of approximately -200 mV), which is typical for deep groundwater (Baas Becking et al. 1960). Additionally, the water was assumed to have a P_{CO_2} of $10^{-2.5}$ atm. Groundwater often has a higher P_{CO_2} than atmospheric conditions, especially if organic carbon is present (Kirby and Cravotta 2005) and reduction reactions are occurring, which are likely conditions for the Morrison Formation. After applying these changes to the infiltrating pit lake water, oversaturated mineral phases were allowed to precipitate out of solution, including metal selenides (CdSe, MnSe, NiSe, ZnSe), uraninite, and metal sulfides (ZnS, and CdS). Results of the predictive modeling for pit water flowing through the Morrison Formation are provided in **Table C5**. As shown in the table, concentrations of nickel, cadmium,

uranium, selenium, and zinc decrease due to precipitation of NiSe, uraninite, ZnS, and CdS.

As leakage from the pit travels through the Morrison Formation and eventually mixes with the N-aquifer, dilution will occur. To predict the amount of dilution that will occur in the N-aquifer mixing zone immediately below the pit, the leachate groundwater dilution factor was calculated based on equations from the Soil Attenuation Model for Derivation of Risk-Based Soil Remediation Standards (Conner et al. 1997), which take into account the flow rate of seepage from the Morrison Formation (approximately 0.6 gpm) and groundwater Darcy velocity and thickness of the N-aquifer. The Darcy velocity for the N-aquifer was estimated using an average hydraulic conductivity of 1.9 x 10^{-4} cm/s from pumping tests at well MW96-7B (Whetstone 2010) and a hydraulic gradient of approximately 0.02, based on pre-mining water levels for wells MW96-7B, MW97-13, and MW97-12 from November 1997 (Whetstone 2010). Using these values, additional dimensions for the bottom of the pit, and approximate aquifer thickness, a dilution factor of seven is predicted for water in the mixing zone, meaning that the seepage from the Morrison Formation will be diluted with N-aquifer water by a factor of approximately seven in the mixing zone directly beneath the pit. This mixing zone encompasses the area of the N-aquifer immediately below the pit (approximately 7 acres in area), with an approximate thickness of 80 ft. Dilution factor calculations are provided in **Table C6**.

Dilution will also occur in the area outside the mixing zone as leakage from the Morrison Formation mixes with the entire aquifer. To predict this amount of dilution, the N-aquifer was assumed to have 2,540 acre-ft of water (area of approximately 254 acres, a thickness of 200 feet, and a porosity of 5%). This volume is similar to the volume assumed for mixing calculations in previous annual models (Whetstone 2010). The chemistry and volume of N-aquifer water were mixed with the chemistry and volume of water leaking into the aquifer over 100 years (80 acre-ft) (see Table C5). These predictions are conservative; as the thickness of the N-aquifer is likely greater than 200 ft and N-aquifer flow would result in additional dilution. For comparison purposes, Table C5 also presents the average and maximum N-aquifer concentrations as represented by wells MW96-7B, MW97-9, and MW97-11, and the average and maximum concentrations for well MW96-7B, which is closest to the pit. The N-aquifer is classified as a Class III aquifer based on levels of gross alpha and gross beta which naturally exceed the groundwater standards in UAC R317-6-2 (UDEQ 1998). For a Class III aquifer, protection levels are defined as 1.5 times the background concentration (Utah Administrative Code R317-6-4). Predicted concentrations are below 1.5 times the average N-aquifer concentration or 1.5 times the average Well MW96-7B concentration, except for magnesium. Magnesium in the N-aquifer after 100

years of leakage is expected to be 30 mg/L, which is greater than the previously observed maximum concentration of 26 mg/L. The predicted sulfate concentration for the N-aquifer is 215 mg/L. For comparison, the N-aquifer monitoring well closest to the pit (Well MW97-7B) has an average sulfate concentration of 177 mg/L and an average pre-mining sulfate concentration of 182 mg/L. The predicted sulfate concentration of 215 mg/L for the N-aquifer is below 1.5 times the background concentration for Well MW96-7B and is therefore below the protection level for a Class III aquifer.

