1226457 - R8 SDMS

URS OPERATING SERVICES

999 18TH STREET
SUITE 900
DENVER, COLORADO 80202-1908
TEL: (303) 291-8200
FAX: (303) 293-8585

March 20, 2012

Steven Way
On-Scene Coordinator
U.S. Environmental Protection Agency, Region 8
Mail Code: 8EPR-ER
1595 Wynkoop Street
Denver, Colorado 80202-1129

SUBJECT: START 3, EPA Region 8, Contract No. EP-W-05-050, TDD No. 1005-01, 2011 Source Water Investigation Report, Rico-Argentine St. Louis Tunnel, Rico, Dolores County, Colorado

Dear Steve:

Enclosed are three copies of the 2011 Source Water Investigation Report for the California Gulch Operable Unit 11 site. The report provides the results of high-flow and low-flow stream tracer studies, mine tracer studies, and mine entries performed to identify sources of water and contaminants to the mine workings that drain to the St. Louis Tunnel. The report was prepared with significant input from Rory Cowie and Mark Williams of the University of Colorado, contracted through Mountain Studies Institute, Rob Runkel of the U.S. Geological Survey, Allen Sorenson of the Colorado Division of Mining Reclamation and Safety, and Mike Wireman and yourself of EPA.

If you have any questions, please call me at 505-269-1925.

Very truly yours,

URS OPERATING SERVICES, INC.

Rebecca A. Jaramillo for

Jan Christner, P.E.
Environmental Engineer

cc: Charles W. Baker/UOS (w/o attachment)
File/UOS

START 3

Superfund Technical Assessment and Response Team 3 – Region 8

United States
Environmental Protection Agency
Contract No. EP-W-05-050

2011 SOURCE WATER INVESTIGATION REPORT

RICO-ARGENTINE ST. LOUIS TUNNEL
Rico, Dolores County, Colorado

TDD No. 1005-01

MARCH 20, 2012

URS
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In association with:
Garry Struthers Associates, Inc.
LT Environmental, Inc.
TechLaw, Inc.
Tetra Tech EMI
TN & Associates, Inc.

RICO ARGENTINE ST. LOUIS TUNNEL
2011 MINE INVESTIGATION REPORT
Rico, Dolores County, Colorado

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1.0 INTRODUCTION

This report presents the findings of the source water investigation studies performed during 2011 under the direction of the U.S. Environmental Protection Agency (EPA) for the Rico-Argentine site near Rico, Dolores County, Colorado. EPA performed the work in conjunction with Atlantic Richfield Company (AR) in response to requirements in Task E – Source Water Investigations and Controls of the Removal Action Work Plan accompanying the Unilateral Administrative Order for Removal Action, Docket No. CERCLA-08-2011-0005. EPA tasked the U.S. Geological Survey (USGS), the Colorado Division of Reclamation Mining and Safety (DRMS), Institute for Arctic and Alpine Research (INSTAAR) subcontracted through Mountain Studies Institute (MSI), and URS Operating Services, Inc. (UOS) to assist in planning and performing the studies. The work was performed under the guidance of the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) (EPA 2011a).

The source water investigation is being performed to help determine the feasibility of reducing the volume of water and/or the load of contaminants that exit the mine workings at the St. Louis Tunnel, which discharges to the Dolores River. Reducing the flow of water into and through the mine workings, reducing the mobilization of contaminants within the mine, and/or isolating high-concentration contaminant source water for limited smaller-scale treatment, may create alternatives for managing the St. Louis Tunnel discharge that are not currently available. The current efforts, as described below, are limited to the mine workings associated with the southeast crosscut of the St. Louis Tunnel. The percentage of the metals load from the southeast mine system into the St. Louis Tunnel is unknown at this time.

The 2011 source water investigation focused on identifying sources of water and contaminants in the upper mine workings, including the Blaine Tunnel, the 517 Shaft, and the Argentine Tunnel, in the vicinity of Silver Creek (Figures 1 and 2). The following objectives were identified for the 2011 source water investigation. Note that the shaft that was identified as the Argentine Shaft during project planning and field work is now known to be the 517 Shaft and is referenced as the 517 Shaft in this report. The tunnel that accesses the 517 Shaft is now referred to as the 517 Shaft Access Tunnel.

- Determine if a significant volume of surface water from Silver Creek contributes to the flow at the St. Louis Tunnel by entering the mine workings near the Blaine Tunnel and 517 Shaft Access Tunnel.
- Identify sources of acid mine drainage and routes of flow by both underground reconnaissance and use of tracer methods.

- Measure flow and water quality (metals concentrations) within the mine workings to establish a quantitative understanding of the primary sources of loading to the St. Louis Tunnel discharges.

The following tasks were designed to meet these objectives.

Stream tracer studies using bromide and chloride injections were performed in Silver Creek during high flow (late June) and lower flow (early October) to provide quantitative flow measurements to help determine if water is lost from the creek in the vicinity of the Rico-Argentine mine workings and the Blackhawk fault. Both continuous injection and slug injection tests were performed during each event. Water samples were collected during the high-flow and low-flow tracer studies.

Mine tracer studies using both organic dye and inorganic salt injections were performed to track and measure the flow of water through the Silver Creek/Rico-Argentine mine system. Tracers were injected into the 517 Shaft (fluorescein and lithium hydroxide), up-tunnel of the Blaine coffer dam (sodium fluoride), and Silver Creek upstream of the Blaine Tunnel, Argentine Shaft, and the 517 Shaft (rhodamine WT and sodium bromide). Samples were collected in the 517 Shaft, the Argentine Tailings seep, Silver Creek, and at the St. Louis Tunnel portal.

Mine entries: The Blaine Tunnel, the 517 Shaft Access Tunnel, and the Argentine Tunnel (uphill from the Blaine Tunnel) were entered to improve understanding of the flow of water and contaminants between different portions of these interconnected mine workings and to characterize the physical aspects of the mines that may be important for identifying potential remedial alternatives that would reduce the mobilization and transport of metals in the mine workings. A camera was lowered down the 517 Shaft to characterize the condition of the shaft walls and help identify the sources of water to the shaft. Visual observations were made and samples of mine water were collected for water quality analysis.

This report summarizes the findings of mine investigation work performed during 2011 and provides recommendations for work to be completed during 2012. Background information is provided in Section 2, sample collection and analysis are described in Section 3, stream tracer work is described in Section 4, observations from the mine entries are presented in Section 5, the mine tracer work is described in Section 6, water quality results and contaminant loading are discussed in Section 7, and recommendations for further work are provided in Section 8. A photolog is presented in Appendix A, conceptual mine workings maps from AR are presented in Appendix B, and laboratory data packages are in Appendix C.

2.0 BACKGROUND

This section presents background information directly applicable to understanding the purpose and results of the source water investigation. Other site characteristics are described in the Work Plan (EPA 2011b) and associated documents and in other site documents such as the Water Quality Assessment (Colorado Department of Public Health and the Environment [CDPHE] Water Quality Control Division [WQCD] 2008) and the Watershed Plan for the East Fork of the Dolores River in Dolores County (Grayling Environmental 2006).

The Rico-Argentine Mine Site consists of a complex of historical water treatment ponds, the St. Louis Tunnel, and the associated mine workings. Mine water discharge currently flows from the St. Louis Tunnel portal through the ponds, located along the Dolores River, and enters the Dolores River from the pond system outfall downstream of Pond 5 (Figure 1). The St. Louis Tunnel is connected to mine workings associated with Telegraph Hill to the north and to mine workings associated with the Rico-Argentine mining district (near Silver Creek) to the south.

2.1 SITE HISTORY

The site was historically used for mining and material processing. Mining in the Rico area, known as the Pioneer District, began in 1869 and continued sporadically over the next century. Significant mining began at the site in the early 1900s. The St. Louis Tunnel was driven during 1930 and 1931, and several expansions in subsequent years have connected the St. Louis Tunnel to other mine workings in the area. An acid generation plant was operated at the site, beginning in the 1950s. Rico Argentine Mining Company ceased most mining operations in 1971 and allowed deeper workings beneath Silver Creek to flood. During 1973 to 1975, Rico Argentine Mining Company operated a leach heap just northwest of the St. Louis Tunnel, immediately adjacent to the Dolores River. All mining activities by Rico Argentine Mining Company ended in 1976–1977, and exploration work ceased in 1978. In 1980, the Anaconda Company (Anaconda) acquired Rico Argentine Mining Company's surface and mineral properties in the Rico area. Anaconda conducted exploration drilling from 1980 to 1983, resulting in discovery of a deep molybdenite deposit beneath Silver Creek. The discovery did not proceed to the development phase, and Anaconda never produced ore in Rico. The acid plant and associated structures were demolished and the site was re-graded, capped with a soil cover, and re-vegetated during 1985 and 1986 (AR 2010).

A series of ponds was installed at the site by 1956 and additional ponds were added by 1979. At least some of the ponds were initially used in the production of sulfuric acid from pyritic ore and tailings. More recently, the ponds have received mine-impacted water that discharges from the St. Louis Tunnel and contains elevated concentrations of metal contaminants.

As part of the acquisition of Rico Argentine Mining Company's surface and mineral properties in 1980, a pre-existing National Pollutant Discharge Elimination System (NPDES) permit (No. CO-0029793) was transferred to Anaconda. In 1983 water from the Blaine Mine on Silver Creek (outfall 002 under the original NPDES permit) was redirected to lower workings, which are thought to be connected to the St. Louis Tunnel, and the Blaine Tunnel (or adit) became zero discharge. In 1984, a slaked lime water treatment system began operation. The treatment system added lime to the mine discharge water in order to increase pH and precipitate metal contaminants. The treated water flowed through the ponds where the metal precipitate was allowed to settle before the water was discharged to the Dolores River. The system was permitted by the State of Colorado under Colorado Discharge Permit System (CDPS) permit number CO-0029793. Water treatment reportedly ceased in 1996, but mine discharge water has continued to flow through the ponds.

2.2 MINE WORKINGS

The St. Louis Tunnel portal is located at the base of CHC Hill to the east-northeast of the pond system in the Dolores River valley (Figure 1). The first approximately 200 feet of the tunnel behind the portal structure have collapsed due to heavy grading on the slope above. Water continuously discharges from the collapsed adit, with flows varying seasonally.

The St. Louis Tunnel extends northeast from the portal approximately 4,600 feet into Telescope Mountain where it intersects crosscut tunnels that connect to mine workings located both northwest and southeast from the St. Louis Tunnel. The St. Louis Tunnel then extends approximately 500 feet beyond the intersection with these crosscuts. The southeast crosscut is approximately 4,400 feet long and connects to mine workings associated with Dolores Mountain, including the extensive workings associated with the Rico-Argentine mines near Silver Creek (see figures in Appendix B). The southeast crosscut is located within or parallel to the Blackhawk fault from 1,450 feet southeast of the St. Louis Tunnel, where it crosses into the footwall of the fault to a point 390 feet northwest of the Argentine Shaft, where it crosses the fault again. The southeast crosscut is interconnected by mine workings to the 517 Shaft at the 500 level. The

Argentine Shaft is believed to bottom at the 300 level. The northwest crosscut connects the St. Louis Tunnel to the Mountain Spring mines and other mines on Telescope Mountain. Based on flow estimates made in August 1980, AR reports that 2/3 of the portal discharge is from the southeast crosscut tunnel from Dolores Mountain mine workings and approximately ¼ of the portal discharge is derived from the northwest crosscut from the Telescope Mountain mine workings. The efforts described in this document are targeted at identifying the sources of water and contaminants from the southeast crosscut that connects the St. Louis Tunnel to the Rico-Argentine mines and Silver Creek and characterize flow in the southeast crosscut.

The Rico-Argentine mines are located along Silver Creek, about 1.5 miles northeast of the Town of Rico. There are extensive underground mine workings in the ridge southeast of Silver Creek that are accessed by a number of tunnels, which include, from Silver Creek upward, the Blaine Tunnel, the Rico Consolidated middle and upper tunnels (both are collapsed at the portal), the Argentine Tunnel, and the Log Cabin (Blackhawk) Tunnel. There are several tunnels above the Log Cabin portal (including the Blacksmith Tunnel) that have reportedly collapsed at the portal. In addition there are at least five levels below the Blaine level: the 200 level, the 300 level, the 400 level, the 500 level, and the 600 level. The workings on the 200 and 300 levels are connected to the Argentine and 517 shafts located on the northwest side of Silver Creek; the 400, 500, and 600 levels are connected to the 517 Shaft. The Argentine, Blaine, 200 level, and 300 level workings are the most extensive. Workings on these levels extend thousands of feet into and under the ridge. In the latter years of operation, most of the ore from the Rico-Argentine mines was produced from levels below the Blaine.

Three shafts constructed in these mines are of potential importance: the Argentine Shaft, the 517 Shaft, and the #3 Shaft. Ore was removed from the mines below the Blaine level by using these three shafts. The Argentine and 517 shafts were accessed by short tunnels. The tunnel to the 517 Shaft (referred to here as the 517 Shaft Access Tunnel) is still in good condition. The tunnel to the Argentine Shaft is collapsed and the location of the portal is currently unknown. The camera work in the 517 Shaft during 2011 demonstrated that it extends to the 600 level. The 500 level is the level of the southeast crosscut tunnel that connects the Rico-Argentine mine workings, including the 517 shaft, to the St. Louis Tunnel. The #3 Shaft extends from the Blaine level to at least the 300 level. The top of the #3 Shaft is located approximately 800 to 1,000 feet from the Blaine Tunnel portal. Reconnaissance of the Blaine level during 2011 determined that access to the #3 Shaft is not safe without rehabilitation of the tunnel.

The Blaine Tunnel historically discharged mining-impacted water to Silver Creek, but several years ago a coffer dam was placed near the intersection of the main adit and a crosscut or drift within the Blaine Tunnel to halt this discharge. Access to this drift is impeded by a cave-in/blockage near the intersection with the main adit. The coffer dam diverts water down the drift toward a stoped area connected with lower workings (and 517 Shaft) on the west side of Silver Creek. Mine maps show a large, relatively shallow (100 [Blaine] to the 200 level) stoped area that crosses underneath Silver Creek between the 517 Shaft Access Tunnel and Blaine Tunnel upstream of the Argentine Tailings. Flows intercepted by the coffer dam may also be running down the Morris Cook Incline, which mine maps indicate connects the 200 and 100 levels. The Blackhawk Fault crosses under the Silver Creek channel a short distance above the Blaine Tunnel and 517 Shaft Access Tunnel portals, and seepage flowing down the 517 Shaft has been observed at the 517 Shaft Access Tunnel level.

3.0 SAMPLE COLLECTION AND ANALYSIS

Several types of samples were collected for the source water investigation. Sample collection and analysis for each sample type are described in the following sections. The sample locations are shown on Figures 1 and 2.

During the high-flow and low-flow stream tracer studies, the following samples were collected:

- Samples were collected from Silver Creek and analyzed for chloride as part of one slug test to show correlation between conductivity measurements and chloride concentrations.
- Synoptic samples were collected from Silver Creek and tributary inflows as part of the continuous injection stream tracer studies. The samples were analyzed for the stream tracer compounds (bromide and chloride) plus nitrate and sulfate. Samples collected during the low-flow stream tracer study were also analyzed for fluoride, which was injected into the Blaine Tunnel as part of the mine tracer study.
- Samples were collected from a subset of the stream tracer sample locations and from the Argentine Tailings seep and analyzed for total and dissolved metals, select anions, and hardness.
- Samples from the Argentine Tailings seep were collected for 2 weeks after the low-flow continuous bromide/rhodamine WT injection to Silver Creek began. The seep samples were analyzed for the tracers injected into Silver Creek (bromide and rhodamine WT) plus fluoride, chloride, and nitrate.

Water samples were collected in October and November 2011 to trace the flow of water through the mine system before and after salt and dye tracers were injected into Silver Creek, the Blaine Tunnel, and the 517 Shaft.

- Samples were collected from approximately 25 feet below the water surface in the 517 Shaft and analyzed for the mine tracer compounds: bromide, fluoride, lithium, rhodamine WT, and fluorescein. Some 517 Shaft samples were also analyzed for chloride, nitrate, and sulfate.
- Samples were collected from the St. Louis Tunnel portal (upstream of AR sample location DR-3) and analyzed for select mine tracer compounds (lithium, bromide, fluoride, and fluorescein) and chloride. Some St. Louis Tunnel samples were analyzed for sulfate.

Additional analysis was performed on specific water samples to supplement the investigation of the flow of water and contaminants into and through the Rico-Argentine mines.

- Water samples were collected from select Silver Creek monitoring stations, the Dolores River, selected locations within the mine workings, the St. Louis Tunnel discharge, and local rain and snow unimpacted by the mine system and analyzed for stable water isotopes and tritium to help determine the source and age of waters in the source area.
- Water samples were collected from the 517 Shaft Access Tunnel, the 517 Shaft, the Argentine Tunnel, the Blaine Tunnel, and a stream of water dripping into the Blaine Tunnel from a raise and analyzed for total and dissolved metals, select anions, and hardness.

3.1 IONS

Water samples collected during the high- and low-flow stream tracer studies and the mine tracer studies were collected in cleaned 125-milliliter (mL) high-density polyethylene (HDPE) bottles after rinsing three times with sample water at the time of collection. Samples were sent for ion analysis to the Kiowa Environmental Chemistry Laboratory, where sub-samples were immediately filtered through pre-combusted glass fiber filters with a nominal pore size of 0.7 micrometers (µm) and stored in the dark at 4°C prior to analyses. Samples were analyzed for chloride (Cl^-), nitrate (NO_3^-), sulfate (SO_4^{2-}), bromide (Br^-), and fluoride (F^-), using a Metrohm 761 Compact Ion Cromatograph. Lithium (Li^+) was analyzed on a Perkin Elmer AAnalyst 200 Atomic Absorption Spectrometer.

The analytical results including detection limits and precisions for these analyses are provided in Tables 1 and 2.

3.2 DYE TRACERS

A Fluoromax 2 spectrophotometer was used to analyze water samples for the presence of two distinct fluorescent dyes, rhodamine WT and fluorescein. The presence of each dye was analyzed using a single excitation and a single emission value. The rhodamine WT dye was run with 550/580 nanometer (nm) excitation/emission and the fluorescein was run with 485/540 nm excitation/emission. A multiple point calibration curve was then generated using both filtered and unfiltered samples from four standards with known concentrations (Figures 3a and 3b). The filtered standard curve was used for determining dye concentrations because all samples were filtered prior to laboratory analysis.

To test for potential effects of acidification on fluoresence, high concentration (400 parts per billion [ppb]) standards of both fluorescein and rhodamine WT were acidified to a pH of 2.5 for 24 hours and then filtered. The result was a 77 percent reduction in fluorescein emissions and an 11 percent reduction in rhodamine WT emissions.

The results of the dye analyses are presented in Table 3.

3.3 TOTAL AND DISSOLVED METALS, ANIONS, AND HARDNESS

Water samples collected during synoptic sampling from along the study reach on Silver Creek, within the mine workings, at the St. Louis Tunnel portal, and in the Dolores River during the June and October tracer studies were analyzed for total and dissolved metals, select anions, and hardness. The samples were analyzed for pH in the field. Samples were analyzed at the EPA Region 8 Laboratory operated by the Environmental Sampling Assistance Team (ESAT) contractor for total and dissolved metals analysis using EPA 200 Series methods, for anions using EPA Method 300, and hardness was calculated using EPA method 2340B. The EPA laboratory data is presented in Tables 4 through 6.

Quality assurance/quality control samples were collected and the data were reviewed upon receipt from the laboratory. The laboratory data reports, review reports, and discussion of duplicate and blank sample analytical results are provided in Appendix C.

3.4 STABLE WATER ISOTOPES AND TRITIUM

Representative water samples were collected from along the study reach on Silver Creek, from the St. Louis Tunnel discharge, and from the Dolores River above and below the St. Louis mine area and analyzed for isotopes including ^{18}O ($\delta^{18}O$), deuterium (δD), and tritium (^{3}H). Snow and rainfall were also sampled and analyzed for isotopes to characterize sources of water to the stream and mine. Water samples for isotopic (δD and $\delta^{18}O$) analysis were collected unfiltered in cleaned 25-mL borosilicate bottles with no-headspace lids to avoid any evaporation or fractionation. Water samples to be analyzed for tritium were collected as grab samples in 1 liter (L) HDPE bottles and kept at 4°C. δD and $\delta^{18}O$ analyses were performed at the Kiowa Environmental Chemistry Laboratory in Boulder, Colorado using an L1102-i Isotopic Liquid Water Analyzer developed by Picarro Incorporated. The analyzer is based on Picarro's unique Wavelength- Scanned Cavity Ring Down Spectroscopy (WS-CRDS), which is a time-based measurement using near-infrared laser to quantify spectral features of molecules in a gas contained in an optical measurement cavity. Isotopic compositions are expressed as a δ (per mil) ratio of the sample to the Vienna Standard Mean Ocean Water (V-SMOW), as shown for $^{18}0$:

$$\delta^{18}O = \frac{(^{18}O/^{16}O)_{sample} - (^{18}O/^{16}O)_{VSMOW}}{(^{18}O/^{16}O)_{VSMOW}} \times 1000 \qquad \textit{(Equation 1)}$$

The precision for $\delta^{18}O$ was ±0.028‰ and for δ D was ±0.148‰.

The tritium (^{3}H) samples were analyzed at the USGS Tritium Laboratory in Menlo Park, California by electrolytic enrichment and liquid scintillation counting. Distilled sample water was reduced electrolytically in electrolysis cells to 10 mL from an initial 200 mL in a cooling bath. This increases the concentration of tritium by a factor of 16. The remaining liquid is mixed with a scintillation cocktail of known tritium concentrations to improve baseline values. The sample is then counted in a Packard scintillation counter. Tritium concentrations are reported in "tritium units," or TU, and 1 TU is defined as equal to 1 tritium atom per 10^{18} hydrogen atoms. The detection limit is reported as twice the precision. Tritium has a half-life of 12.3 years.

The isotopes analytical results are presented on Table 7.

4.0 STREAMFLOW INVESTIGATION

This section presents the results of the Silver Creek flow investigation that was performed to determine if a significant amount of water flows from Silver Creek into the mine workings in the vicinity of the Blaine Tunnel and the 517 Shaft Access Tunnel. Tracer dilution testing was conducted during June and October. For purposes of this report, the June testing is referred to as high-flow and the October testing is referred to as low-flow.

Various methods were used to quantify streamflow along Silver Creek:

- Slug additions to develop point estimates of streamflow at select locations that are above and below suspected losing reaches of Silver Creek.
- Development of stage-discharge relationships to provide a time series of streamflow at two locations. Direct discharge measurements were made upstream and downstream of the suspected losing reaches of Silver Creek to supplement the study results.
- Continuous tracer additions were performed to measure discharge above and below the Silver Creek reach suspected of losing water into the mine workings and to develop spatial 'snapshots' of streamflow.

The following sections describe the high-flow and low-flow streamflow investigations and findings.

4.1 HIGH-FLOW STREAM TRACER STUDY (JUNE 2011)

The high-flow tracer tests were conducted in Silver Creek during the week of June 20, 2011, with primary testing being performed on Thursday, June 23, 2011. Based on streamflow measurements in the Dolores River, peak runoff occurred during early June 2011, so Silver Creek flow may have been just past peak run-off. Flow was measured from 29 cubic feet per second (cfs) to 44 cfs at SC-493 during the study week. A number of stream tracing investigations were conducted by MSI and USGS to help evaluate the presence, magnitude, and timing of stream loss from Silver Creek to mine workings underlying, and on either side of the creek.

4.1.1 Slug Additions

Numerous slug injections were performed at various locations along Silver Creek during the week of June 20, 2011 (Table 8). These slug injections were designed to provide point estimates of streamflow within the study reach. Each slug was prepared by

dissolving a pre-weighed quantity of sodium chloride (NaCl) in stream water; non-iodized table salt was used for this purpose. Following complete dissolution of the added salt, each slug was slowly poured into the stream over a short time period (~15 seconds, Table 8). Transport of the slug to a downstream observation point was monitored by a YSI XLM V.2 sonde that recorded conductivity at 4-second intervals. Conductivity increases at the observation point reflect the passage of the added sodium chloride, and conductivity was thus used as a surrogate for chloride concentration. On any given day, the slugs were performed in downstream-to-upstream order, such that a given addition was unaffected by prior additions.

Several water samples were collected from Silver Creek on June 22 as a slug passed observation point SC-636 (Figure 2). Chloride concentrations from these samples were matched with corresponding observations of specific conductance, and these data were used to develop a chloride-conductivity relationship (Table 9). This relationship was used to convert the observed increases in conductivity to chloride concentrations (conductivity profiles were edited to remove obvious outliers prior to conversion). The resultant chloride profiles (Figure 4) were then integrated to provide estimates of streamflow (Kilpatrick and Cobb, 1985):

*Q = (mass Cl added / integrated area under Cl curve) * unit_conversion_factor*

where Q is streamflow. Streamflow estimates from all slugs are depicted in Figure 5.

4.1.2 Stage-Discharge Relationships

Flow in Silver Creek was measured using transducers and stage discharge rating curves at two locations: the weir/gauge house (SC-68; Photos 1 and 2) and below the bridge (below SC-443; Photo 3) (Figure 2). Stage-discharge relationships (rating curves) were developed by correlating data from pressure transducers (stage) with streamflow measurements made using a Marsh-McBirney electromagnetic flow meter. Pressure transducers recorded stage levels every 15 minutes over the course of the high-flow study; streamflow measurements were made at both locations over a range of flows.

Rating curves at SC-68 and SC-493 were developed using measured streamflows and the observed stage (Figures 6 and 7). The resultant streamflow estimates are in good agreement with streamflow estimates obtained from slug injections at nearby locations

(Table 10; Figures 8 and 9). Streamflows from both SC-68 and SC-493 are shown on Figure 10.

4.1.3 Slug Adjustments

The slug results shown in Figure 5 cannot be directly used without adjustment to assess flow loss due to the unsteady streamflow observed during the high-flow study and the fact that the slug additions on a given day were not performed at the same time. This issue is illustrated in Figure 11, where data from June 22 is shown. Two slug additions were performed in the afternoon of June 22 during a period of increasing flow; the flow loss calculated from the two additions is an overestimate due to the fact that the top slug addition (SC-106) was performed after the bottom slug addition (SC-636). (If the slug addition at the top had been performed at the same time as the bottom slug addition, streamflow at the top would have been lower and the calculated flow loss would have been less.) Rating curve streamflow values were, therefore, used to adjust the slug streamflow estimates, such that all estimates corresponded to a common time (i.e., the time of the bottom slug):

$$Adjusted\_slug\_Q = slug\_Q - change\_rating\_Q$$

where the change_rating_Q is based on the nearest station with a rating curve (e.g., the adjusted streamflow at SC-106 on June 22 [34.95 cfs] is equal to the calculated streamflow [38.01 cfs] minus the change in streamflow at SC-68 [3.06 cfs]). Adjusted streamflows are shown in Table 11 and Figure 12.

4.1.4 Spatial 'Snapshots' of Streamflow

A continuous sodium bromide (NaBr) injection was conducted on June 23 from 08:00 to 19:40 (Photo 4). The purpose of the injection was to provide streamflow estimates via the tracer-dilution method (Kilpatrick and Cobb 1985) and to document any potential areas of flow loss.

At a given stream site, bromide concentrations increase with time as tracer-laden waters replace tracer-free water in the hyporheic zone and surface pools; given sufficient time, the entire hyporheic zone and all surface pools are filled with tracer-laden water and bromide concentrations reach a plateau concentration. Synoptic sampling during the

plateau period provides a spatial snapshot of bromide concentration that may be used to determine the flow regime. In gaining streams, dilution of bromide with respect to distance is indicative of increased streamflow, as inflow waters act to dilute the added bromide. Losing streams, in contrast, will exhibit steady bromide concentrations with distance as water leaving the stream does not affect the in-stream concentration.

Two synoptic sampling sweeps were conducted in the afternoon of June 23. Bromide concentrations from the first sweep (~16:00 to 17:00) suggest a gaining stream (dilution of bromide with distance), whereas data from the second sweep (~19:00 to 19:20) suggest the possibility of a losing reach (no dilution of bromide from SC-136 [bromide=0.569 milligrams per liter {mg/L}] to SC-699 [bromide=0.566 mg/L]) (Figure 13). The difference between these results is likely related to two injection pump outages that preceded the first sweep (the actual duration of these outages is unknown; the maximum time the pump was off is from 11:20 to 12:32 and 14:26 to 14:40). Due to these pump outages, data from the first synoptic sweep are unlikely to reflect plateau conditions; data from the second synoptic sweep should therefore be the primary focus of the streamflow analysis.

Spatial snapshots of streamflow were constructed using data from the first and second synoptic sweeps. Streamflows at SC-68 and SC-106 were, therefore, calculated by:

$$Q_x = Q_i\, C_i / C_x$$

where Q_i is the injection rate, C_i is the injection concentration, and C_x is the average concentration at SC-68 and SC-106. Slug results (Table 11) suggest a loss of flow downstream of SC-106, and streamflow from SC-136 to SC-636 was calculated as:

$$Q_d = Q_u - (MLR * deltaX)$$

where Q_u is streamflow at the adjacent (upstream) site, MLR is the median loss rate determined from the slug additions (5.05 cubic feet per second per kilometer [cfs/km] = 0.143 liter per second per meter [L/s/m]; Table 11), and deltaX is the distance between the two sites. In contrast to the upper part of the study reach, surface inflows were observed downstream of SC-636 (East Fork Silver Creek and seepage from the Argentine tailings pile), resulting in bromide dilution from SC-699 to SC-1131 during synoptic

sweep 2. Streamflow for sites SC-826 to SC-1131 for synoptic sweep 2 was, therefore, calculated as:

$$Qd = Qu * Cu/Cd$$

where C_u and C_d are plateau bromide concentrations at adjacent sites. Bromide concentrations at SC-826 through SC-1131 for sweep 1 were not at plateau, and streamflow estimates for these sites during sweep 1 were calculated based on the observed dilution during sweep 2. The resultant streamflow profiles for sweeps 1 and 2 are shown in Figure 14.

4.1.5 Streamflow Loss at High Flow

The slug results shown in Figure 12 are remarkably consistent (lines connecting the top and bottom streamflow estimates have the same slope; see Figure 12 and "Loss per distance" in Table 11). Flow losses within the study reach ranged from 5.3 percent to 9 percent (Table 11). These results are in contrast to the rating curve results shown in Figure 10, which suggest a small flow increase from SC-68 to SC-493. This discrepancy may be due to the relatively sparse data set used to develop the rating curves, variability in the pressure transducer readings at SC-68 (see flow variations, Figure 8), and known difficulties in quantifying streamflow in mountain streams. In addition, slug results at SC-106 and the SC-68 streamflow estimates from the second synoptic sweep are higher than those from the SC-68 rating curve (Figure 8), suggesting that the rating curve estimates are on the low side. The potential underestimation of streamflow by the rating curve may be explained by the fact that streamflow measurements at SC-68 were made at an old weir that creates a small waterfall; underflow and flow through the materials that create the waterfall would not have been included in the streamflow measurements and could explain why the SC-68 rating curve results might be biased low. The increase in flow suggested by Figure 10 is, therefore, questionable and the slug results should be the primary means to assess the spatial flow distribution. Further, the flow loss documented by the slug additions is supported by steady bromide profile observed during the second synoptic sweep (Figure 13).

4.2 LOW-FLOW STREAM TRACER STUDY (OCTOBER 2011)

The site is not easily accessible during winter months when the seasonal low flow typically occurs, so the low-flow tests were conducted in Silver Creek during the week of October 3, 2011. Flow was measured from 0.7 cfs to 2 cfs at SC-493 during the study week. The October stream tracing investigations were the same as those performed during June.

4.2.1 Slug Injections

Numerous slug additions were performed at various locations along Silver Creek during the week of October 3, 2011 (Table 12). Two sets of slug additions were conducted prior to the onset of wet weather (October 3 and 4), and two sets were conducted following rain and snow (October 5 and 6). All slug additions were designed to provide point estimates of streamflow within the study reach. Each slug was prepared by dissolving a pre-weighed quantity of sodium chloride in stream water; non-iodized table salt was used for this purpose. Following complete dissolution of the added salt, each slug was slowly poured into the stream over a short time period (~25 seconds, Table 12). Transport of the slug to a downstream observation point was monitored by a YSI XLM V.2 sonde that recorded conductivity at 4-second intervals. Conductivity increases at the observation point reflect the passage of the added sodium chloride, and conductivity was, thus, used as a surrogate for chloride concentration. On any given day, the slugs were performed in downstream-to-upstream order, such that a given addition was unaffected by prior additions.

Several samples were collected on October 6 as a slug passed observation point SC-636 (Table 13; Figure 15). Chloride concentrations from these samples were matched with corresponding observations of specific conductance, and these data were used to develop a chloride-conductivity relationship This relationship was used to convert the observed increases in conductivity to chloride (conductivity profiles were edited to remove obvious outliers prior to conversion). The resultant chloride profiles (Figure 16) were then integrated to provide estimates of streamflow (Kilpatrick and Cobb 1985):

*Q = (mass Cl added/integrated area under chloride curve) * unit_conversion_factor*

Streamflow estimates from all slugs are depicted in Figure 17.

4.2.2 Stage-Discharge Relationships

Stage-discharge relationships (rating curves) were developed at two locations (SC-68 and SC-493) by correlating data from pressure transducers (stage) with streamflow measurements made using a Marsh-McBirney electromagnetic flow meter. Pressure transducers were installed on October 4 and recorded stage levels every 10 minutes over the course of the low-flow study. Streamflow measurements were made at both locations over a narrow range of flows.

Rating curves at both locations were developed using measured streamflows and the observed stage. Streamflow estimates from these rating curves are highly uncertain due to (1) the limited number of streamflow observations used in the regressions, and (2) the narrow range of stage readings associated with the streamflow observations. Many of the stage readings recorded October 3 through October 8 are lower or higher than the range of stage readings used to develop the stage-discharge relationships; extrapolation is, therefore, required. The rating curve streamflow estimates are generally lower than comparable slug estimates and estimates from the continuous sodium bromide injection (Section 4.2.4). The apparent low bias of the rating curve estimates is attributable to the problems noted above and the potential for hyporheic flows that are not accounted for by the flow meter. Rating curve streamflow estimates for SC-68 and SC-493 are shown in Figure 18.

4.2.3 Slug Adjustments

The slug results shown in Figure 17 cannot be used directly to assess flow loss due to the unsteady streamflow observed during the low-flow study and the fact that the slug additions on a given day were not performed at the same time. (See Section 4.1.3 for a full description of the issue.) Rating curve streamflow values were, therefore, used to adjust the slug streamflow estimates, such that all estimates corresponded to a common time (i.e., the time of the bottom slug):

$$Adjusted\_slug\_Q = slug\_Q - change\_rating\_Q$$

where the change_rating_Q is based on the rating curve that agrees most closely with the slug measurement (i.e., the rating curve at SC-68 is used for all adjustments on October 3 and 4 because it agrees most closely with the slug data; the rating curve at SC-493 is used

for all adjustments on October 6 and 7 for the same reason [Figure 18]). Adjusted streamflows are shown in Table 14 and Figure 19.

4.2.4 Spatial Bromide Profiles

A continuous sodium bromide injection was initiated 11:02 on October 5, 2011, and terminated at 9:40 on October 8. The purpose of the injection was to provide streamflow estimates via the tracer-dilution method (Kilpatrick and Cobb 1985), to document potential areas of flow loss, and to determine if stream water was flowing through the right-bank tailings downstream of SC-493. (See Section 4.1.4 for a definition of the tracer plateau and interpretation of spatial tracer data.)

Synoptic sampling sweeps were conducted in the afternoon of October 5 and the morning of October 7. Both of these sweeps followed precipitation events (rain on October 4 and snow on October 6; see Figure 18). Bromide concentrations from both sweeps suggest a gaining stream (dilution of bromide w/ distance) at the upstream end of the study reach, and the potential for flow loss farther downstream (no bromide dilution with distance) (Figure 20).

4.2.5 Streamflow Loss at Low Flow

Slug additions conducted prior to the onset of wet weather indicate a substantial (~22-23 percent) loss of flow over the length of the study reach (Table 14; Figure 19). These results are somewhat at odds with the dilution shown by the spatial bromide profiles (Figure 20). Note, however, that the bromide profiles represent conditions following rainfall on the afternoon of October 4 and snow on October 6. These precipitation events may have changed hydrologic conditions within the study reach. (The stream may have been losing prior to the precipitation events, and gaining following; this hypothesis is supported by the “cross-over” of the rating curves shown in Figure 19.)

Slug additions conducted after the precipitation events provide conflicting results; the slug additions conducted on October 6 indicate a flow loss that is larger than the earlier slugs (29 percent), while slug additions from October 7 indicate a small flow loss (7 percent) that is comparable to the flow losses calculated for the high-flow period (Table 14, Figure 18). The large flow loss associated with the October 6 slugs seems unlikely given the bromide dilution observed on October 5 and 7 (Figure 20), and these slugs may

be in error due to the dynamic conditions caused by snowfall (Figure 19). The smaller flow loss on October 7 is more plausible, as flow was more stable and this small amount of flow loss could be occurring in the sub-reach with the steady bromide concentrations (Figure 20).

In summary, relatively large flow losses (~22-23 percent) appear to be occurring under dry, low-flow conditions, with a smaller loss observed (~7 percent) following precipitation events.

5.0 MINE CHARACTERIZATION

Mine entries were performed to conduct sampling, perform tracing investigations, identify sources of water that flow into the mine, and evaluate the flow of water and contaminants from upper levels to the lower mine workings (below the Blaine level) and ultimately the St. Louis Tunnel. EPA coordinated underground activities with the mine owner (Outlook Resources) and DRMS to investigate the flow and chemistry of mine waters in Blaine adit and associated underground workings.

5.1 517 SHAFT

Underground reconnaissance was performed by EPA, DRMS, and Outlook Resources concurrent with the high-flow stream tracer study during the week of June 20, 2011. The team entered the 517 Shaft Access Tunnel and traveled by foot to the intersection with the 517 Shaft. A well sounder cable was lowered about 280 feet (its full length) into the shaft and no water or obstruction was detected. The shaft is timbered and appeared to be in excellent condition. An equipment cage used to hoist ore cars up the shaft was disconnected from its hoist and supported by heavy timbers over the shaft; the presence of the cage would prevent any efforts to sound the shaft from the J-hook shaft closure from the land surface above the chamber where the shaft is located. This is a two-compartment shaft, the second compartment being a ladderway. There was a large wedge of ice on the floor leading to the shaft, which made walking difficult, and the entry team decided not to attempt to carry the heavy camera equipment to the shaft. A water sample was collected from a steel pipe discharging from the rock ceiling in the hoist room (Photo 5) adjacent to the shaft room. This pipe angles toward the land surface and appears to follow the hoisting rope corridor.

In August, EPA, DRMS, and Outlook Resources re-entered the 517 Shaft Access Tunnel to investigate the 517 Shaft. A well camera was lowered down the opening to photograph the shaft;

a DVD of the camera work was recorded. Apart from the equipment hoist cage, the shaft was unobstructed down to the water surface. Water was trickling into the shaft from the Silver Creek side. The depth to the water surface was 450 feet, and the total depth from the 517 Shaft Access Tunnel level to a layer of solids that appeared to be loose precipitates was 503 feet. A water sample was collected at 500 feet using a bailer, and samples (sample ID: 517 Shaft) were submitted to the Region 8 Laboratory in Golden, Colorado for dissolved metals and sulfate analysis, to the University of Colorado for ^{18}O and deuterium analysis, and to Menlo Park, California for tritium analysis. The pH of the water was between 2.0 and 2.5.

5.2 BLAINE TUNNEL

Attempts to enter the Blaine Tunnel (Figure 21) in late June were unsuccessful due to thick ice in front of and behind the top hinged air door located less than 100 feet into the tunnel. Ice was removed to free the door enough to partially open it to accelerate melting for a future attempt at entry.

The purpose for investigating the Blaine Tunnel in August was to evaluate the ability to measure flows at this level and assess the stability of the features that divert flow towards the St. Louis Tunnel. EPA, DRMS, and Outlook Resources entered the Blaine Tunnel on August 4, 2011. Features of the Blaine Tunnel are shown on Figure 21. The portal was in poor condition and it was determined that while current conditions were adequate for mine entry, work would be needed to keep the tunnel open for additional investigations. The team progressed to the coffer dam located approximately 350 feet in from the portal. The coffer dam had been installed to prevent Blaine Tunnel mine water from entering Silver Creek by re-directing the water inwards toward a crosscut or drift to the Morris Cook incline and possibly to stopes that interconnect the Blaine level to lower levels. The incline conveys the water to the 200 level, then into the 517 Shaft via as yet undetermined pathways and ultimately to the St. Louis Tunnel. In August icing conditions had improved allowing access to the coffer dam, which was leaking (Photo 6). The pooled water behind the coffer dam was sampled (sample ID: Blaine Tunnel) and submitted for total and dissolved metals, sulfate, ^{18}O, deuterium, and tritium analysis. The pH of the water was between 2.0 and 2.5. A blockage from a collapse of rock below a raise approximately 50 feet in from the coffer dam was causing water to build up behind the coffer dam because it restricted flow to the crosscut (Photos 7 and 8). Flow was occurring through the blockage via several small diameter pipes, some possibly located on the floor and some at the water surface (Photo 7). It was not possible to measure flow from the Blaine to lower levels of the tunnel due to the

configuration of the pooled water and the location of the outlets on the backside of the debris blockage. In addition, water was observed to be leaking around the coffer dam and flowing down the adit towards the portal.

The property owner performed work in September to reinforce and raise the height of the coffer dam, creating additional free board and containing water within the mine (Photo 9). In addition, the Blaine portal area was re-timbered to allow continued safe entry into the adit.

Several Blaine adit entries were conducted to perform the mine tracer study during October. During that time, DRMS performed reconnaissance of the workings behind the coffer dam. The following measurements of the water pool were collected on October 4, 2011.

Distance from Coffer Dam	Water Pool Depth	Tunnel Width
0 feet	25 inches	6 feet
25 feet	24 inches	6 feet
50 feet	15 inches	6 feet
75 feet	16 inches	6 feet
100 feet	12 inches	6 feet
118 feet*	14 inches	6 feet

* Conditions were unsafe at 118 past the coffer dam in October 2011.