Based on the predicted dilution and changes in water chemistry described above, leakage from a pit lake is not expected to result in water quality impacts to the N-aquifer. Constituent concentrations are predicted to remain below Standards and within the range of previously observed values, with the exception for magnesium, as described above.

5. Summary and Conclusions

This appendix presents the results of a sensitivity model simulation for the Centennial Pit, in which a runoff coefficient of 10% is used for pit wall runoff. This runoff coefficient is twice the value used in the base case model in which a pit lake does not form. Using this higher runoff coefficient, two small pit lakes are predicted to form. Groundwater model results for this sensitivity simulation are presented in Appendix B, *Groundwater Model Report*.

The water chemistry of the pit lake was predicted based on rates of precipitation, runoff, groundwater inflow, evaporation, and seepage from the bottom of the pit bottom to the Morrison Formation and chemistries for each inflow. The pit lake water quality is predicted to be neutral to alkaline and have elevated TDS, sulfate, and elevated concentrations of metals including cadmium, selenium, and uranium. The elevated concentrations are due to the small water volume and a high evaporation rate, resulting in evapoconcentration. However, the predicted pit lake will be a terminal sink and therefore will not impact the Burro Canyon aquifer. A small portion of the pit water would seep into the Morrison Formation and eventually mix with the N-aquifer. Constituent concentrations in the N-aquifer as a result of this leakage are expected to remain below the Standards with the exception of the mixing zone immediately below the pit in the N-aquifer. N-aquifer concentrations are predicted to be within the range of previously observed values, except for magnesium, which is predicted to increase to 30 mg/L in the N-aquifer after 100 years of pit lake leakage.

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APPENDIX C

TABLES

TABLE C1: PIT INFLOW CHEMISTRIES USED FOR MODEL

Parameter	Burro Canyon Groundwater (mg/L)	Runoff from Pit Walls (mg/L)	Precipitation (mg/L)
pH	6.9	5.9	5.6
Alkalinity as $CaCO_3$	449	39	2.5
Sulfate	1035	403	1.6
Silver	--	0.00004	--
Aluminum	0.06	1.37	0.01
Arsenic	0.004	--	--
Barium	0.055	0.020	--
Beryllium	--	0.00005	--
Calcium	335	113	--
Cadmium	0.003	0.082	--
Chloride	40.6	15.6	0.2
Chromium	0.0026	--	--
Copper	0.042	0.049	--
Iron*	3.10	0.62	--
Potassium	15.4	11.5	0.6
Magnesium	126.9	36.0	0.2
Manganese*	0.90	0.38	--
Molybdenum	0.016	0.010	--
Sodium	91.2	11.6	0.6
Nickel	0.015	0.031	--
Lead	0.002	0.003	--
Antimony	--	0.00026	--
Selenium	0.003	0.019	--
Silicon	3.32	2.53	--
Uranium	0.10	0.06	--
Vanadium	--	0.005	--
Zinc	0.46	1.06	--
Fluoride	0.40	0.59	--

*Assumed to be Fe^{2+} and Mn^{2+} for groundwater

"--" modeled concentration is zero

TABLE C2: EXPOSED ROCK TYPES ON PIT WALLS

Pit Wall Rock Type	Formation	Description	Percent of Total Area	MWMP Results used to Represent Runoff
Bed 3	Dakota	buff to white sandstone, may have shale at base; represented by Bed 11 data	11.7	Bed 11
Bed 6	Dakota	coal, grades into carbonaceous shale	7.4	Bed 6-8
Bed 9	Dakota	light gray shale, grading into fine-grained sandstone	8.3	Bed 9-10
Bed 12	Dakota	greenish shale and sandstone, often pyritic	5.7	Bed 12
Bed 13	Dakota	white, buff or orange sandstone, poorly semented	6.6	Bed 13
Bed 14	Burro Canyon	varicolored shale, may grade into cherty limestone or conglomerate	11.9	Bed 14
Bed 15	Burro Canyon	pure white quartzose sandstone, local shale intercalations	48.4	Bed 15

Note: Descriptions from Pincock Allen & Holt, Technical Report of the Lisbon Valley Copper Project (2005)

TABLE C3: METEORIC WATER MOBILITY PROCEDURE RESULTS FOR WASTE ROCK

Parameter	Bed 11	Bed 12	Bed 9-10	Bed 6-8	Bed 13
	Pass 1	Pass 1	Pass 1	Pass 1	Pass 1
Dissolved Metals					
Aluminum (MWMP)	<0.03	<0.03	<0.03	18.20	0.09 B
Antimony (MWMP)	<0.0004	0.0017 B	0.0023	<0.0004	0.0012 B
Arsenic (MWMP)	<0.06	<0.1	<0.06	<0.06	<0.06
Barium (MWMP)	0.019 B	0.010 B	0.021	0.018 B	0.021
Beryllium (MWMP)	<0.01	<0.01	<0.01	0.02 B	<0.01
Cadmium (MWMP)	<0.005	<0.005	<0.005	1.070	<0.005
Calcium (MWMP)	96.1	144	275	117	20.3
Chromium (MWMP)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper (MWMP)	0.02 B	0.03 B	0.02 B	0.34	0.17
Iron (MWMP)	0.09	<0.02	<0.02	8.05	0.02 B
Lead (MWMP)	0.0005	0.0001 B	0.0001 B	0.0456	<0.0001
Magnesium (MWMP)	58.6	53.7	103	32.6	5.2
Manganese (MWMP)	0.611	0.042	0.089	1.210	0.006 B
Mercury (MWMP)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum (MWMP)	<0.01	0.12	0.19	<0.01	0.03 B
Nickel (MWMP)	0.02 B	<0.01	0.09	0.24	<0.01
Potassium (MWMP)	7.9	42.5	32.7	10.0	13.2
Selenium (MWMP)	<0.06	<0.1	0.08 B	<0.06	<0.06
Silica (MWMP)	1.8 B	6.6	5.2	8.7	9.2
Silver (MWMP)	<0.00005	<0.00005	0.00017 B	<0.00005	<0.00005
Sodium (MWMP)	8.6	75.3	26.4	9.5	13.2
Thallium (MWMP)	0.0001 B	0.0007	0.0004 B	0.0024	<0.0001
Uranium (MWMP)	0.0143	0.0673	0.0253	0.726	0.0081
Vanadium (MWMP)	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc (MWMP)	0.03 B	<0.01	<0.01	14.20	<0.01
Anions					
Sulfate (MWMP)	460	410	950	560	50
Total Alkalinity	15 B	124	62	<2	57
Bicarbonate as $CaCO_3$	15 B	124	62	<2	57
Carbonate as $CaCO_3$	<2	<2	<2	<2	<2
Hydroxide as $CaCO_3$	<2	<2	<2	<2	<2
Chloride (MWMP)	13	130	55	4 B	15
Fluoride (MWMP)	0.1 B	2.2	0.8	0.5	0.6
MWMP Parameters					
Dry Weight (g)	4995.92	4915.17	4760.01	4986.65	5000.37
Extraction pH	7	7	7	7	7
Extraction Time (hrs)	25	26.25	25	25.5	25.5
Leachate pH	6.17	7.3	7	4.06	6.95
Leachate Volume (mL)	5007.2	4993.7	4833.3	5040.9	5152
Particle Size over 5 cm (%)	71.8	0	9.39	41.39	24.19
Retained Moisture (%)	7.68	23.7	19.24	9.69	12.1
Soil Analyses					
pH	6.2	7.3	7.0	4.1	7.0