Based on these measurements, it is assumed that the water pool tapers out against the tunnel floor 230 to 250 feet from the coffer dam. Assuming the tunnel width and grade is consistent and the floor of the tunnel is even, the mine pool volume calculated from the measurements is approximately 1,500 cubic feet. However, multiple deeper pools and tunnel side pockets were probed and observed during reconnaissance. Therefore, it is known that the mine pool volume is greater than 1,500 cubic feet and is possibly as much as 3,000 cubic feet. Approximately 120 feet in from the coffer dam was a raise where water was observed flowing into the Blaine (100 Level) at approximately 5 gallons per minute (gpm) to 10 gpm. Conditions allowed only limited access into the Blaine adit approximately 150 feet past the coffer dam in August 2011 and prevented access to the #3 Shaft.

Attempts to pump the pooled water over the blockage during the tracer injection were conducted using a pneumatic 3-inch diaphragm pump. On October 6, the pump was run continuously for 2 hours at an estimated 50 gpm to 80 gpm. During that period, the water level in the pool did not drop based on pre-established water level lines around the pool. Continued pumping was

attempted over the course of the next two days, but pumping was impeded by the icing of internal valves within the pump mechanism. The initial pumping period suggests that inflow to the area exceeds approximately 50 gpm.

There is a concern that the blockage may worsen with additional collapses.

5.3 ARGENTINE TUNNEL

In an attempt to assess possible sources of flow from above the Blaine Tunnel, the June mine entry team entered the Argentine Tunnel (Figure 22) located on the east side of Silver Creek above the Blaine Tunnel, and travelled by foot along two different headings. There were significant iron oxy-hydroxide sludge deposits on the tunnel floor and pooled water that was very acidic – a field pH measurement (paper) indicated a pH of 2 to 3. A water sample was collected from one of the acidic pools. The investigation in each of the two headings was terminated when deep pooled water and "spooge" (sediment and metals precipitates) prevented further access with the personal protective equipment at hand. Access beyond the terminal points appeared possible with chest waders, but the lateness of the hour prevented re-gearing and re-entry. While substantial flowing and pooled water was present, there was no discharge from the portal of the Argentine Tunnel. This indicates that the water in the Argentine Mine workings may flow downward to lower mine levels either through interconnected workings or fracture systems, or both.

6.0 MINE WATER FLOW INVESTIGATION

Tracer studies were performed in the mine workings to assist in verifying flow pathways and determining travel times of various water sources to each other and the St. Louis Tunnel discharge. Fluorescent dyes and salt tracers were injected into the 517 Shaft, the Blaine Tunnel behind the coffer dam, and Silver Creek immediately downstream of the Rico municipal water supply intake (the same injection site used for the streamflow study described in Section 4). Water was sampled in the 517 Shaft, at the St. Louis Tunnel, in Silver Creek at SC-493, and from the Argentine Tailings seep (designated SVS-12 in previous studies). The following sections describe the tracer injections, provide analytical results, and discuss the results.

6.1 517 SHAFT TRACER INJECTION

On October 4 at 12:00 a 50-gallon slug containing 3.22 pounds of lithium and 22.65 pounds of fluorescein was injected into the 517 Shaft. The slug was mixed using acidic water (pH 2.7) from the Blaine Tunnel to simulate the water found in the 517 Shaft. The slug was mixed in two new, clean 30-gallon plastic cans located adjacent to the top of the shaft and then siphoned from the cans into the shaft using 450 feet of new, clean garden hose (Photo 10). The slug injection took approximately 45 minutes to complete and was then chased by approximately 50,000 gallons of water from Silver Creek delivered by a high capacity water pump.

A Teledyne Isco automated sampler was installed at the St. Louis Tunnel portal and collected water samples at 1-hour intervals for the first 40 hours starting at 10:00 on October 4 (Photo 11). By October 7 it was determined that the peak of the tracer emergence had occurred, so sample collection was reduced to 4-hour intervals. Each sample collected by the automated sampler was first analyzed (unfiltered) for dye tracer concentrations using a Cyclops field fluorometer before being sent to the laboratory for additional analysis. All samples were filtered in the lab prior to analysis.

6.2 517 SHAFT TRACER RESULTS

The results from each of the introduced tracers are summarized in Tables 1 and 3. The fluorescein first arrived at the St. Louis Tunnel portal at 03:00 on October 5, 15 hours after injection (Figures 23 and 24). The fluorescein then returned to near background levels at 08:00 on October 5 before returning to a peak concentration of 522 ppb at 02:00 on October 6, 37 hours after the injection. The initial peak is most likely associated with the water chase (approximately 50,000 gallons), which pushed through the initial portion of fluorescein dye and most of the lithium, and the second peak was from water flowing through the system at a more typical rate. The lithium also arrived in 15 hours at 03:00 on October 5. The lithium slug reached a peak concentration of 37.1 micromoles per liter (μmoles/L) at 09:00 on October 5, 21 hours after injection. Given an estimated distance of 8,500 feet between the 517 Shaft and the St. Louis Tunnel portal, the average velocity of the advection front was 567 feet per hour (ft/hour) while the average velocity of the lithium and fluorescein peaks was 405 ft/hour and 230 ft/hour, respectively. At the last sampling date (November 16) the lithium concentrations had returned to background (within the analytical precision range of background measurements) while the fluorescein concentrations were still elevated relative to background, indicating that the fluorescent dye tracer was still

moving through the system more than 1100 hours after the tracer injection. As of the last discharge measurement on November 16, recovery of lithium was 74 percent and recovery of the fluorescein dye was 58 percent. These results suggest that there is a two-phase system: fast transport via advection (which was likely helped by the water chase) and a slower diffusion pathway. The fast times for the advection front suggest that in general the tunnel has few obstructions and water moves through it relatively quickly. These results are consistent with the isotopic values. However, there is something causing diffusion in the system. One possibility is an obstruction at some point in the tunnel that causes the water to interact with rock and sediment. The collapsed portion of the adit behind the St. Louis Tunnel portal is a likely candidate. A second possibility is a large reservoir of water at or below the 500 level of the 517 Shaft (extending outwards from the 517 Shaft into other workings in the 500 and possible 600 level) that has slow mixing/turnover time. The presumed "drain" to the southeast crosscut/St. Louis Tunnel appears to be at the top of the reservoir as indicated by the similar elevation between the water level in the 517 Shaft and the elevation of the drainage tunnel.

The red line (field fluorometer) matches well with the initial arrival of the dye but fails to capture the double peak because values measured were mistaken for misreading due to oversaturation of the dye (instrument calibrated only up to 400 ppb) and, therefore, not recorded during the period between the two fluorescein peaks. Therefore, the field fluorometer successfully confirmed the arrival of the fluorescein dye, but the results were not used for quantitative analysis of the tracer recovery. The following table summarizes the 517 Shaft tracer work.

Summary of Tracer Recovery at the St. Louis Tunnel

Parameter	Value
Lower integration limit	0 hours
Upper integration limit	1106 hours
The quantity of lithium tracer injected	3.22 pounds
The quantity of lithium tracer recovered	2.38 pounds (74 percent)
The quantity of fluorescein tracer injected	22.65 pounds
The quantity of fluorescein tracer recovered	13.18 pounds (58 percent)
Volume of water recovered	47,958,261 gallons
Time to leading edge (first arrival) fluorescein and lithium	15 hours
Time to peak tracer concentration	37 hours fluorescein 21 hours lithium

Summary of Tracer Recovery at the St. Louis Tunnel

Parameter	Value
Distance from input to outflow point	8,500 feet

The results of laboratory acidification tests (see Section 3.3) indicate that a significant mass of fluorescein may precipitate out of solution in the 517 Shaft if exposed to low pH water for a period of at least 24 hours. However, the first arrival of the fluorescein dye at the St. Louis Tunnel portal at just 15 hours indicated that the dye spent only a short period of time in the low pH shaft water before moving toward the St. Louis Tunnel and mixing with more neutral waters. According to the dye manufacturer, the fluorescein dye may precipitate out at a pH below 3. The pH of the water in the 517 Shaft was measured at 2.7 but the 50,000 gallons of chase water came from Silver Creek with a pH of 7.34, thus potentially minimizing the dye exposure to acidic water with a pH below 3 for the timespan that the water chase was in the tunnel.

6.3 BLAINE TUNNEL TRACER INJECTION

On October 5 at 14:15 a slug containing 5.9 pounds of fluoride was added to the water behind the coffer dam in the Blaine Tunnel (Photo 13). The slug was made by dissolving 13.2 pounds of sodium fluoride (NaF) powder into 8 gallons of Blaine Tunnel water and slowly pouring the solution into the pool of water at a distance of about 25 feet in from the coffer dam. After the slug injection, a water pump was used to move water from the pool behind the coffer dam over the first visible tunnel collapse (pile of rock and debris) and toward a drainage stope and the Morris Cook Incline that pass flows to the lower mine levels (Photos 14 and 15). The 3-inch diaphragm pump was pumped for 2 hours under steady state conditions at an estimated rate of 50 to 80 gpm based on measurement prior to entering the mine. However, during that period, no reduction in water level was observed in the pool. Continued pumping was not effective due to pump freezing problems, and it was not possible to move the entire pool of water past the blockage/collapse. The initial pumping is estimated to have moved approximately 6,000 gallons to 9,600 gallons of water past the initial visible collapse. The exact pathway of the water (and tracer) leaving the Blaine Tunnel pool is unknown, but it is expected that water flows to the 200 level via the Morris Cook incline and associated stopes, then from the 200 level to the 300 level the water could flow down either the Argentine Shaft or the 517 Shaft or both. From the 300 level to the 500 level, the water likely flows down the 517 Shaft. Other interconnections (raises, winzes, and stopes) may be

involved in more complex and varied flow paths. The direct line distance from the coffer dam to the water surface in the 517 shaft is 480 feet. Considering the change in elevation between the injection point and the water level in the 517 Shaft, the shortest possible tracer travel distance is 660 feet.

There was no practical way to quantify the volume of water entering the 517 Shaft from the Blaine Tunnel area, thus quantification of tracer recovery was not possible.

At the 517 Shaft, water samples were collected at a depth of 25 feet below the water surface, which was 450 feet below the collar of the shaft at the access adit landing. Samples were collected manually using a Solinst stainless steel point source bailer lowered to the same depth for each sample using a calibrated cable reel and pulley system (Photos 16 and 17). Samples were collected at 1-hour intervals for the first 36 hours after tracer injections were made in the Blaine Tunnel and then at approximately daily intervals for the following week. The last sample was collected in the 517 Shaft 690 hours after tracer was injected in the Blaine Tunnel.

Water samples were also collected from Silver Creek to determine if water was flowing from the Blaine Tunnel through the subsurface to Silver Creek. A Teledyne Isco automated sampler was installed at Silver Creek below the mine workings at SC-493 (Figure 2; Photo 18). The sampler was located about 10 meters upstream of the lower Silver Creek pressure transducer, which provided flow data for all samples collected at this location. Sample collection began on October 5 at 09:30 and ended on November 3 at 15:00. Samples were collected at 30-minute intervals on October 5 from 09:30 to 18:00 and then at 1-hour intervals until October 7 at 14:00. Samples were collected at 3-hour intervals from October 7 at 15:00 to October 11 at 18:00. Samples were collected at 6-hour intervals from October 11 at 18:00 until October 23 at 12:00 and then at 12-hour intervals from October 25 at 0:00 until removal of the sampler on November 3 at 15:00. Due to freezing of water in the sampler collection tubing, some nighttime samples were missed during the sample period.

Originally, PTSA dye was to be injected into the Blaine Tunnel along with the fluoride. The dye tracer was not added to the Blaine Tunnel during this study because it was anticipated that the Blaine to 517 Shaft pathway might have several obstructions (collapsed rock and sediment build up) and that the water chase might be impeded by logistical issues such as pump function, creating an unacceptable potential for tracer losses due to sorption or other processes.

6.4 BLAINE TUNNEL TRACER RESULTS

Figure 25 shows a time series plot of fluoride and chloride concentrations in the 517 Shaft starting on October 5 at 14:00 when the fluoride slug was added to the Blaine Tunnel behind the coffer dam. The fluoride concentrations began to show a steady increase at the 517 Shaft beginning 10 hours after injection, and a peak concentration of 260 micro-equivalents per liter (μeq/L) was reached 68 hours after slug injection. Given an approximate minimum distance from the Blaine Tunnel coffer dam to the base of the 517 Shaft of 660 feet, the average velocity of the advection front was 66 feet per hour while the average velocity of the peak fluoride concentration was 10 feet per hour. The fast times for the advection front suggest that in general the tunnel has few obstructions and water moves through relatively quickly; however, there is something causing diffusion in the system since there was not a distinct breakthrough curve. One anticipated possibility is one or several obstructions at points along the tunnel that causes the water to interact with rock and sediment; the collapsed portion of the adit over which water was pumped immediately after dye injection is one likely obstruction. Another possibility is storage of water and diffusion of tracer in stagnant pools that discharge only during high-water conditions.

Chloride concentrations in the 517 Shaft samples did not increase during the tracer test, indicating that the water in the 517 Shaft was not significantly altered during the experiment, and insures that the addition of the 50,000 gallon water chase to push the first set of tracers through did not create false or diluted background levels of solutes prior to adding the fluoride tracer to the Blaine Tunnel.

6.5 SILVER CREEK TRACER INJECTION AND RESULTS

As described in previous sections, bromide and rhodamine WT tracers were continuously injected into Silver Creek from October 5 at 11:02 until October 8 at 09:38. The 517 Shaft was sampled for the presence of these tracers to supplement the findings of the continuous injection stream tracer study, and the analytical results are shown on Figure 26. The injection period is shown as the first 71 hours on Figure 26.

Detectable levels of both the salt (bromide) and dye (rhodamine WT) tracers were found in the 517 Shaft, but concentrations remained at very low levels with no evidence of a significant increase or breakthrough slug emerging at the 517 Shaft. The earliest samples, collected before the tracer would have reached the shaft, showed slightly elevated rhodamine WT concentrations,

indicating that low levels of background fluorescence may naturally occur in the mine waters. The presence of background fluorescence and the low concentrations of the dye tracer measured during the study at this location prevent positive identification of flow from Silver Creek through the mine to the 517 Shaft.

The lack of a clear bromide or rhodamine WT breakthrough in the 517 Shaft should not be construed as proof that there is not a hydrologic connection between Silver Creek and the shaft. This connection may in fact exist, but may not have been detectable given the large volume of water in the shaft and the relatively small amount of water leaving Silver Creek (approximately 0.25 cfs).

6.6 POTENTIAL DIVERSION TO ARGENTINE TAILINGS

The location of the Argentine Tailings adjacent to Silver Creek and the previous location of the stream within the footprint of the current tailings pile indicated that some of the potential streamflow loss from Silver Creek identified during the high-flow tracer study in June could be due to water exiting Silver Creek, entering the alluvium, and returning to the creek at the Argentine Tailings seep (SVS-12). Therefore, during the low-flow sampling event, Argentine Tailings seep samples were collected and analyzed for the bromide and rhodamine WT tracers that were injected upstream in Silver Creek.

Seep discharge was directed through a 3-inch Parshall flume, and stage heights of water in the flume were measured manually from September 14 to October 17, 2011 (Photos 19 and 20). The stage height measurements were converted to discharge flow rates using a standard conversion chart provided by the flume manufacturer. Water samples were collected at the flume using a Teledyne Isco automated sampler that was installed on October 5 at 08:00. Samples were collected at 1-hour intervals from October 5 at 12:00 to October 8 at 08:00. Samples were collected at 2-hour intervals from October 8 08:00 until October 11 at 18:00. Samples were collected at 6-hour intervals from October 11 18:00 until October 17 at 12:00 when the automated sampler was removed.

Seep discharge was between 8 gpm and 16 gpm during the study period (Figure 27). The peak in seep discharge on October 5, 2011 may be associated with a mixed rain/snow precipitation event that produced approximately 0.2 inch of precipitation between October 4 and October 6, 2011.

The Silver Creek tracer (bromide and rhodamine WT) concentrations did not increase measurably at the seep during the sampling period. Bromide concentrations remained below detection (<0.003 mg/L) for the duration of the sampling at the seep. There was no detectable increase in rhodamine WT concentrations, which remained at background levels (4.4E-09 +/- 4.2E-09 ppb) throughout the sampling period. The low but detectable background fluorescence is most likely attributed to the presence of naturally occurring compounds that fluoresce at a similar wavelength as the dye tracer.

A background presence of fluoride was detected at the seep, but no significant changes in concentration occurred during the study period with a mean concentration of 5.88 mg/L +/- 0.55 mg/L (Figure 28). Due to the absence of an increase in fluoride concentration at the seep, it is not believed that the fluoride detected in seep samples originated from the Blaine Tunnel injection. Nitrate and chloride concentrations remained generally constant throughout the study at 0.114 mg/L +/- 0.019 mg/L and 0.66mg/L +/- 0.183 mg/L, respectively (Figure 28); however, on October 6 and 7, 2011, the concentration of fluoride decreased while the concentration of chloride increased in the seep discharge. The changes in concentration may indicate that the source of the increased discharge was new precipitation that moved through near-surface flow paths thus picking up available chloride but not fluoride, which is coming from deeper flow paths. Sulfate was the most prevalent solute measured at the seep with a mean concentration of 782 +/- 19.0 mg/L (16280 +/- 395 μeq/L). These results are consistent with the isotopic results (see Section 7.3) and suggest water flowing out of the seep has little if any contact with Silver Creek but is more likely from groundwater discharge or infiltration of precipitation through the overlying tailings.

7.0 WATER CHEMISTRY AND LOADING

The following sections describe the analytical results for surface water and mine water samples collected during the source water investigation. Potential sources of contaminants to Silver Creek are discussed. Flow data that were used in the tracer study evaluations and that provide an indication of seasonal flow variations are presented.

7.1 MINE WATER CHEMISTRY

Water from the floor of the Argentine Tunnel and from a pipe in the hoist room in the 517 Shaft Access Tunnel was sampled in June. Water from the 517 Shaft and from the pool behind the

Blaine Tunnel coffer dam were sampled in August. Water from the 517 Shaft (two depths) and from the pool behind the Blaine Tunnel coffer dam was sampled prior to injection of tracers in early October. A sample of water flowing into the Blaine Tunnel from a raise was collected after injection of tracers in early October. The results are presented on Table 4, and select dissolved metals results are graphed in Figure 29.

The lower acidic pool in the Argentine Tunnel, sampled in June 2011, had extremely high dissolved metals concentrations (349 mg/L copper, 1,950 mg/L iron, 294 mg/L manganese, and 2,460 mg/L zinc) and hardness (6,230 mg/L). The pH of this sample was in the range of 2 to 2.5. The sample location is shown on Figure 22.

The 517 Shaft dissolved metal concentrations were generally lower than the concentrations measured in the Argentine Tunnel, with the exception of lead. 517 Shaft metal concentrations were greater in October than in August. Dissolved metals concentrations were very similar between the samples collected from 455 feet and 475 feet

The Blaine Tunnel was sampled from water built up behind the coffer dam in August and October (Figure 21). The samples contained elevated metal concentrations, but the concentrations were significantly lower than in samples collected from the acidic pool in the Argentine Tunnel in June. The October sample contained significantly higher metal concentrations than the sample collected in August, perhaps due to the extended time the water sat in the pool prior to sampling relative to the influx of water during spring/summer runoff or more concentrated water entering the mine during lower flow conditions.

An inflow to the Blaine Tunnel was sampled in October. The sampled water was flowing into the Blaine Tunnel from a raise past the blockage that is behind the coffer dam (Figure 21). The inflow had metal concentrations generally similar to or slightly higher than measured in the sample collected from the Blaine Tunnel during the same week.

The water from the hoist room pipe in the 517 Shaft Access Tunnel in June 2011 had relatively low trace metals concentrations. This water is likely coming directly from near-surface groundwater rather than through extensive mine workings; therefore, the water has less interaction with rock.

7.2 SILVER CREEK WATER CHEMISTRY

The Silver Creek time series and longitudinal chemical analysis provide useful information on the interactions between the stream and the mine workings. A brief review of the time-series data collected in Silver Creek at SC-493 and the synoptic sample results collected along the entire reach of Silver Creek is presented below. The results of all of the ions analysis performed at the Kiowa Environmental Chemistry Laboratory are provided in Table 1. The results of dissolved metals, total metals, anions, hardness, and field pH analyses are presented on Tables 5 and 6.

7.2.1 Time Series Trends

Continuous discharge measurements and regular water quality samples were collected at SC-493. Focusing in on the week of October 5 to 9, there were large changes in discharge caused by the snow event that started during the evening of October 5 (Figure 30). The large decrease in discharge centered on about hour 30 was due to freezing conditions during the night. Discharge increased again the following day when the snow began to melt. Discharge decreased during the rest of the week as the stored snow melted and contributed to the hydrologic cycle. Nitrate concentrations showed strong diurnal changes and in general appeared to increase with increasing flow and decrease as flow decreased. This may reflect flushing of nitrate from the near-surface environment to the stream during snowmelt. In contrast, the fluoride concentrations showed large changes, on the order of 50 percent at a time, but with no obvious trend or sustained increases associated with fluoride additions to the Blaine Tunnel (Figure 30). These episodic changes in fluoride concentration may have been from the fluoride tracer introduced to the Blaine Tunnel. The base fluoride values of about 6 μeq/L are elevated relative to most pristine mountain streams and are consistent with an acid mine drainage source. Thus, the changes in fluoride concentration may also reflect changes in source water contributions to the stream during snowmelt, including some flushing of fluoride stored in near-surface areas.

Looking at a longer timeframe, October 5 to November 3, at the same site, the concentrations of fluoride remained relatively stable (Figure 31). These fluoride values suggest that little, if any, fluoride from the Blaine Tunnel was found in the stream at site SC-493 after the first few days following tracer application. In contrast, nitrate concentrations increased by a factor of about three, from about 0.1 mg/L to 0.3 mg/L.

There may be an anthropogenic source of nitrate that is contributing to nitrate in the stream at SC-493.

Sulfate concentrations were almost two orders of magnitude greater than fluoride concentrations; the values of near 20 mg/L are consistent with an acid mine drainage source (Figure 32). Concentrations of sulfate were inversely related to discharge. Thus, as discharge decreased after the snow storm of October 6th, sulfate concentrations increased. As discharge increased at about hour 200, again sulfate concentrations decreased. Diurnal changes in discharge also affected sulfate concentrations, with sulfate concentrations higher at night where there was no snowmelt and lower in the day when there was snowmelt and discharge increased. These changes in sulfate concentrations are consistent with the source of sulfate being a groundwater source with a large acid mine drainage component. Increasing amounts of snowmelt diluted the groundwater contributions to streamflow, resulting in lower concentrations of sulfate.

7.2.2 Synoptic Silver Creek Sample Results and Discussion

Synoptic sampling of sulfate along the entire reach of Silver Creek indicates that there is an increasing contribution of acid mine drainage water from groundwater discharge to Silver Creek (Figures 33 and 34). Under both high-flow and low-flow conditions, sulfate concentrations increase when the creek crosses the fault zone and adits and other workings associated with the Rico-Argentine mines (between SC-193 and SC-404) and then again where the water from the tailings seep enters the creek (SC-826 to SC-1131). Sulfate concentrations during low-flow conditions in October (about 600 μeq/L) were about 12 times greater than during high-flow conditions in June (about 50 μeq/L). These differences in concentration between high-flow and low-flow are consistent with dilution of acid mine drainage in groundwater by snowmelt runoff.

The Silver Creek samples have similar metal contaminant concentrations for the most part. A review of the dissolved cadmium, copper, lead, manganese, and zinc concentrations (Figures 35 through 39 and Table 5) shows the following.

- Dissolved cadmium concentrations increased at SC-351 in June and at SC-275 in October and increased gradually at downstream locations. The East Fork

contained higher cadmium concentrations than Silver Creek but the Argentine Tailings seep did not.

- Dissolved copper concentrations increased between SC-404 and SC-493 and remained steady or decreased somewhat at downstream locations. The dissolved copper concentration in the East Fork in June was similar to that seen in Silver Creek below SC-493. Copper was not detected in the Argentine Tailings seep.
- Dissolved lead concentrations appeared to increase in the vicinity of the Blaine Tunnel and 517 Shaft Access Tunnel, then appeared to decreased downstream of the site. East Fork contained similar concentrations as downstream in Silver Creek. Dissolved lead was not detected in the Argentine Tailings seep.
- Dissolved manganese concentrations increased gradually down the sampled reach of Silver Creek during June. During October, the manganese concentration increased significantly in the vicinity of the Blaine Tunnel and 517 Shaft Access Tunnel, tapering off downstream of the bridge, and spiked sharply downstream of the Argentine Tailings seep.
- Dissolved zinc concentrations increased in Silver Creek at SC-351 (June) or SC-275 (October). During June, the dissolved zinc concentration increased gradually toward downstream locations. During October, the dissolved zinc concentrations increased sharply at SC-275, then remained relatively constant to SC-895 and SC-1131. Dissolved zinc concentrations were much higher in the Argentine Tailings seep than in Silver Creek. The East Fork had slightly higher concentrations of zinc than Silver Creek when it was flowing in June.

The sulfate and mining-associated metal concentration increases in the vicinity of the Rico-Argentine mines and downstream indicate that even though there is a net loss of flow in the reach, there may be small inputs of mine water (e.g., an observed trickle coming out the Blaine Tunnel) or other inflows that influence the stream chemistry.

A trend of gradually increasing cadmium, manganese, and zinc concentrations from upstream to downstream was more apparent during June than in October, when the primary increases were observed in the vicinity of the Rico-Argentine mines and the Argentine Tailings seeps. This supports the discussion of sulfate loading in the reach. During spring runoff, contaminants that are mobile at near-neutral or over a range of pH

values (cadmium, manganese, and zinc) are entering the river not only from the vicinity of the Rico-Argentine mines and tailings seep, but also as water flows over and through the hillsides and into the creek.

Dissolved cadmium, manganese, and zinc concentrations were higher in samples collected during October than in those collected in June. Dissolved copper concentrations were similar in June and October at upgradient locations but were higher in June than October at downstream locations, perhaps due to water flowing through the hillsides on either side of the river or from groundwater entering the stream. Lead concentrations varied with distance more than with season.

7.2.3 St. Louis Tunnel Area Samples

Tables 5 and 6 show the results of sampling the St. Louis Tunnel discharge and the Dolores River (June only). The results should be considered in light of the monthly water quality data being collected at these and other locations by AR, as well as historical data. Table 15 shows the longer-term water quality data for the St. Louis Tunnel discharge.

The St. Louis Tunnel discharge water had concentrations similar to previous sampling events, but cadmium and zinc concentrations were in the high range for this location during June.

The St. Louis Tunnel shows an opposite trend than the mine waters and Silver Creek. Concentrations generally increase during spring and early summer, then decrease during periods of lower flow (Table 15). This may be an indication that as spring runoff flows into the Rico-Argentine mine and other sources, the flow contribution from these contaminated sources increases relative to the more constant base flow of cleaner groundwater that feeds the St. Louis Tunnel.

7.3 ISOTOPES ANALYSIS AND DISCUSSION

Mine and surface water, rain, and snow were collected and analyzed for isotopes to assist in determining the source of water to the mine and Argentine Tailings seep.

7.3.1 Deuterium and Oxygen 18 Analytical Results

The δD and δ ^{18}O values for each sample location were plotted along with incoming rain and snow precipitation (Figure 40). The snow value is the volume weighted mean of the previous winter snowpack collected on May 1, 2011 around the time of maximum snow accumulation. The rain values are weekly samples collected from June to August 2011. The mine and surface water sample results are plotted as the average from all samples collected at each location throughout 2011. All surface water and mine water samples fall on a mixing line between the snow and rain inputs.

The surface and subsurface isotope results are bracketed by snow on the more depleted end and rain on the more enriched end. Thus it appears that surface water and groundwater are a mixture of these two sources. At the scale shown on Figure 40, samples from different times at the same site plot on top of each other.

Figure 41 shows a narrower range of values so that variations in surface waters and subsurface waters are easier to see. The isotopic concentration of Silver Creek shows the greatest seasonal variation with waters more depleted in δD and δ ^{18}O in June as a result of snow melt and more enriched in δD and δ ^{18}O in October from summer rains and groundwater. All of the samples collected near the mine (Argentine Tailings seep, Blaine Tunnel, 517 Shaft) have an isotopic composition similar to Silver Creek in October, which indicates that stream baseflow is primarily from a groundwater source that is similar to the water moving through the mine and seep. The isotopic signature of the Argentine Tailings seep has little variation and does not follow that of Silver Creek, indicating that water exiting the seep is coming from a well-mixed source that is not significantly influenced by Silver Creek, especially during high flows.

The water discharging from the St. Louis Tunnel has similar isotopic concentrations in May, June, and October, indicating the water is predominantly from a well-mixed groundwater source with limited seasonal variation. The St. Louis Tunnel samples are also consistently more depleted than the samples from the 517 Shaft and Blaine Tunnel, indicating that water exiting the 517 Shaft is mixing with water that has a distinctly different isotopic signature (more depleted) before reporting to the portal. All three mine water locations and the tailings seep become more isotopically depleted in October,

which suggests that the groundwater contributions during baseflow are coming from flow paths that started from snowmelt recharge rather than summer rain recharge.

7.3.2 Tritium Analytical Results

Residence time estimates of surface water and groundwater can be made by measuring the amount of tritium found in water from different locations. Since tritium enters the groundwater system through recharge initially derived from precipitation, an analysis of tritium concentrations can provide information concerning the time since the water was isolated from the surface (i.e., recharge date). The activity of tritium available to form precipitation in the atmosphere greatly exceeded natural levels due to aboveground nuclear weapons testing in the 1950s and early 1960s. Tritium is a radioactive atom with a half-life of 12.33 years (Maloszewski et al. 1983) and, thus, is an ideal tracer for identifying relatively young groundwater (<60 years). Since tritium is a part of the water molecule, it does not undergo any substantial chemical reactions once the water has entered the subsurface and, thus, is an ideal hydrological tracer (Rose 1996).

The first (June 2011) synoptic sampling of waters for tritium produced the results shown in Table 2. Precipitation value for rain was 3.9 TU, and results from snow are still pending. The values for surface water and groundwater are in Table 2 and are all between 5 and 10 TU, indicating relatively new water that is not significantly different than precipitation falling in the last 10 years. There is no indication of elevated tritium bomb spike water (20-60 years old), or tritium dead water (pre 1940s). Tritium values of about 5.7 TU for the St. Louis Tunnel and 517 Shaft Access Tunnel Hoist Room are consistent with current precipitation values and indicate a residence time of only a few years, a fast flow-through system. In contrast, the higher values for the 517 Shaft appear to have some bomb spike water and indicate a much slower flow-through system.

Note: Rain and snow samples have been sent to the laboratory for analysis, awaiting results.

7.4 SILVER CREEK, ST. LOUIS TUNNEL, AND DOLORES RIVER FLOW DATA

Flow data used to measure recovery of dye tracers and that show trends in relative flows of Silver Creek, the St. Louis Tunnel, and local surface water are presented here.

Silver Creek flow data collected using transducers and stage discharge rating curves are provided in Figure 42. The USGS operates gauge station 09165000 in the Dolores River downstream of Rico (USGS 2012). The USGS data is presented on Figure 43. The USGS data and the Silver Creek data show similar trends in the time periods that overlap.

Flow discharging from the St. Louis Tunnel is monitored by AR. The AR flow data from April through late November 2011 and concurrent Dolores River flow data is presented in Figure 44. There is some noise in the data due to turbulent flow at the measurement flume. The problem was corrected in September. The peak flow from the St. Louis Tunnel lagged the Silver Creek and Dolores River peaks by approximately 1 month, and was relatively damped compared to the surface water flows.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The following summarizes the findings of the studies described in this report.

- Silver Creek tracer studies identified a loss of flow during the high-flow period, when flow was estimated to be between 29 cfs to 44 cfs, and during the low-flow period, when flow was estimated to be between 0.7 cfs and 2 cfs. Percent losses ranged from about 5.3 to 9 percent at high flow and 22 to 23 percent at low flow during dry conditions. A smaller flow loss was estimated after precipitation during the low-flow tracer study (approximately 7 percent). Flow loss under high-flow conditions potentially occurs along a 600 meter sub-reach that includes the Blackhawk Fault (Section 4.1.4; Figure 13). The location of the flow loss under low-flow conditions is uncertain due to precipitation events that occurred after the initial slug additions and prior to synoptic sampling (Section 4.2.5).
- Given the percent loss in flow and estimated flow rates at SC-493, 690 gpm to 1,780 gpm may be lost from Silver Creek during high flow, and approximately 60 gpm to 70 gpm may be lost during low flow. The fate of the water with respect to the St. Louis Tunnel is unknown at this time.
- The leading front of water traveling from the 517 Shaft to the St. Louis Tunnel during the fluorescein and lithium tracer study arrived in 15 hours, giving a velocity of 567 ft/hour. The peak travel time was measured at 21 to 37 hours, resulting in a velocity of 230 to 405 ft/hour. Concentrations of fluorescent dye and salt tracers indicate that there is minimal blockage present in the St. Louis Tunnel and the southeast crosscut connecting to the 517 Shaft. However, the tracer was detected in the last samples collected from the 517 Shaft and the St.

Louis Tunnel in November 2011 and there was not complete recovery of the applied mass of tracer (72 percent recovery of lithium and 58 percent recovery of fluorescein). This indicates there is some residence time within the 517 Shaft – crosscut – St. Louis Tunnel system. There could be a blockage in the tunnel that is causing an increase in dispersion of the tracer; one likely location for this blockage is the collapsed section of the adit near the St. Louis Tunnel portal. Other possible causes of incomplete tracer recovery could be related to extended residence time in the pool of water in the 517 Shaft below the 500 level discharge to the St. Louis Tunnel and loss of fluorescein from interaction with the acidic mine water.

- The leading front of water traveling from the Blaine Tunnel behind the coffer dam to the base of the 517 Shaft during the fluoride tracer study arrived in 10 hours, giving a velocity of 54 ft/hour. The peak travel time was measured at 68 hours, resulting in a velocity of 8 ft/hour. Mass recovery of fluoride at the 517 Shaft could not be quantified based on the tracer results and the conditions restricting measurement while underground.
- The stable isotope analysis shows wide variation of isotope concentrations over the year, with isotope-depleted waters occurring in June as a result of snowmelt and more isotope-rich concentrations occurring in October when inflows are from groundwater and the Argentine Tailings seep. Water from the St. Louis Tunnel showed little variation in isotope concentrations over time (May, June, and October) and is more depleted in isotopes than Silver Creek, the Blaine Tunnel, and the 517 Shaft, indicating a consistent inflow of water from a well-mixed groundwater source along the southeast crosscut and the St. Louis Tunnel.

Recommendations regarding additional work include the following.

- Perform the work necessary to stabilize the conditions at the coffer dam in the Blaine Tunnel to allow access to remove the blockage and ensure flow continues to the St. Louis Tunnel.
- Install a flume and transducer or other means to measure flow in the Blaine Tunnel. Conductivity or pH measurements may also be useful.
- Collect additional samples from the Blaine Tunnel and 517 Shaft to identify seasonal effects on water quality.
- Determine the response on the flow and water quality at the St. Louis Tunnel to eliminating/temporarily diverting flow from the Blaine Tunnel (one source of contaminated water to the St. Louis Tunnel).
- Evaluate the need for additional tracer studies to characterize the flow of water between specific locations within the mine workings.

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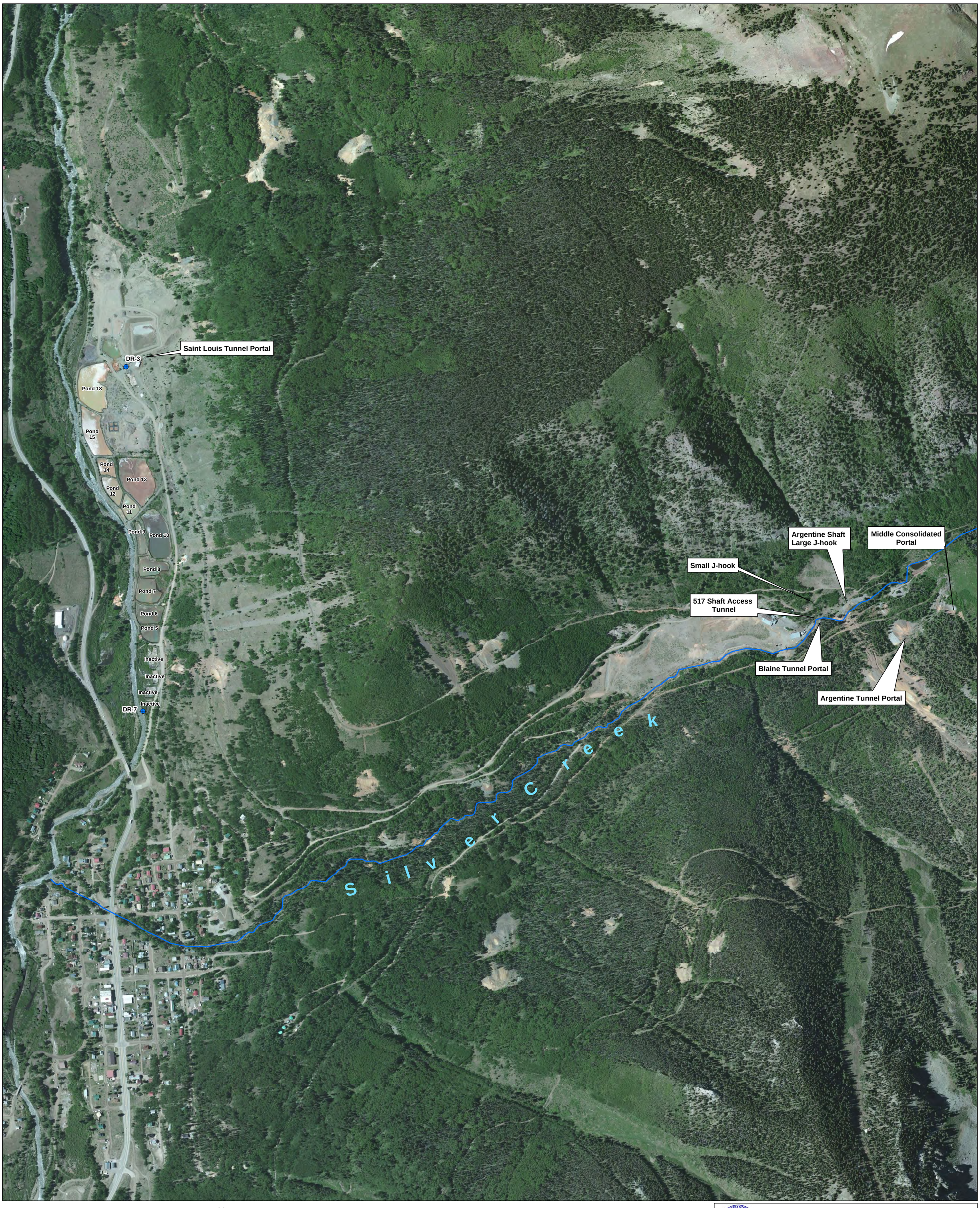

Datum/Projection: NAD 1983 UTM Zone 12N
Source: Bing Maps

N
S

0 175 350 700 1,050 1,400
Feet

Legend

Surface Water Sample Location

Treatment Ponds

Silver Creek

URS
OPERATING SERVICES

Rico-Argentine St. Louis Tunnel
Rico, Dolores County, Colorado

Site Map
Figure 1

Date: 03/2012

TDD No. 1005-01

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Source: Bing Maps

N
S

0 100 200 400 600 800 Feet

Legend

Surface Water Sample Location

Silver Creek

URS
OPERATING SERVICES

Rico-Argentine St. Louis Tunnel
Rico, Dolores County, Colorado
Site Map - Blaine-Argentine
Mine Vicinity
Figure 2

Date: 03/2012

TDD No. 1005-01

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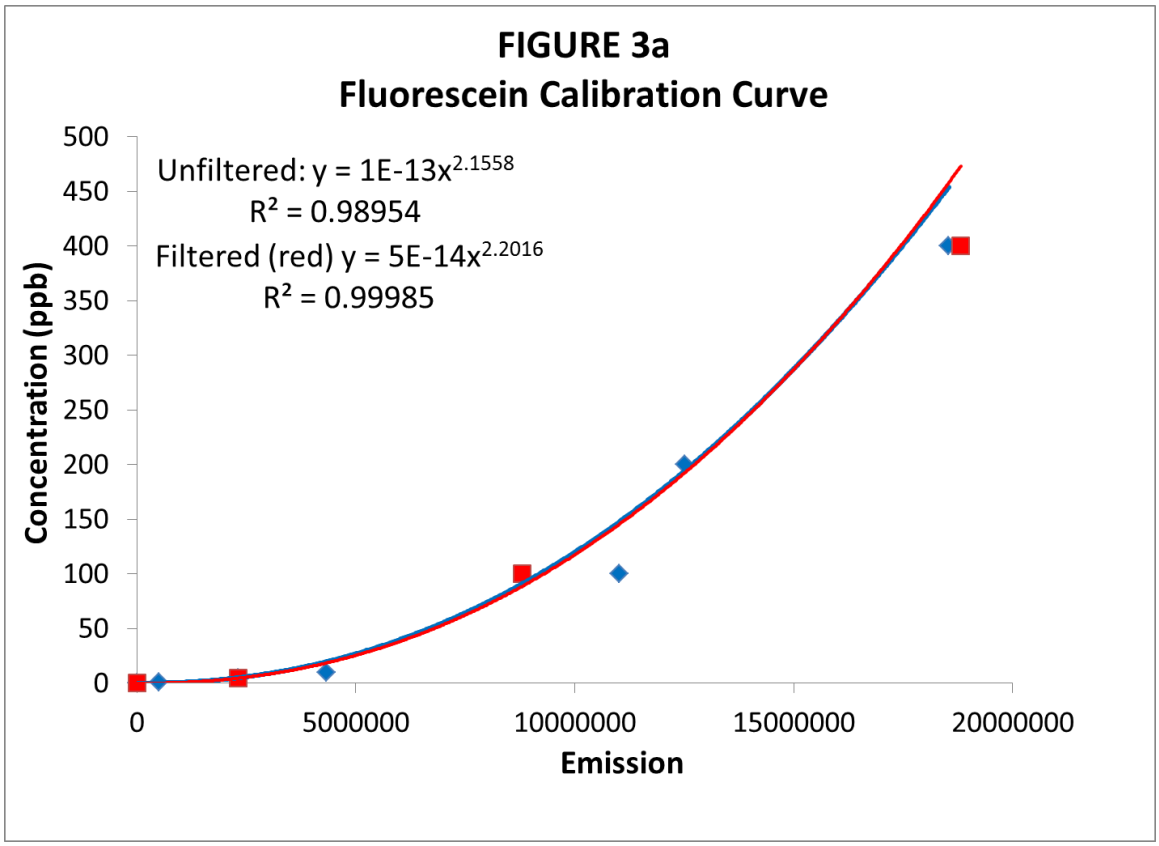


FIGURE 3a
Fluorescein Calibration Curve
Unfiltered: y = 1E-13x^2.1558
R² = 0.98954
Filtered (red) y = 5E-14x^2.2016
R² = 0.99985
Concentration (ppb)
500
450
400
350
300
250
200
150
100
50
0
0
5000000
10000000
15000000
20000000
Emission

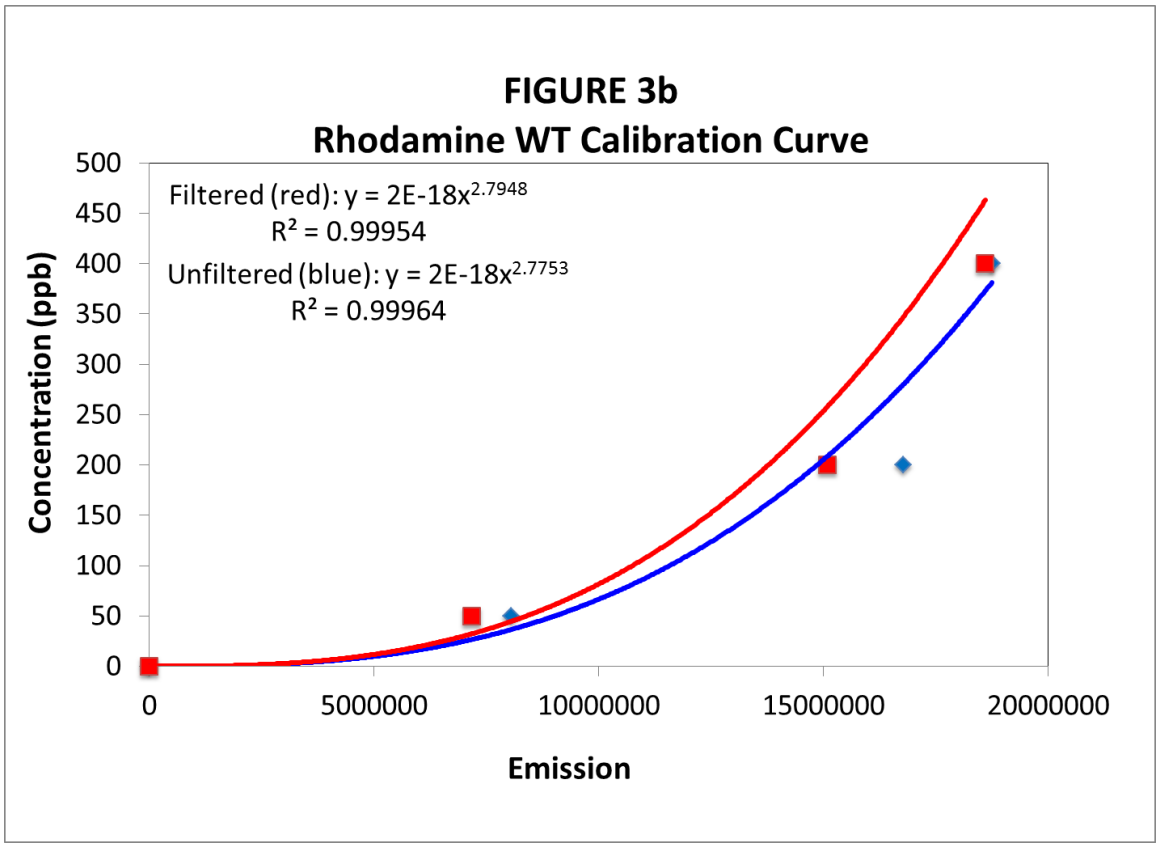


FIGURE 3b
Rhodamine WT Calibration Curve
Filtered (red): y = 2E-18x^2.7948
R² = 0.99954
Unfiltered (blue): y = 2E-18x^2.7753
R² = 0.99964
Concentration (ppb)
500
450
400
350
300
250
200
150
100
50
0
0
5000000
10000000
15000000
20000000
Emission

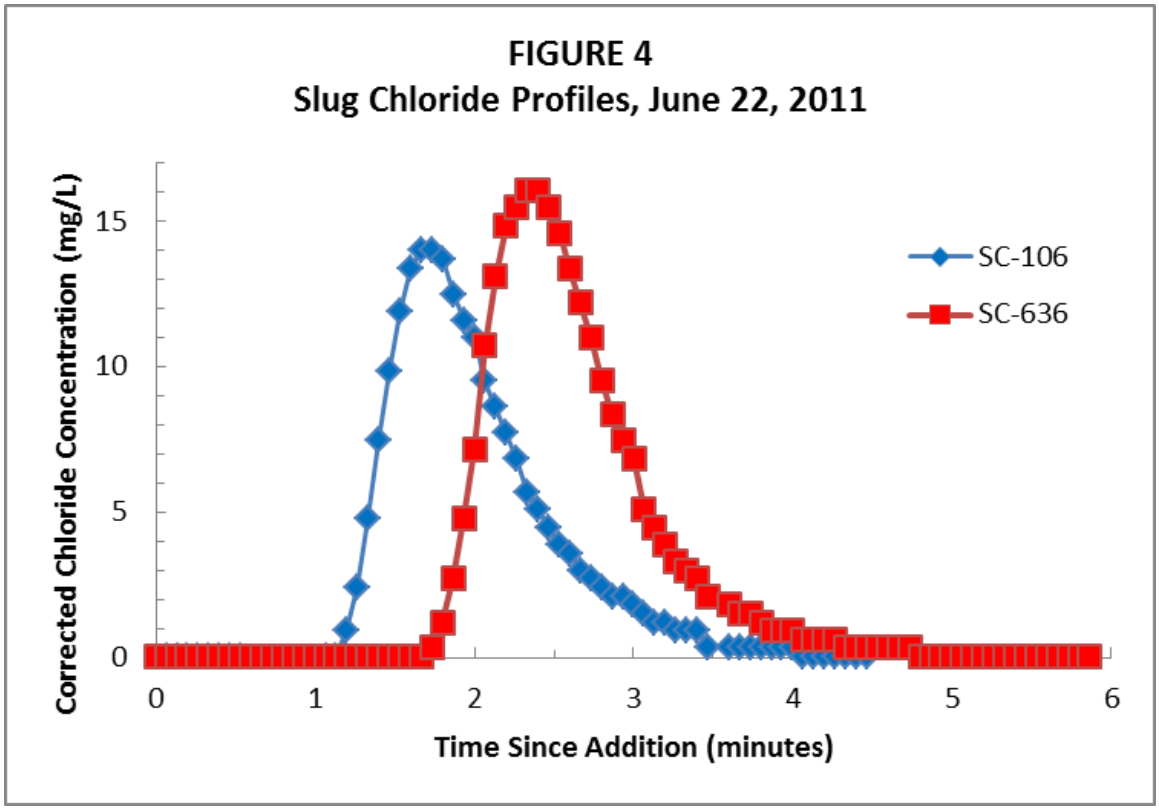


FIGURE 4
Slug Chloride Profiles, June 22, 2011
Corrected Chloride Concentration (mg/L)
15
10
5
0
0
1
2
3
4
5
6
Time Since Addition (minutes)
SC-106
SC-636

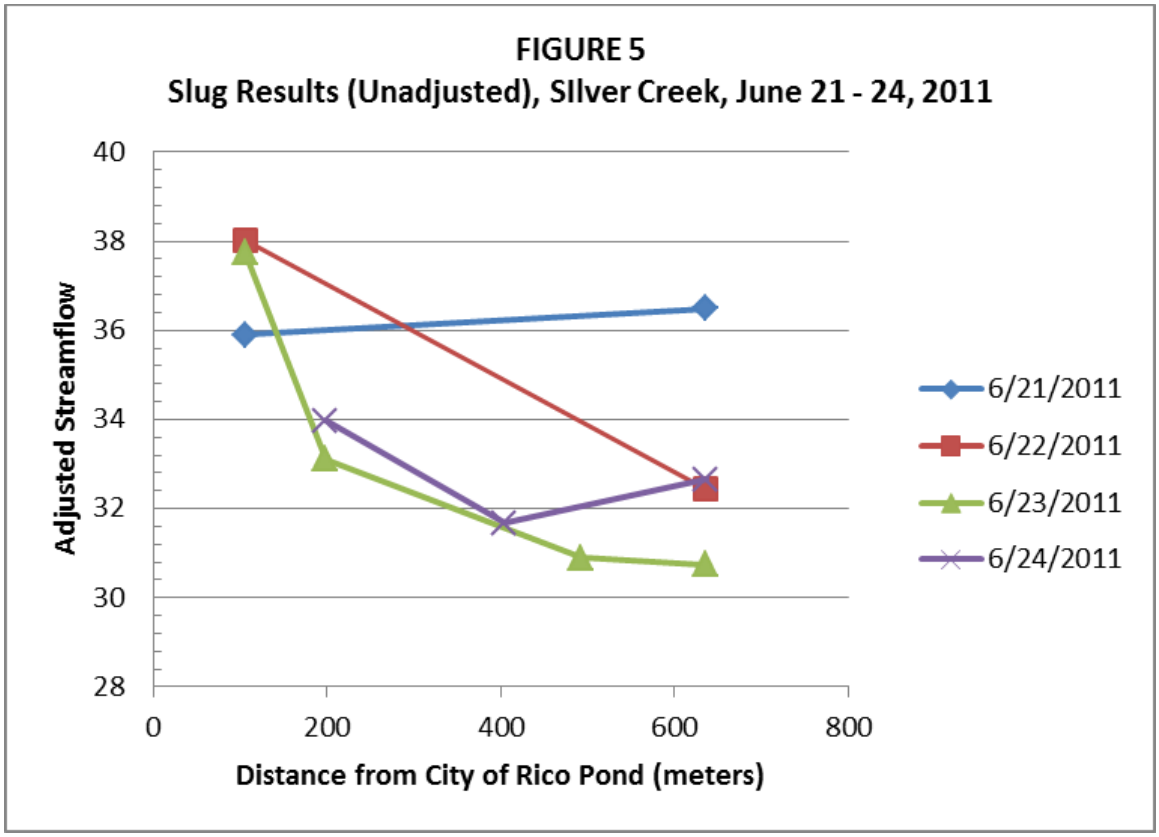


FIGURE 5
Slug Results (Unadjusted), SIlver Creek, June 21 - 24, 2011
Adjusted Streamflow
40
38
36
34
32
30
28
0
200
400
600
800
Distance from City of Rico Pond (meters)
6/21/2011
6/22/2011
6/23/2011
6/24/2011

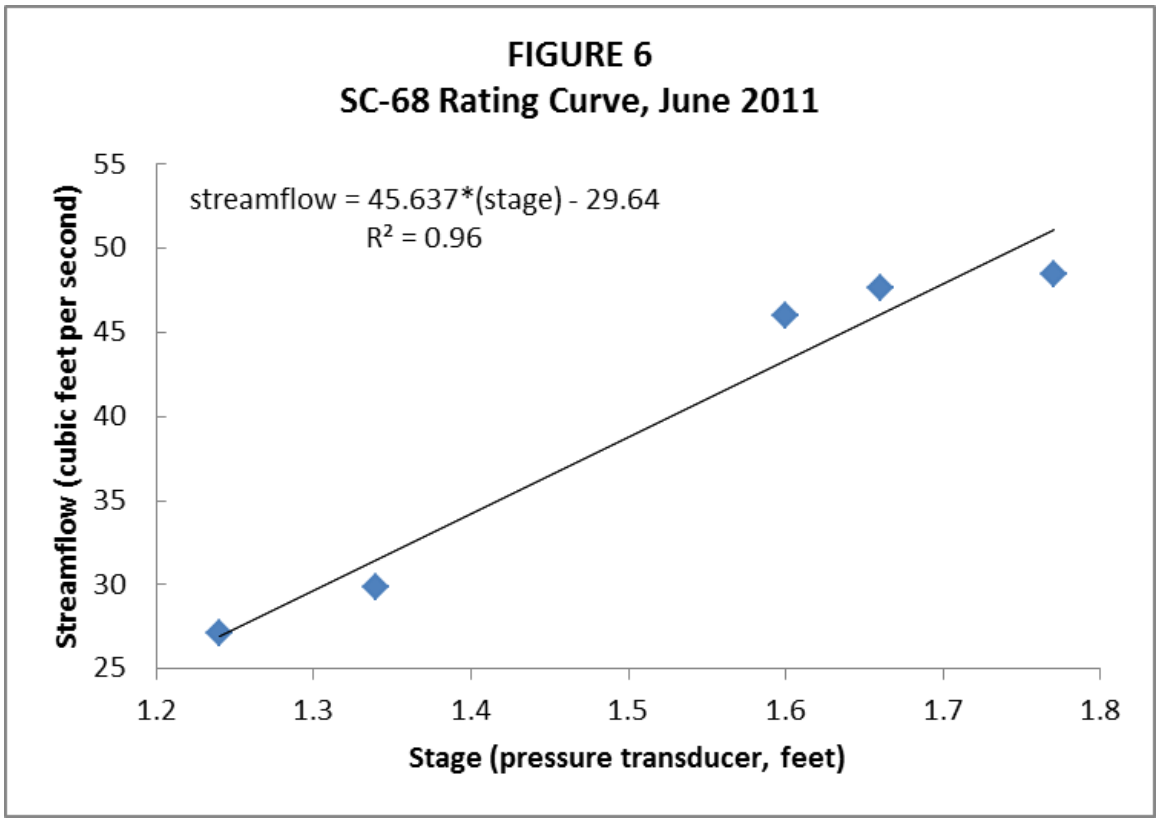


FIGURE 6
SC-68 Rating Curve, June 2011
streamflow = 45.637*(stage) - 29.64
R² = 0.96
Streamflow (cubic feet per second)
55
50
45
40
35
30
25
1.2
1.3
1.4
1.5
1.6
1.7
1.8
Stage (pressure transducer, feet)

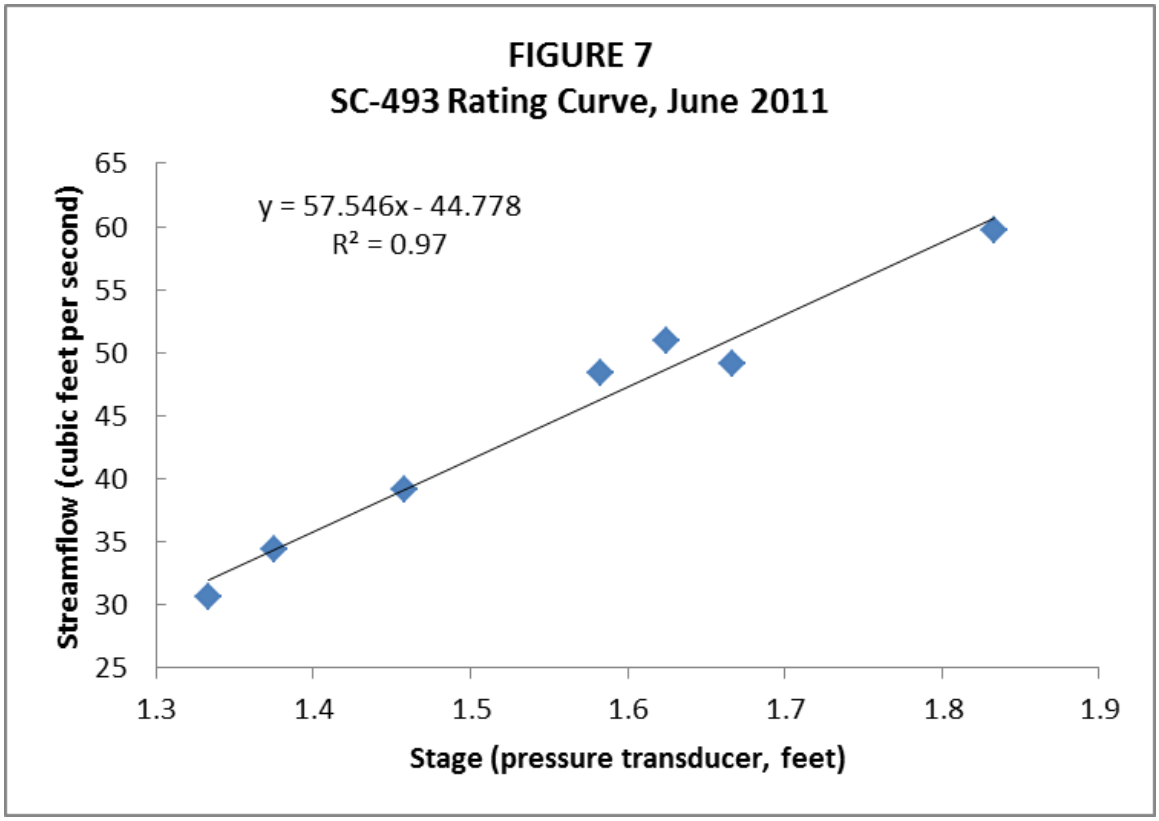


FIGURE 7
SC-493 Rating Curve, June 2011
y = 57.546x - 44.778
R² = 0.97
Streamflow (cubic feet per second)
65
60
55
50
45
40
35
30
25
1.3
1.4
1.5
1.6
1.7
1.8
1.9
Stage (pressure transducer, feet)

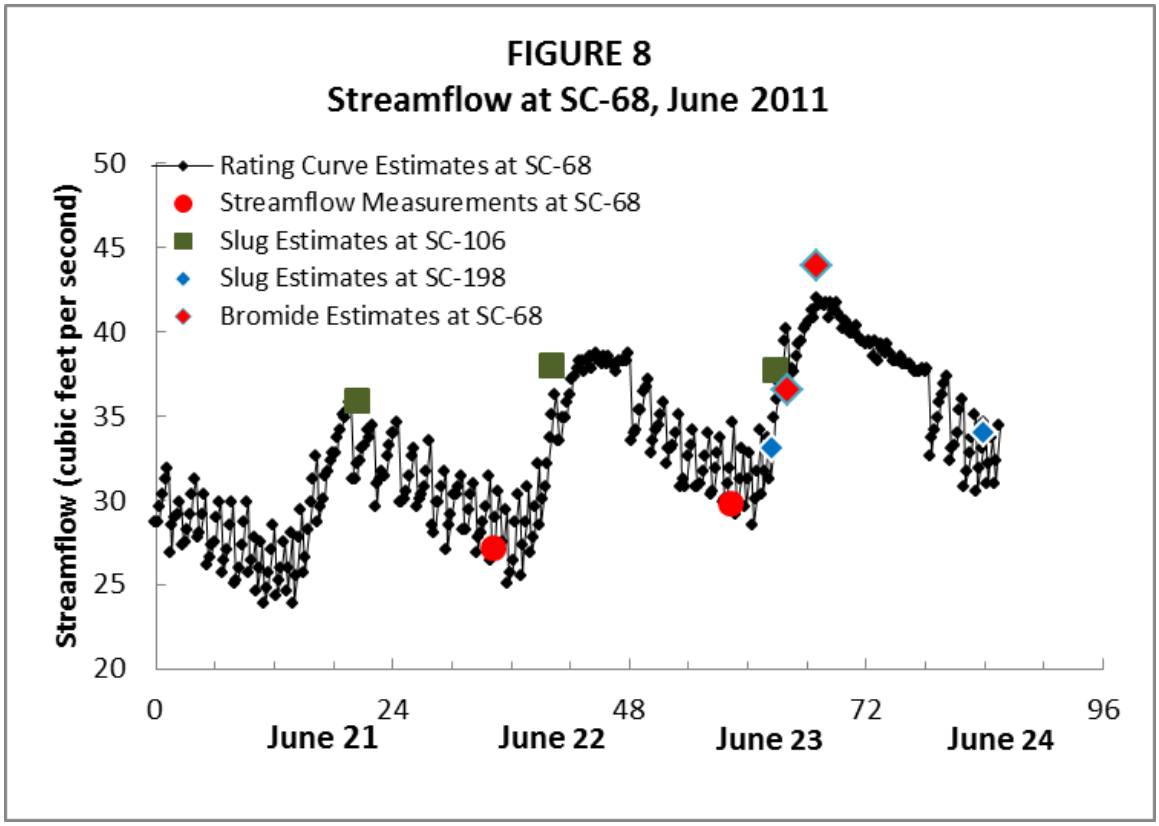


FIGURE 8
Streamflow at SC-68, June 2011
Rating Curve Estimates at SC-68
Streamflow Measurements at SC-68
Slug Estimates at SC-106
Slug Estimates at SC-198
Bromide Estimates at SC-68
Streamflow (cubic feet per second)
50
45
40
35
30
25
20
0
24
48
72
96
June 21
June 22
June 23
June 24

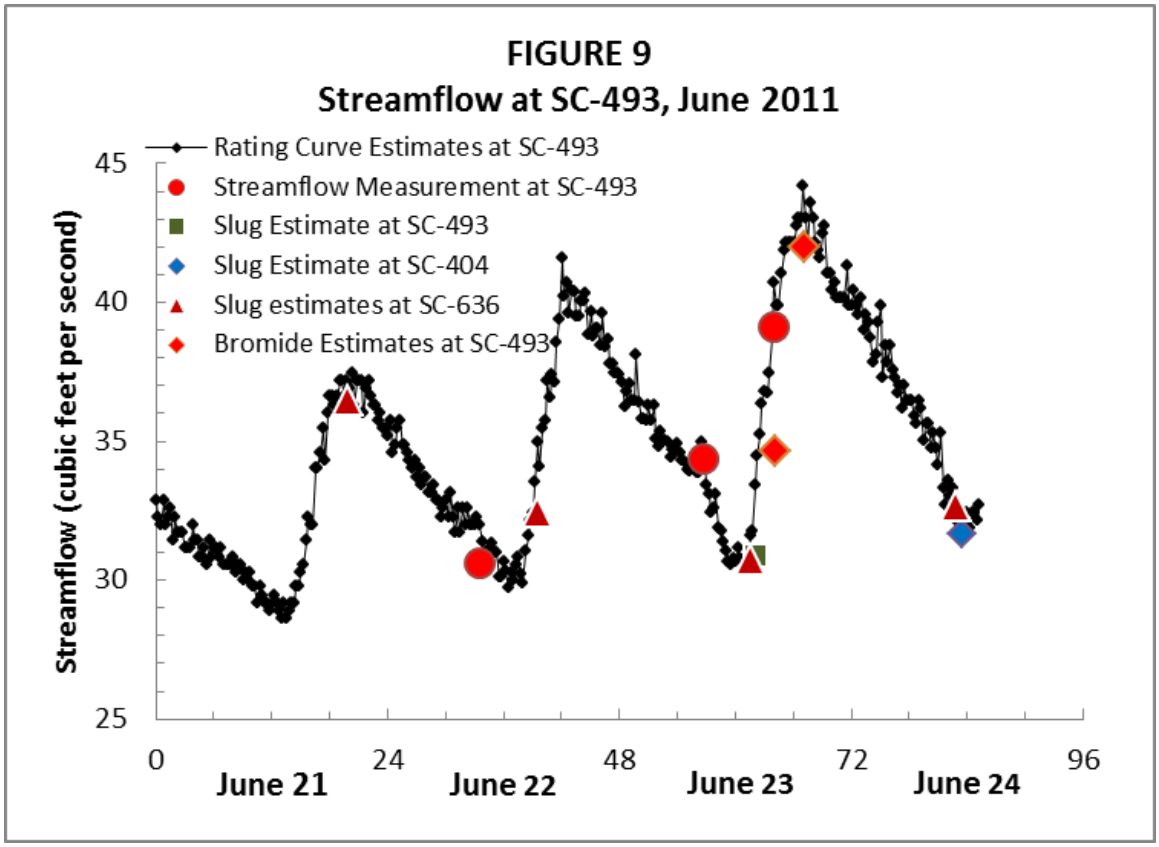


FIGURE 9
Streamflow at SC-493, June 2011
Rating Curve Estimates at SC-493
Streamflow Measurement at SC-493
Slug Estimate at SC-493
Slug Estimate at SC-404
Slug estimates at SC-636
Bromide Estimates at SC-493
Streamflow (cubic feet per second)
45
40
35
30
25
0
24
48
72
96
June 21
June 22
June 23
June 24

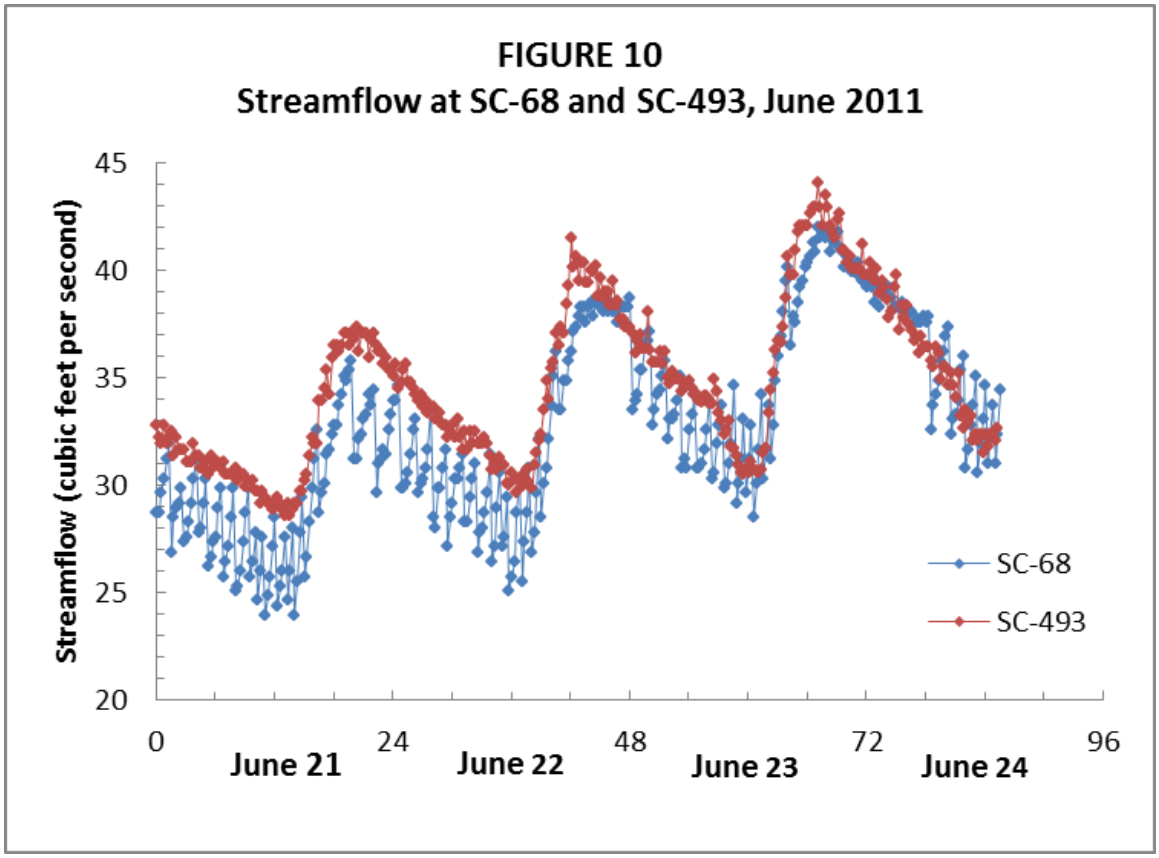


FIGURE 10
Streamflow at SC-68 and SC-493, June 2011
Streamflow (cubic feet per second)
45
40
35
30
25
20
0
24
48
72
96
June 21
June 22
June 23
June 24
SC-68
SC-493

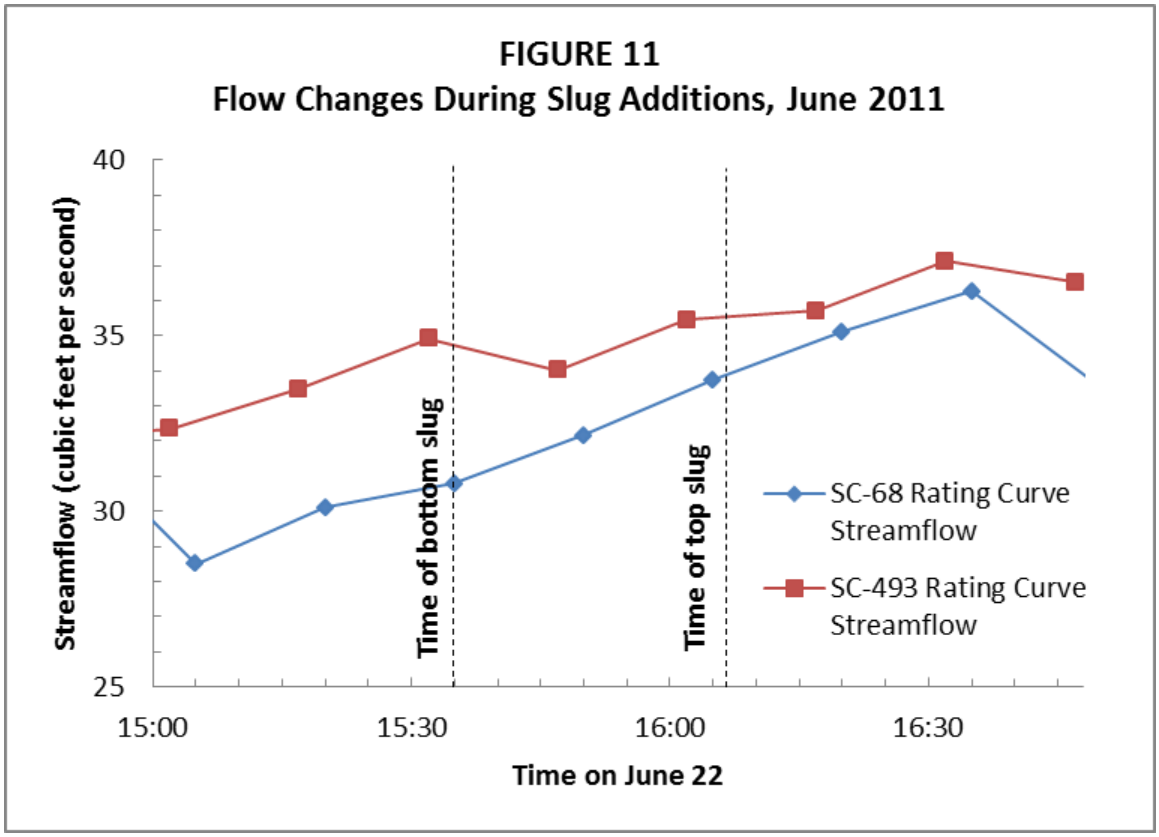


FIGURE 11
Flow Changes During Slug Additions, June 2011
Streamflow (cubic feet per second)
40
35
30
25
Time of bottom slug
Time of top slug
SC-68 Rating Curve Streamflow
SC-493 Rating Curve Streamflow
15:00
15:30
16:00
16:30
Time on June 22

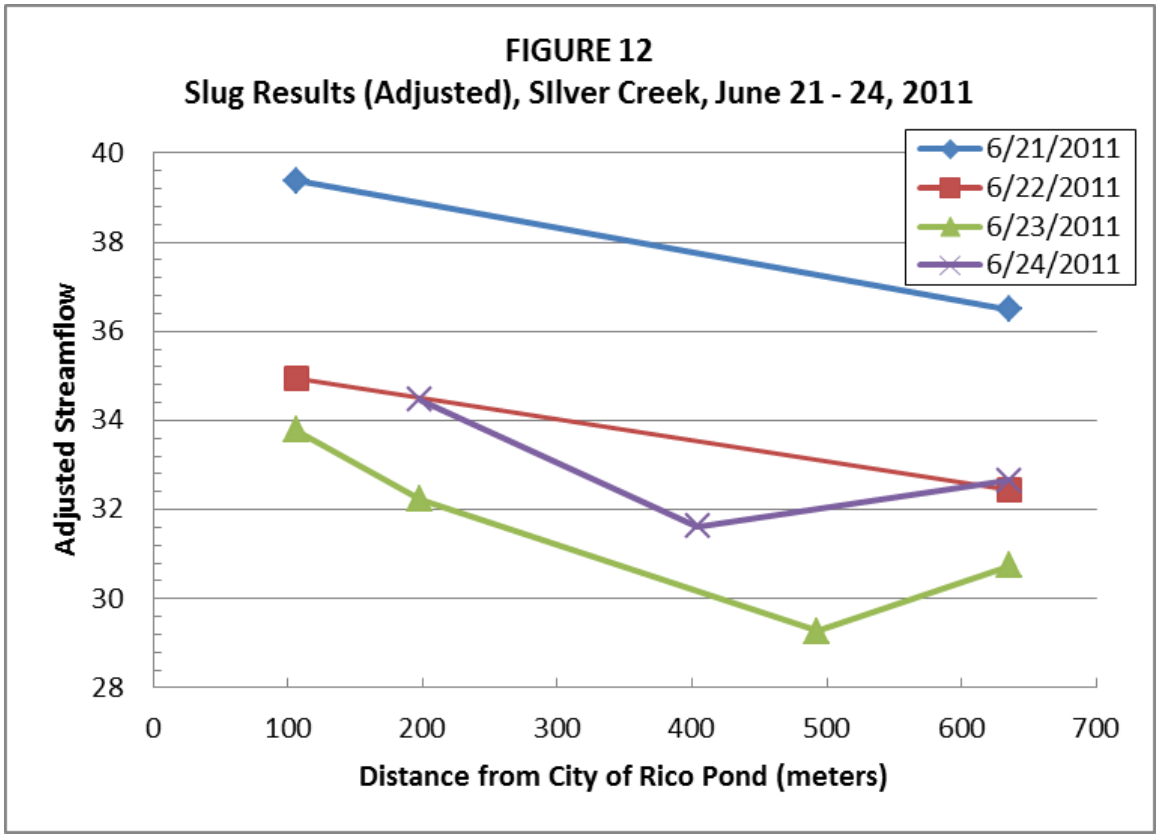


FIGURE 12
Slug Results (Adjusted), SIlver Creek, June 21 - 24, 2011
Adjusted Streamflow
40
38
36
34
32
30
28
0
100
200
300
400
500
600
700
Distance from City of Rico Pond (meters)
6/21/2011
6/22/2011
6/23/2011
6/24/2011

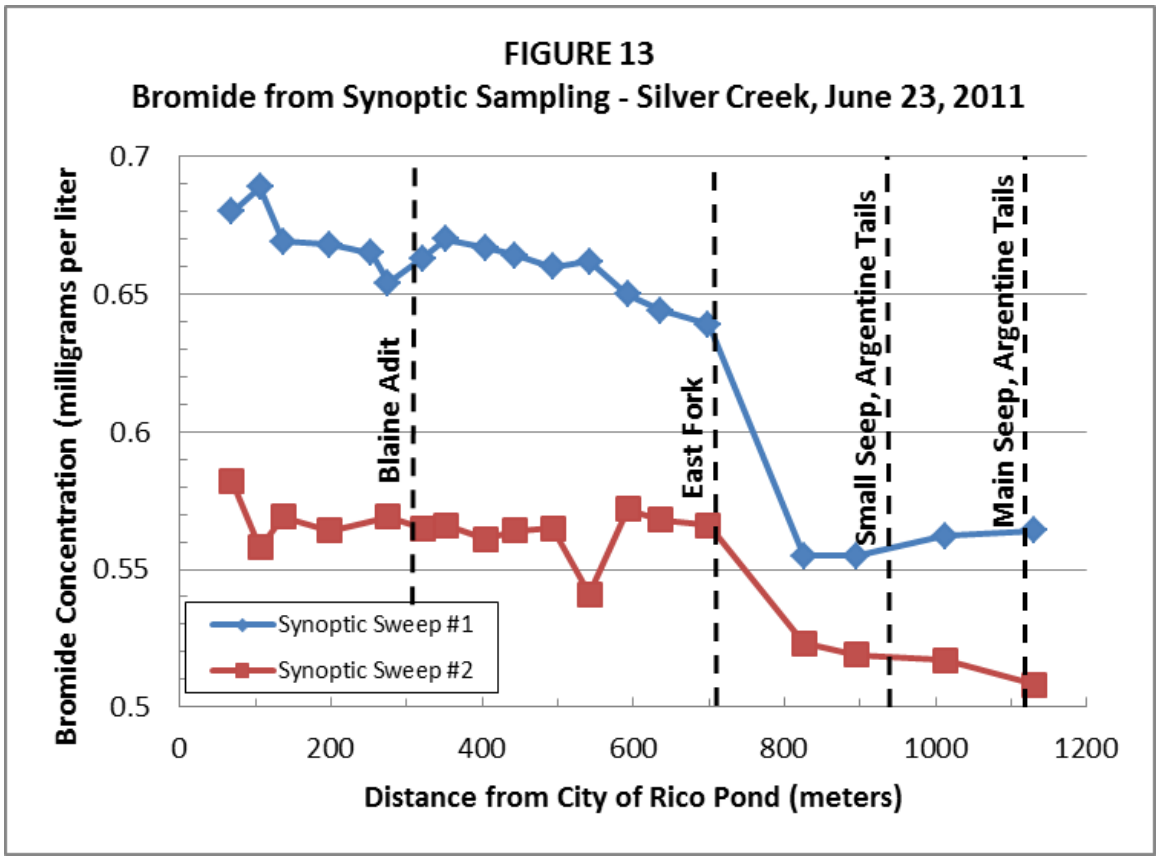


FIGURE 13
Bromide from Synoptic Sampling - Silver Creek, June 23, 2011
Bromide Concentration (milligrams per liter
0.7
0.65
0.6
0.55
0.5
0
200
400
600
800
1000
1200
Distance from City of Rico Pond (meters)
Blaine Adit
East Fork
Small Seep, Argentine Tails
Main Seep, Argentine Tails
Synoptic Sweep #1
Synoptic Sweep #2

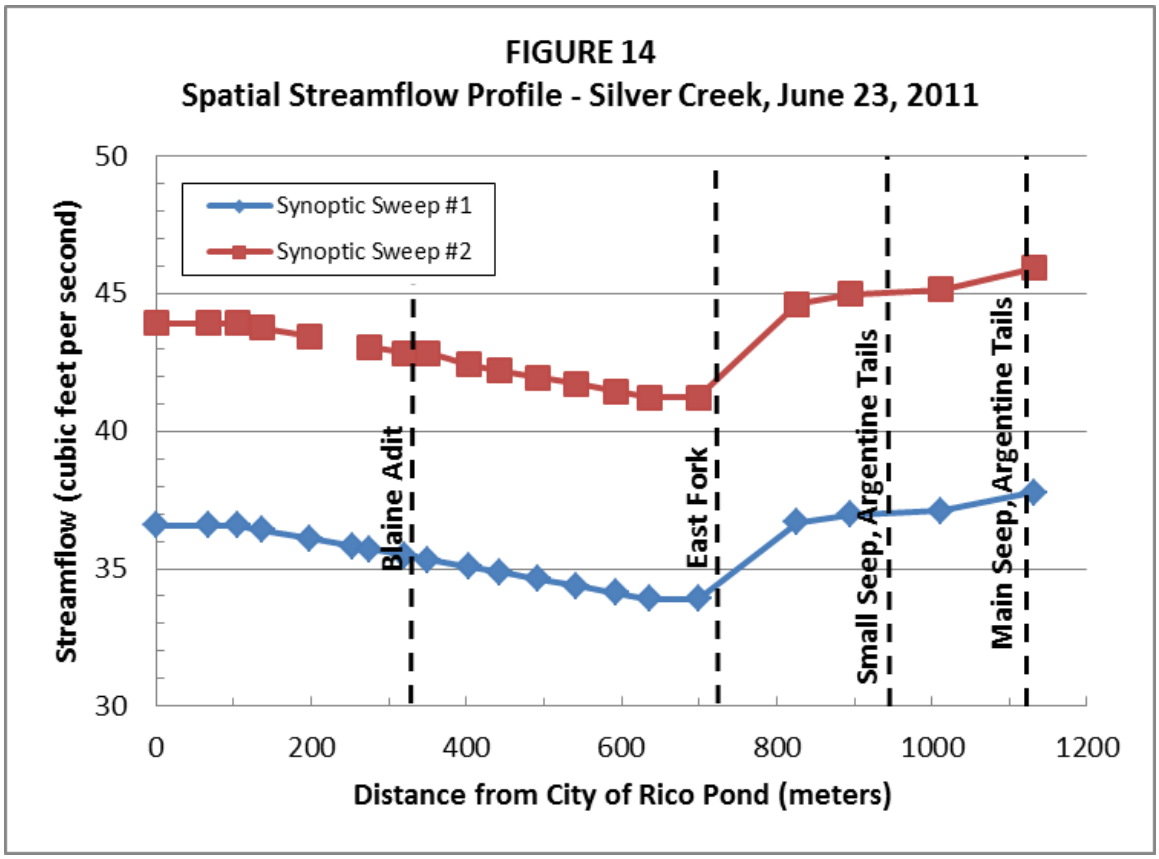


FIGURE 14
Spatial Streamflow Profile - Silver Creek, June 23, 2011
Synoptic Sweep #1
Synoptic Sweep #2
Streamflow (cubic feet per second)
50
45
40
35
30
0
200
400
600
800
1000
1200
Distance from City of Rico Pond (meters)
Blaine Adit
East Fork
Small Seep, Argentine Tails
Main Seep, Argentine Tails