TABLE C4: GEOCHEMICAL MODEL SET-UP

Parameter	Model Input
Geochemical Database	Minteq.v4*
Charge balance	adjust sulfate concentration
Redox of pit water	pe of 6.8 (Eh of 0.4 V)
Mineral Phases	Al(OH)3(am)
	Al4(OH)10SO4
	Otavite
	Brochantite
	Cu(OH)2
	Tenorite
	Malachite
	Azurite
	Chalcanthite
	Ferrihydrite
	Siderite
	Melanterite
	Anglesite
	Rhodochrosite
	Birnessite
	Manganite
	Ni(OH)2
	Zn(OH)2(am)
	Smithsonite
	Goslarite
	Gypsum
	SiO2(am-ppt)
	H-Jarosite
	K-Jarosite
	Na-Jarosite
	Calcite
	Magnesite
	Witherite
	Barite
	Fluorite
	Cerrusite

Note:
*Database was updated to include uranium sorption as defined by Dzombak and Morel (1990)

TABLE C5: PREDICTED PIT WATER QUALITY

Parameter	Base Case	Sensitivity Run	Anoxic Pit Leakage
	5% Runoff	10% Runoff	10% Runoff
pH	NA	7.9	6.9
Alkalinity as $CaCO_3$	NA	33	30
Sulfate	NA	3837	3826
Aluminum	NA	0.7	0.1
Arsenic	NA	0.00001	0.00001
Barium	NA	0.004	0.004
Calcium	NA	515	515
Cadmium	NA	0.4	<0.0001
Chloride	NA	195	195
Chromium	NA	0.001	0.001
Copper	NA	0.008	0.008
Iron	NA	0.0001	0.0001
Potassium	NA	107	107
Magnesium	NA	535	535
Manganese	NA	3	3
Molybdenum	NA	0.1	0.1
Sodium	NA	307	307
Nickel	NA	0.2	0.1
Lead	NA	0.001	0.001
Selenium	NA	0.1	<0.0001
Silicon	NA	11	11
Uranium	NA	0.6	<0.0001
Vanadium	NA	0.0001	0.0001
Zinc	NA	6.3	0.0003
Fluoride	NA	4.2	4.2

Note: All concentrations in mg/L, except pH

NA: Not applicable, no pit lake is expected to occur for base case model.