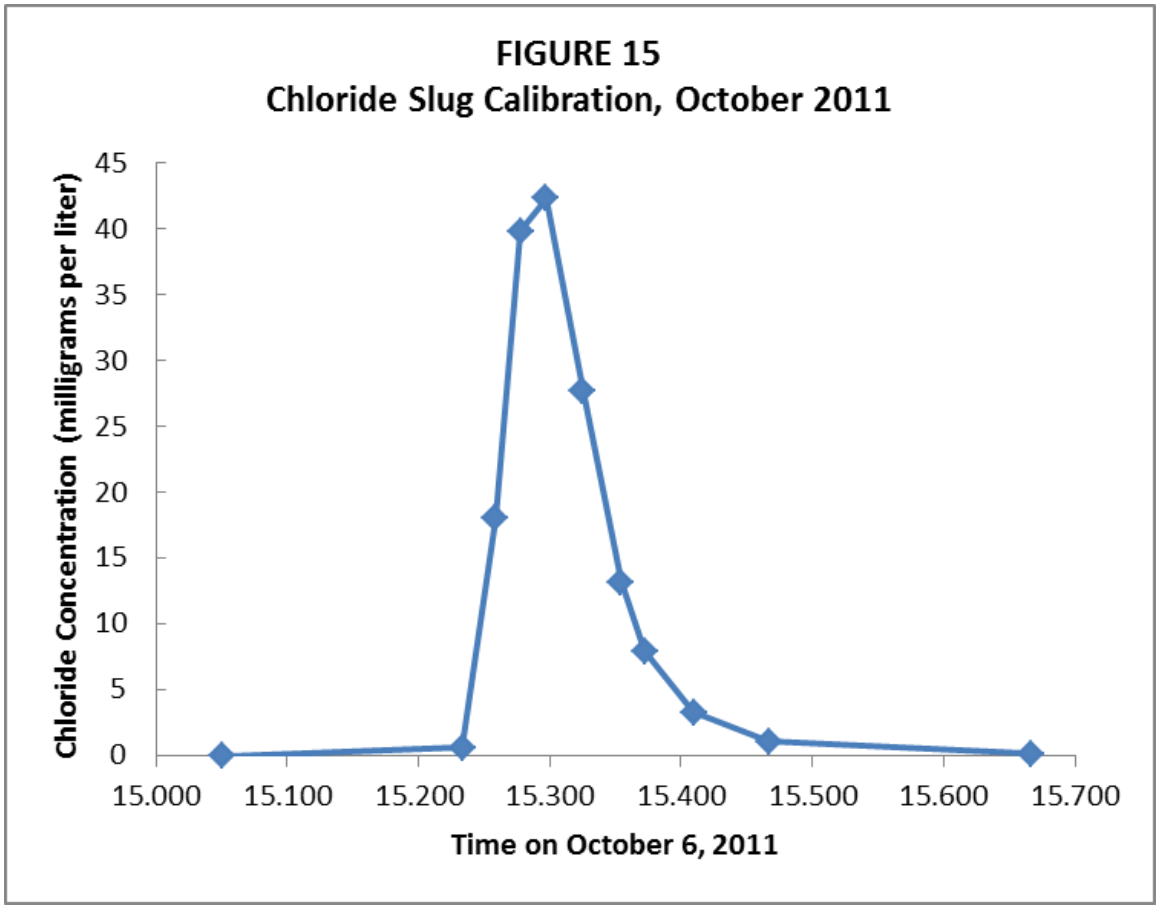


FIGURE 15
Chloride Slug Calibration, October 2011
Chloride Concentration (milligrams per liter)
45
40
35
30
25
20
15
10
5
0
15.000
15.100
15.200
15.300
15.400
15.500
15.600
15.700
Time on October 6, 2011

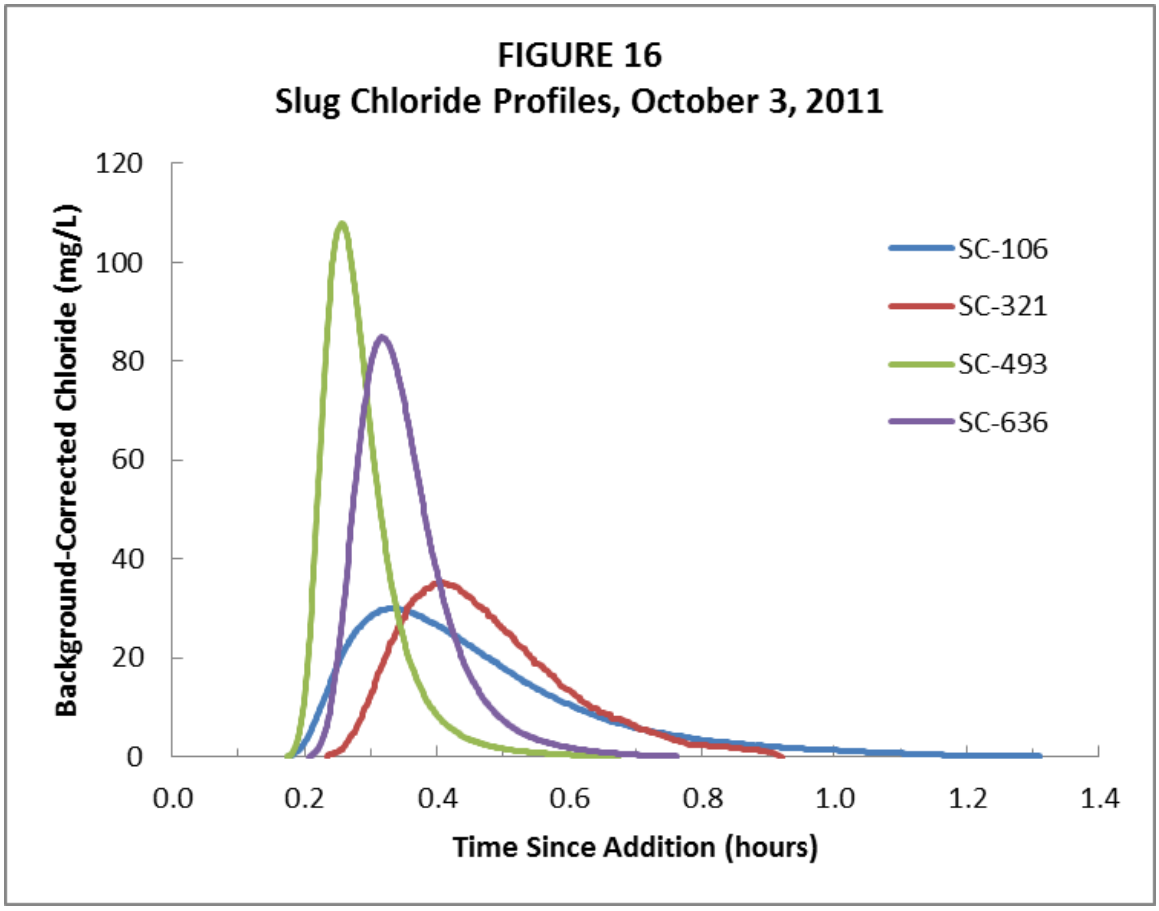


FIGURE 16
Slug Chloride Profiles, October 3, 2011
Background-Corrected Chloride (mg/L)
120
100
80
60
40
20
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Time Since Addition (hours)
SC-106
SC-321
SC-493
SC-636

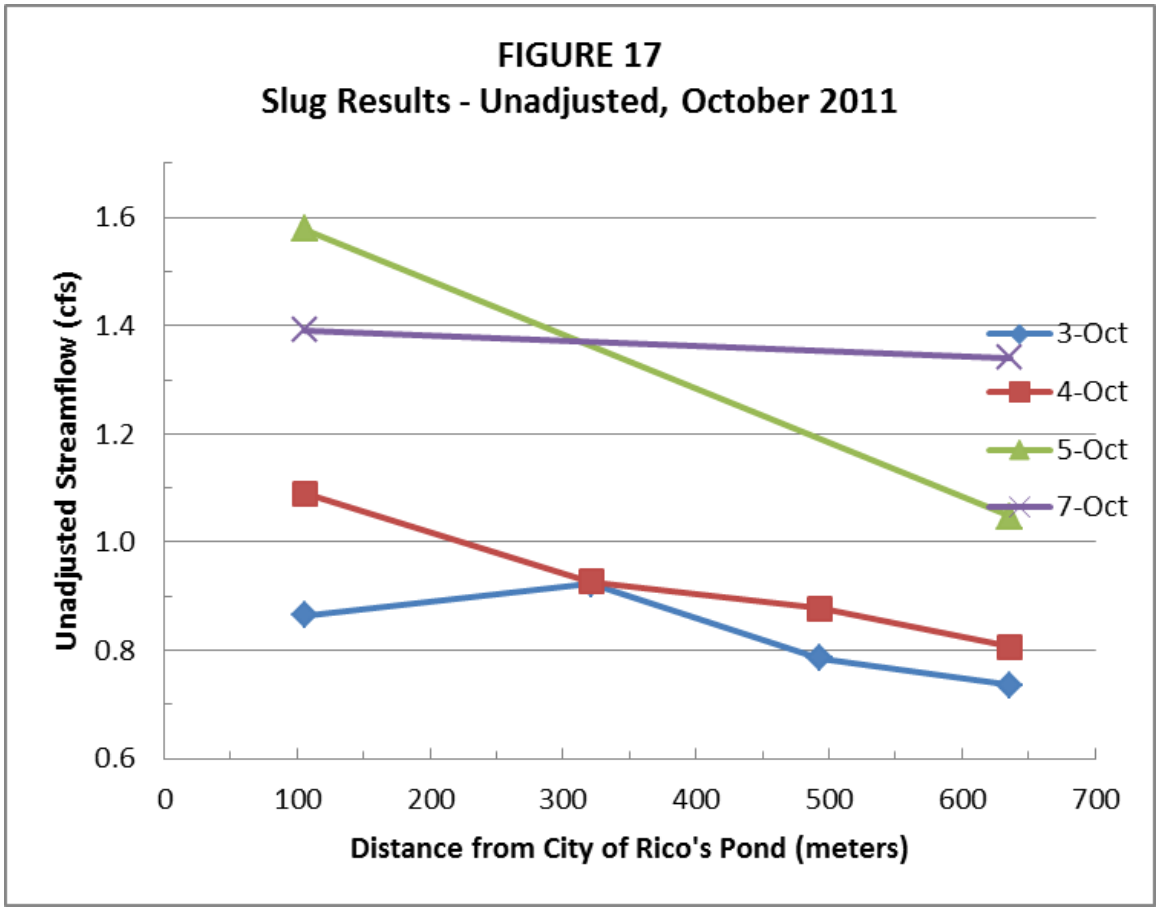


FIGURE 17
Slug Results - Unadjusted, October 2011
Unadjusted Streamflow (cfs)
1.6
1.4
1.2
1.0
0.8
0.6
0
100
200
300
400
500
600
700
Distance from City of Rico's Pond (meters)
3-Oct
4-Oct
5-Oct
7-Oct

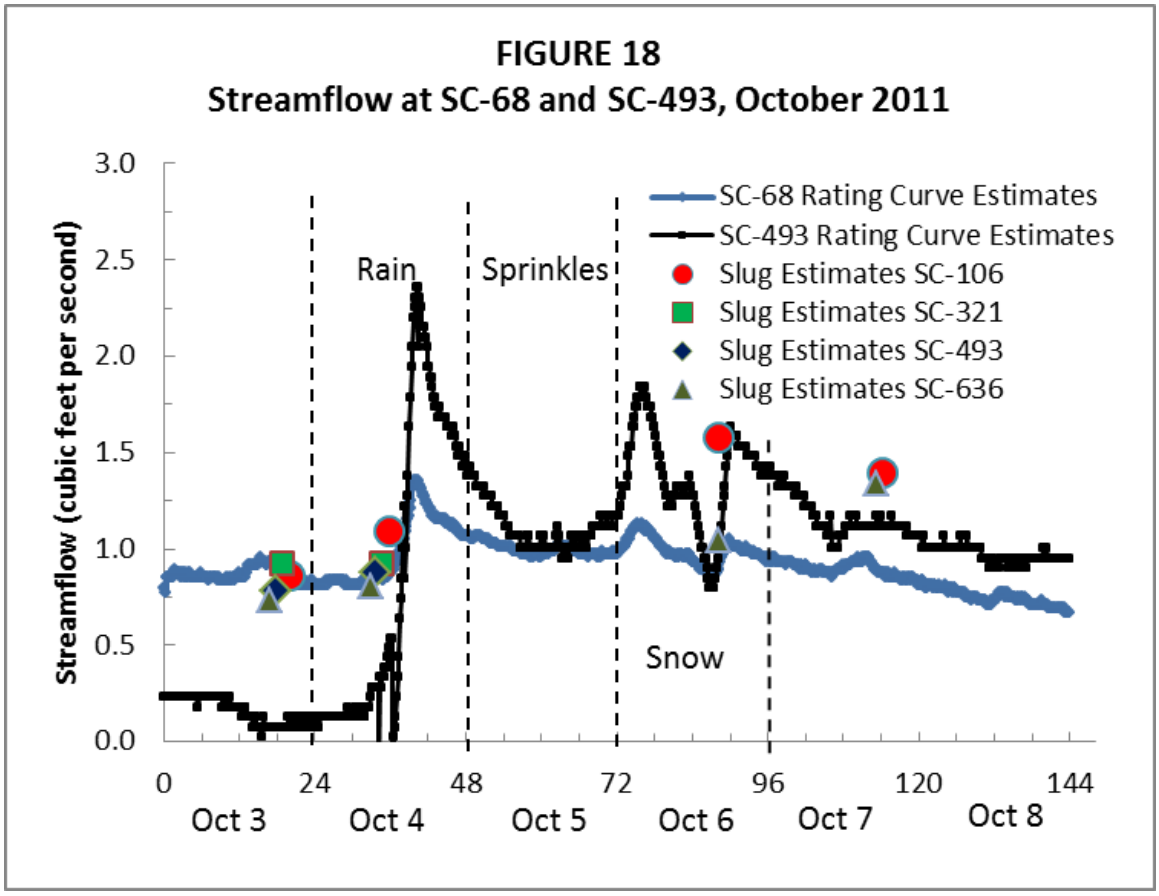


FIGURE 18
Streamflow at SC-68 and SC-493, October 2011
Streamflow (cubic feet per second)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Rain
Sprinkles
Snow
SC-68 Rating Curve Estimates
SC-493 Rating Curve Estimates
Slug Estimates SC-106
Slug Estimates SC-321
Slug Estimates SC-493
Slug Estimates SC-636
0
24
48
72
96
120
144
Oct 3
Oct 4
Oct 5
Oct 6
Oct 7
Oct 8

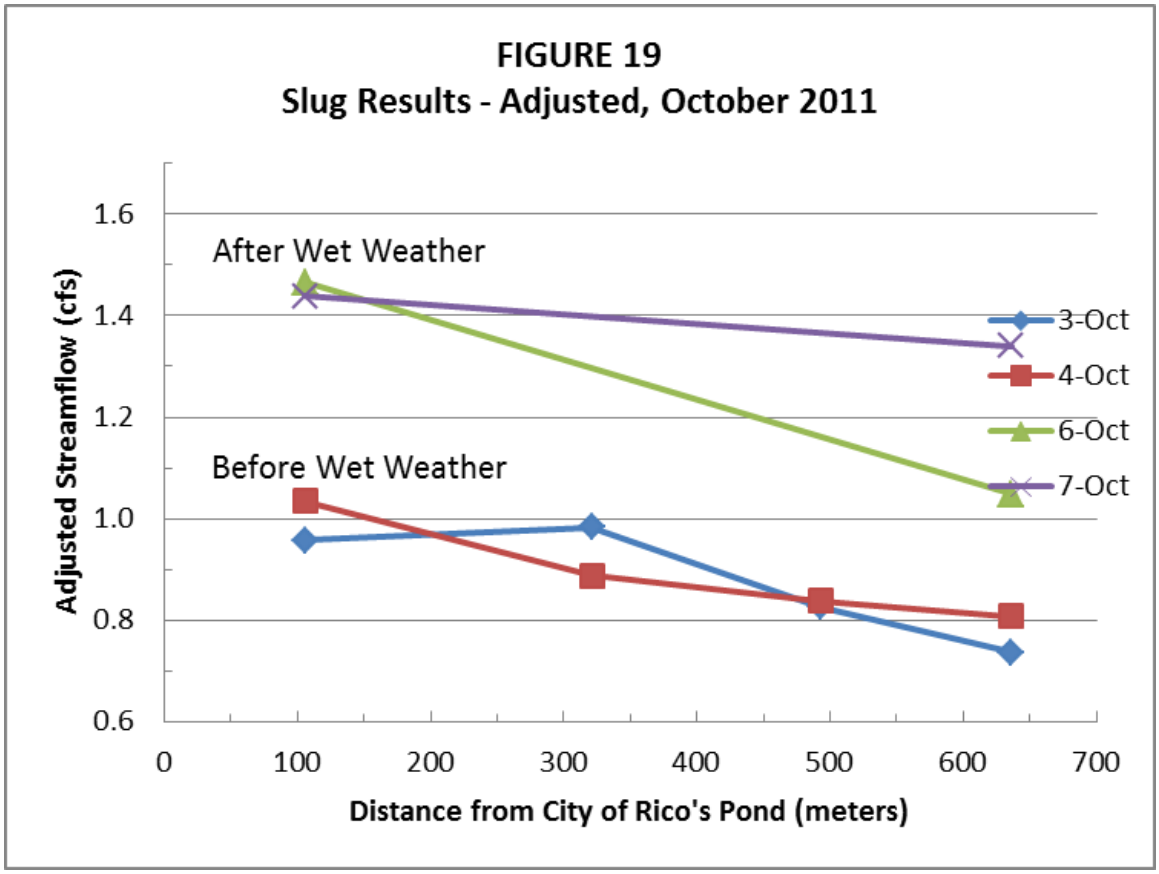


FIGURE 19
Slug Results - Adjusted, October 2011
Adjusted Streamflow (cfs)
1.6
1.4
1.2
1.0
0.8
0.6
After Wet Weather
Before Wet Weather
3-Oct
4-Oct
6-Oct
7-Oct
0
100
200
300
400
500
600
700
Distance from City of Rico's Pond (meters)

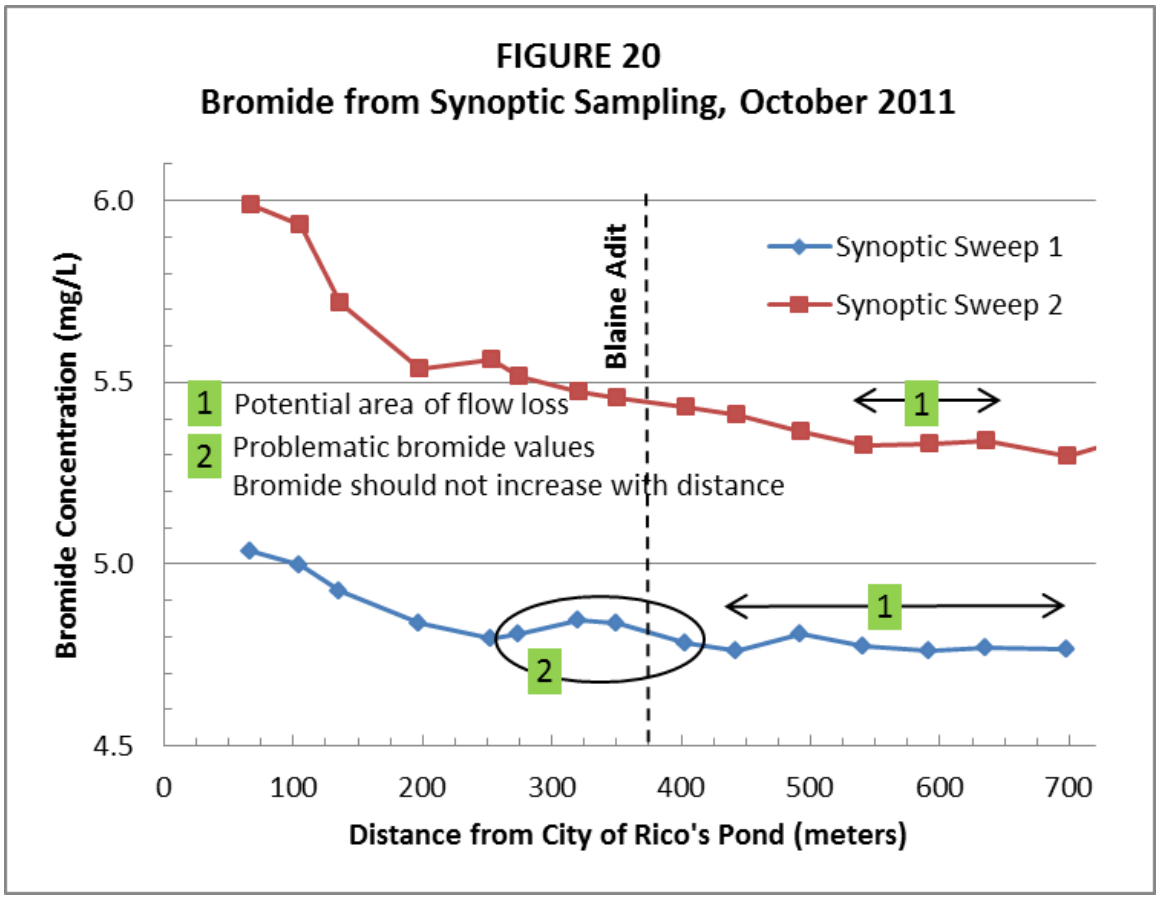


FIGURE 20
Bromide from Synoptic Sampling, October 2011
Bromide Concentration (mg/L)
6.0
5.5
5.0
4.5
0
100
200
300
400
500
600
700
Distance from City of Rico's Pond (meters)
Blaine Adit
Synoptic Sweep 1
Synoptic Sweep 2
1 Potential area of flow loss
2 Problematic bromide values
Bromide should not increase with distance
1
1
2

FIGURE 21

BLAINE LEVEL 2011 RECONNAISANCE MAP

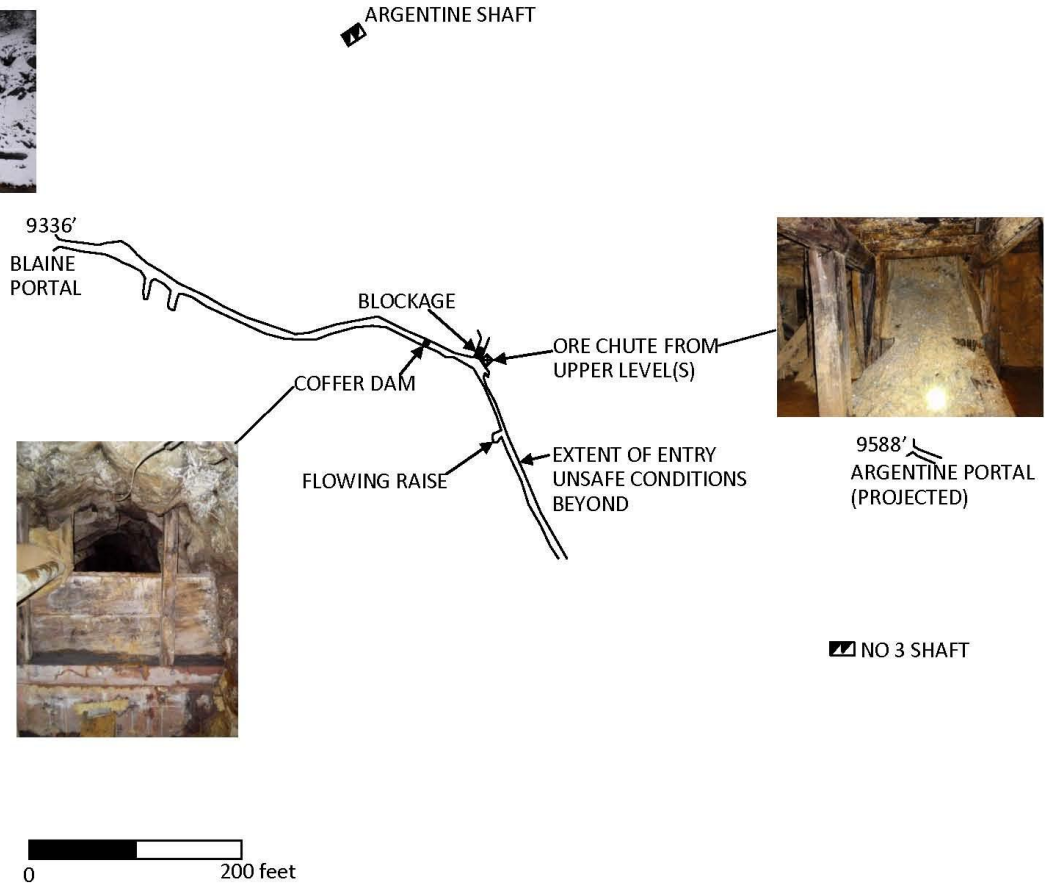
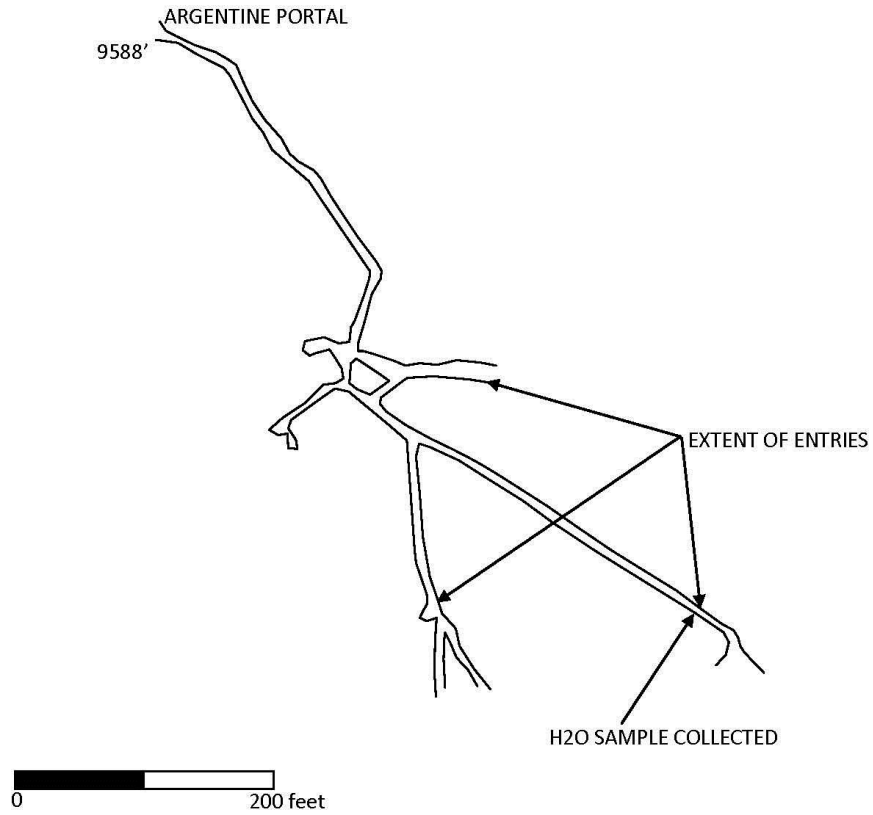


FIGURE 22

ARGENTINE TUNNEL 2011 RECONNAISANCE MAP



The Argentine Tunnel was entered once during June of 2011. Tunnel stability and ventilation was generally good. The extent of the entry was limited only by water depth and thick sediment/precipitate deposits. There is no discharge at the portal, but considerable pooled and flowing water in the tunnel. Re-entry in 2012 using chest waders, scaling bars, and other necessary equipment will allow tracking of the water to presumed discharge point(s) to the lower levels.

Figure 23
Tracer Breakthrough Curves
517 Shaft to St. Louis Tunnel

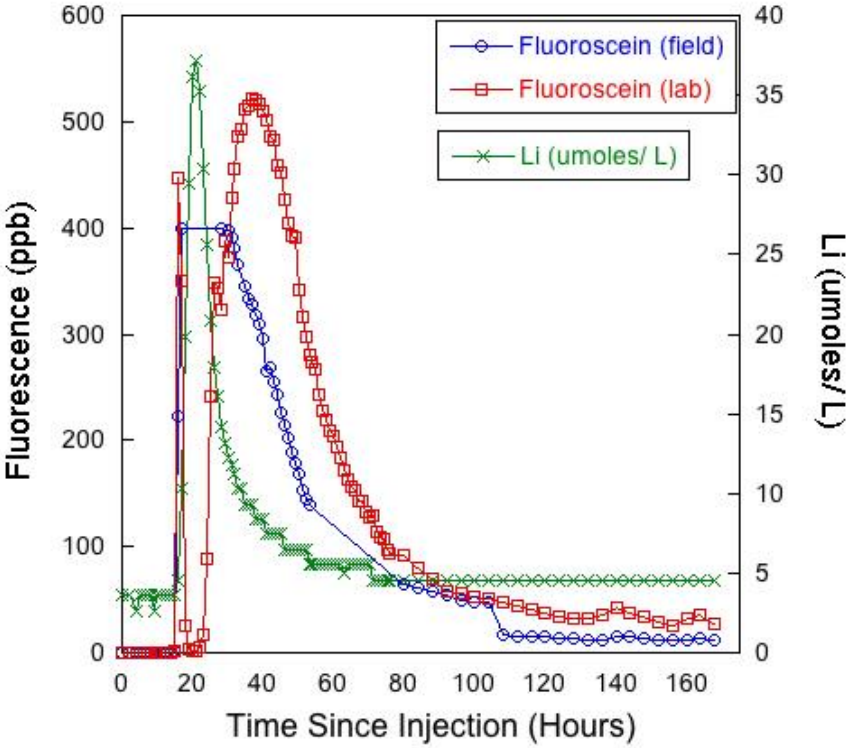


Figure 24
St. Louis Tunnel
Fluoroscein Concentration

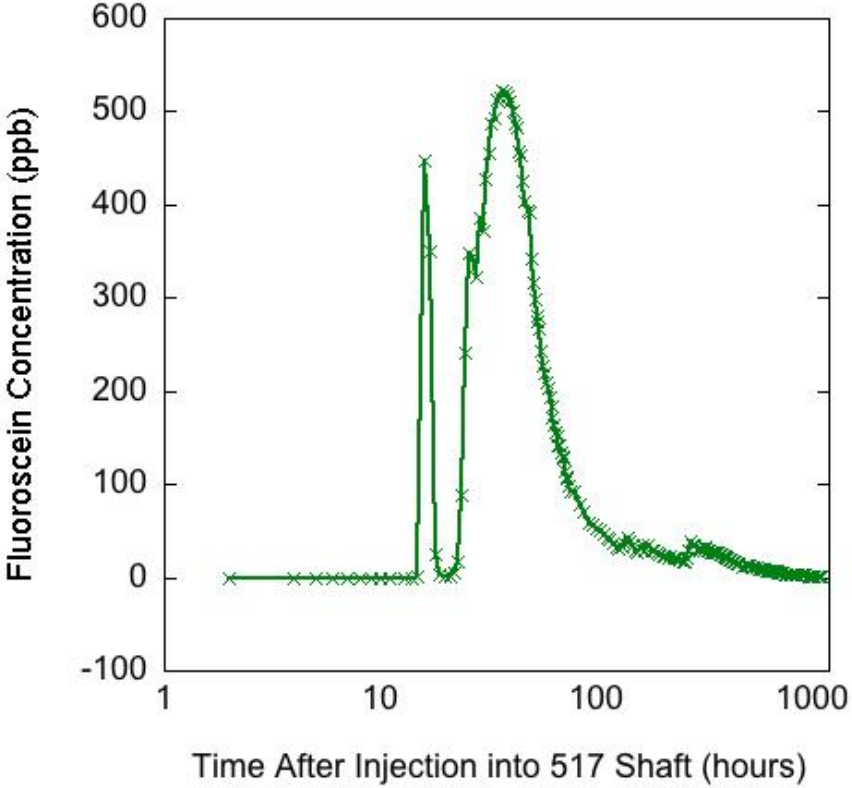


Figure 25

F^- and Cl^- in 517 Shaft After Blaine Injection

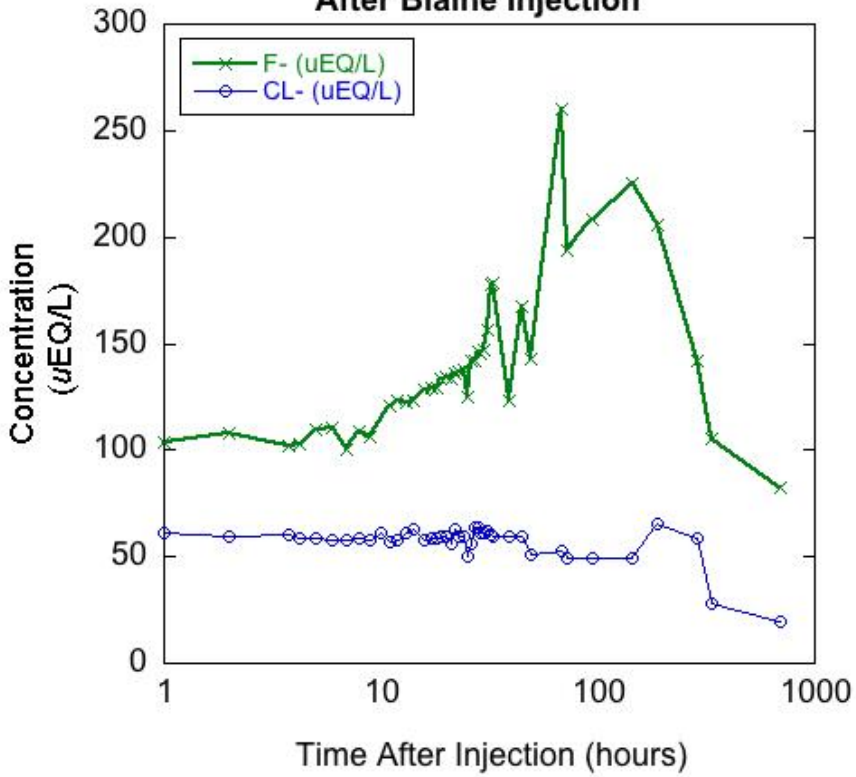
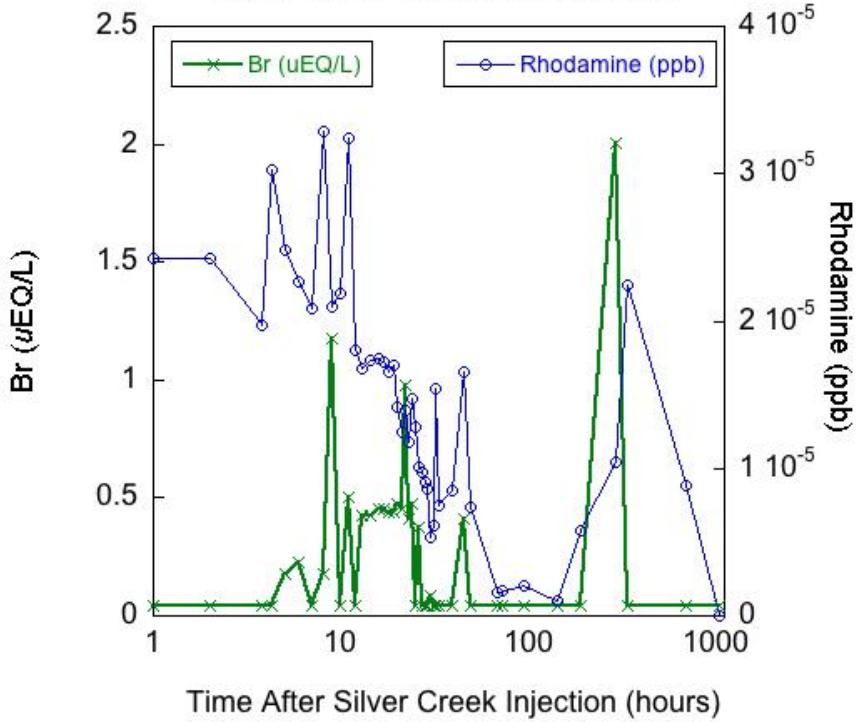


Figure 26

Silver Creek Tracers in 517 Shaft



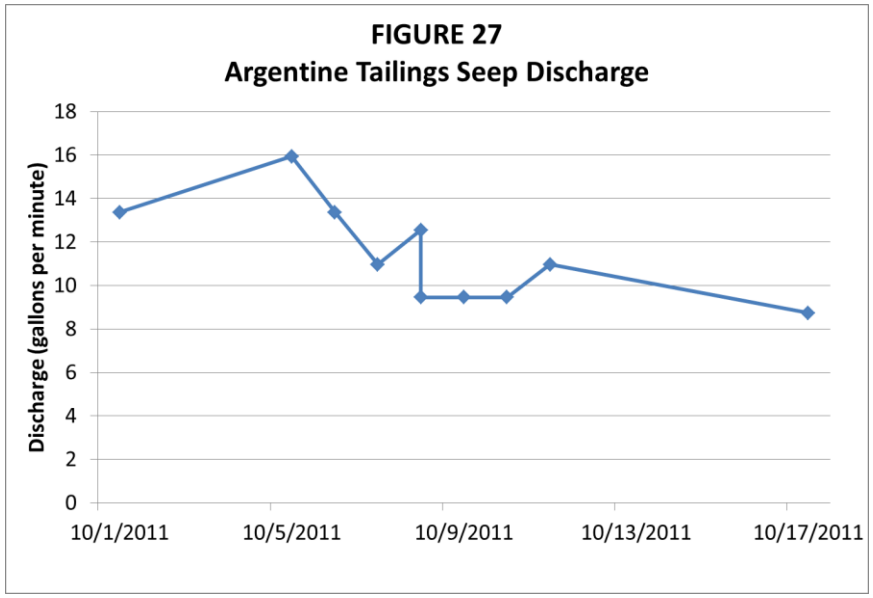


FIGURE 27
Argentine Tailings Seep Discharge
Discharge (gallons per minute)
18
16
14
12
10
8
6
4
2
0
10/1/2011
10/5/2011
10/9/2011
10/13/2011
10/17/2011

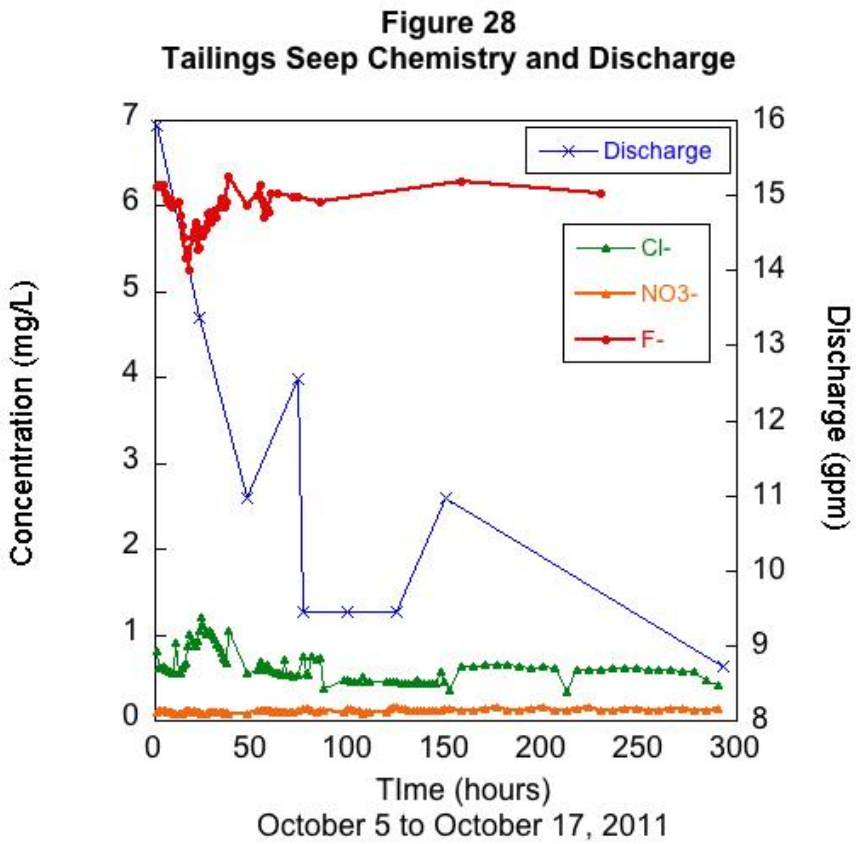
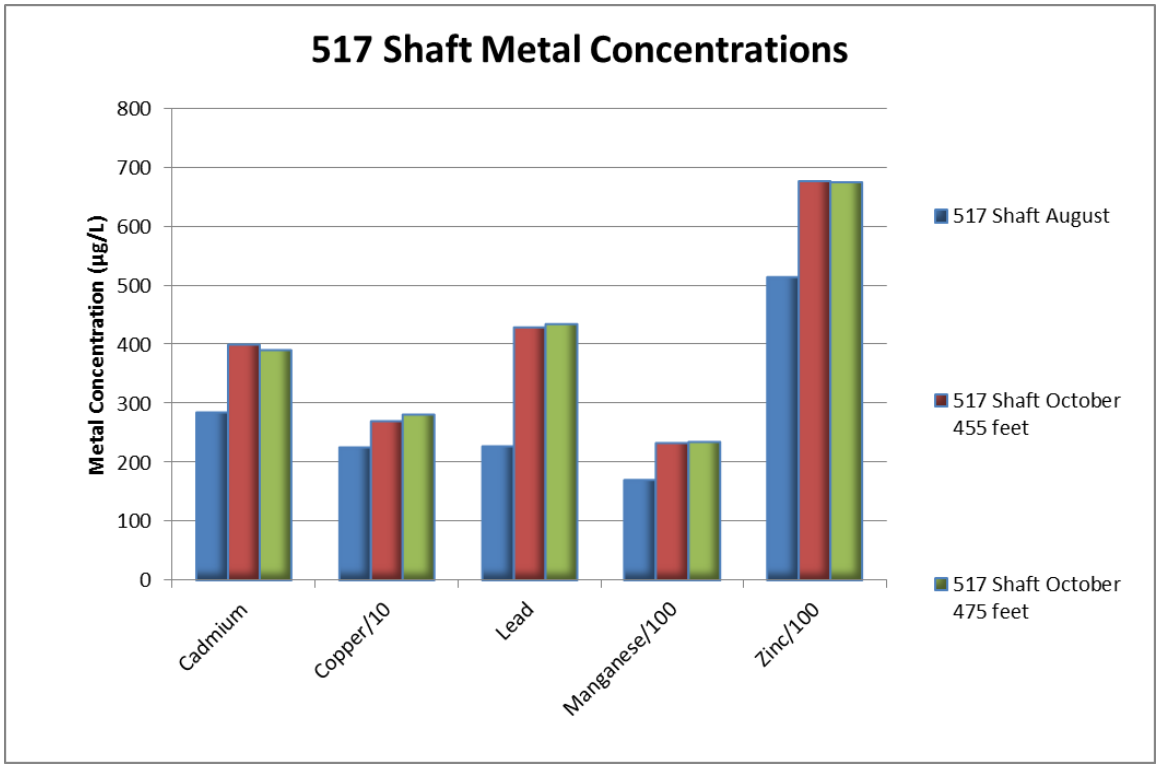


Figure 28
Tailings Seep Chemistry and Discharge
Discharge
Cl-
NO3-
F-
Concentration (mg/L)
Discharge (gpm)
7
6
5
4
3
2
1
0
16
15
14
13
12
11
10
9
8
0
50
100
150
200
250
300
TIme (hours)
October 5 to October 17, 2011

FIGURE 29
Mine Metal Concentrations



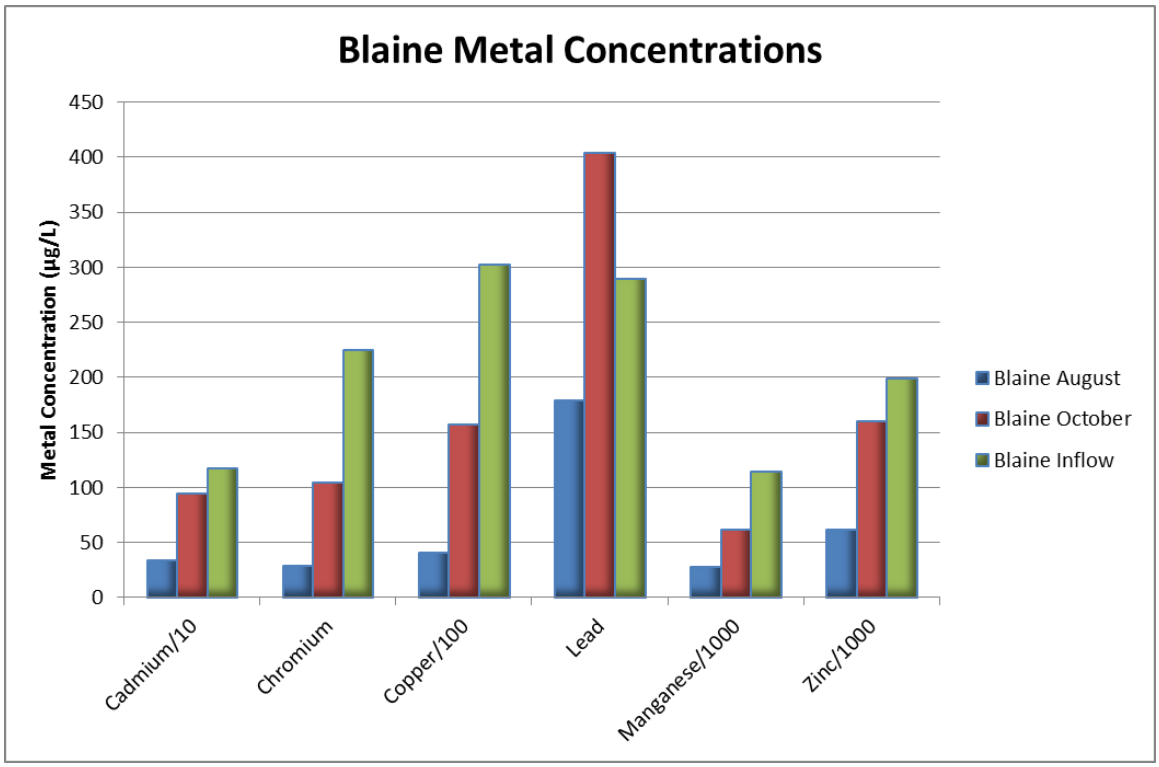


Figure 30
Silver Creek Chemistry and Discharge
October 5 to October 9, 2011

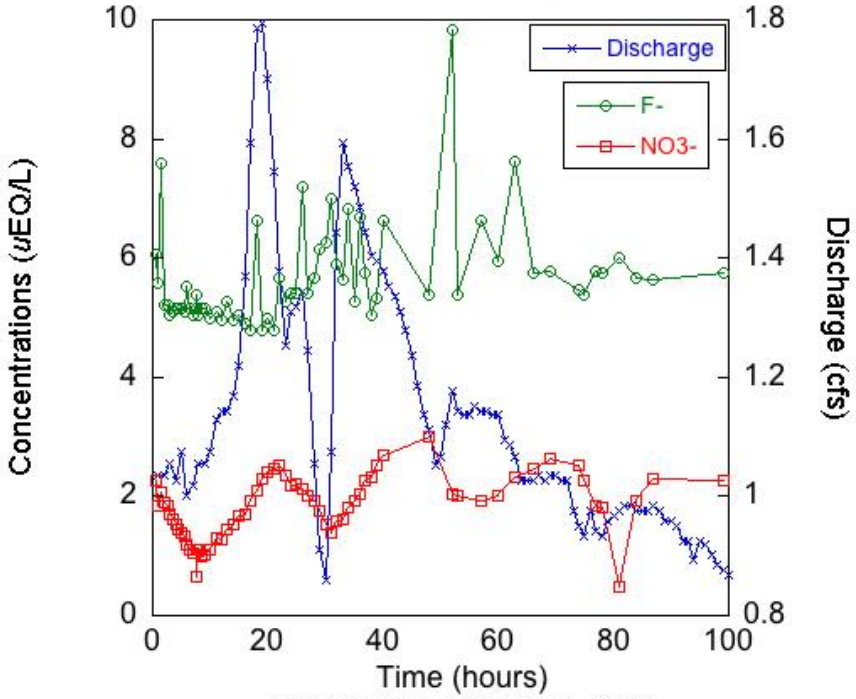


Figure 31
Fluoride (F^-) Concentrations
at Silver Creek 493

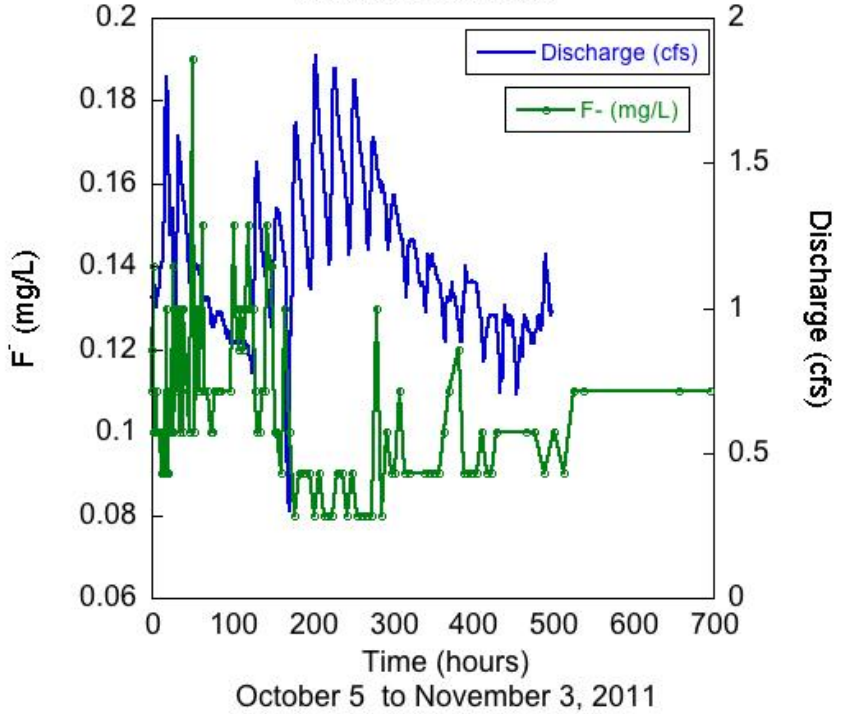
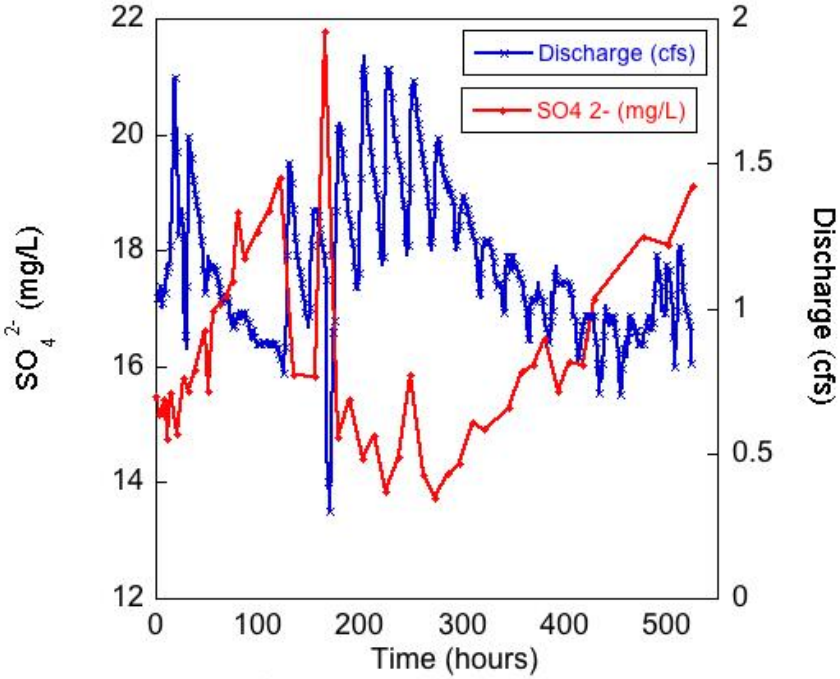


Figure 32

Sulfate (SO_4^{2-}) Concentrations

at Silver Creek 493



October 5 to October 27, 2011

Figure 33

Silver Creek Sulfate (SO_4^{2-}) Concentrations

June and October

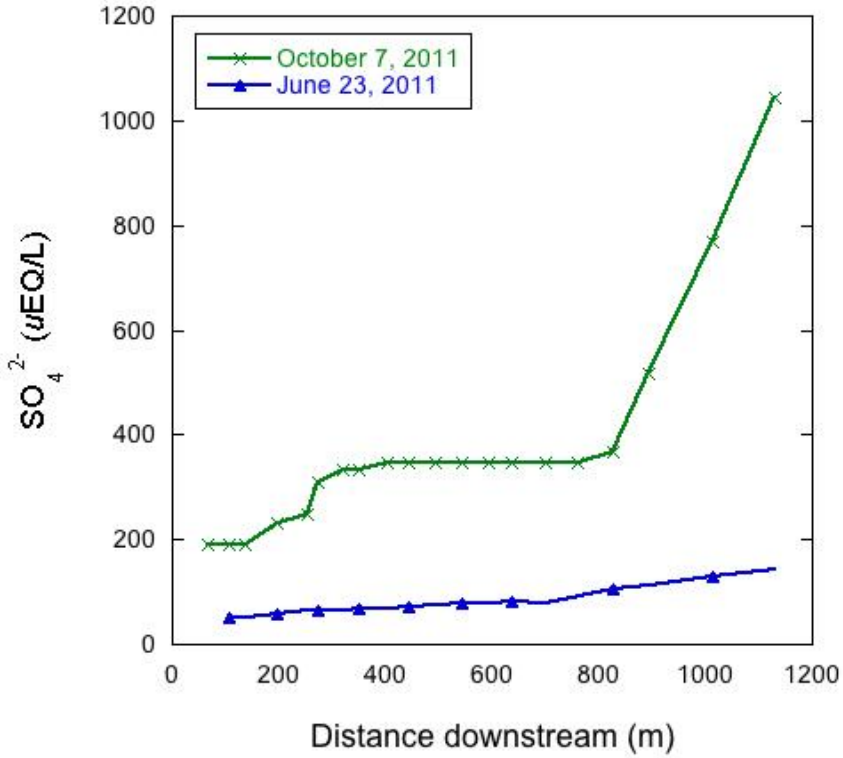


Figure 34
Silver Creek Sulfate Concentrations

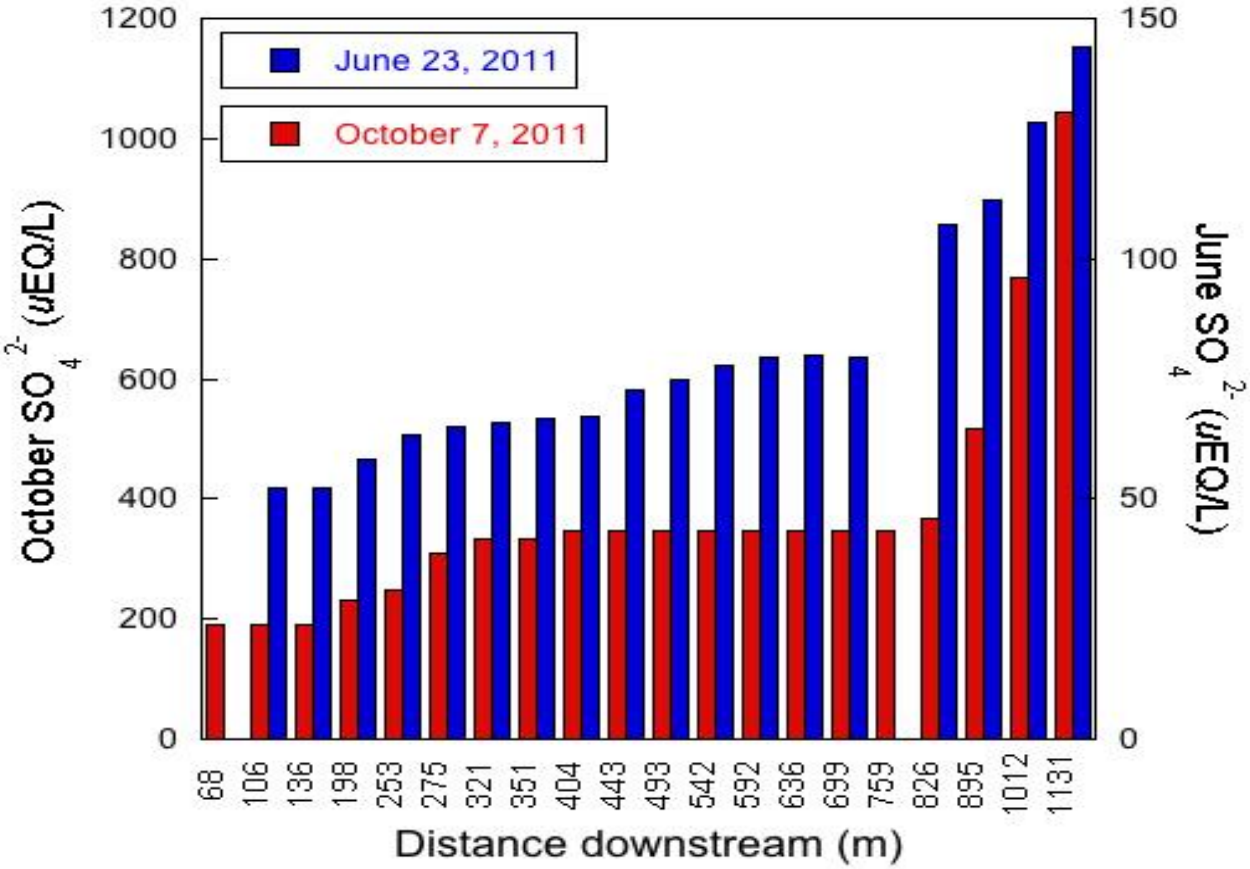
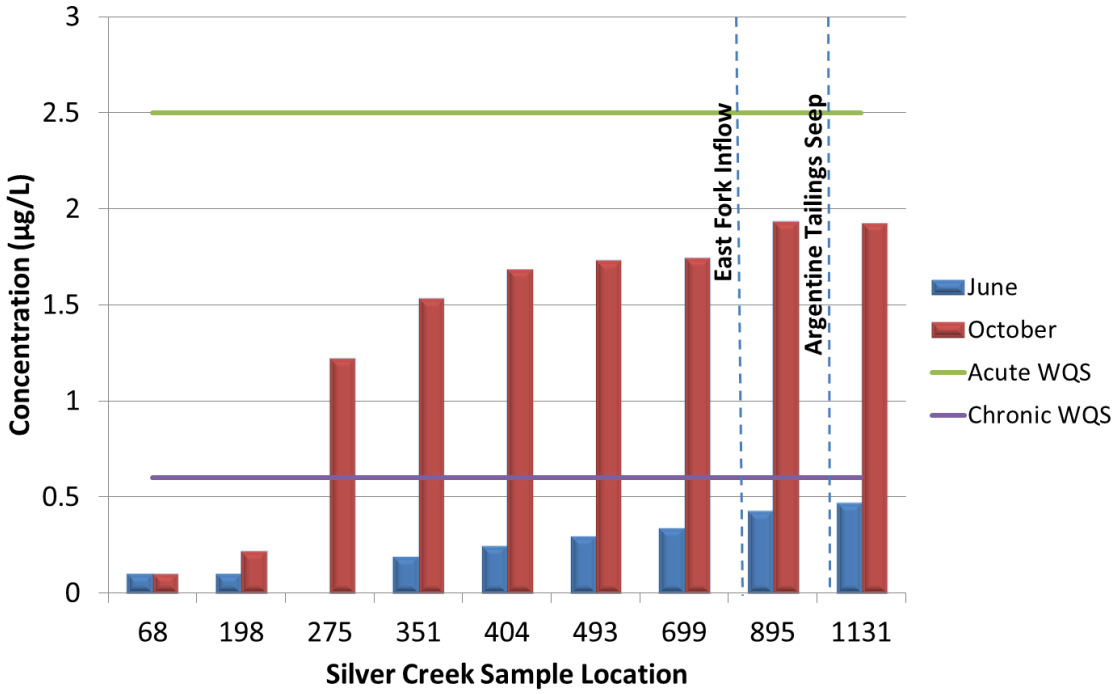


FIGURE 35
Dissolved Cadmium Concentrations along Silver Creek



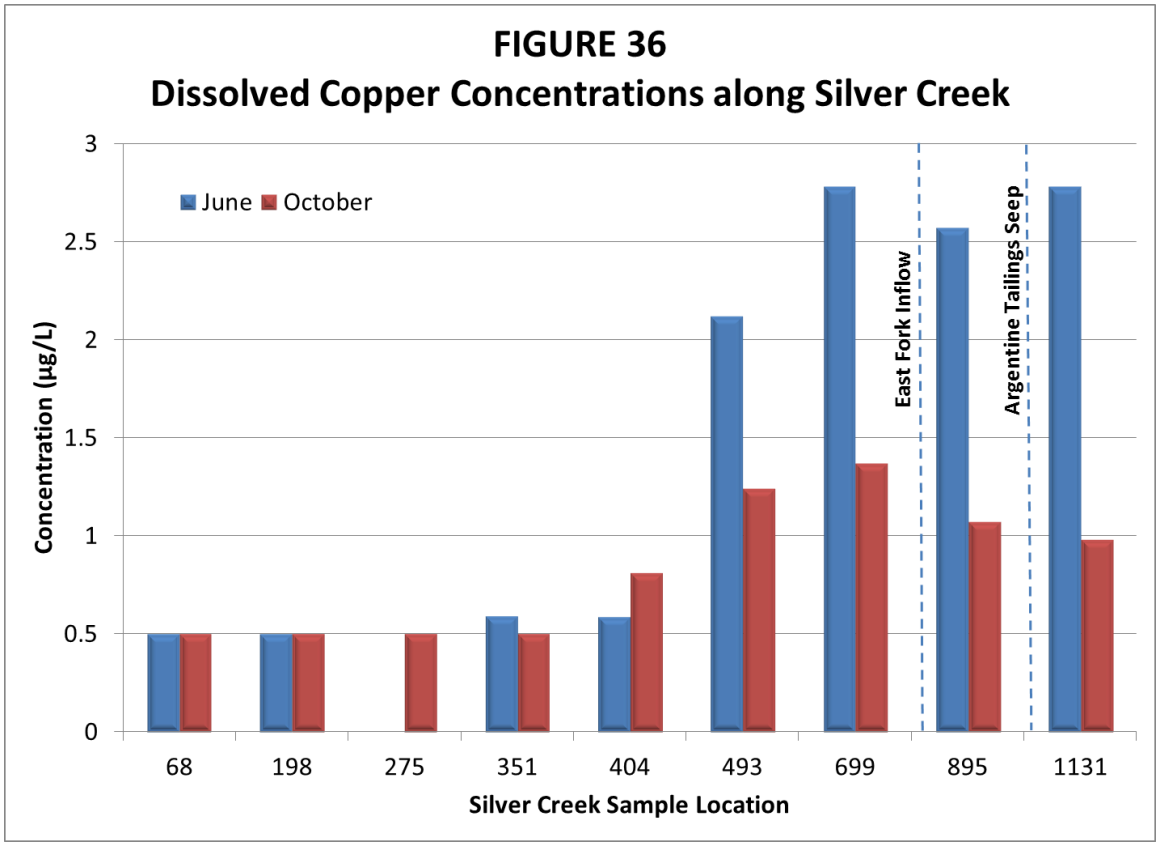


FIGURE 36
Dissolved Copper Concentrations along Silver Creek
June
October
Concentration (µg/L)
3
2.5
2
1.5
1
0.5
0
East Fork Inflow
Argentine Tailings Seep
68
198
275
351
404
493
699
895
1131
Silver Creek Sample Location

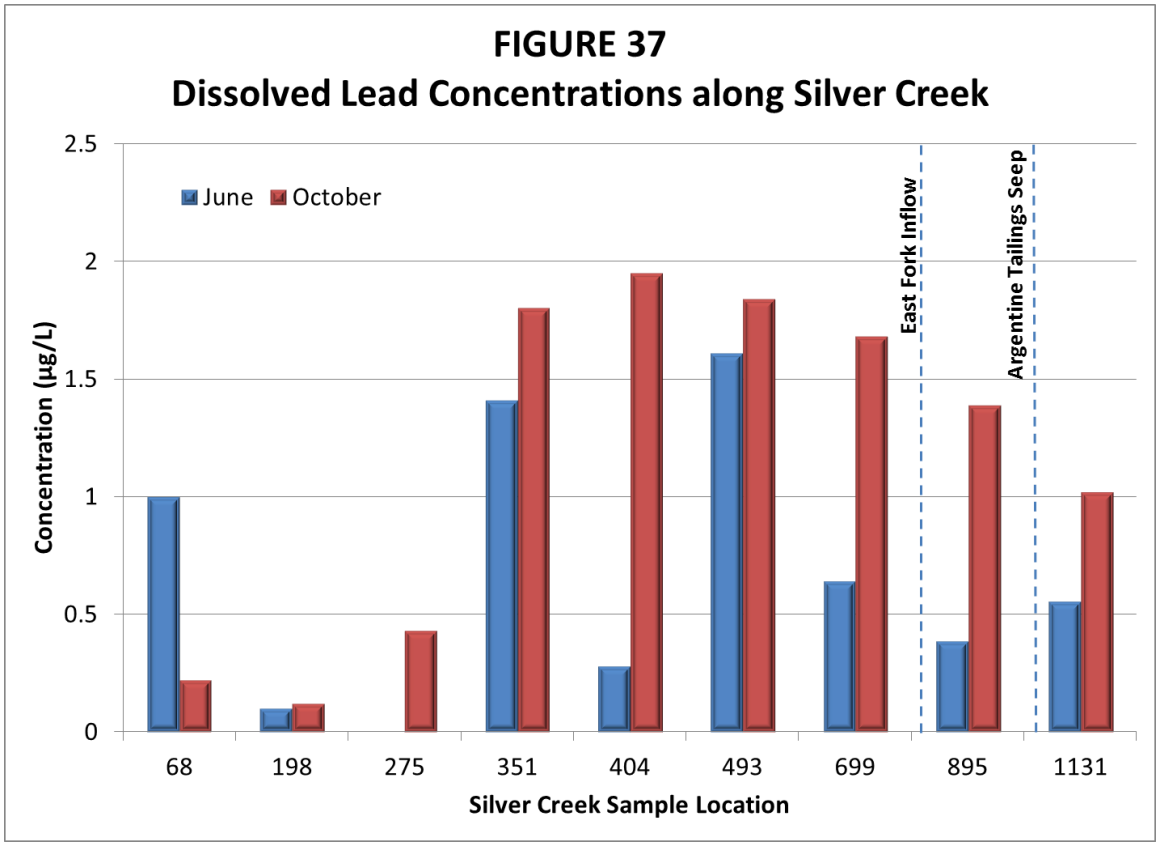


FIGURE 37
Dissolved Lead Concentrations along Silver Creek
June
October
Concentration (µg/L)
2.5
2
1.5
1
0.5
0
East Fork Inflow
Argentine Tailings Seep
68
198
275
351
404
493
699
895
1131
Silver Creek Sample Location

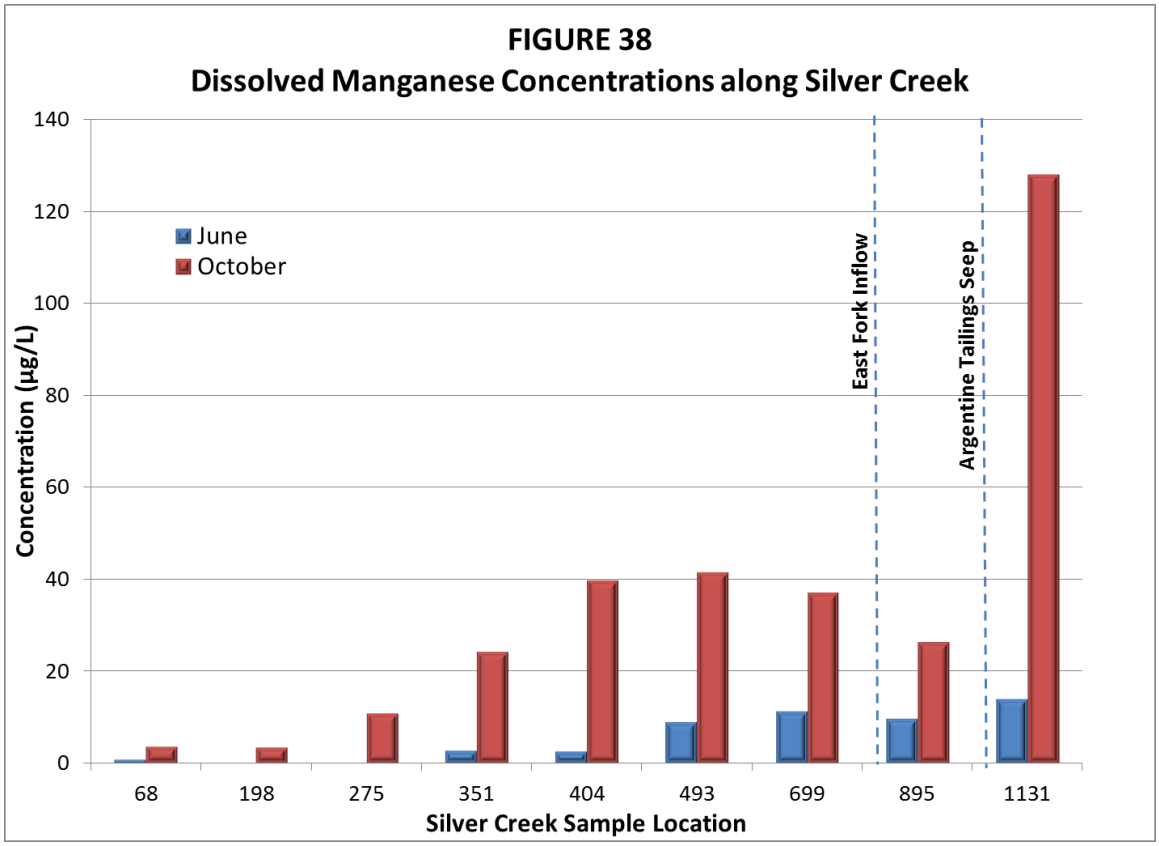


FIGURE 38
Dissolved Manganese Concentrations along Silver Creek
Concentration (µg/L)
140
120
100
80
60
40
20
0
June
October
East Fork Inflow
Argentine Tailings Seep
68
198
275
351
404
493
699
895
1131
Silver Creek Sample Location

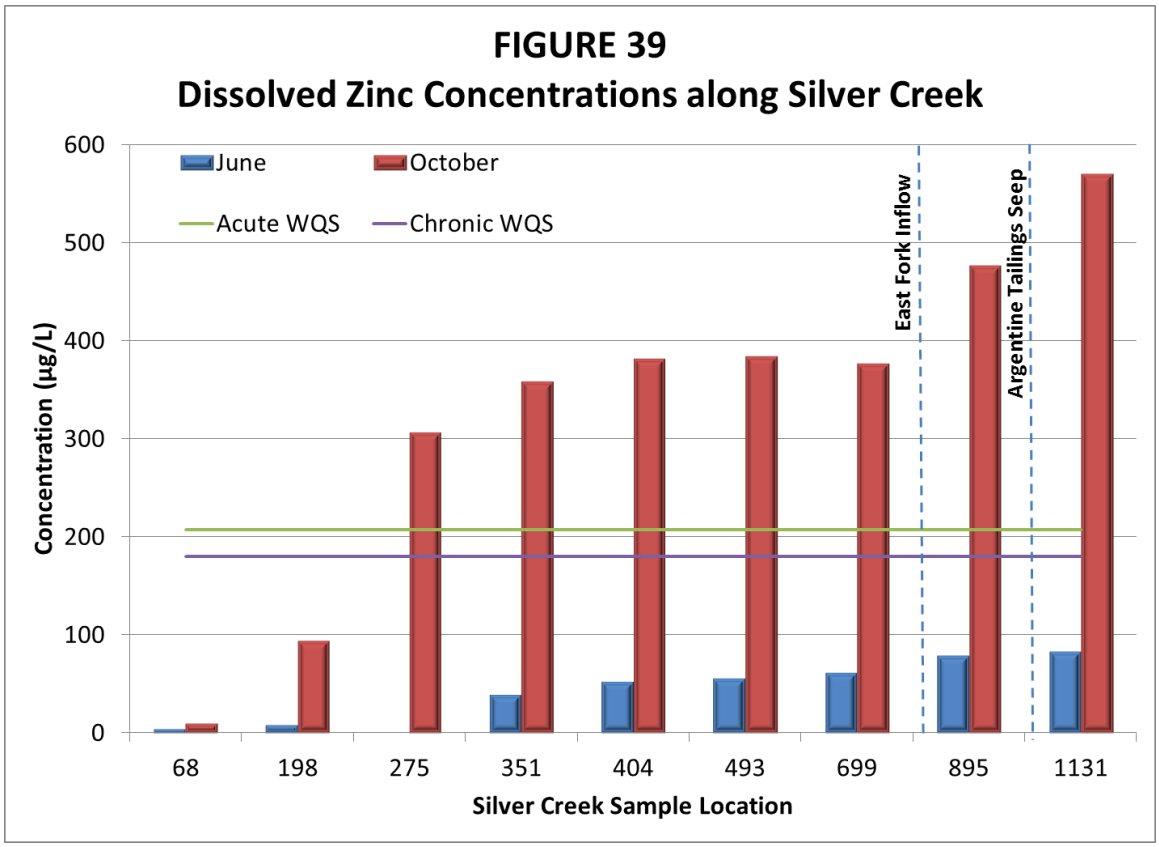


FIGURE 39
Dissolved Zinc Concentrations along Silver Creek
Concentration (µg/L)
600
500
400
300
200
100
0
June
October
Acute WQS
Chronic WQS
East Fork Inflow
Argentine Tailings Seep
68
198
275
351
404
493
699
895
1131
Silver Creek Sample Location

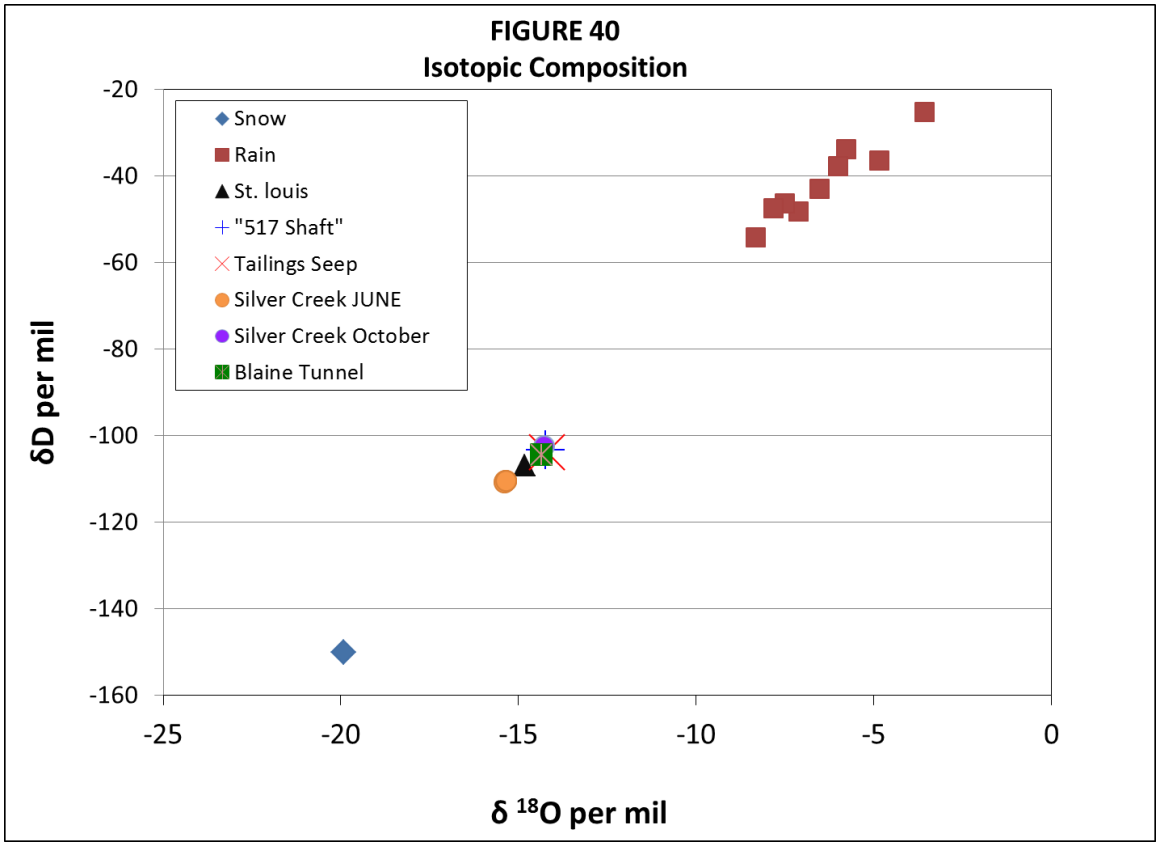


FIGURE 40
Isotopic Composition
Snow
Rain
St. louis
"517 Shaft"
Tailings Seep
Silver Creek JUNE
Silver Creek October
Blaine Tunnel
δD per mil
δ 18O per mil
-20
-40
-60
-80
-100
-120
-140
-160
-25
-20
-15
-10
-5
0

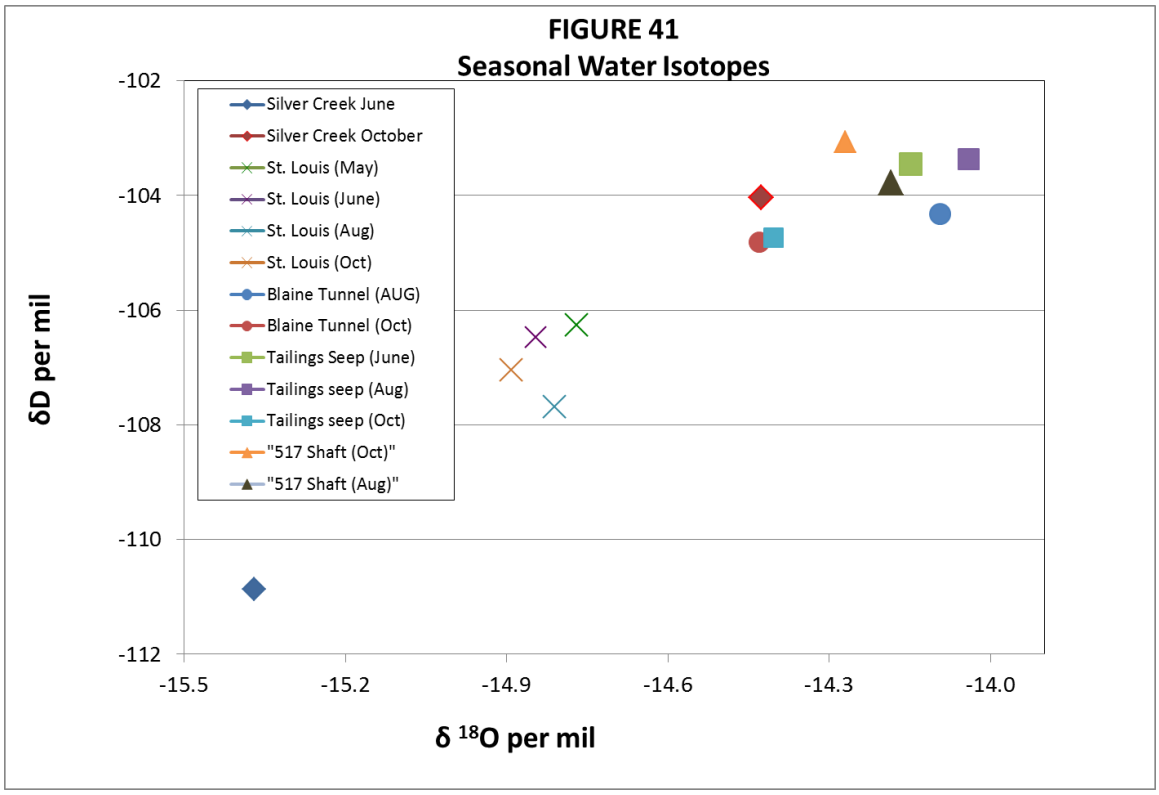


FIGURE 41
Seasonal Water Isotopes
Silver Creek June
Silver Creek October
St. Louis (May)
St. Louis (June)
St. Louis (Aug)
St. Louis (Oct)
Blaine Tunnel (AUG)
Blaine Tunnel (Oct)
Tailings Seep (June)
Tailings seep (Aug)
Tailings seep (Oct)
"517 Shaft (Oct)"
"517 Shaft (Aug)"
δD per mil
δ 18O per mil
-102
-104
-106
-108
-110
-112
-15.5
-15.2
-14.9
-14.6
-14.3
-14.0

Figure 42

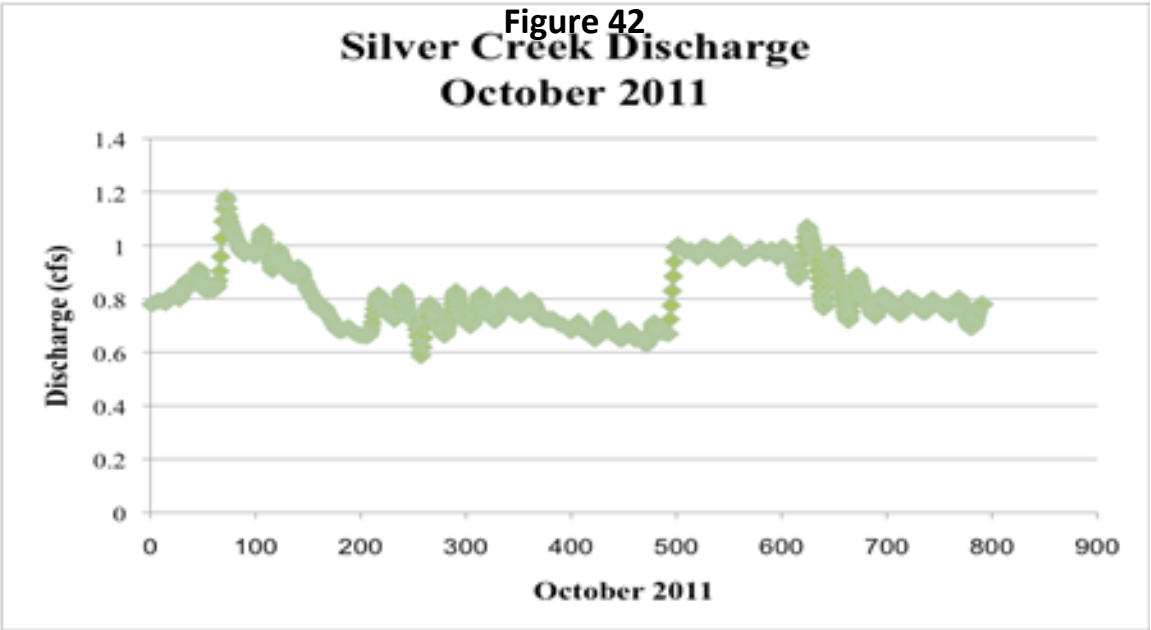
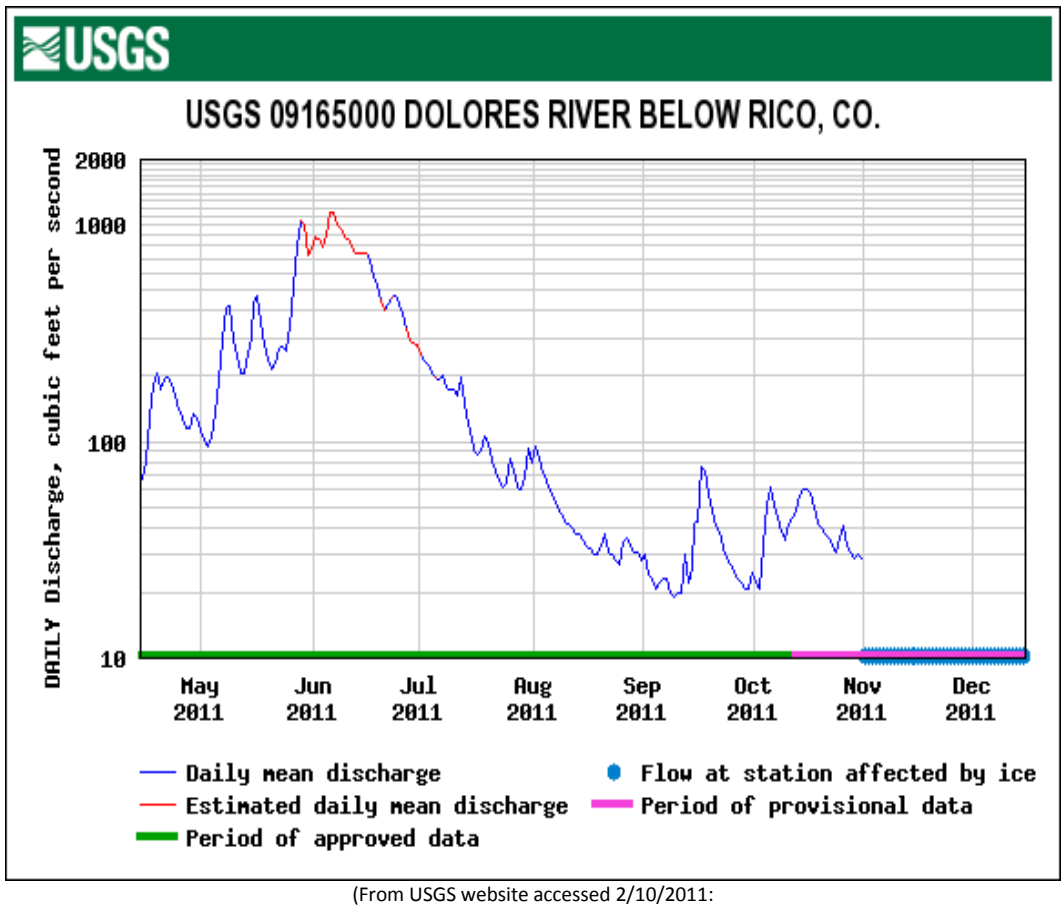
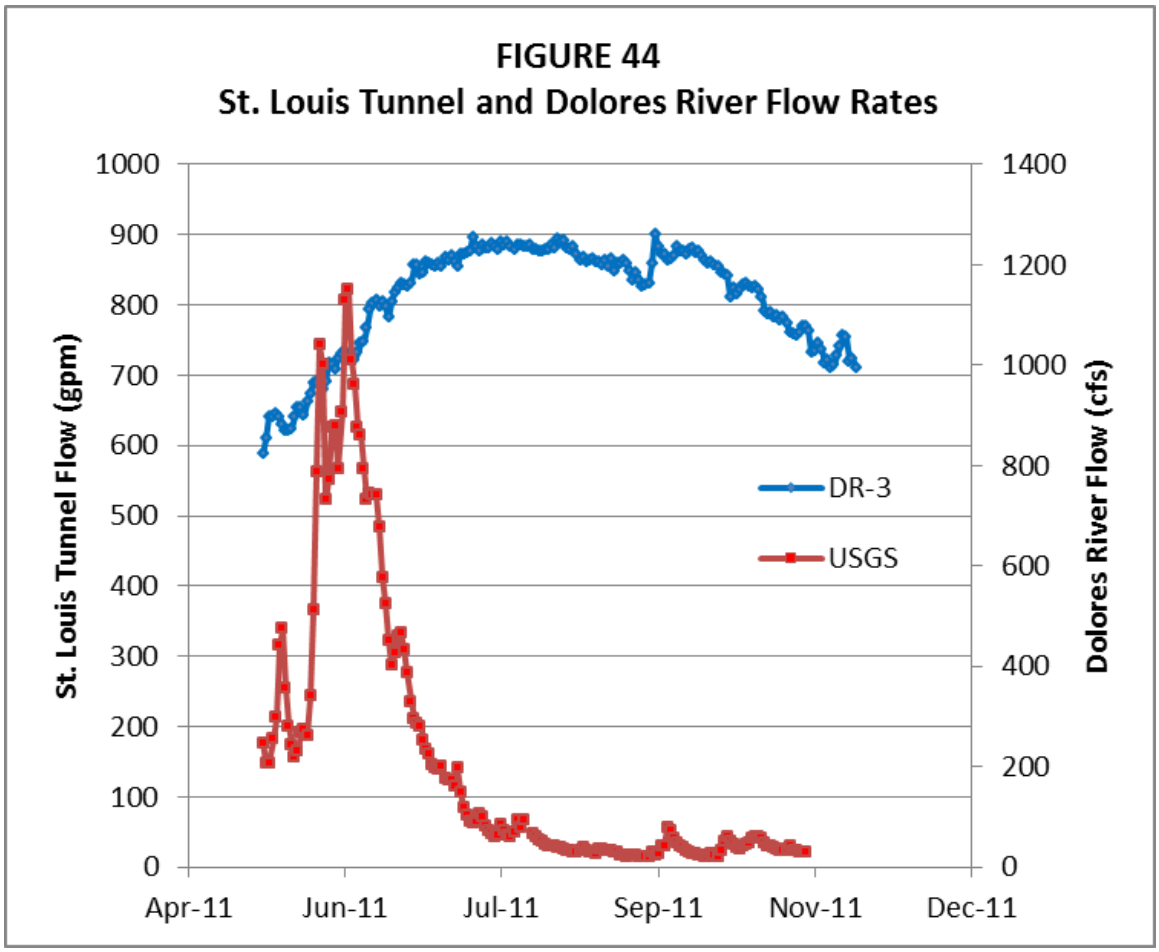


FIGURE 43
Dolores River Flow Rates – April 15 through December 15, 2011



(From USGS website accessed 2/10/2011:
http://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=gif_default&site_no=09165000&referred_module=sw)



St. Louis Tunnel flow rates in gallons per minute provided by Atlantic Richfield. Dolores River data provided by USGS (see Figure 43).