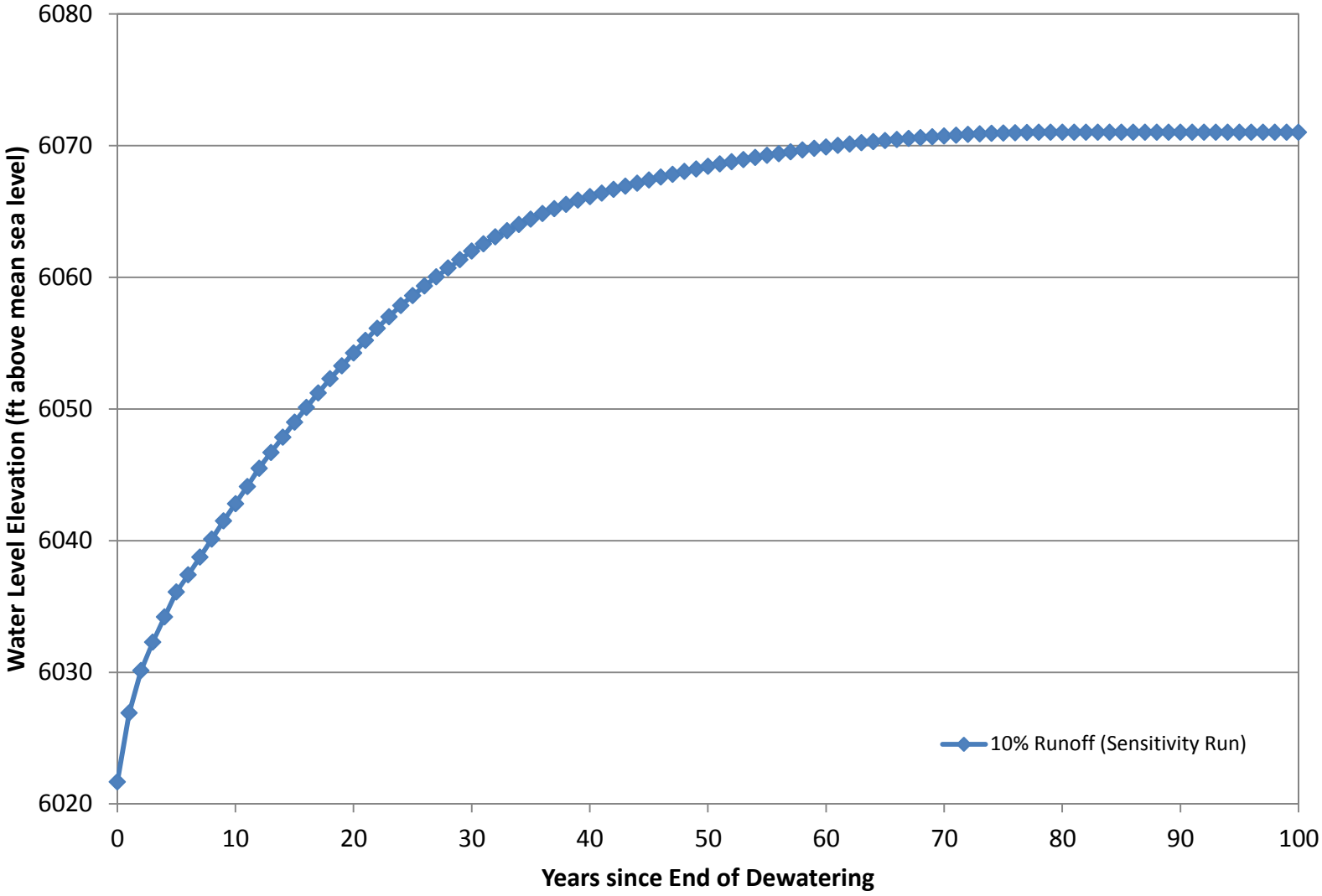
TABLE C6: VALUES FOR N-AQUIFER DILUTION FACTOR CALCULATIONS

Parameter	Value	Units	Assumptions
Area of bottom of pit	6.9	acres	Bottom of backfilled pit at elevation of 6,020 ft
	302232	ft^2	
Net flow from Morrison Formation into N-Aquifer	0.0002	ft/d	Flow rate into the N-Aquifer is the same as the leakage rate from the pit bottom to the Morrison Formation
	2.54	cm/yr	
W, Lateral width of pit bottom in direction of GW	620	ft	Assuming that the pit has a circular bottom
	18908	cm	
b, Saturated thickness of waterbearing unit (N-Aquifer)	200	ft	A thickness of 200 ft was assumed, however, the dilution factor calculation is not sensitive to this thickness
	6096	cm	
α_v, Vertical groundwater dispersivity	105.9	cm	Calculated from the lateral width
N-Aquifer hydraulic gradient	0.003	unitless	Based on potentiometric surface map for N-Aquifer in Avery 1986
N-Aquifer hydraulic conductivity	1.9×10^{-4}	cm/s	Average of pumping tests at Well MW96-7B
Groundwater Darcy velocity	121.55	cm/yr	N-Aquifer Darcy velocity
$\delta_{gw,}$ groundwater mixing zone thickness	2383.6	cm	Calculation
	78.2	ft	
Dilution Factor	7	unitless	Leakage from the Morrison Formation will be diluted with N-Aquifer water by this factor.