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
517 Shaft*														
517	10/3/2011	1700	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
517	10/5/2011	1200	0.115	1.44	1.86	98.12	2.15	60.76	0.14	2.18	NP	NP	0.458	65.96
517	10/5/2011	1330	<0.003	<0.04	1.90	99.80	2.15	60.56	0.15	2.40	464.94	9680	NP	NP
517	10/5/2011	1430	<0.003	<0.04	1.95	102.85	2.13	60.14	0.16	2.55	472.27	9833	NP	NP
517	10/5/2011	1530	<0.003	<0.04	1.97	103.85	2.17	61.07	0.17	2.68	472.52	9838	NP	NP
517	10/5/2011	1630	<0.003	<0.04	2.05	108.12	2.11	59.63	0.18	2.97	496.04	10328	NP	NP
517	10/5/2011	1815	<0.003	<0.04	1.94	102.12	2.14	60.45	0.19	3.08	486.11	10121	NP	NP
517	10/5/2011	1846	0.014	0.18	1.96	103.17	2.08	58.75	0.16	2.64	489.33	10188	NP	NP
517	10/5/2011	1935	0.018	0.23	2.08	109.33	2.08	58.70	0.17	2.73	497.34	10355	NP	NP
517	10/5/2011	2030	<0.003	<0.04	2.11	110.91	2.06	58.13	0.17	2.68	501.30	10437	NP	NP
517	10/5/2011	2130	0.014	0.18	1.91	100.38	2.06	58.02	0.21	3.31	496.47	10336	NP	NP
517	10/5/2011	2230	0.094	1.18	2.06	108.49	2.09	58.84	0.17	2.76	507.87	10574	NP	NP
517	10/5/2011	2330	<0.003	<0.04	2.02	106.48	2.06	58.13	0.17	2.77	503.35	10480	NP	NP
517	10/6/2011	0030	0.040	0.50	1.16	61.16	2.17	61.29	0.19	3.00	577.10	12015	NP	NP
517	10/6/2011	0130	<0.003	<0.04	2.29	120.54	2.02	57.06	0.18	2.97	517.88	10782	NP	NP
517	10/6/2011	0230	0.034	0.43	2.34	123.22	2.05	57.68	0.17	2.71	520.67	10840	NP	NP
517	10/6/2011	0330	0.034	0.43	2.33	122.38	2.17	61.07	0.17	2.69	531.49	11066	NP	NP
517	10/6/2011	0445	0.036	0.45	2.35	123.49	2.23	63.01	0.20	3.16	538.55	11212	NP	NP
517	10/6/2011	0630	0.036	0.45	2.44	128.65	2.06	58.08	0.18	2.90	546.74	11383	NP	NP
517	10/6/2011	0730	0.035	0.44	2.46	129.22	2.08	58.56	0.18	2.85	552.75	11508	NP	NP
517	10/6/2011	0830	0.035	0.44	2.45	129.17	2.07	58.47	0.18	2.90	556.95	11596	NP	NP
517	10/6/2011	0930	0.038	0.48	2.54	133.49	2.10	59.12	0.16	2.63	555.26	11561	NP	NP
517	10/6/2011	1030	0.036	0.45	2.56	134.70	2.12	59.71	0.13	2.14	538.64	11214	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
517	10/6/2011	1130	0.078	0.98	2.54	133.65	1.98	55.91	0.14	2.18	539.08	11224	NP	NP
517	10/6/2011	1230	0.033	0.41	2.59	136.38	2.25	63.35	0.14	2.18	558.67	11631	NP	NP
517	10/6/2011	1330	0.038	0.48	2.60	136.70	2.12	59.83	0.60	9.61	566.01	11784	NP	NP
517	10/6/2011	1430	<0.003	<0.04	2.62	138.07	2.12	59.85	0.27	4.40	560.07	11661	NP	NP
517	10/6/2011	1530	0.030	0.38	2.37	124.80	1.79	50.43	0.19	3.11	515.33	10729	NP	NP
517	10/6/2011	1630	<0.003	<0.04	2.69	141.70	1.99	56.22	0.15	2.44	568.34	11833	NP	NP
517	10/6/2011	1730	<0.003	<0.04	2.70	142.23	2.25	63.49	0.16	2.52	593.57	12358	NP	NP
517	10/6/2011	1830	<0.003	<0.04	2.77	145.96	2.27	64.11	0.15	2.34	593.85	12364	NP	NP
517	10/6/2011	1930	0.007	0.09	2.77	145.70	2.17	61.18	0.14	2.29	606.09	12619	NP	NP
517	10/6/2011	2030	<0.003	<0.04	2.79	146.65	2.17	61.07	0.17	2.69	594.40	12375	NP	NP
517	10/6/2011	2130	<0.003	<0.04	2.98	156.75	2.20	61.94	0.24	3.81	594.61	12380	NP	NP
517	10/6/2011	2230	<0.003	<0.04	3.38	177.70	2.13	60.05	0.18	2.97	605.76	12612	NP	NP
517	10/6/2011	2330	<0.003	<0.04	3.39	178.60	2.13	59.94	0.17	2.79	609.29	12685	NP	NP
517	10/7/2011	0530	0.033	0.41	2.35	123.59	2.12	59.68	0.18	2.85	556.70	11590	NP	NP
517	10/7/2011	1130	<0.003	<0.04	3.18	167.54	2.12	59.71	0.18	2.84	633.71	13194	NP	NP
517	10/7/2011	1530	<0.003	<0.04	2.71	142.59	1.80	50.74	0.16	2.52	577.52	12024	NP	NP
517	10/8/2011	1030	<0.003	<0.04	4.94	259.92	1.86	52.58	0.18	2.85	714.89	14884	0.463	66.68
517	10/8/2011	1500	<0.003	<0.04	3.68	193.86	1.74	49.05	0.14	2.19	710.97	14802	NP	NP
517	10/9/2011	1230	<0.003	<0.04	3.95	207.92	1.75	49.28	0.16	2.56	749.68	15608	NP	NP
517	10/11/2011	1330	<0.003	<0.04	4.28	225.34	1.74	49.11	0.17	2.76	828.58	17251	NP	NP
517	10/13/2011	1230	0.160	2.00	3.90	205.50	2.33	65.72	0.31	5.06	874.42	18205	NP	NP
517	10/17/2011	1650	<0.003	<0.04	2.70	142.07	2.09	58.98	0.46	7.34	NP	NP	NP	NP
517	10/19/2011	1455	<0.003	<0.04	2.01	105.80	0.99	27.92	0.05	0.85	NP	NP	NP	NP
517	11/3/2011	1000	<0.003	<0.04	1.57	82.69	0.70	19.77	0.08	1.24	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
Blaine Tunnel														
Blaine After Salt	10/5/2011	1445	NV	NV	143.09	7531.85	NV	NV	0.06	0.89	5755.07	119820	0.209	30.19
Blaine Background	10/3/2011	1400	<0.003	<0.04	NP	NP	NP	NP	0.05	0.77	NP	NP	NP	NP
Blaine Inflow	10/6/2011	1300	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Silver Creek														
SC_injection _solution	10/6/2011	1630	2028567	2538596	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
SC-1012	10/7/2011	0915	4.357	54.52	0.28	14.63	0.52	14.53	0.18	2.97	36.83	767	NP	NP
SC-106	10/5/2011	1642	4.998	62.55	0.04	1.95	0.47	13.29	0.07	1.19	9.28	193	NP	NP
SC-106	10/7/2011	0917	5.933	74.25	0.04	1.95	0.51	14.36	0.21	3.37	9.18	191	NP	NP
SC-1094	10/7/2011	0926	<0.003	<0.04	6.60	347.46	0.69	19.43	0.22	3.50	875.34	18224	NP	NP
SC-1131	10/6/2011	1259	3.233	40.46	0.43	22.58	0.48	13.54	0.09	1.45	56.71	1181	NP	NP
SC-1131	10/7/2011	0915	4.126	51.63	0.40	21.16	0.52	14.67	0.18	2.85	50.20	1045	NP	NP
SC-136	10/5/2011	1640	4.927	61.66	0.04	1.95	0.48	13.45	0.08	1.23	9.39	195	NP	NP
SC-136	10/7/2011	0915	5.720	71.58	0.05	2.58	0.51	14.39	0.21	3.44	9.14	190	NP	NP
SC-198	10/5/2011	1637	4.838	60.54	0.06	3.00	0.48	13.40	0.07	1.05	11.24	234	NP	NP
SC-198	10/7/2011	0910	5.539	69.32	0.05	2.74	0.50	14.13	0.20	3.18	11.16	232	NP	NP
SC-253	10/5/2011	1645	4.797	60.03	0.09	4.63	0.47	13.31	0.06	0.98	11.33	236	NP	NP
SC-253	10/7/2011	0924	5.563	69.62	0.06	3.11	0.50	14.13	0.19	3.05	11.91	248	NP	NP
SC-275	10/5/2011	1642	4.807	60.16	0.09	4.47	0.48	13.54	0.06	1.00	13.80	287	NP	NP
SC-275	10/7/2011	0920	5.515	69.02	0.09	4.68	0.50	14.22	0.19	3.05	14.93	311	NP	NP
SC-321	10/5/2011	1639	4.845	60.63	0.09	4.95	0.48	13.48	0.06	0.97	14.57	303	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-321	10/7/2011	0916	5.474	68.50	0.10	5.11	0.51	14.24	0.19	3.08	16.07	334	NP	NP
SC-351	10/5/2011	1635	4.839	60.56	0.11	5.68	0.48	13.54	0.06	0.95	15.20	316	NP	NP
SC-351	10/7/2011	0910	5.459	68.32	0.09	4.95	0.51	14.33	0.18	2.92	16.04	334	NP	NP
SC-404	10/5/2011	1645	4.783	59.86	0.12	6.47	0.48	13.43	0.06	0.92	15.36	320	NP	NP
SC-404	10/6/2011	1040	4.238	53.04	0.10	5.32	0.47	13.29	0.12	1.97	15.56	324	NP	NP
SC-404	10/7/2011	0913	5.431	67.96	0.10	5.21	0.51	14.33	0.18	2.95	16.66	347	NP	NP
SC-443	10/5/2011	1642	4.763	59.61	0.11	6.00	0.48	13.60	0.06	0.89	15.49	323	NP	NP
SC-443	10/7/2011	0910	5.411	67.71	0.12	6.37	0.51	14.39	0.18	2.87	16.72	348	NP	NP
SC-493	10/4/2011	1200	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
SC-493	10/5/2011	0930	<0.003	<0.04	0.12	6.05	0.50	14.13	0.14	2.27	15.48	322	NP	NP
SC-493	10/5/2011	1000	<0.003	<0.04	0.11	5.58	0.51	14.27	0.12	1.85	NP	NP	NP	NP
SC-493	10/5/2011	1030	<0.003	<0.04	0.14	7.58	0.49	13.82	0.13	2.06	NP	NP	NP	NP
SC-493	10/5/2011	1100	<0.003	<0.04	0.10	5.21	0.48	13.57	0.12	1.89	NP	NP	NP	NP
SC-493	10/5/2011	1130	<0.003	<0.04	0.10	5.21	0.49	13.74	0.11	1.84	NP	NP	NP	NP
SC-493	10/5/2011	1200	0.678	8.48	0.10	5.05	0.48	13.60	0.11	1.71	15.18	316	NP	NP
SC-493	10/5/2011	1230	4.486	56.14	0.10	5.11	0.49	13.76	0.10	1.61	NP	NP	NP	NP
SC-493	10/5/2011	1300	4.572	57.22	0.10	5.16	0.51	14.24	0.09	1.52	NP	NP	NP	NP
SC-493	10/5/2011	1330	5.034	63.00	0.10	5.16	0.49	13.74	0.09	1.45	NP	NP	NP	NP
SC-493	10/5/2011	1400	5.118	64.05	0.10	5.16	0.50	14.05	0.09	1.39	NP	NP	NP	NP
SC-493	10/5/2011	1430	4.264	53.36	0.10	5.11	0.64	18.14	0.08	1.32	NP	NP	NP	NP
SC-493	10/5/2011	1500	4.627	57.90	0.11	5.53	0.48	13.51	0.07	1.18	15.21	317	NP	NP
SC-493	10/5/2011	1530	4.810	60.19	0.10	5.16	0.48	13.45	0.07	1.10	NP	NP	NP	NP
SC-493	10/5/2011	1600	4.957	62.03	0.10	5.05	0.47	13.14	0.07	1.05	NP	NP	NP	NP
SC-493	10/5/2011	1630	5.123	64.11	0.10	5.16	0.49	13.71	0.07	1.11	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/5/2011	1640	4.809	60.18	0.10	5.37	0.48	13.54	0.04	0.65	15.42	321	NP	NP
SC-493	10/5/2011	1700	4.986	62.40	0.10	5.05	0.50	14.10	0.07	1.10	NP	NP	NP	NP
SC-493	10/5/2011	1730	4.907	61.41	0.10	5.16	0.47	13.37	0.06	0.98	NP	NP	NP	NP
SC-493	10/5/2011	1800	4.768	59.67	0.10	5.16	0.49	13.93	0.06	1.03	15.37	320	NP	NP
SC-493	10/5/2011	1900	4.656	58.27	0.10	5.00	0.46	12.86	0.07	1.10	NP	NP	NP	NP
SC-493	10/5/2011	2000	5.189	64.94	0.10	5.11	0.47	13.20	0.08	1.31	NP	NP	NP	NP
SC-493	10/5/2011	2100	4.965	62.13	0.09	4.95	0.45	12.72	0.08	1.29	14.76	307	NP	NP
SC-493	10/5/2011	2200	4.726	59.14	0.10	5.26	0.47	13.20	0.09	1.44	NP	NP	NP	NP
SC-493	10/5/2011	2300	4.547	56.90	0.09	4.95	0.45	12.81	0.09	1.52	NP	NP	NP	NP
SC-493	10/5/2011	2400	4.767	59.66	0.10	5.05	0.47	13.14	0.10	1.66	15.45	322	NP	NP
SC-493	10/6/2011	0100	4.829	60.43	0.09	4.90	0.47	13.17	0.11	1.71	NP	NP	NP	NP
SC-493	10/6/2011	0200	4.474	55.99	0.09	4.79	0.47	13.12	0.12	1.92	NP	NP	NP	NP
SC-493	10/6/2011	0300	3.333	41.71	0.13	6.63	0.46	12.95	0.13	2.11	NP	NP	NP	NP
SC-493	10/6/2011	0400	3.150	39.42	0.09	4.79	0.46	13.00	0.14	2.31	NP	NP	NP	NP
SC-493	10/6/2011	0500	3.303	41.33	0.10	5.00	0.48	13.45	0.15	2.40	NP	NP	NP	NP
SC-493	10/6/2011	0600	3.445	43.11	0.09	4.79	0.49	13.88	0.15	2.47	14.84	309	NP	NP
SC-493	10/6/2011	0700	3.643	45.59	0.11	5.68	0.50	13.99	0.16	2.52	NP	NP	NP	NP
SC-493	10/6/2011	0800	4.177	52.27	0.10	5.26	0.50	13.99	0.15	2.34	NP	NP	NP	NP
SC-493	10/6/2011	0900	4.401	55.08	0.10	5.42	0.49	13.85	0.14	2.18	NP	NP	NP	NP
SC-493	10/6/2011	1000	4.455	55.75	0.10	5.42	0.48	13.51	0.14	2.21	NP	NP	NP	NP
SC-493	10/6/2011	1100	4.264	53.36	0.14	7.21	0.48	13.62	0.13	2.13	NP	NP	NP	NP
SC-493	10/6/2011	1200	4.242	53.09	0.10	5.42	0.49	13.71	0.12	2.00	15.81	329	NP	NP
SC-493	10/6/2011	1300	4.546	56.89	0.11	5.68	0.48	13.57	0.12	1.94	NP	NP	NP	NP
SC-493	10/6/2011	1400	4.983	62.36	0.12	6.16	0.48	13.54	0.11	1.76	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/6/2011	1500	6.426	80.42	0.12	6.26	0.48	13.51	0.10	1.53	NP	NP	NP	NP
SC-493	10/6/2011	1600	6.376	79.79	0.13	7.00	0.47	13.37	0.09	1.40	NP	NP	NP	NP
SC-493	10/6/2011	1700	6.404	80.14	0.11	5.90	4.89	138.04	0.10	1.60	NP	NP	NP	NP
SC-493	10/6/2011	1800	4.543	56.85	0.11	5.63	0.90	25.44	0.10	1.61	15.58	324	NP	NP
SC-493	10/6/2011	1900	4.191	52.45	0.13	6.84	0.52	14.55	0.11	1.81	NP	NP	NP	NP
SC-493	10/6/2011	2000	4.188	52.41	0.10	5.26	0.50	14.19	0.12	1.94	NP	NP	NP	NP
SC-493	10/6/2011	2100	4.221	52.82	0.13	6.68	0.51	14.24	0.13	2.03	NP	NP	NP	NP
SC-493	10/6/2011	2200	4.396	55.01	0.11	5.74	0.51	14.44	0.14	2.27	NP	NP	NP	NP
SC-493	10/6/2011	2300	4.494	56.24	0.10	5.05	0.51	14.36	0.14	2.32	NP	NP	NP	NP
SC-493	10/6/2011	2400	4.692	58.72	0.10	5.32	0.52	14.70	0.16	2.53	15.93	332	NP	NP
SC-493	10/7/2011	0100	4.851	60.71	0.13	6.63	0.70	19.80	0.17	2.69	NP	NP	NP	NP
SC-493	10/7/2011	0911	5.365	67.14	0.10	5.37	0.51	14.30	0.19	3.00	16.61	346	NP	NP
SC-493	10/7/2011	1300	5.004	62.62	0.19	9.84	0.46	12.89	0.13	2.03	15.58	324	NP	NP
SC-493	10/7/2011	1400	5.073	63.48	0.10	5.37	0.47	13.29	0.12	2.00	NP	NP	NP	NP
SC-493	10/7/2011	1800	5.214	65.25	0.13	6.63	0.49	13.91	0.12	1.92	16.96	353	NP	NP
SC-493	10/7/2011	2100	5.299	66.31	0.11	5.95	0.57	16.19	0.13	2.02	NP	NP	NP	NP
SC-493	10/7/2011	2400	5.522	69.10	0.15	7.63	0.52	14.72	0.14	2.32	17.07	355	NP	NP
SC-493	10/8/2011	0300	5.662	70.86	0.11	5.74	0.49	13.82	0.15	2.47	NP	NP	NP	NP
SC-493	10/8/2011	0600	5.586	69.90	0.11	5.79	0.47	13.12	0.16	2.63	17.22	358	NP	NP
SC-493	10/8/2011	1100	2.005	25.09	0.10	5.47	0.45	12.75	0.16	2.52	NP	NP	NP	NP
SC-493	10/8/2011	1200	1.307	16.36	0.10	5.37	0.44	12.27	0.14	2.27	17.46	363	NP	NP
SC-493	10/8/2011	1400	0.510	6.38	0.11	5.79	0.45	12.58	0.11	1.84	NP	NP	NP	NP
SC-493	10/8/2011	1500	0.530	6.63	0.11	5.74	0.44	12.47	0.11	1.82	NP	NP	NP	NP
SC-493	10/8/2011	1800	0.362	4.53	0.11	6.00	0.49	13.74	0.03	0.48	18.67	389	NP	NP

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Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/8/2011	2100	0.347	4.34	0.11	5.68	0.44	12.38	0.12	1.94	NP	NP	NP	NP
SC-493	10/8/2011	2400	0.284	3.55	0.11	5.63	0.44	12.41	0.14	2.31	17.86	372	NP	NP
SC-493	10/9/2011	1200	0.186	2.33	0.11	5.74	0.42	11.79	0.14	2.26	18.31	381	NP	NP
SC-493	10/9/2011	1500	<0.003	<0.04	0.15	7.90	0.42	11.73	0.14	2.23	NP	NP	NP	NP
SC-493	10/9/2011	1800	<0.003	<0.04	0.13	6.79	0.41	11.62	0.13	2.10	NP	NP	NP	NP
SC-493	10/9/2011	2100	0.131	1.64	0.12	6.47	0.41	11.65	0.16	2.50	NP	NP	NP	NP
SC-493	10/9/2011	2400	<0.003	<0.04	0.13	6.58	0.44	12.35	0.18	2.85	18.70	389	NP	NP
SC-493	10/10/2011	0300	<0.003	<0.04	0.12	6.53	0.41	11.54	0.20	3.16	NP	NP	NP	NP
SC-493	10/10/2011	0600	<0.003	<0.04	0.13	6.58	0.41	11.65	0.22	3.47	NP	NP	NP	NP
SC-493	10/10/2011	0900	<0.003	<0.04	0.15	7.69	0.40	11.17	0.21	3.31	NP	NP	NP	NP
SC-493	10/10/2011	1200	<0.003	<0.04	0.13	6.74	0.43	12.07	0.20	3.19	19.25	401	NP	NP
SC-493	10/10/2011	1500	<0.003	<0.04	0.13	6.63	0.40	11.25	0.17	2.73	NP	NP	NP	NP
SC-493	10/10/2011	1800	<0.003	<0.04	0.11	6.00	0.43	12.19	0.15	2.44	NP	NP	NP	NP
SC-493	10/10/2011	2100	<0.003	<0.04	0.10	5.32	0.41	11.68	0.16	2.61	NP	NP	NP	NP
SC-493	10/10/2011	2400	<0.003	<0.04	0.10	5.37	0.42	11.76	0.18	2.92	15.84	330	NP	NP
SC-493	10/11/2011	0300	<0.003	<0.04	0.11	5.58	0.46	12.97	0.19	3.08	NP	NP	NP	NP
SC-493	10/11/2011	0600	<0.003	<0.04	0.11	5.74	0.43	12.02	0.20	3.19	NP	NP	NP	NP
SC-493	10/11/2011	0900	<0.003	<0.04	0.15	7.79	0.46	12.86	0.19	3.06	NP	NP	NP	NP
SC-493	10/11/2011	1200	<0.003	<0.04	0.14	7.58	0.42	11.85	0.15	2.42	NP	NP	NP	NP
SC-493	10/11/2011	1500	<0.003	<0.04	0.14	7.58	0.45	12.81	0.11	1.84	NP	NP	NP	NP
SC-493	10/11/2011	1800	<0.003	<0.04	0.10	5.05	0.44	12.35	0.12	2.00	NP	NP	NP	NP
SC-493	10/11/2011	2400	<0.003	<0.04	0.10	5.00	0.44	12.52	0.14	2.32	15.83	330	NP	NP
SC-493	10/12/2011	0600	<0.003	<0.04	0.09	4.68	0.45	12.69	0.17	2.76	NP	NP	NP	NP
SC-493	10/12/2011	1200	<0.003	<0.04	0.13	6.95	0.45	12.58	0.14	2.29	21.77	453	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/12/2011	1801	<0.003	<0.04	0.10	5.26	0.44	12.38	0.14	2.24	NP	NP	NP	NP
SC-493	10/12/2011	2400	<0.003	<0.04	0.08	4.21	0.45	12.81	0.18	2.95	14.78	308	NP	NP
SC-493	10/13/2011	0600	<0.003	<0.04	0.09	4.58	0.46	13.09	0.21	3.44	NP	NP	NP	NP
SC-493	10/13/2011	1200	<0.003	<0.04	0.09	4.53	0.45	12.66	0.16	2.61	15.42	321	NP	NP
SC-493	10/13/2011	1800	<0.003	<0.04	0.09	4.58	0.47	13.23	0.15	2.44	NP	NP	NP	NP
SC-493	10/13/2011	2400	<0.003	<0.04	0.08	4.32	0.49	13.71	0.23	3.68	14.40	300	NP	NP
SC-493	10/14/2011	0600	<0.003	<0.04	0.09	4.53	0.48	13.65	0.21	3.32	NP	NP	NP	NP
SC-493	10/14/2011	1200	<0.003	<0.04	0.08	4.42	0.48	13.40	0.17	2.76	14.80	308	NP	NP
SC-493	10/14/2011	1800	<0.003	<0.04	0.08	3.95	0.50	14.19	0.20	3.21	NP	NP	NP	NP
SC-493	10/14/2011	2400	<0.003	<0.04	0.08	4.16	0.50	13.96	0.23	3.63	13.85	288	NP	NP
SC-493	10/15/2011	0600	<0.003	<0.04	0.09	4.68	0.49	13.82	0.20	3.18	NP	NP	NP	NP
SC-493	10/15/2011	1200	<0.003	<0.04	0.09	4.53	0.48	13.65	0.16	2.52	14.45	301	NP	NP
SC-493	10/15/2011	1800	<0.003	<0.04	0.08	4.05	0.50	14.02	0.10	1.58	NP	NP	NP	NP
SC-493	10/15/2011	2400	<0.003	<0.04	0.09	4.68	0.46	13.00	0.19	3.06	15.86	330	NP	NP
SC-493	10/16/2011	0600	<0.003	<0.04	0.08	4.16	0.50	13.99	0.24	3.79	NP	NP	NP	NP
SC-493	10/16/2011	1200	<0.003	<0.04	0.08	4.32	0.49	13.93	0.22	3.53	14.12	294	NP	NP
SC-493	10/16/2011	1800	<0.003	<0.04	0.08	4.42	0.49	13.76	0.17	2.73	NP	NP	NP	NP
SC-493	10/16/2011	2400	<0.003	<0.04	0.08	4.16	0.49	13.68	0.21	3.34	13.72	286	NP	NP
SC-493	10/17/2011	0600	<0.003	<0.04	0.13	6.74	0.65	18.22	0.26	4.14	NP	NP	NP	NP
SC-493	10/17/2011	1200	<0.003	<0.04	0.08	4.42	0.48	13.54	0.20	3.16	14.15	295	NP	NP
SC-493	10/17/2011	1800	<0.003	<0.04	0.10	5.32	0.47	13.29	0.12	1.89	NP	NP	NP	NP
SC-493	10/17/2011	2400	<0.003	<0.04	0.09	4.53	0.47	13.26	0.17	2.79	14.32	298	NP	NP
SC-493	10/18/2011	0600	<0.003	<0.04	0.09	4.47	0.46	13.06	0.20	3.29	NP	NP	NP	NP
SC-493	10/18/2011	1200	<0.003	<0.04	0.11	5.84	0.46	12.97	0.20	3.19	15.02	313	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/18/2011	1800	<0.003	<0.04	0.09	4.47	0.45	12.69	0.18	2.84	NP	NP	NP	NP
SC-493	10/18/2011	2400	<0.003	<0.04	0.09	4.53	0.45	12.61	0.21	3.44	14.93	311	NP	NP
SC-493	10/19/2011	1800	<0.003	<0.04	0.09	4.79	0.45	12.64	0.24	3.81	NP	NP	NP	NP
SC-493	10/19/2011	1800	<0.003	<0.04	0.10	5.05	0.44	12.38	0.22	3.48	NP	NP	NP	NP
SC-493	10/19/2011	2400	<0.003	<0.04	0.09	4.53	0.44	12.27	0.25	4.05	15.28	318	NP	NP
SC-493	10/20/2011	0600	<0.003	<0.04	0.09	4.84	0.43	12.04	0.31	4.94	NP	NP	NP	NP
SC-493	10/20/2011	1200	<0.003	<0.04	0.09	4.90	0.42	11.90	0.28	4.53	15.92	331	NP	NP
SC-493	10/20/2011	1800	<0.003	<0.04	0.10	5.32	0.44	12.30	0.25	4.02	NP	NP	NP	NP
SC-493	10/20/2011	2400	<0.003	<0.04	0.11	5.63	0.42	11.71	0.29	4.71	16.03	334	NP	NP
SC-493	10/21/2011	1200	<0.003	<0.04	0.12	6.21	0.41	11.54	0.31	4.92	16.47	343	NP	NP
SC-493	10/21/2011	1800	<0.003	<0.04	0.09	4.68	0.40	11.31	0.28	4.47	NP	NP	NP	NP
SC-493	10/21/2011	2400	<0.003	<0.04	0.09	4.74	0.40	11.34	0.31	4.97	15.57	324	NP	NP
SC-493	10/22/2011	0600	<0.003	<0.04	0.09	4.74	0.40	11.17	0.34	5.47	NP	NP	NP	NP
SC-493	10/22/2011	1200	<0.003	<0.04	0.09	4.95	0.40	11.17	0.33	5.35	16.08	335	NP	NP
SC-493	10/22/2011	1800	<0.003	<0.04	0.10	5.11	0.39	11.00	0.28	4.48	NP	NP	NP	NP
SC-493	10/22/2011	2400	<0.003	<0.04	0.09	4.90	0.39	10.97	0.31	4.97	16.01	333	NP	NP
SC-493	10/23/2011	0600	<0.003	<0.04	0.09	4.90	0.39	10.86	0.35	5.66	NP	NP	NP	NP
SC-493	10/23/2011	1200	<0.003	<0.04	0.10	5.32	0.42	11.76	0.33	5.26	17.15	357	NP	NP
SC-493	10/25/2011	000	<0.003	<0.04	0.10	5.47	0.40	11.20	0.35	5.63	NP	NP	NP	NP
SC-493	10/25/2011	1200	<0.003	<0.04	0.10	5.37	0.44	12.35	0.37	5.98	18.23	380	NP	NP
SC-493	10/26/2011	000	<0.003	<0.04	0.09	4.63	0.39	11.09	0.32	5.14	NP	NP	NP	NP
SC-493	10/26/2011	1200	<0.003	<0.04	0.10	5.21	0.44	12.27	0.34	5.42	18.09	377	NP	NP
SC-493	10/27/2011	000	<0.003	<0.04	0.09	4.90	0.42	11.71	0.32	5.11	NP	NP	NP	NP
SC-493	10/27/2011	1200	<0.003	<0.04	0.11	5.90	0.39	11.06	0.29	4.66	19.11	398	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-493	10/28/2011	000	<0.003	<0.04	0.11	5.95	0.46	13.03	0.31	5.05	NP	NP	NP	NP
SC-493	11/2/2011	000	<0.003	<0.04	0.11	5.79	0.43	12.04	0.48	7.71	NP	NP	NP	NP
SC-493	11/3/2011	1500	<0.003	<0.04	0.11	5.95	0.39	11.09	0.43	6.93	NP	NP	NP	NP
SC-542	10/5/2011	1637	4.775	59.76	0.10	5.32	0.49	13.93	0.05	0.74	15.37	320	NP	NP
SC-542	10/7/2011	0910	5.325	66.64	0.10	5.37	0.51	14.36	0.17	2.77	16.73	348	NP	NP
SC-592	10/5/2011	1644	4.763	59.61	0.10	5.37	0.52	14.58	0.04	0.66	15.11	315	NP	NP
SC-592	10/7/2011	0916	5.330	66.70	0.10	5.42	0.51	14.33	0.17	2.79	16.74	348	NP	NP
SC-636	10/5/2011	1641	4.768	59.67	0.10	5.42	0.51	14.39	0.04	0.61	15.31	319	NP	NP
SC-636	10/6/2011	1503	5.006	62.65	0.13	6.74	0.50	13.96	0.08	1.26	NP	NP	NP	NP
SC-636	10/6/2011	1514	6.082	76.11	0.11	6.00	1.10	31.11	0.07	1.18	NP	NP	NP	NP
SC-636	10/6/2011	1515	6.365	79.65	0.11	5.90	18.58	524.05	0.07	1.15	NP	NP	NP	NP
SC-636	10/6/2011	1517	6.436	80.54	0.11	5.90	40.33	1137.65	0.07	1.11	NP	NP	NP	NP
SC-636	10/6/2011	1518	6.509	81.46	0.11	5.84	42.85	1208.53	0.08	1.29	NP	NP	NP	NP
SC-636	10/6/2011	1520	6.583	82.38	0.11	5.90	28.22	795.98	0.08	1.24	NP	NP	NP	NP
SC-636	10/6/2011	1521	6.690	83.72	0.11	5.95	13.71	386.77	0.08	1.23	NP	NP	NP	NP
SC-636	10/6/2011	1522	6.730	84.22	0.11	6.00	8.42	237.58	0.08	1.29	NP	NP	NP	NP
SC-636	10/6/2011	1525	6.719	84.08	0.11	6.00	3.77	106.23	0.08	1.24	NP	NP	NP	NP
SC-636	10/6/2011	1528	6.663	83.38	0.11	5.95	1.59	44.90	0.08	1.23	NP	NP	NP	NP
SC-636	10/6/2011	1540	6.374	79.77	0.13	6.79	0.64	17.94	0.09	1.37	NP	NP	NP	NP
SC-636	10/7/2011	0914	5.337	66.79	0.10	5.37	0.51	14.39	0.17	2.71	16.70	348	NP	NP
SC-68	10/5/2011	1645	5.036	63.02	0.04	1.95	0.48	13.43	0.08	1.26	9.54	199	NP	NP
SC-68	10/6/2011	1127	4.679	58.55	0.04	1.84	0.47	13.34	0.14	2.26	8.83	184	NP	NP
SC-68	10/7/2011	0920	5.989	74.95	0.04	2.26	0.51	14.39	0.22	3.58	9.18	191	NP	NP
SC-699	10/5/2011	1637	4.764	59.62	0.10	5.32	0.49	13.71	0.04	0.58	15.35	320	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SC-699	10/7/2011	0910	5.297	66.29	0.13	6.74	0.51	14.33	0.17	2.66	16.63	346	NP	NP
SC-759	10/7/2011	0915	5.362	67.10	0.11	5.58	0.47	13.34	0.16	2.52	16.63	346	NP	NP
SC-826	10/7/2011	0910	5.217	65.29	0.12	6.11	0.49	13.74	0.17	2.66	17.62	367	NP	NP
SC-895	10/6/2011	1252	3.421	42.81	0.17	9.00	0.46	12.89	0.10	1.53	21.91	456	NP	NP
SC-895	10/7/2011	0920	4.513	56.48	0.17	8.79	0.51	14.39	0.18	2.94	24.81	517	NP	NP
Argentine Tailings Seep														
SEEP	10/5/2011	0800	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
SEEP	10/5/2011	1200	<0.003	<0.04	6.23	327.72	0.81	22.88	0.10	1.63	793.56	16522	NP	NP
SEEP	10/5/2011	1300	<0.003	<0.04	6.24	328.40	0.63	17.63	0.11	1.81	773.36	16101	NP	NP
SEEP	10/5/2011	1400	<0.003	<0.04	6.22	327.46	0.61	17.18	0.11	1.84	NP	NP	NP	NP
SEEP	10/5/2011	1500	<0.003	<0.04	6.25	328.82	0.63	17.69	0.11	1.81	NP	NP	NP	NP
SEEP	10/5/2011	1600	<0.003	<0.04	6.15	323.82	0.61	17.06	0.12	1.95	NP	NP	NP	NP
SEEP	10/5/2011	1700	<0.003	<0.04	6.07	319.72	0.59	16.70	0.11	1.76	NP	NP	NP	NP
SEEP	10/5/2011	1800	<0.003	<0.04	6.02	317.09	0.58	16.47	0.10	1.66	NP	NP	NP	NP
SEEP	10/5/2011	1900	<0.003	<0.04	6.09	320.77	0.58	16.25	0.09	1.52	NP	NP	NP	NP
SEEP	10/5/2011	2000	<0.003	<0.04	5.99	315.24	0.57	15.96	0.10	1.53	NP	NP	NP	NP
SEEP	10/5/2011	2100	<0.003	<0.04	6.01	316.19	0.56	15.82	0.09	1.42	NP	NP	NP	NP
SEEP	10/5/2011	2200	<0.003	<0.04	6.03	317.19	0.92	25.89	0.07	1.18	NP	NP	NP	NP
SEEP	10/5/2011	2300	<0.003	<0.04	6.05	318.45	0.56	15.71	0.09	1.42	NP	NP	NP	NP
SEEP	10/5/2011	2400	<0.003	<0.04	5.88	309.56	0.56	15.82	0.09	1.39	749.49	15604	NP	NP
SEEP	10/5/2011	2400	<0.003	<0.04	2.34	123.22	0.37	10.41	0.04	0.56	NP	NP	NP	NP
SEEP	10/6/2011	0100	<0.003	<0.04	5.76	303.30	0.62	17.40	0.09	1.37	NP	NP	NP	NP
SEEP	10/6/2011	0200	<0.003	<0.04	5.63	296.40	0.65	18.22	0.10	1.60	NP	NP	NP	NP
SEEP	10/6/2011	0300	<0.003	<0.04	5.39	283.50	0.68	19.26	0.11	1.81	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SEEP	10/6/2011	0400	<0.003	<0.04	5.49	288.71	0.87	24.54	0.12	1.90	NP	NP	NP	NP
SEEP	10/6/2011	0500	<0.003	<0.04	5.26	276.87	1.01	28.38	0.12	1.92	NP	NP	NP	NP
SEEP	10/6/2011	0600	<0.003	<0.04	5.64	296.93	0.93	26.18	0.11	1.74	NP	NP	NP	NP
SEEP	10/6/2011	0700	<0.003	<0.04	5.72	300.87	0.88	24.79	0.12	1.94	NP	NP	NP	NP
SEEP	10/6/2011	0800	<0.003	<0.04	5.81	305.66	0.88	24.91	0.11	1.74	NP	NP	NP	NP
SEEP	10/6/2011	0900	<0.003	<0.04	5.48	288.66	0.93	26.09	0.10	1.61	NP	NP	NP	NP
SEEP	10/6/2011	1000	<0.003	<0.04	5.52	290.45	1.05	29.64	0.10	1.53	NP	NP	NP	NP
SEEP	10/6/2011	1100	<0.003	<0.04	5.72	301.19	1.21	34.21	0.09	1.44	NP	NP	NP	NP
SEEP	10/6/2011	1200	<0.003	<0.04	5.66	298.03	1.12	31.59	0.09	1.40	NP	NP	NP	NP
SEEP	10/6/2011	1300	<0.003	<0.04	5.73	301.72	1.01	28.40	0.08	1.21	NP	NP	NP	NP
SEEP	10/6/2011	1400	<0.003	<0.04	5.92	311.45	1.01	28.52	0.10	1.55	NP	NP	NP	NP
SEEP	10/6/2011	1500	<0.003	<0.04	5.93	311.98	1.05	29.59	0.09	1.50	NP	NP	NP	NP
SEEP	10/6/2011	1600	<0.003	<0.04	5.81	306.03	1.02	28.86	0.10	1.55	NP	NP	NP	NP
SEEP	10/6/2011	1700	<0.003	<0.04	5.85	307.66	1.00	28.07	0.10	1.68	NP	NP	NP	NP
SEEP	10/6/2011	1800	<0.003	<0.04	5.95	313.24	0.96	27.05	0.10	1.53	NP	NP	NP	NP
SEEP	10/6/2011	1900	<0.003	<0.04	5.87	309.03	0.90	25.27	0.10	1.65	NP	NP	NP	NP
SEEP	10/6/2011	2000	<0.003	<0.04	5.98	314.77	0.85	23.86	0.10	1.63	NP	NP	NP	NP
SEEP	10/6/2011	2100	<0.003	<0.04	6.08	320.19	0.80	22.45	0.10	1.58	NP	NP	NP	NP
SEEP	10/6/2011	2200	<0.003	<0.04	6.00	315.77	0.74	20.96	0.10	1.60	NP	NP	NP	NP
SEEP	10/6/2011	2300	<0.003	<0.04	5.99	315.40	0.71	20.14	0.09	1.37	NP	NP	NP	NP
SEEP	10/6/2011	2400	<0.003	<0.04	6.05	318.19	0.68	19.26	0.09	1.50	780.00	16240	NP	NP
SEEP	10/7/2011	0100	<0.003	<0.04	6.36	334.56	1.06	29.87	0.08	1.29	NP	NP	NP	NP
SEEP	10/7/2011	1000	<0.003	<0.04	6.00	315.93	0.55	15.57	0.09	1.40	NP	NP	NP	NP
SEEP	10/7/2011	1405	<0.003	<0.04	6.14	322.93	0.60	16.98	0.12	1.94	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SEEP	10/7/2011	1500	<0.003	<0.04	6.24	328.61	0.69	19.35	0.13	2.05	NP	NP	NP	NP
SEEP	10/7/2011	1600	<0.003	<0.04	6.07	319.51	0.65	18.31	0.11	1.77	NP	NP	NP	NP
SEEP	10/7/2011	1700	<0.003	<0.04	5.87	308.93	0.64	17.94	0.11	1.79	NP	NP	NP	NP
SEEP	10/7/2011	1800	<0.003	<0.04	6.01	316.24	0.60	17.01	0.12	1.98	NP	NP	NP	NP
SEEP	10/7/2011	1900	<0.003	<0.04	5.98	314.66	0.65	18.28	0.12	1.94	NP	NP	NP	NP
SEEP	10/7/2011	2000	<0.003	<0.04	5.93	312.30	0.59	16.59	0.13	2.06	NP	NP	NP	NP
SEEP	10/7/2011	2100	<0.003	<0.04	6.14	323.35	0.59	16.56	0.11	1.79	NP	NP	NP	NP
SEEP	10/7/2011	2200	<0.003	<0.04	NP	NP	0.58	16.47	0.11	1.73	NP	NP	NP	NP
SEEP	10/7/2011	2300	<0.003	<0.04	NP	NP	0.57	15.94	0.11	1.82	NP	NP	NP	NP
SEEP	10/7/2011	2400	<0.003	<0.04	6.15	323.93	0.56	15.77	0.10	1.65	764.54	15918	NP	NP
SEEP	10/8/2011	0100	<0.003	<0.04	NP	NP	0.55	15.54	0.10	1.61	NP	NP	NP	NP
SEEP	10/8/2011	0200	<0.003	<0.04	NP	NP	0.55	15.37	0.11	1.73	NP	NP	NP	NP
SEEP	10/8/2011	0300	<0.003	<0.04	NP	NP	0.53	15.03	0.10	1.66	NP	NP	NP	NP
SEEP	10/8/2011	0400	<0.003	<0.04	NP	NP	0.72	20.31	0.10	1.60	NP	NP	NP	NP
SEEP	10/8/2011	0500	<0.003	<0.04	NP	NP	0.53	14.92	0.10	1.68	NP	NP	NP	NP
SEEP	10/8/2011	0700	<0.003	<0.04	NP	NP	0.53	15.03	0.10	1.53	NP	NP	NP	NP
SEEP	10/8/2011	0800	<0.003	<0.04	NP	NP	0.53	15.01	0.09	1.50	NP	NP	NP	NP
SEEP	10/8/2011	0845	<0.003	<0.04	6.11	321.67	0.51	14.47	0.10	1.66	NP	NP	NP	NP
SEEP	10/8/2011	1145	<0.003	<0.04	6.12	321.98	0.55	15.37	0.12	2.00	NP	NP	NP	NP
SEEP	10/8/2011	1400	<0.003	<0.04	NP	NP	0.76	21.47	0.14	2.31	NP	NP	NP	NP
SEEP	10/8/2011	1600	<0.003	<0.04	NP	NP	0.55	15.57	0.14	2.18	NP	NP	NP	NP
SEEP	10/8/2011	1700	<0.003	<0.04	NP	NP	0.54	15.20	0.13	2.10	NP	NP	NP	NP
SEEP	10/8/2011	1900	<0.003	<0.04	NP	NP	0.75	21.15	0.12	1.95	NP	NP	NP	NP
SEEP	10/8/2011	2100	<0.003	<0.04	NP	NP	0.72	20.42	0.11	1.76	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SEEP	10/8/2011	2300	<0.003	<0.04	6.04	317.93	0.74	20.79	0.12	1.89	788.54	16417	NP	NP
SEEP	10/9/2011	0100	<0.003	<0.04	NP	NP	0.39	10.92	0.12	1.95	NP	NP	NP	NP
SEEP	10/9/2011	1100	<0.003	<0.04	NP	NP	0.48	13.40	0.11	1.76	NP	NP	NP	NP
SEEP	10/9/2011	1300	<0.003	<0.04	NP	NP	0.47	13.17	0.13	2.13	NP	NP	NP	NP
SEEP	10/9/2011	1500	<0.003	<0.04	NP	NP	0.46	12.95	0.13	2.14	NP	NP	NP	NP
SEEP	10/9/2011	1700	<0.003	<0.04	NP	NP	0.45	12.78	0.12	1.94	NP	NP	NP	NP
SEEP	10/9/2011	1900	<0.003	<0.04	NP	NP	0.45	12.75	0.12	1.85	NP	NP	NP	NP
SEEP	10/9/2011	2100	<0.003	<0.04	NP	NP	0.51	14.47	0.08	1.35	NP	NP	NP	NP
SEEP	10/9/2011	2300	<0.003	<0.04	NP	NP	0.45	12.75	0.09	1.52	NP	NP	NP	NP
SEEP	10/10/2011	0100	<0.003	<0.04	NP	NP	0.46	12.95	0.09	1.52	NP	NP	NP	NP
SEEP	10/10/2011	0900	<0.003	<0.04	NP	NP	0.46	12.86	0.11	1.76	NP	NP	NP	NP
SEEP	10/10/2011	1100	<0.003	<0.04	NP	NP	0.45	12.69	0.13	2.13	NP	NP	NP	NP
SEEP	10/10/2011	1300	<0.003	<0.04	NP	NP	0.45	12.78	0.15	2.47	NP	NP	NP	NP
SEEP	10/10/2011	1500	<0.003	<0.04	NP	NP	0.45	12.81	0.16	2.58	NP	NP	NP	NP
SEEP	10/10/2011	1700	<0.003	<0.04	NP	NP	0.45	12.58	0.15	2.40	NP	NP	NP	NP
SEEP	10/10/2011	1900	<0.003	<0.04	NP	NP	0.44	12.44	0.13	2.14	NP	NP	NP	NP
SEEP	10/10/2011	2100	<0.003	<0.04	NP	NP	0.44	12.41	0.13	2.02	NP	NP	NP	NP
SEEP	10/10/2011	2300	<0.003	<0.04	NP	NP	0.43	12.10	0.11	1.82	NP	NP	NP	NP
SEEP	10/11/2011	0100	<0.003	<0.04	NP	NP	0.48	13.48	0.12	1.85	NP	NP	NP	NP
SEEP	10/11/2011	0300	<0.003	<0.04	NP	NP	0.45	12.61	0.12	1.97	NP	NP	NP	NP
SEEP	10/11/2011	0500	<0.003	<0.04	NP	NP	0.44	12.47	0.12	1.89	NP	NP	NP	NP
SEEP	10/11/2011	0700	<0.003	<0.04	NP	NP	0.44	12.33	0.12	1.90	NP	NP	NP	NP
SEEP	10/11/2011	0900	<0.003	<0.04	NP	NP	0.44	12.47	0.12	1.85	NP	NP	NP	NP
SEEP	10/11/2011	1100	<0.003	<0.04	NP	NP	0.44	12.52	0.12	1.94	NP	NP	NP	NP

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SEEP	10/11/2011	1300	<0.003	<0.04	NP	NP	0.58	16.42	0.12	1.94	NP	NP	NP	NP
SEEP	10/11/2011	1500	<0.003	<0.04	NP	NP	0.46	13.00	0.14	2.18	NP	NP	NP	NP
SEEP	10/11/2011	1800	<0.003	<0.04	NP	NP	0.36	10.04	0.15	2.40	NP	NP	NP	NP
SEEP	10/11/2011	2400	<0.003	<0.04	6.28	330.77	0.63	17.88	0.12	1.97	808.17	16826	NP	NP
SEEP	10/12/2011	0600	<0.003	<0.04	NP	NP	0.64	18.14	0.12	1.89	NP	NP	NP	NP
SEEP	10/12/2011	1200	<0.003	<0.04	NP	NP	0.65	18.31	0.13	2.16	NP	NP	NP	NP
SEEP	10/12/2011	1800	<0.003	<0.04	NP	NP	0.65	18.36	0.16	2.56	NP	NP	NP	NP
SEEP	10/12/2011	2400	<0.003	<0.04	NP	NP	0.65	18.39	0.12	1.94	NP	NP	NP	NP
SEEP	10/13/2011	0600	<0.003	<0.04	NP	NP	0.64	18.05	0.12	1.89	NP	NP	NP	NP
SEEP	10/13/2011	1200	<0.003	<0.04	NP	NP	0.62	17.35	0.14	2.18	NP	NP	NP	NP
SEEP	10/13/2011	1800	<0.003	<0.04	NP	NP	0.63	17.66	0.15	2.44	NP	NP	NP	NP
SEEP	10/13/2011	2400	<0.003	<0.04	NP	NP	0.62	17.57	0.13	2.05	NP	NP	NP	NP
SEEP	10/14/2011	0600	<0.003	<0.04	NP	NP	0.35	9.76	0.12	1.87	NP	NP	NP	NP
SEEP	10/14/2011	1200	<0.003	<0.04	NP	NP	0.59	16.56	0.14	2.21	NP	NP	NP	NP
SEEP	10/14/2011	1800	<0.003	<0.04	NP	NP	0.61	17.06	0.15	2.44	NP	NP	NP	NP
SEEP	10/14/2011	2400	<0.003	<0.04	6.15	323.56	0.60	16.92	0.12	1.95	796.99	16593	NP	NP
SEEP	10/15/2011	0600	<0.003	<0.04	NP	NP	0.61	17.09	0.12	1.85	NP	NP	NP	NP
SEEP	10/15/2011	1200	<0.003	<0.04	NP	NP	0.61	17.18	0.13	2.11	NP	NP	NP	NP
SEEP	10/15/2011	1800	<0.003	<0.04	NP	NP	0.62	17.35	0.15	2.34	NP	NP	NP	NP
SEEP	10/15/2011	2400	<0.003	<0.04	NP	NP	0.60	16.92	0.12	1.97	NP	NP	NP	NP
SEEP	10/16/2011	0600	<0.003	<0.04	NP	NP	0.60	17.01	0.12	1.89	NP	NP	NP	NP
SEEP	10/16/2011	1200	<0.003	<0.04	NP	NP	0.60	16.98	0.14	2.19	NP	NP	NP	NP
SEEP	10/16/2011	1800	<0.003	<0.04	NP	NP	0.59	16.50	0.15	2.40	NP	NP	NP	NP
SEEP	10/16/2011	2400	<0.003	<0.04	NP	NP	0.57	16.02	0.12	2.00	NP	NP	NP	NP

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Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SEEP	10/17/2011	0600	<0.003	<0.04	NP	NP	0.47	13.37	0.12	1.92	NP	NP	NP	NP
SEEP	10/17/2011	1200	<0.003	<0.04	NP	NP	0.43	11.99	0.13	2.14	NP	NP	NP	NP
SEEP dup 243	10/10/2011	1500	<0.003	<0.04	NP	NP	0.58	16.36	0.12	1.97	NP	NP	NP	NP
St. Louis Tunnel at Portal														
SL	10/4/2011	1000	<0.003	<0.04	2.34	123.38	0.37	10.44	0.03	0.50	548.57	11421	0.018	2.64
SL	10/4/2011	1200	<0.003	<0.04	2.35	123.54	0.37	10.30	0.03	0.53	550.35	11458	0.025	3.60
SL	10/4/2011	1400	<0.003	<0.04	2.28	119.85	0.37	10.41	0.03	0.45	516.12	10746	0.025	3.60
SL	10/4/2011	1600	<0.003	<0.04	2.31	121.38	0.39	10.86	0.03	0.52	NP	NP	0.018	2.64
SL	10/4/2011	1700	<0.003	<0.04	2.34	123.12	0.37	10.32	0.03	0.55	NP	NP	0.025	3.60
SL	10/4/2011	1800	<0.003	<0.04	2.35	123.80	0.37	10.30	0.03	0.48	NP	NP	0.025	3.60
SL	10/4/2011	1900	<0.003	<0.04	2.36	124.07	0.37	10.30	0.03	0.48	NP	NP	0.025	3.60
SL	10/4/2011	2000	<0.003	<0.04	2.34	122.91	0.37	10.38	0.04	0.56	NP	NP	0.025	3.60
SL	10/4/2011	2100	<0.003	<0.04	2.34	122.91	0.37	10.32	0.03	0.52	NP	NP	0.018	2.64
SL	10/4/2011	2200	<0.003	<0.04	2.36	124.12	0.37	10.30	0.03	0.45	NP	NP	0.025	3.60
SL	10/4/2011	2300	<0.003	<0.04	2.38	125.17	0.36	10.18	0.03	0.53	NP	NP	0.025	3.60
SL	10/5/2011	0100	<0.003	<0.04	2.34	122.91	0.38	10.83	0.03	0.48	548.20	11413	0.025	3.60
SL	10/5/2011	0200	<0.003	<0.04	2.35	123.86	0.37	10.32	0.03	0.50	NP	NP	0.025	3.60
SL	10/5/2011	0300	<0.003	<0.04	2.35	123.91	0.37	10.38	0.03	0.48	NP	NP	0.025	3.60
SL	10/5/2011	0400	<0.003	<0.04	2.39	126.01	0.37	10.35	0.03	0.50	NP	NP	0.032	4.56
SL	10/5/2011	0500	<0.003	<0.04	2.44	128.49	0.37	10.46	0.03	0.55	NP	NP	0.071	10.30
SL	10/5/2011	0600	<0.003	<0.04	2.49	131.01	0.38	10.61	0.03	0.48	586.88	12219	0.138	19.88
SL	10/5/2011	0700	<0.003	<0.04	2.45	128.96	0.38	10.69	0.03	0.48	NP	NP	0.204	29.47
SL	10/5/2011	0800	<0.003	<0.04	2.47	129.75	0.38	10.77	0.03	0.50	NP	NP	0.251	36.18

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Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/5/2011	0900	<0.003	<0.04	2.44	128.38	0.39	10.92	0.03	0.48	NP	NP	0.258	37.14
SL	10/5/2011	1000	<0.003	<0.04	2.38	125.17	0.37	10.55	0.03	0.55	NP	NP	0.244	35.22
SL	10/5/2011	1100	<0.003	<0.04	2.36	123.96	0.37	10.55	0.03	0.50	NP	NP	0.211	30.42
SL	10/5/2011	1200	<0.003	<0.04	2.34	123.22	0.38	10.69	0.04	0.58	578.74	12049	0.178	25.63
SL	10/5/2011	1300	<0.003	<0.04	2.30	121.22	0.37	10.49	0.03	0.53	NP	NP	0.145	20.84
SL	10/5/2011	1400	<0.003	<0.04	2.30	121.12	0.37	10.46	0.03	0.52	NP	NP	0.125	17.97
SL	10/5/2011	1500	<0.003	<0.04	2.26	119.07	0.37	10.44	0.03	0.55	NP	NP	0.111	16.05
SL	10/5/2011	1600	<0.003	<0.04	2.24	117.96	0.37	10.35	0.03	0.50	NP	NP	0.098	14.13
SL	10/5/2011	1700	<0.003	<0.04	2.25	118.64	0.37	10.55	0.03	0.50	NP	NP	0.091	13.18
SL	10/5/2011	1800	<0.003	<0.04	2.23	117.54	0.36	10.27	0.03	0.53	556.76	11592	0.085	12.22
SL	10/5/2011	1900	<0.003	<0.04	2.24	117.80	0.36	10.24	0.03	0.47	NP	NP	0.081	11.74
SL	10/5/2011	2000	<0.003	<0.04	2.29	120.28	0.35	9.99	0.03	0.50	NP	NP	0.078	11.26
SL	10/5/2011	2200	<0.003	<0.04	2.26	119.01	0.36	10.15	0.03	0.48	NP	NP	0.071	10.30
SL	10/5/2011	2300	<0.003	<0.04	2.27	119.28	0.36	10.21	0.03	0.48	NP	NP	0.065	9.34
SL	10/5/2011	2400	<0.003	<0.04	2.27	119.64	0.36	10.21	0.03	0.47	551.88	11490	0.065	9.34
SL	10/6/2011	0100	<0.003	<0.04	2.29	120.70	0.37	10.30	0.03	0.52	NP	NP	0.065	9.34
SL	10/6/2011	0200	<0.003	<0.04	2.28	120.12	0.37	10.30	0.03	0.50	NP	NP	0.058	8.39
SL	10/6/2011	0300	<0.003	<0.04	2.30	121.12	0.36	10.24	0.03	0.50	NP	NP	0.058	8.39
SL	10/6/2011	0400	<0.003	<0.04	2.29	120.43	0.37	10.30	0.03	0.53	NP	NP	0.058	8.39
SL	10/6/2011	0500	<0.003	<0.04	2.28	120.07	0.36	10.27	0.03	0.50	NP	NP	0.052	7.43
SL	10/6/2011	0600	<0.003	<0.04	2.30	120.85	0.36	10.24	0.03	0.48	553.98	11534	0.052	7.43
SL	10/6/2011	0700	<0.003	<0.04	2.33	122.64	0.36	10.27	0.03	0.45	NP	NP	0.052	7.43
SL	10/6/2011	0800	<0.003	<0.04	2.30	120.85	0.36	10.21	0.03	0.47	NP	NP	0.052	7.43
SL	10/6/2011	0900	<0.003	<0.04	2.30	120.85	0.37	10.32	0.03	0.52	NP	NP	0.052	7.43

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/6/2011	1000	<0.003	<0.04	2.28	120.07	0.37	10.35	0.04	0.58	NP	NP	0.045	6.47
SL	10/6/2011	1100	<0.003	<0.04	2.28	120.22	0.37	10.30	0.03	0.45	NP	NP	0.045	6.47
SL	10/6/2011	1200	<0.003	<0.04	2.34	123.22	0.36	10.24	0.03	0.47	563.27	11727	0.045	6.47
SL	10/6/2011	1300	<0.003	<0.04	2.40	126.49	0.36	10.24	0.03	0.44	NP	NP	0.045	6.47
SL	10/6/2011	1400	<0.003	<0.04	2.33	122.38	0.37	10.44	0.03	0.42	NP	NP	0.045	6.47
SL	10/6/2011	1500	<0.003	<0.04	2.31	121.33	0.37	10.35	0.03	0.42	NP	NP	0.045	6.47
SL	10/6/2011	1600	<0.003	<0.04	2.33	122.49	0.37	10.38	0.03	0.40	NP	NP	0.045	6.47
SL	10/6/2011	1700	<0.003	<0.04	2.31	121.33	0.37	10.41	0.03	0.42	NP	NP	0.038	5.51
SL	10/6/2011	1800	<0.003	<0.04	2.35	123.43	0.37	10.44	0.03	0.40	NP	NP	0.038	5.51
SL	10/6/2011	1900	<0.003	<0.04	2.32	121.85	0.37	10.35	0.02	0.39	NP	NP	0.038	5.51
SL	10/6/2011	2000	<0.003	<0.04	2.30	121.28	0.37	10.44	0.03	0.44	NP	NP	0.038	5.51
SL	10/6/2011	2100	<0.003	<0.04	2.27	119.43	0.37	10.55	0.03	0.42	NP	NP	0.071	10.30
SL	10/6/2011	2100	0.050	0.63	2.43	127.86	0.37	10.46	0.04	0.56	NP	NP	0.032	4.56
SL	10/6/2011	2200	<0.003	<0.04	2.33	122.49	0.37	10.41	0.03	0.40	NP	NP	0.038	5.51
SL	10/6/2011	2300	<0.003	<0.04	2.34	123.17	0.36	10.18	0.03	0.42	NP	NP	0.038	5.51
SL	10/6/2011	2400	<0.003	<0.04	2.31	121.33	0.37	10.32	0.03	0.44	NP	NP	0.038	5.51
SL	10/7/2011	0100	<0.003	<0.04	2.41	127.07	0.36	10.21	0.04	0.61	NP	NP	0.038	5.51
SL	10/7/2011	0200	<0.003	<0.04	2.31	121.38	0.37	10.44	0.02	0.39	NP	NP	0.038	5.51
SL	10/7/2011	0300	<0.003	<0.04	2.31	121.59	0.37	10.38	0.03	0.40	NP	NP	0.038	5.51
SL	10/7/2011	0400	<0.003	<0.04	2.27	119.22	0.37	10.32	0.03	0.44	NP	NP	0.035	5.04
SL	10/7/2011	0500	<0.003	<0.04	2.26	118.70	0.37	10.38	0.03	0.42	NP	NP	0.038	5.51
SL	10/7/2011	0600	<0.003	<0.04	2.25	118.49	0.37	10.32	0.03	0.40	NP	NP	0.038	5.51
SL	10/7/2011	0700	<0.003	<0.04	2.24	117.75	0.37	10.35	0.03	0.44	NP	NP	0.038	5.51
SL	10/7/2011	0800	<0.003	<0.04	2.32	122.12	0.37	10.30	0.03	0.44	NP	NP	0.038	5.51

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/7/2011	0900	<0.003	<0.04	2.34	123.33	0.37	10.35	0.03	0.40	NP	NP	0.038	5.51
SL	10/7/2011	1000	0.017	0.21	2.42	127.22	0.36	10.13	0.04	0.60	NP	NP	0.038	5.51
SL	10/7/2011	1100	0.021	0.26	2.37	124.96	0.36	10.21	0.03	0.48	NP	NP	0.038	5.51
SL	10/7/2011	1200	0.028	0.35	2.38	125.38	0.36	10.10	0.03	0.45	NP	NP	0.032	4.56
SL	10/7/2011	1300	0.026	0.33	2.33	122.86	0.36	10.10	0.04	0.60	NP	NP	0.032	4.56
SL	10/7/2011	1400	0.025	0.31	2.34	122.96	0.36	10.15	0.03	0.50	NP	NP	0.032	4.56
SL	10/7/2011	1500	0.025	0.31	2.34	123.07	0.36	10.15	0.03	0.45	NP	NP	0.032	4.56
SL	10/7/2011	1600	0.022	0.28	2.35	123.75	0.33	9.44	0.04	0.68	NP	NP	0.032	4.56
SL	10/7/2011	2000	0.027	0.34	2.29	120.75	0.36	10.01	0.04	0.66	NP	NP	0.032	4.56
SL	10/7/2011	2400	0.030	0.38	2.38	125.07	0.39	11.11	0.03	0.55	NP	NP	0.032	4.56
SL	10/8/2011	0400	<0.003	<0.04	2.42	127.49	0.36	10.27	0.04	0.56	NP	NP	0.032	4.56
SL	10/8/2011	0800	0.013	0.16	2.43	128.01	0.37	10.38	0.04	0.56	NP	NP	0.032	4.56
SL	10/8/2011	1200	<0.003	<0.04	2.40	126.43	0.36	10.21	0.04	0.63	NP	NP	0.032	4.56
SL	10/8/2011	1600	0.013	0.16	2.37	124.80	0.37	10.38	0.04	0.56	NP	NP	0.032	4.56
SL	10/8/2011	2000	0.031	0.39	2.43	128.07	0.35	9.93	0.04	0.69	NP	NP	0.032	4.56
SL	10/8/2011	2400	0.039	0.49	2.42	127.59	0.35	9.87	0.03	0.55	NP	NP	0.032	4.56
SL	10/9/2011	0400	0.023	0.29	2.37	124.70	0.36	10.07	0.04	0.61	NP	NP	0.032	4.56
SL	10/9/2011	0800	0.015	0.19	2.36	124.17	0.36	10.13	0.04	0.56	NP	NP	0.032	4.56
SL	10/9/2011	1200	0.040	0.50	2.46	129.28	0.36	10.10	0.04	0.63	NP	NP	0.032	4.56
SL	10/9/2011	1600	<0.003	<0.04	2.49	131.12	0.37	10.30	0.03	0.52	NP	NP	0.032	4.56
SL	10/9/2011	2000	<0.003	<0.04	2.47	129.75	0.36	10.24	0.03	0.55	NP	NP	0.032	4.56
SL	10/9/2011	2400	<0.003	<0.04	2.54	133.59	0.36	10.07	0.03	0.55	NP	NP	0.032	4.56
SL	10/10/2011	0400	<0.003	<0.04	2.44	128.49	0.37	10.46	0.04	0.69	NP	NP	0.032	4.56
SL	10/10/2011	0800	<0.003	<0.04	2.44	128.28	0.37	10.49	0.04	0.65	NP	NP	0.032	4.56

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/10/2011	1200	<0.003	<0.04	2.42	127.28	0.36	10.24	0.04	0.60	NP	NP	0.032	4.56
SL	10/10/2011	1600	<0.003	<0.04	2.37	124.80	0.37	10.30	0.05	0.73	NP	NP	0.032	4.56
SL	10/10/2011	2000	<0.003	<0.04	2.36	124.33	0.36	10.27	0.04	0.60	NP	NP	0.032	4.56
SL	10/10/2011	2400	<0.003	<0.04	2.37	124.86	0.36	10.21	0.04	0.58	NP	NP	0.032	4.56
SL	10/11/2011	0400	<0.003	<0.04	2.35	123.91	0.36	10.24	0.04	0.68	NP	NP	0.032	4.56
SL	10/11/2011	0800	<0.003	<0.04	2.33	122.38	0.36	10.21	0.04	0.60	NP	NP	0.032	4.56
SL	10/11/2011	1200	0.014	0.18	2.35	123.80	0.36	10.27	0.04	0.61	NP	NP	0.032	4.56
SL	10/11/2011	1800	0.021	0.26	2.50	131.43	0.36	10.21	0.04	0.58	NP	NP	0.032	4.56
SL	10/11/2011	2400	0.034	0.43	2.41	126.80	0.37	10.35	0.03	0.50	NP	NP	0.032	4.56
SL	10/12/2011	0600	0.024	0.30	2.40	126.28	0.37	10.35	0.04	0.56	NP	NP	0.032	4.56
SL	10/12/2011	1200	0.015	0.19	2.39	125.86	0.37	10.41	0.03	0.53	NP	NP	0.032	4.56
SL	10/12/2011	1800	0.026	0.33	2.42	127.38	0.37	10.38	0.03	0.55	NP	NP	0.032	4.56
SL	10/12/2011	2400	0.016	0.20	2.38	125.17	0.37	10.32	0.04	0.58	NP	NP	0.032	4.56
SL	10/13/2011	0600	0.015	0.19	2.37	124.91	0.37	10.30	0.04	0.56	NP	NP	0.032	4.56
SL	10/13/2011	1200	0.021	0.26	2.36	124.43	0.36	10.24	0.03	0.53	NP	NP	0.032	4.56
SL	10/13/2011	1800	0.015	0.19	2.34	123.07	0.37	10.32	0.04	0.58	NP	NP	0.032	4.56
SL	10/13/2011	2400	0.015	0.19	2.36	124.22	0.37	10.32	0.04	0.60	NP	NP	0.032	4.56
SL	10/14/2011	0600	0.038	0.48	2.42	127.28	0.37	10.30	0.04	0.58	NP	NP	0.032	4.56
SL	10/14/2011	1200	0.024	0.30	2.39	125.75	0.45	12.61	0.04	0.60	NP	NP	0.032	4.56
SL	10/14/2011	1800	0.022	0.28	2.37	124.70	0.37	10.55	0.04	0.58	NP	NP	0.032	4.56
SL	10/14/2011	2400	0.022	0.28	2.35	123.86	0.36	10.27	0.03	0.53	NP	NP	0.032	4.56
SL	10/15/2011	0600	0.015	0.19	2.31	121.33	0.36	10.13	0.04	0.58	NP	NP	0.032	4.56
SL	10/15/2011	1200	0.015	0.19	2.33	122.75	0.37	10.30	0.04	0.58	NP	NP	0.032	4.56
SL	10/15/2011	1800	0.024	0.30	2.37	124.64	0.37	10.49	0.03	0.55	NP	NP	0.032	4.56

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/15/2011	2400	0.015	0.19	2.34	123.07	0.38	10.58	0.04	0.60	NP	NP	0.032	4.56
SL	10/16/2011	0600	0.015	0.19	2.32	122.22	0.38	10.83	0.04	0.60	NP	NP	0.032	4.56
SL	10/16/2011	1200	0.015	0.19	2.43	127.86	0.37	10.55	0.04	0.58	NP	NP	0.032	4.56
SL	10/16/2011	1800	0.021	0.26	2.36	124.33	0.37	10.35	0.04	0.61	NP	NP	0.032	4.56
SL	10/16/2011	2400	0.027	0.34	2.31	121.70	0.37	10.44	0.03	0.55	NP	NP	0.032	4.56
SL	10/17/2011	0600	0.023	0.29	2.31	121.75	0.38	10.80	0.04	0.58	NP	NP	0.032	4.56
SL	10/17/2011	1200	0.024	0.30	2.30	120.91	0.38	10.75	0.04	0.60	NP	NP	0.032	4.56
SL	10/17/2011	1800	0.023	0.29	2.33	122.59	0.36	10.27	0.04	0.63	NP	NP	0.034	4.92
SL	10/17/2011	2400	0.023	0.29	2.36	124.07	0.38	10.69	0.04	0.66	NP	NP	0.030	4.30
SL	10/18/2011	0600	0.026	0.33	2.31	121.49	0.37	10.46	0.03	0.53	NP	NP	0.034	4.92
SL	10/18/2011	1200	0.020	0.25	2.34	123.33	0.37	10.49	0.03	0.55	NP	NP	0.030	4.30
SL	10/18/2011	1800	0.013	0.16	2.34	123.22	0.37	10.55	0.04	0.65	NP	NP	0.030	4.30
SL	10/18/2011	2400	0.013	0.16	2.34	123.17	0.38	10.58	0.04	0.60	NP	NP	0.030	4.30
SL	10/19/2011	0600	0.013	0.16	2.33	122.70	0.37	10.44	0.04	0.58	NP	NP	0.030	4.30
SL	10/19/2011	1200	0.013	0.16	2.50	131.70	0.38	10.77	0.04	0.68	NP	NP	0.030	4.30
SL	10/19/2011	1800	0.013	0.16	2.34	123.28	0.38	10.61	0.04	0.61	NP	NP	0.030	4.30
SL	10/19/2011	2400	0.013	0.16	2.35	123.49	0.37	10.55	0.04	0.60	NP	NP	0.030	4.30
SL	10/20/2011	0600	0.042	0.53	2.40	126.43	0.37	10.32	0.04	0.61	NP	NP	0.030	4.30
SL	10/20/2011	1200	0.013	0.16	2.36	124.33	0.37	10.52	0.04	0.68	NP	NP	0.030	4.30
SL	10/20/2011	1800	<0.003	<0.04	2.32	122.17	0.37	10.41	0.04	0.61	NP	NP	0.030	4.30
SL	10/20/2011	2400	<0.003	<0.04	2.36	124.12	0.37	10.52	0.04	0.60	NP	NP	0.030	4.30
SL	10/21/2011	0600	<0.003	<0.04	2.31	121.70	0.37	10.55	0.03	0.52	NP	NP	0.030	4.30
SL	10/21/2011	1200	<0.003	<0.04	2.33	122.64	0.37	10.41	0.04	0.61	NP	NP	0.030	4.30
SL	10/21/2011	1800	<0.003	<0.04	2.33	122.80	0.37	10.38	0.03	0.42	NP	NP	0.030	4.30

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	10/21/2011	2400	<0.003	<0.04	2.32	121.91	0.37	10.38	0.04	0.69	NP	NP	0.030	4.30
SL	10/22/2011	0600	<0.003	<0.04	2.32	121.96	0.37	10.41	0.04	0.61	NP	NP	0.030	4.30
SL	10/22/2011	1200	<0.003	<0.04	2.32	122.17	0.37	10.32	0.04	0.60	NP	NP	0.030	4.30
SL	10/22/2011	1800	0.018	0.23	2.35	123.64	0.36	10.15	0.04	0.58	NP	NP	0.026	3.69
SL	10/22/2011	2400	0.026	0.33	2.31	121.49	0.37	10.49	0.03	0.53	NP	NP	0.030	4.30
SL	10/23/2011	0600	0.019	0.24	2.30	121.28	0.37	10.44	0.04	0.56	NP	NP	0.030	4.30
SL	10/23/2011	1200	0.013	0.16	2.30	120.96	0.37	10.46	0.03	0.53	NP	NP	0.030	4.30
SL	10/25/2011	0	0.021	0.26	2.35	123.80	0.38	10.61	0.03	0.52	NP	NP	0.030	4.30
SL	10/25/2011	1200	0.013	0.16	2.31	121.80	0.37	10.55	0.04	0.56	NP	NP	0.030	4.30
SL	10/26/2011	0	0.013	0.16	2.33	122.43	0.38	10.58	0.03	0.55	NP	NP	0.030	4.30
SL	10/26/2011	1200	0.022	0.28	2.36	123.96	0.37	10.55	0.03	0.53	NP	NP	0.030	4.30
SL	10/27/2011	0	0.013	0.16	2.31	121.80	0.37	10.44	0.04	0.58	NP	NP	0.026	3.69
SL	10/27/2011	1200	0.021	0.26	2.34	122.96	0.37	10.49	0.03	0.53	NP	NP	0.030	4.30
SL	10/28/2011	0000	0.037	0.46	2.37	124.59	0.37	10.38	0.03	0.55	NP	NP	0.026	3.69
SL	10/28/2011	1200	0.025	0.31	2.29	120.64	0.37	10.41	0.04	0.56	NP	NP	0.026	3.69
SL	10/29/2011	0	0.024	0.30	2.28	119.96	0.38	10.58	0.04	0.56	NP	NP	0.026	3.69
SL	10/29/2011	1200	0.021	0.26	2.28	120.17	0.37	10.44	0.04	0.58	NP	NP	0.026	3.69
SL	10/30/2011	0	0.021	0.26	2.28	119.80	0.37	10.44	0.04	0.61	NP	NP	0.026	3.69
SL	10/30/2011	1200	0.021	0.26	2.26	118.85	0.37	10.35	0.04	0.56	NP	NP	0.026	3.69
SL	10/31/2011	0	0.022	0.28	2.28	120.12	0.38	10.58	0.04	0.60	NP	NP	0.026	3.69
SL	10/31/2011	1200	0.020	0.25	2.27	119.43	0.37	10.38	0.04	0.60	NP	NP	0.026	3.69
SL	11/1/2011	0	0.020	0.25	2.26	118.85	0.37	10.35	0.04	0.56	NP	NP	0.026	3.69
SL	11/1/2011	1200	0.021	0.26	2.28	119.85	0.37	10.38	0.03	0.55	NP	NP	0.026	3.69
SL	11/2/2011	0	0.021	0.26	2.30	120.80	0.36	10.15	0.04	0.58	NP	NP	0.026	3.69

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
SL	11/2/2011	1200	0.032	0.40	2.27	119.22	0.37	10.32	0.03	0.53	NP	NP	0.026	3.69
SL	11/3/2011	0	<0.003	<0.04	2.31	121.80	0.36	10.01	0.03	0.45	NP	NP	0.026	3.69
SL	11/3/2011	1200	0.021	0.26	2.24	118.07	0.36	10.27	0.04	0.61	NP	NP	0.026	3.69
SL	11/4/2011	0	0.022	0.28	2.21	116.22	0.36	10.24	0.03	0.48	NP	NP	0.026	3.69
SL	11/4/2011	1200	<0.003	<0.04	2.27	119.70	0.36	10.13	0.05	0.73	NP	NP	0.026	3.69
SL	11/5/2011	1200	<0.003	<0.04	2.28	120.12	0.36	10.15	0.04	0.69	NP	NP	0.026	3.69
SL	11/6/2011	1200	0.032	0.40	2.29	120.38	0.36	10.07	0.04	0.61	NP	NP	0.026	3.69
SL	11/7/2011	1200	0.013	0.16	2.28	119.85	0.36	10.27	0.04	0.65	NP	NP	0.026	3.69
SL	11/8/2011	1200	0.013	0.16	2.24	117.96	0.37	10.49	0.04	0.69	NP	NP	0.026	3.69
SL	11/9/2011	1200	0.019	0.24	2.23	117.49	0.36	10.18	0.04	0.69	NP	NP	0.026	3.69
SL	11/10/2011	1200	0.021	0.26	2.26	118.91	0.36	10.24	0.05	0.73	NP	NP	0.026	3.69
SL	11/11/2011	1200	0.019	0.24	2.22	116.91	0.39	10.94	0.05	0.74	NP	NP	0.026	3.69
SL	11/12/2011	1200	0.018	0.23	2.24	117.80	0.37	10.46	0.04	0.69	NP	NP	0.026	3.69
SL	11/13/2011	1200	0.020	0.25	2.26	118.75	0.36	10.24	0.04	0.68	NP	NP	0.026	3.69
SL	11/14/2011	1200	0.013	0.16	2.21	116.49	0.37	10.41	0.04	0.69	NP	NP	0.026	3.69
SL	11/15/2011	1200	0.019	0.24	2.22	116.64	0.36	10.13	0.04	0.69	NP	NP	0.026	3.69
SL	11/16/2011	1200	0.031	0.39	2.24	117.91	0.36	10.21	0.04	0.66	NP	NP	0.026	3.69
SL	11/17/2011	1200	0.020	0.25	2.21	116.22	0.36	10.13	0.04	0.71	NP	NP	0.026	3.69
SL	11/18/2011	1200	0.019	0.24	2.19	115.12	0.36	10.04	0.04	0.69	NP	NP	0.026	3.69
SL	11/19/2011	1200	0.022	0.28	2.17	114.01	0.35	9.96	0.04	0.65	NP	NP	0.026	3.69
SL_A	10/24/2011	1200	0.021	0.26	2.24	117.75	0.37	10.30	0.03	0.42	NP	NP	0.026	3.69
SL_B	10/24/2011	1200	<0.003	<0.04	0.10	5.21	0.38	10.72	0.35	5.71	NP	NP	0.004	0.62

TABLE 1
Time-Series and Synoptic Analytical Results – Ions

Location	Date	Time	Bromide		Fluoride		Chloride		Nitrate		Sulfate		Lithium	
			mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µEQ/L	mg/L	µmole/L
Miscellaneous														
Pond outflow to Dolores River	10/11/2011	1200	<0.003	<0.04	2.34	123.22	0.41	11.56	0.04	0.60	NP	NP	0.038	5.51
Snow	10/7/2011	1600	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Tailings Pond 15	10/5/2011	0800	<0.003	<0.04	2.36	124.17	0.61	17.29	0.05	0.87	NP	NP	0.052	7.43

* Samples were originally labeled ARG for Argentine Shaft but are shown as 517 to reflect the correct name of the sample location.
Mg/L milligrams per liter
µEQ/L microequivalents per liter
µmole/L micromoles per liter
NP Not processed

TABLE 2
Analytical Precision for Laboratory Analysis of Water Samples for Ions and Isotopes

Test/Solute	Detection Limit (µEQ/L)	Detection Limit (mg/L)	Sample Size	Within Run Precision (%RSD)
Chloride (Cl^-)	0.05	0.0017	85	0.50%
Nitrate (NO_3^-)	0.04	0.0024	85	0.56%
Sulfate (SO_4^-)	0.05	0.0022	85	0.49%
Bromide (Br^-)	0.039	0.0031	54	0.24%
Lithium (Li^+)	1.56	0.0108	23	1.06%
Fluoride (F^-)	0.30	0.0057	46	1.05%
Oxygen (^{18}O)	NA	NA	30	0.028 1 sigma
Deuterium (^2H)	NA	NA	30	0.148 1 sigma
Tritium (^3H)	0.3 TU	0.3 TU	NA	0.4 TU

µEQ/L microequivalents per liter
mg/L milligrams per liter
TU tritium units

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
517 Shaft*				
RICO_517	10/3/2011	1700	0	0
RICO_517	10/5/2011	30	2.6226E-05	350.2334643
RICO_517	10/5/2011	1200	1.98331E-05	419.9863269
RICO_517	10/5/2011	1330	1.95375E-05	443.7060733
RICO_517	10/5/2011	1430	1.95941E-05	456.4007601
RICO_517	10/5/2011	1530	1.96236E-05	448.5529453
RICO_517	10/5/2011	1630	1.60376E-05	479.6680527
RICO_517	10/5/2011	1815	2.45237E-05	351.9575653
RICO_517	10/5/2011	1846	2.01039E-05	408.0726615
RICO_517	10/5/2011	1935	1.84115E-05	477.1478393
RICO_517	10/5/2011	2030	1.691E-05	479.0902762
RICO_517	10/5/2011	2130	2.65965E-05	316.2825837
RICO_517	10/5/2011	2230	1.70548E-05	450.5971333
RICO_517	10/5/2011	2330	1.77196E-05	442.9285013
RICO_517	10/6/2011	130	1.46611E-05	478.1352884
RICO_517	10/6/2011	230	1.35911E-05	478.4139271
RICO_517	10/6/2011	330	1.41214E-05	472.1980769
RICO_517	10/6/2011	445	1.41794E-05	478.3979869
RICO_517	10/6/2011	630	1.39803E-05	462.7007646
RICO_517	10/6/2011	730	1.34248E-05	466.5649117
RICO_517	10/6/2011	830	1.3793E-05	458.0238015
RICO_517	10/6/2011	930	1.15269E-05	444.9969896
RICO_517	10/6/2011	1030	1.0139E-05	411.4187254
RICO_517	10/6/2011	1130	1.13158E-05	447.5921745
RICO_517	10/6/2011	1230	9.5644E-06	405.2981029
RICO_517	10/6/2011	1330	1.20013E-05	450.1355462
RICO_517	10/6/2011	1430	1.04067E-05	412.3040332
RICO_517	10/6/2011	1530	8.2707E-06	407.224506
RICO_517	10/6/2011	1630	7.91657E-06	376.152201
RICO_517	10/6/2011	1730	7.42145E-06	369.4246102
RICO_517	10/6/2011	1830	7.04163E-06	318.998508
RICO_517	10/6/2011	1930	4.32661E-06	298.0564692
RICO_517	10/6/2011	2030	5.00694E-06	318.8928037
RICO_517	10/6/2011	2130	1.25476E-05	446.1700324
RICO_517	10/6/2011	2230	6.12819E-06	318.9533934