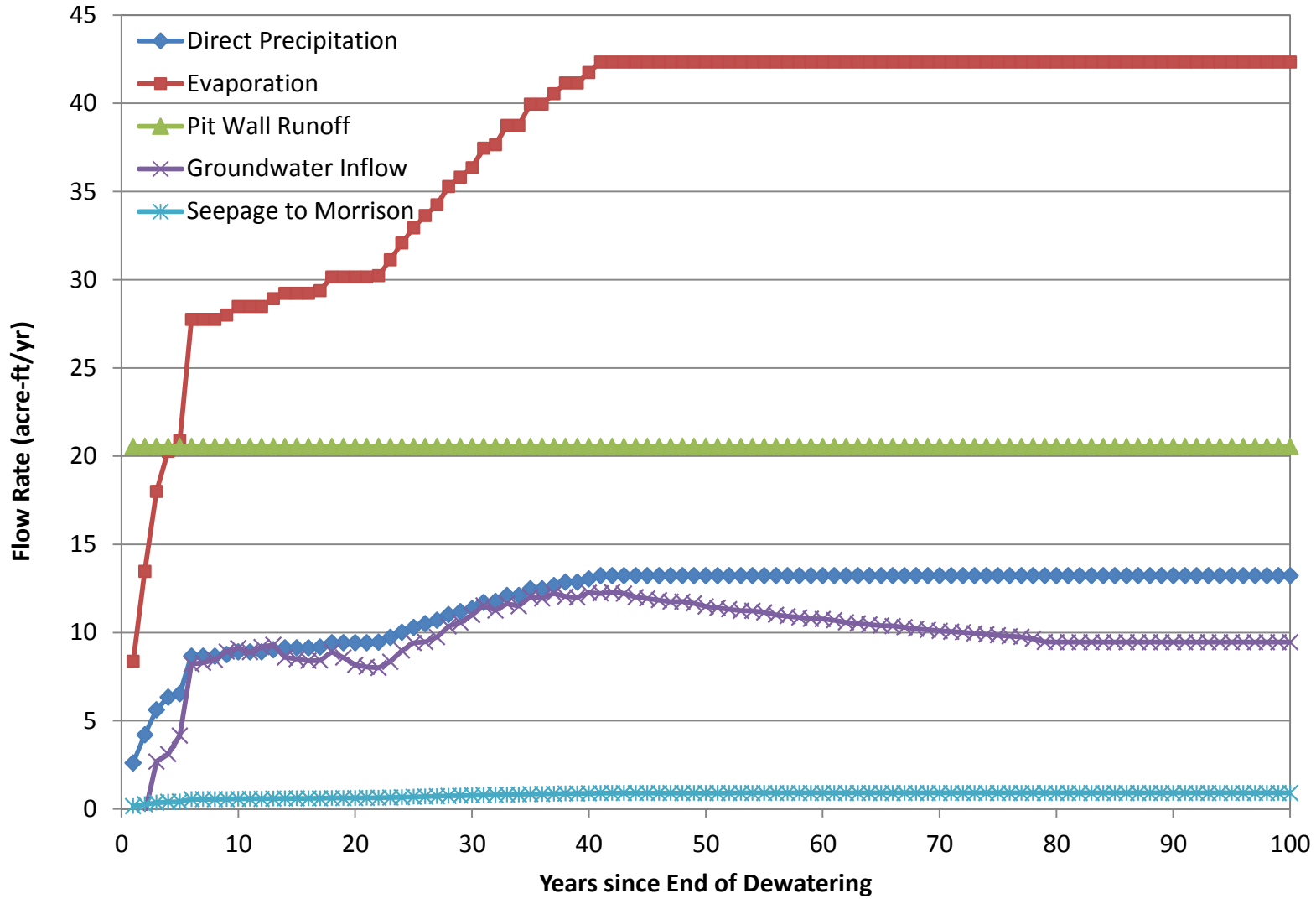
Note: Equations from Soil Attenuation Model for Derivation of Risk-Based Soil Remediation Standards, Groundwater Services (Conner et al. 1997)

APPENDIX C

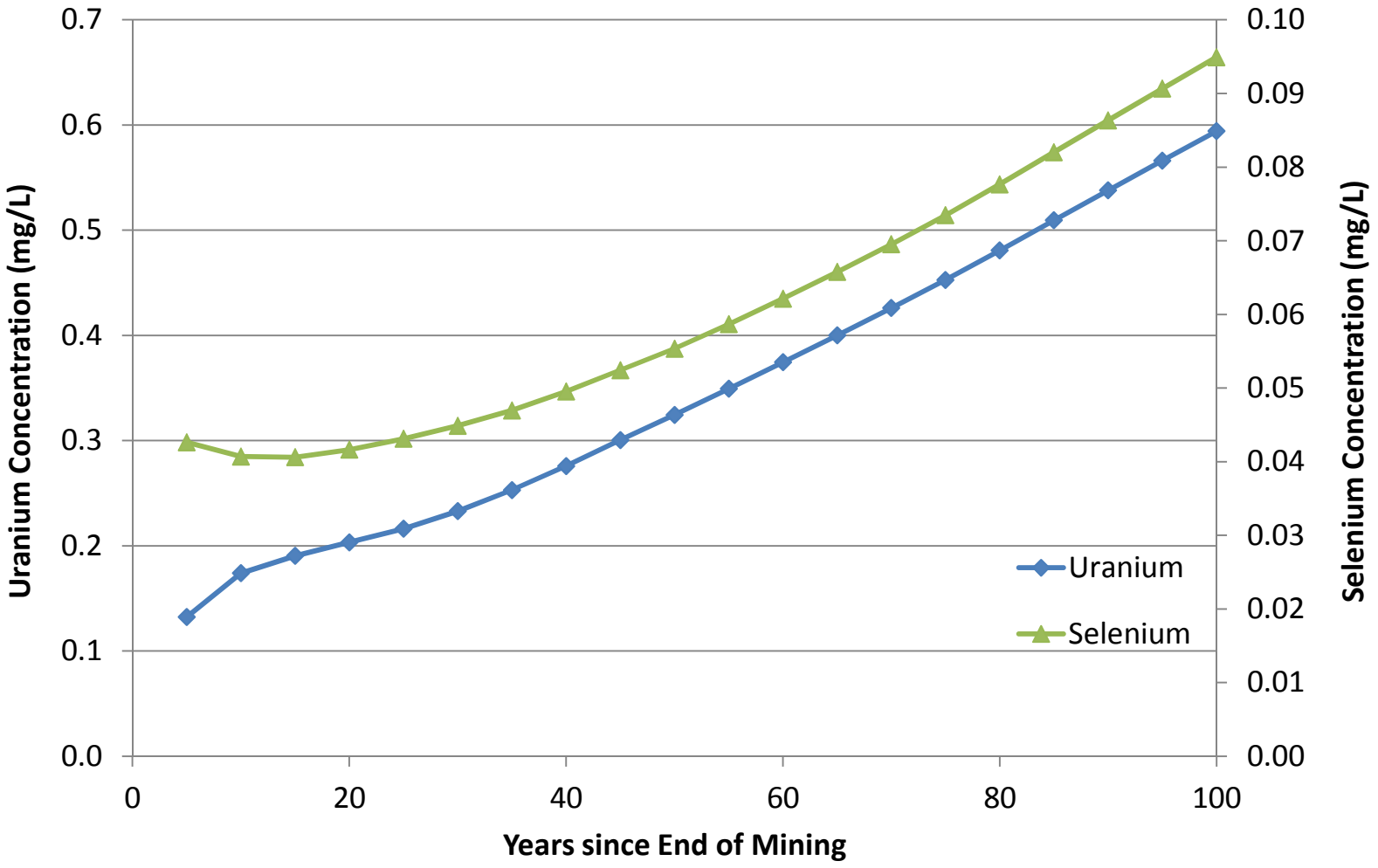
FIGURES



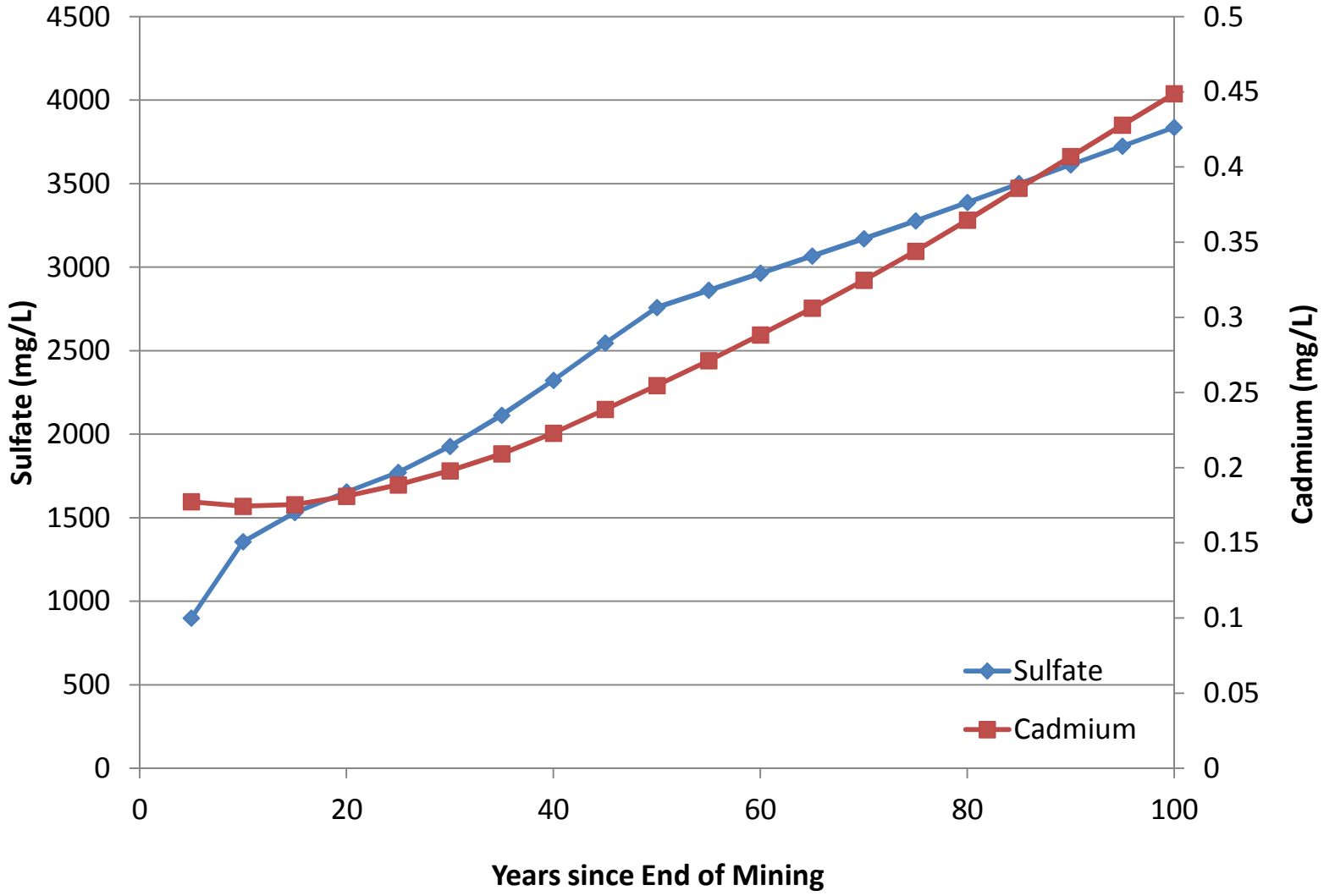
10/11/2012 ARCADIS	**Figure C1: Pit Lake Elevations over Time for 10% Runoff Simulation**	Project No: **Lisbon Valley Mining Company**



10/11/2012 ARCADIS	**Figure C2: Inflows and Outflows to Pit used for Geochemical Modeling**	Project No: **Lisbon Valley Mining Company**



10/11/2012 ARCADIS	**Figure C3: Pit Water Quality over Time: Uranium and Selenium**	Project No: **Lisbon Valley Mining Company**



10/11/2012 ARCADIS	**Figure C4: Pit Water Quality over Time: Sulfate and Cadmium**	Project No: **Lisbon Valley Mining Company**