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_517	10/6/2011	2330	6.97936E-06	353.5436853
RICO_517	10/7/2011	530	1.34569E-05	66814.22078
RICO_517	10/7/2011	1130	6.06748E-06	350.0531958
RICO_517	10/7/2011	1530	1.31431E-06	159.1277933
RICO_517	10/8/2011	1030	1.37352E-06	162.4536061
RICO_517	10/8/2011	1500	1.71657E-06	190.3993798
RICO_517	10/9/2011	1230	8.11479E-07	123.5434438
RICO_517	10/11/2011	1330	4.73247E-06	299.5783498
RICO_517	10/13/2011	1230	8.46629E-06	298.9282427
RICO_517	10/17/2011	**1650**	1.82241E-05	336.4792382
RICO_517	10/19/2011	1455	7.25013E-06	0
RICO_517	11/3/2011	1000	3.43476E-09	493.156153
Blaine Tunnel				
RICO_Blaine After Salt	10/5/2011	1445	1.29946E-06	0.000488291
RICO_Blaine Background	10/3/2011	1400	1.90628E-10	0.000152166
RICO_Blaine Inflow	10/6/2011	1300	0	0
Silver Creek				
RICO_SC_injection_solution	10/6/2011	1630	0	0
RICO_SC-1012	10/7/2011	915	0.808428475	NA
RICO_SC-106	10/5/2011	1642	1.991963363	NA
RICO_SC-106	10/7/2011	917	3.246841803	NA
RICO_SC-1094	10/7/2011	926	1.8638E-08	NA
RICO_SC-1131	10/6/2011	1259	0.332542872	NA
RICO_SC-1131	10/7/2011	915	0.605778221	NA
RICO_SC-136	10/5/2011	1640	0.803797054	NA
RICO_SC-136	10/7/2011	915	3.337428262	NA
RICO_SC-198	10/5/2011	1637	1.515108438	NA
RICO_SC-198	10/7/2011	910	2.373007926	NA
RICO_SC-253	10/5/2011	1645	1.334984318	NA
RICO_SC-253	10/7/2011	924	2.108045022	NA
RICO_SC-275	10/5/2011	1642	1.303171018	NA
RICO_SC-275	10/7/2011	920	2.169508049	NA
RICO_SC-321	10/5/2011	1639	0.75904304	NA
RICO_SC-321	10/7/2011	1916	1.741993369	NA
RICO_SC-351	10/5/2011	1635	0.360669468	NA
RICO_SC-351	10/7/2011	910	1.997123251	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SC-404	10/5/2011	1645	0.595833659	NA
RICO_SC-404	10/6/2011	1040	1.078129846	NA
RICO_SC-404	10/7/2011	913	1.925505897	NA
RICO_SC-443	10/5/2011	1642	0.402553071	NA
RICO_SC-443	10/7/2011	910	1.863510285	NA
RICO_SC-493	10/5/2011	930	1.42554E-08	NA
RICO_SC-493	10/5/2011	1000	1.49341E-08	NA
RICO_SC-493	10/5/2011	1030	1.00214E-08	NA
RICO_SC-493	10/5/2011	1100	4.71771E-09	NA
RICO_SC-493	10/5/2011	1130	5.13166E-09	NA
RICO_SC-493	10/5/2011	1200	0.000497457	NA
RICO_SC-493	10/5/2011	1230	0.080933114	NA
RICO_SC-493	10/5/2011	1300	0.09808285	NA
RICO_SC-493	10/5/2011	1330	0.117916916	NA
RICO_SC-493	10/5/2011	1400	0.126310424	NA
RICO_SC-493	10/5/2011	1430	0.084446196	NA
RICO_SC-493	10/5/2011	1500	0.10376522	NA
RICO_SC-493	10/5/2011	1530	0.109526556	NA
RICO_SC-493	10/5/2011	1600	0.104383057	NA
RICO_SC-493	10/5/2011	1630	0.118742179	NA
RICO_SC-493	10/5/2011	1700	0.365964868	NA
RICO_SC-493	10/5/2011	1730	0.611271053	NA
RICO_SC-493	10/5/2011	1800	0.634839526	NA
RICO_SC-493	10/5/2011	1900	1.560984444	NA
RICO_SC-493	10/5/2011	2000	1.278105424	NA
RICO_SC-493	10/5/2011	2100	0.962293473	NA
RICO_SC-493	10/5/2011	2200	0.925387034	NA
RICO_SC-493	10/5/2011	2300	0.832331534	NA
RICO_SC-493	10/5/2011	2400	0.9081979	NA
RICO_SC-493	10/6/2011	100	0.944749749	NA
RICO_SC-493	10/6/2011	200	0.953896713	NA
RICO_SC-493	10/6/2011	300	0.517084308	NA
RICO_SC-493	10/6/2011	400	0.470574924	NA
RICO_SC-493	10/6/2011	500	0.941322495	NA
RICO_SC-493	10/6/2011	600	1.019066833	NA
RICO_SC-493	10/6/2011	700	1.039905523	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SC-493	10/6/2011	800	1.308952506	NA
RICO_SC-493	10/6/2011	900	1.689467653	NA
RICO_SC-493	10/6/2011	1000	1.671673205	NA
RICO_SC-493	10/6/2011	1100	1.317164824	NA
RICO_SC-493	10/6/2011	1200	1.304435469	NA
RICO_SC-493	10/6/2011	1300	1.377517306	NA
RICO_SC-493	10/6/2011	1400	1.74118548	NA
RICO_SC-493	10/6/2011	1500	3.206959084	NA
RICO_SC-493	10/6/2011	1600	3.186500572	NA
RICO_SC-493	10/6/2011	1700	3.114458151	NA
RICO_SC-493	10/6/2011	1800	1.503303713	NA
RICO_SC-493	10/6/2011	1900	1.205075619	NA
RICO_SC-493	10/6/2011	2000	0.968443282	NA
RICO_SC-493	10/6/2011	2100	0.991143214	NA
RICO_SC-493	10/6/2011	2200	1.21275997	NA
RICO_SC-493	10/6/2011	2300	0.96649813	NA
RICO_SC-493	10/6/2011	2400	1.361318948	NA
RICO_SC-493	10/7/2011	100	1.435474389	NA
RICO_SC-493	10/7/2011	1300	1.78748365	NA
RICO_SC-493	10/7/2011	1400	1.295371809	NA
RICO_SC-493	10/7/2011	1800	3.590245472	NA
RICO_SC-493	10/7/2011	2100	1.467851137	NA
RICO_SC-493	10/7/2011	2400	1.477962252	NA
RICO_SC-493	10/8/2011	300	1.64909966	NA
RICO_SC-493	10/8/2011	600	1.533263037	NA
RICO_SC-493	10/8/2011	1100	0.087279275	NA
RICO_SC-493	10/8/2011	1200	0.032551597	NA
RICO_SC-493	10/8/2011	1400	0.001244935	NA
RICO_SC-493	10/8/2011	1500	0.003946999	NA
RICO_SC-493	10/8/2011	1800	0.001097057	NA
RICO_SC-493	10/8/2011	2100	0.00124214	NA
RICO_SC-493	10/8/2011	2400	0.000540724	NA
RICO_SC-493	10/9/2011	1200	0.00021297	NA
RICO_SC-493	10/9/2011	1500	0.000200804	NA
RICO_SC-493	10/9/2011	1800	0.000164688	NA
RICO_SC-493	10/9/2011	2100	0.000185258	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SC-493	10/9/2011	2400	0.000120672	NA
RICO_SC-493	10/10/2011	300	0.000256395	NA
RICO_SC-493	10/10/2011	300	4.39865E-05	NA
RICO_SC-493	10/10/2011	600	6.47091E-05	NA
RICO_SC-493	10/10/2011	600	1.75469E-05	NA
RICO_SC-493	10/10/2011	900	5.7592E-05	NA
RICO_SC-493	10/10/2011	900	1.54723E-05	NA
RICO_SC-493	10/10/2011	1200	4.86762E-05	NA
RICO_SC-493	10/10/2011	1200	1.56639E-05	NA
RICO_SC-493	10/10/2011	1500	5.7856E-05	NA
RICO_SC-493	10/10/2011	1800	3.3982E-05	NA
RICO_SC-493	10/10/2011	2100	5.57952E-05	NA
RICO_SC-493	10/10/2011	2400	3.0678E-05	NA
RICO_SC-493	10/11/2011	1500	1.34783E-05	NA
RICO_SC493	10/11/2011	1800	3.0743E-05	0
RICO_SC493	10/11/2011	2400	1.40819E-05	0
RICO_SC493	10/12/2011	600	8.20622E-06	0
RICO_SC493	10/12/2011	1200	1.97156E-05	0
RICO_SC493	10/12/2011	1801	9.04422E-06	0
RICO_SC493	10/12/2011	2400	5.96839E-06	0
RICO_SC493	10/13/2011	600	3.45549E-06	0
RICO_SC493	10/13/2011	1200	8.31714E-06	0
RICO_SC493	10/13/2011	1800	1.96474E-05	0
RICO_SC493	10/13/2011	2400	0.000243396	0
RICO_SC493	10/14/2011	600	3.01425E-06	0
RICO_SC493	10/14/2011	1200	4.72927E-06	0
RICO_SC493	10/14/2011	1800	1.86622E-06	0
RICO_SC493	10/14/2011	2400	1.62666E-06	0
RICO_SC493	10/15/2011	600	1.70466E-06	0
RICO_SC493	10/15/2011	1200	3.08321E-06	0
RICO_SC493	10/15/2011	1800	1.30888E-06	0
RICO_SC493	10/15/2011	2400	7.16066E-06	0
RICO_SC493	10/16/2011	600	1.48979E-06	0
RICO_SC493	10/16/2011	1200	1.71896E-06	0
RICO_SC493	10/16/2011	1800	1.12947E-06	0
RICO_SC493	10/16/2011	2400	1.04272E-06	0

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SC493	10/17/2011	600	7.15819E-07	0
RICO_SC493	10/17/2011	1200	9.17182E-07	0
RICO_SC493	10/17/2011	1800	6.07336E-07	0
RICO_SC493	10/17/2011	2400	5.50566E-07	0
RICO_SC493	10/18/2011	600	5.05278E-07	0
RICO_SC493	10/18/2011	1200	4.10117E-07	0
RICO_SC493	10/18/2011	1800	4.63824E-07	0
RICO_SC493	10/18/2011	2400	3.10197E-07	0
RICO_SC493	10/19/2011	1800	3.32542E-07	0
RICO_SC493	10/19/2011	1800	2.93186E-07	0
RICO_SC493	10/19/2011	2400	5.71585E-07	0
RICO_SC493	10/20/2011	600	4.01259E-07	0
RICO_SC493	10/20/2011	1200	4.795E-07	0
RICO_SC493	10/20/2011	1800	5.53648E-07	0
RICO_SC493	10/20/2011	2400	2.54355E-07	0
RICO_SC493	10/21/2011	1200	5.73952E-07	0
RICO_SC493	10/21/2011	1800	5.79896E-07	0
RICO_SC493	10/21/2011	2400	2.61458E-07	0
RICO_SC493	10/22/2011	600	1.89439E-07	0
RICO_SC493	10/22/2011	1200	2.8277E-07	0
RICO_SC493	10/22/2011	1800	5.95534E-07	0
RICO_SC493	10/22/2011	2400	2.6723E-07	0
RICO_SC493	10/23/2011	600	2.92416E-07	0
RICO_SC493	10/23/2011	1200	2.36692E-07	0
RICO_SC493	10/25/2011	0	3.37733E-09	0
RICO_SC493	10/25/2011	1200	3.32051E-09	0
RICO_SC493	10/26/2011	0	3.26431E-09	0
RICO_SC493	10/26/2011	1200	3.20872E-09	0
RICO_SC493	10/27/2011	0	3.15374E-09	0
RICO_SC493	10/27/2011	1200	3.09936E-09	0
RICO_SC493	10/28/2011	0	3.04559E-09	0
RICO_SC493	11/2/2011	0	2.99242E-09	0
RICO_SC493	11/3/2011	1500	2.93985E-09	0
RICO_SC-493	10/5/2011	1640	0.293859579	NA
RICO_SC-493	10/7/2011	911	1.836370159	NA
RICO_SC-542	10/5/2011	1637	0.197442329	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SC-542	10/7/2011	910	1.858856737	NA
RICO_SC-592	10/5/2011	1644	0.182625272	NA
RICO_SC-592	10/7/2011	916	1.814467316	NA
RICO_SC-636	10/5/2011	1641	0.208903358	NA
RICO_SC-636	10/6/2011	15:16:40	0	NA
RICO_SC-636	10/6/2011	15:17:50	0	NA
RICO_SC-636	10/6/2011	15:19:30	0	NA
RICO_SC-636	10/6/2011	15:21:15	0	NA
RICO_SC-636	10/6/2011	15:22:20	0	NA
RICO_SC-636	10/6/2011	15:24:35	0	NA
RICO_SC-636	10/6/2011	15:28	0	NA
RICO_SC-636	10/6/2011	1503	2.506587103	NA
RICO_SC-636	10/6/2011	1514	4.069060959	NA
RICO_SC-636	10/6/2011	1515	3.7069873	NA
RICO_SC-636	10/6/2011	1540	0	NA
RICO_SC-636	10/7/2011	914	1.581828353	NA
RICO_SC-68	10/5/2011	1645	1.908702694	NA
RICO_SC-68	10/6/2011	1127	1.88420593	NA
RICO_SC-68	10/7/2011	920	2.979692827	NA
RICO_SC-699	10/5/2011	1637	0.199518401	NA
RICO_SC-699	10/7/2011	910	1.888183138	NA
RICO_SC-759	10/7/2011	915	1.288466633	NA
RICO_SC-826	10/7/2011	910	0.874952778	NA
RICO_SC-895	10/6/2011	1252	0.468947554	NA
RICO_SC-895	10/7/2011	920	0.887686207	NA
Argentine Tailings Seep (SVS-12)				
RICO_SEEP	10/5/2011	800	0	0
RICO_SEEP	10/5/2011	1200	7.37781E-09	NA
RICO_SEEP	10/5/2011	1300	8.96237E-09	NA
RICO_SEEP	10/5/2011	1400	6.8307E-09	NA
RICO_SEEP	10/5/2011	1500	1.17384E-08	NA
RICO_SEEP	10/5/2011	1600	4.25682E-09	NA
RICO_SEEP	10/5/2011	1700	2.92678E-09	NA
RICO_SEEP	10/5/2011	1800	5.30747E-09	NA
RICO_SEEP	10/5/2011	1900	1.71939E-09	NA
RICO_SEEP	10/5/2011	2000	6.35447E-09	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SEEP	10/5/2011	2100	2.26626E-09	NA
RICO_SEEP	10/5/2011	2200	3.30575E-09	NA
RICO_SEEP	10/5/2011	2300	2.37088E-09	NA
RICO_SEEP	10/5/2011	2400	1.19548E-09	NA
RICO_SEEP	10/5/2011	2400	2.55092E-10	NA
RICO_SEEP	10/6/2011	100	4.95962E-09	NA
RICO_SEEP	10/6/2011	200	5.1704E-09	NA
RICO_SEEP	10/6/2011	300	6.75809E-10	NA
RICO_SEEP	10/6/2011	400	1.54309E-09	NA
RICO_SEEP	10/6/2011	500	1.3814E-08	NA
RICO_SEEP	10/6/2011	600	3.42376E-09	NA
RICO_SEEP	10/6/2011	700	2.85981E-09	NA
RICO_SEEP	10/6/2011	800	2.26626E-09	NA
RICO_SEEP	10/6/2011	900	1.05336E-08	NA
RICO_SEEP	10/6/2011	1000	3.69905E-09	NA
RICO_SEEP	10/6/2011	1100	1.67181E-09	NA
RICO_SEEP	10/6/2011	1200	2.0231E-09	NA
RICO_SEEP	10/6/2011	1300	3.49887E-09	NA
RICO_SEEP	10/6/2011	1400	2.72883E-09	NA
RICO_SEEP	10/6/2011	1500	3.0222E-09	NA
RICO_SEEP	10/6/2011	1600	1.76782E-09	NA
RICO_SEEP	10/6/2011	1700	2.26626E-09	NA
RICO_SEEP	10/6/2011	1800	8.46456E-10	NA
RICO_SEEP	10/6/2011	1900	8.50089E-09	NA
RICO_SEEP	10/6/2011	2000	1.13559E-09	NA
RICO_SEEP	10/6/2011	2100	4.37793E-09	NA
RICO_SEEP	10/6/2011	2200	3.93895E-09	NA
RICO_SEEP	10/6/2011	2300	1.00113E-09	NA
RICO_SEEP	10/6/2011	2400	4.11923E-10	NA
RICO_SEEP	10/7/2011	100	6.24288E-10	NA
RICO_SEEP	10/7/2011	1000	6.86429E-10	NA
RICO_SEEP	10/7/2011	1405	4.3605E-09	NA
RICO_SEEP	10/7/2011	1500	1.71939E-09	NA
RICO_SEEP	10/7/2011	1600	2.45434E-09	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SEEP	10/7/2011	1700	8.1035E-10	NA
RICO_SEEP	10/7/2011	1800	1.17279E-09	NA
RICO_SEEP	10/7/2011	1900	2.2383E-08	NA
RICO_SEEP	10/7/2011	2000	1.68125E-09	NA
RICO_SEEP	10/7/2011	2100	1.37881E-09	NA
RICO_SEEP	10/7/2011	2200	1.05643E-09	NA
RICO_SEEP	10/7/2011	2300	6.97154E-10	NA
RICO_SEEP	10/7/2011	2400	3.69905E-09	NA
RICO_SEEP	10/8/2011	100	4.19708E-09	NA
RICO_SEEP	10/8/2011	200	1.19363E-08	NA
RICO_SEEP	10/8/2011	300	6.00628E-09	NA
RICO_SEEP	10/8/2011	400	2.08876E-09	NA
RICO_SEEP	10/8/2011	500	8.5276E-09	NA
RICO_SEEP	10/8/2011	700	9.35421E-09	NA
RICO_SEEP	10/8/2011	800	2.14137E-09	NA
RICO_SEEP	10/8/2011	845	2.8201E-09	NA
RICO_SEEP	10/8/2011	1145	8.71711E-10	NA
RICO_SEEP	10/8/2011	1400	9.60239E-10	NA
RICO_SEEP	10/8/2011	1600	1.37132E-09	NA
RICO_SEEP	10/8/2011	1700	4.63514E-10	NA
RICO_SEEP	10/8/2011	1900	1.04756E-08	NA
RICO_SEEP	10/8/2011	2100	3.63669E-09	NA
RICO_SEEP	10/8/2011	2300	7.35537E-10	NA
RICO_SEEP	10/9/2011	100	4.75442E-09	NA
RICO_SEEP	10/9/2011	1100	2.15465E-09	NA
RICO_SEEP	10/9/2011	1300	5.611E-09	NA
RICO_SEEP	10/9/2011	1500	4.05589E-09	NA
RICO_SEEP	10/9/2011	1700	2.87179E-09	NA
RICO_SEEP	10/9/2011	1900	8.74598E-09	NA
RICO_SEEP	10/9/2011	2100	3.8258E-09	NA
RICO_SEEP	10/9/2011	2300	1.09678E-08	NA
RICO_SEEP	10/10/2011	100	1.0348E-08	NA
RICO_SEEP	10/10/2011	900	1.11288E-08	NA
RICO_SEEP	10/10/2011	1100	2.08876E-09	NA
RICO_SEEP	10/10/2011	1300	3.59037E-09	NA
RICO_SEEP	10/10/2011	1500	3.0367E-10	NA

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SEEP	10/10/2011	1700	2.98107E-09	NA
RICO_SEEP	10/10/2011	1900	2.5409E-09	NA
RICO_SEEP	10/10/2011	2100	4.35435E-10	NA
RICO_SEEP	10/10/2011	2300	1.65657E-10	NA
RICO_SEEP	10/11/2011	100	1.66333E-09	NA
RICO_SEEP	10/11/2011	300	5.47666E-10	NA
RICO_SEEP	10/11/2011	500	1.06596E-08	NA
RICO_SEEP	10/11/2011	700	5.64791E-09	NA
RICO_SEEP	10/11/2011	900	1.77266E-08	NA
RICO_SEEP	10/11/2011	1100	1.09915E-09	NA
RICO_SEEP	10/11/2011	1300	5.42879E-09	NA
RICO_SEEP	10/11/2011	1500	2.0434E-09	NA
RICO_SEEP	10/11/2011	1800	1.13633E-09	0
RICO_SEEP	10/11/2011	2400	1.42941E-09	0
RICO_SEEP	10/12/2011	600	1.30508E-09	0
RICO_SEEP	10/12/2011	1200	5.20401E-10	0
RICO_SEEP	10/12/2011	1800	2.16465E-09	0
RICO_SEEP	10/12/2011	2400	1.26148E-08	0
RICO_SEEP	10/13/2011	600	2.25597E-09	0
RICO_SEEP	10/13/2011	1200	1.10623E-08	0
RICO_SEEP	10/13/2011	1800	1.5433E-08	0
RICO_SEEP	10/13/2011	2400	6.1549E-09	0
RICO_SEEP	10/14/2011	600	4.66116E-09	0
RICO_SEEP	10/14/2011	1200	5.87893E-09	0
RICO_SEEP	10/14/2011	1800	1.4111E-08	0
RICO_SEEP	10/14/2011	2400	3.05121E-09	0
RICO_SEEP	10/15/2011	600	1.75807E-09	0
RICO_SEEP	10/15/2011	1200	3.8114E-09	0
RICO_SEEP	10/15/2011	1800	6.80752E-09	0
RICO_SEEP	10/15/2011	2400	1.5801E-09	0
RICO_SEEP	10/16/2011	600	1.41775E-08	0
RICO_SEEP	10/16/2011	1200	3.05121E-09	0
RICO_SEEP	10/16/2011	1800	3.76366E-09	0
RICO_SEEP	10/16/2011	2400	4.23798E-09	0
RICO_SEEP	10/17/2011	600	4.23798E-09	0
RICO_SEEP	10/17/2011	1200	3.48527E-09	0

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SEEP dup 243	10/10/2011	1500	1.16529E-09	NA
RICO_SilverCreek	10/4/2011	1200	0	0
St. Louis Tunnel				
RICO_SL	10/4/2011	1000	5.05783E-10	7.38745E-06
RICO_SL	10/4/2011	1200	4.13619E-09	0.001695104
RICO_SL	10/4/2011	1400	6.33369E-10	0.000398109
RICO_SL	10/4/2011	1600	1.4192E-09	0.005717108
RICO_SL	10/4/2011	1700	2.97066E-10	0.000135701
RICO_SL	10/4/2011	1800	2.23206E-09	0.00190577
RICO_SL	10/4/2011	1900	4.63514E-10	3.31425E-05
RICO_SL	10/4/2011	2000	1.06913E-09	2.60987E-05
RICO_SL	10/4/2011	2100	1.85618E-09	3.04906E-05
RICO_SL	10/4/2011	2200	2.07573E-09	1.70123E-05
RICO_SL	10/4/2011	2300	1.83508E-09	1.79401E-05
RICO_SL	10/5/2011	100	3.48075E-09	2.60987E-05
RICO_SL	10/5/2011	200	6.3947E-10	2.99065E-05
RICO_SL	10/5/2011	300	5.22691E-09	1.170446127
RICO_SL	10/5/2011	400	1.91565E-07	416.9821611
RICO_SL	10/5/2011	500	1.2355E-05	328.6631541
RICO_SL	10/5/2011	600	8.89123E-05	24.68183478
RICO_SL	10/5/2011	700	0.000212586	3.098130614
RICO_SL	10/5/2011	800	0.000260152	1.982331476
RICO_SL	10/5/2011	900	0.000248445	2.276559908
RICO_SL	10/5/2011	1000	0.000160894	4.807896846
RICO_SL	10/5/2011	1100	9.52248E-05	16.52987741
RICO_SL	10/5/2011	1200	4.57843E-05	84.60183576
RICO_SL	10/5/2011	1300	2.56024E-05	227.5239367
RICO_SL	10/5/2011	1400	1.51041E-05	325.8934897
RICO_SL	10/5/2011	1500	9.30163E-06	321.5832481
RICO_SL	10/5/2011	1600	6.0354E-06	302.9403108
RICO_SL	10/5/2011	1700	4.57877E-06	361.4702795
RICO_SL	10/5/2011	1800	3.18606E-06	347.8216204
RICO_SL	10/5/2011	1900	2.50572E-06	399.2514315
RICO_SL	10/5/2011	2000	1.84939E-06	424.6923528
RICO_SL	10/5/2011	2200	1.20522E-06	458.0361522
RICO_SL	10/5/2011	2300	9.53289E-07	475.751137

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SL	10/5/2011	2400	9.25683E-07	479.031254
RICO_SL	10/6/2011	100	6.75097E-07	484.9379978
RICO_SL	10/6/2011	200	6.55563E-07	483.2070414
RICO_SL	10/6/2011	300	5.32604E-07	480.1050445
RICO_SL	10/6/2011	400	4.02801E-07	474.107814
RICO_SL	10/6/2011	500	3.77535E-07	465.9143617
RICO_SL	10/6/2011	600	2.79716E-07	452.6254954
RICO_SL	10/6/2011	700	2.7525E-07	448.7433837
RICO_SL	10/6/2011	800	2.58554E-07	426.6315574
RICO_SL	10/6/2011	900	1.87482E-07	421.5042506
RICO_SL	10/6/2011	1000	1.6098E-07	397.6421857
RICO_SL	10/6/2011	1100	1.69691E-07	377.1080944
RICO_SL	10/6/2011	1200	2.12832E-07	367.2297701
RICO_SL	10/6/2011	1300	1.13755E-07	365.3808949
RICO_SL	10/6/2011	1400	1.05257E-07	319.9813944
RICO_SL	10/6/2011	1500	1.089E-07	296.1196892
RICO_SL	10/6/2011	1600	5.70187E-08	279.9181087
RICO_SL	10/6/2011	1700	5.69106E-08	263.2673034
RICO_SL	10/6/2011	1800	8.83532E-08	258.0410287
RICO_SL	10/6/2011	1900	4.41057E-08	251.8887097
RICO_SL	10/6/2011	2000	4.54966E-08	229.7302178
RICO_SL	10/6/2011	2100	1.99649E-06	452.3121289
RICO_SL	10/6/2011	2100	3.08771E-08	214.6443622
RICO_SL	10/6/2011	2200	4.44047E-08	206.6909413
RICO_SL	10/6/2011	2300	2.31245E-08	197.6504948
RICO_SL	10/6/2011	2400	6.44202E-08	192.9089881
RICO_SL	10/7/2011	100	5.50394E-08	183.8296632
RICO_SL	10/7/2011	200	6.58042E-08	174.4704838
RICO_SL	10/7/2011	300	2.03529E-08	162.7912881
RICO_SL	10/7/2011	400	4.61316E-08	155.7602484
RICO_SL	10/7/2011	500	1.44794E-08	148.8826073
RICO_SL	10/7/2011	600	1.50839E-08	145.0232166
RICO_SL	10/7/2011	700	1.34459E-08	136.4017629
RICO_SL	10/7/2011	800	1.20961E-08	135.8542771
RICO_SL	10/7/2011	900	9.52544E-09	127.3603757
RICO_SL	10/7/2011	1000	1.14455E-08	122.3419313

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SL	10/7/2011	1100	9.49104E-09	123.8166159
RICO_SL	10/7/2011	1200	7.64409E-09	109.2594815
RICO_SL	10/7/2011	1300	1.72566E-08	104.5585069
RICO_SL	10/7/2011	1400	9.40537E-09	102.6281637
RICO_SL	10/7/2011	1500	1.16011E-08	93.71947482
RICO_SL	10/7/2011	1600	9.66386E-09	89.26338075
RICO_SL	10/7/2011	2000	5.58365E-08	88.49171199
RICO_SL	10/7/2011	2400	6.82838E-09	76.80703156
RICO_SL	10/8/2011	400	6.1549E-09	67.9235747
RICO_SL	10/8/2011	800	6.17446E-09	56.64291764
RICO_SL	10/8/2011	1200	3.79226E-09	54.51586569
RICO_SL	10/8/2011	1600	1.28532E-08	51.96402507
RICO_SL	10/8/2011	2000	6.48605E-09	50.29474351
RICO_SL	10/8/2011	2400	3.90316E-09	46.34850163
RICO_SL	10/9/2011	400	2.72625E-09	42.5029026
RICO_SL	10/9/2011	800	4.15136E-09	39.85559879
RICO_SL	10/9/2011	1200	4.20218E-09	36.78250074
RICO_SL	10/9/2011	1600	6.73829E-09	32.85085879
RICO_SL	10/9/2011	2000	6.10942E-09	31.2324129
RICO_SL	10/9/2011	2400	9.98885E-09	31.56119558
RICO_SL	10/10/2011	400	3.6834E-09	35.8292861
RICO_SL	10/10/2011	400	3.30284E-09	31.09894835
RICO_SL	10/10/2011	800	2.49453E-08	41.12950684
RICO_SL	10/10/2011	800	5.16846E-09	34.67956188
RICO_SL	10/10/2011	1200	7.18206E-09	37.50774052
RICO_SL	10/10/2011	1200	2.68775E-09	27.74448847
RICO_SL	10/10/2011	1600	4.07087E-09	33.85589657
RICO_SL	10/10/2011	2000	1.0348E-08	29.30572166
RICO_SL	10/10/2011	2400	5.34507E-09	25.74787083
RICO_SL	10/11/2011	1800	1.2577E-08	33.52272752
RICO_SL	10/11/2011	2400	8.29728E-08	29.31167442
RICO_SL	10/12/2011	600	6.46587E-09	27.85508425
RICO_SL	10/12/2011	1200	2.99721E-08	26.22976522
RICO_SL	10/12/2011	1800	4.38841E-08	24.51512036
RICO_SL	10/12/2011	2400	7.84685E-08	23.18929508
RICO_SL	10/13/2011	600	1.90806E-09	22.27481862

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SL	10/13/2011	1200	8.42106E-09	20.69149868
RICO_SL	10/13/2011	1800	4.75442E-09	22.79293938
RICO_SL	10/13/2011	2400	1.24063E-08	20.76695214
RICO_SL	10/14/2011	600	1.09364E-08	20.89257928
RICO_SL	10/14/2011	1200	1.18041E-08	20.10368383
RICO_SL	10/14/2011	1800	6.85393E-09	18.7479593
RICO_SL	10/14/2011	2400	6.55081E-08	17.66575787
RICO_SL	10/15/2011	600	2.26318E-08	17.02353662
RICO_SL	10/15/2011	1200	1.9899E-08	20.01492789
RICO_SL	10/15/2011	1800	2.93783E-08	29.19278334
RICO_SL	10/15/2011	2400	1.94426E-08	37.56888408
RICO_SL	10/16/2011	600	7.97778E-09	34.52370135
RICO_SL	10/16/2011	1200	8.74326E-09	33.5407501
RICO_SL	10/16/2011	1800	5.34705E-09	30.74067935
RICO_SL	10/16/2011	2400	2.65212E-09	30.30672876
RICO_SL	10/17/2011	600	7.30492E-09	30.64406731
RICO_SL	10/17/2011	1200	3.76208E-09	28.69086139
RICO_SL	10/17/2011	1800	7.30492E-09	31.45379767
RICO_SL	10/17/2011	2400	9.07324E-09	30.54372014
RICO_SL	10/18/2011	600	4.66298E-09	29.27073158
RICO_SL	10/18/2011	1200	3.27666E-09	28.54045895
RICO_SL	10/18/2011	1800	2.33567E-09	27.37646645
RICO_SL	10/18/2011	2400	2.6744E-08	27.39907974
RICO_SL	10/19/2011	600	1.20027E-08	27.07161642
RICO_SL	10/19/2011	1200	5.795E-09	27.19383304
RICO_SL	10/19/2011	1800	5.11236E-09	26.84120721
RICO_SL	10/19/2011	2400	2.39454E-09	25.98178326
RICO_SL	10/20/2011	600	5.15101E-09	25.62640492
RICO_SL	10/20/2011	1200	2.04448E-09	24.10975139
RICO_SL	10/20/2011	1800	3.16195E-09	23.15484885
RICO_SL	10/20/2011	2400	6.73829E-09	22.21339546
RICO_SL	10/21/2011	600	3.17614E-09	21.15410453
RICO_SL	10/21/2011	1200	9.78602E-09	20.08794466
RICO_SL	10/21/2011	1800	1.62508E-09	19.56918703
RICO_SL	10/21/2011	2400	5.24844E-09	18.58749295
RICO_SL	10/22/2011	600	2.76771E-09	18.14360871

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SL	10/22/2011	1200	7.47573E-09	17.39306727
RICO_SL	10/22/2011	1800	2.43031E-09	17.43431308
RICO_SL	10/22/2011	2400	9.07324E-09	16.84234589
RICO_SL	10/23/2011	600	1.729E-09	16.02827827
RICO_SL	10/23/2011	1200	7.20844E-09	15.90622496
RICO_SL	10/25/2011	000	1.79409E-08	13.7985772
RICO_SL	10/25/2011	1200	2.01246E-09	12.8146645
RICO_SL	10/26/2011	000	1.94939E-09	12.3211244
RICO_SL	10/26/2011	1200	1.90806E-09	12.0622453
RICO_SL	10/27/2011	000	2.76771E-09	10.86965364
RICO_SL	10/27/2011	1200	7.97778E-09	10.34532873
RICO_SL	10/28/2011	0	4.8284E-09	9.815367028
RICO_SL	10/28/2011	1200	1.62508E-09	9.479745923
RICO_SL	10/29/2011	000	3.04983E-09	8.692993326
RICO_SL	10/29/2011	1200	1.15102E-08	8.339213
RICO_SL	10/30/2011	000	4.39541E-09	8.071827984
RICO_SL	10/30/2011	1200	3.69905E-09	7.63504836
RICO_SL	10/31/2011	000	8.46456E-10	7.142664987
RICO_SL	10/31/2011	1200	4.88436E-09	6.565001093
RICO_SL	11/1/2011	000	1.44045E-08	6.751488676
RICO_SL	11/1/2011	1200	5.19954E-10	6.461546926
RICO_SL	11/2/2011	000	1.55207E-09	6.537862715
RICO_SL	11/2/2011	1200	1.20027E-08	6.075624281
RICO_SL	11/3/2011	000	8.23668E-09	5.767844864
RICO_SL	11/3/2011	1200	5.28939E-10	5.407196887
RICO_SL	11/4/2011	000	3.49282E-09	5.160667264
RICO_SL	11/4/2011	1200	2.78569E-09	4.284772579
RICO_SL	11/5/2011	1200	2.73548E-09	4.114537883
RICO_SL	11/6/2011	1200	2.68585E-09	3.432668652
RICO_SL	11/7/2011	1200	2.6368E-09	3.195510125
RICO_SL	11/8/2011	1200	2.58833E-09	2.929981306
RICO_SL	11/9/2011	1200	2.54043E-09	2.699379459
RICO_SL	11/10/2011	1200	2.4931E-09	2.348632845
RICO_SL	11/11/2011	1200	2.44634E-09	2.323134129
RICO_SL	11/12/2011	1200	2.40014E-09	2.336213421
RICO_SL	11/13/2011	1200	2.35451E-09	2.270554937

TABLE 3
Dye Tracer Analytical Results

Sample ID	Date	Time	Rhodamine WT Concentration (ppb)	Fluorescein Concentration (ppb)
RICO_SL	11/14/2011	1200	2.30944E-09	2.116912286
RICO_SL	11/15/2011	1200	2.26492E-09	2.014742121
RICO_SL	11/16/2011	1200	2.22095E-09	1.842725528
RICO_SL	11/17/2011	1200	2.17753E-09	1.777663556
RICO_SL	11/18/2011	1200	2.13466E-09	1.732284064
RICO_SL	11/19/2011	1200	2.09234E-09	1.791588887
RICO_SL_A	10/24/2011	1200	2.88787E-09	11.46084223
RICO_SL_B	10/24/2011	1200	2.83649E-09	4.85898E-05
Miscellaneous				
RICO_SilverCreek	10/4/2011	1200	0	0
RICO_Pond outflow to Dolores River	10/11/2011	1200	2.47853E-09	0.009095562
RICO_SNOW	10/7/2011	1600	0	0
RICO_Tailings Pond 15	10/5/2011	800	2.63776E-06	405.0723333

* Samples were originally labeled RICO_ARG for Argentine Shaft but are shown as 517 to reflect the correct name of the sample location.
Ppb Parts per billion

TABLE 4
Mine Water Quality Analytical Results

Location	Fraction	Argentine Tunnel	517 Shaft* Tunnel Hoist Room Pipe	517 Shaft*	517 Shaft* 455 feet	517 Shaft* 475 feet	Blaine Inflow1	Blaine Tunnel	Blaine Tunnel
Date		6/23/2011	6/23/2011	8/4/2011	10/3/2011	10/3/2011	10/6/2011	8/4/2011	10/3/2011
Aluminum (µg/L)	**Total**	677,000	40.6 J	NA	NA	NA	NA	55,600	127,000
	Dissolved	656,000	30.2 J	23,600	28,100	27,600	303,000	41,300	124,000
Antimony (µg/L)	**Total**	50.0 U	2.50 U	NA	NA	NA	NA	2.50 U	5.00 U
	Dissolved	50.0 U	0.500 U	2.50 U	5.00 U	5.00 U	5.00 U	2.50 U	5.00 U
Arsenic (µg/L)	**Total**	98.4 J	2.50 U	NA	NA	NA	NA	37.9	1220
	Dissolved	83.8 J	0.500 U	5.66 J	5.00 U	5.00 U	51.7	19.4	1190
Barium (µg/L)	**Total**	500 U	51.1	NA	NA	NA	NA	25.0 U	50.0 U
	Dissolved	500 U	48.7	74	50.0 U	50.0 U	50.0 U	45.1 J	50.0 U
Beryllium (µg/L)	**Total**	197	0.500 U	NA	NA	NA	NA	9.7	12.3
	Dissolved	172	0.100 U	3.63	4.63	4.26	20.6	10.4	16.1
Cadmium (µg/L)	**Total**	11,900	0.500 U	NA	NA	NA	NA	387	967
	Dissolved	12,000	0.100 U	285	399	390	1180	339	953
Calcium (µg/L)	**Total**	445,000	84,200	NA	NA	NA	NA	332,000	373,000
	Dissolved	435,000	85,200	332,000	436,000	424,000	389,000	318,000	366,000
Chromium (µg/L)	**Total**	331	2.50 U	NA	NA	NA	NA	42.1	103
	Dissolved	336	5.64	16.7	38.5	26.5	225	29.2	105
Cobalt (µg/L)	**Total**	520	0.500 U	NA	NA	NA	NA	56.8	145
	Dissolved	531	0.100 U	27.2	37.1	36.9	242	46.8	152
Copper (µg/L)	**Total**	350,000	2.50 U	NA	NA	NA	NA	5370	14500
	Dissolved	349,000	0.500 U	2250	2700	2810	30300	4140	15800

TABLE 4
Mine Water Quality Analytical Results

Location	Fraction	Argentine Tunnel	517 Shaft* Tunnel Hoist Room Pipe	517 Shaft*	517 Shaft* 455 feet	517 Shaft* 475 feet	Blaine Inflow1	Blaine Tunnel	Blaine Tunnel
Hardness (mg/L)		6230	234	1060	1390	1350	1920	1150	1480
Iron (µg/L)	**Total**	2,010,000	100 U	NA	NA	NA	NA	428,000	1,420,000
	Dissolved	1,950,000	100 U	46000	81700	75300	2,190,000	315,000	1,390,000
Lead (µg/L)	**Total**	473	1.6	NA	NA	NA	NA	237	771
	Dissolved	239	0.14 J	227	429	435	290	179	404
Magnesium (µg/L)	**Total**	1,290,000	5090	NA	NA	NA	NA	95,400	140,000
	Dissolved	1250000	5100	56800	73200	70400	229000	85900	138,000
Manganese (µg/L)	**Total**	270,000	1.00 U	NA	NA	NA	NA	31,400	61,500
	Dissolved	294,000	0.200 U	17,000	23,300	23,400	115,000	28,200	61,600
Molybdenum (µg/L)	**Total**	10.0 U	1.35	NA	NA	NA	NA	4.7	23.4
	Dissolved	10.0 U	1.28	5.3	2.6	1.00 U	7.55	3.37	19
Nickel (µg/L)	**Total**	848	2.50 U	NA	NA	NA	NA	95.6	197
	Dissolved	882	0.500 U	49.7	73.5	73.3	420	81.4	214
Potassium (µg/L)	**Total**	12,500 U	986 J	NA	NA	NA	NA	6970	7810 J
	Dissolved	12,500 U	998 J	2820 J	1430	1280	22,100	6280	7010 J
Selenium (µg/L)	**Total**	295	2.50 U	NA	NA	NA	NA	12.4	33.6
	Dissolved	248	0.806 J	9.89	13.2	8.77 J	43.6	10.9	35.3
Silver (µg/L)	**Total**	33.8 J	0.500 U	NA	NA	NA	NA	0.953	5.00 U
	Dissolved	10.0 U	0.100 U	47.8	6.82 J	5.00 U	5.00 U	0.500 U	5.00 U
Sodium (µg/L)	**Total**	12,500 U	1220	NA	NA	NA	NA	4310	4790 J
	Dissolved	12,500 U	1180	7430	4680	4470	5000	4820	4650 J

TABLE 4
Mine Water Quality Analytical Results

Location	Fraction	Argentine Tunnel	517 Shaft* Tunnel Hoist Room Pipe	517 Shaft*	517 Shaft* 455 feet	517 Shaft* 475 feet	Blaine Inflow1	Blaine Tunnel	Blaine Tunnel
Thallium (µg/L)	**Total**	81.2 J	2.50 U	NA	NA	NA	NA	10.3	9.42
	Dissolved	50.0 U	0.500 U	2.50 U	5.00 U	5.00 U	5.61 J	2.50 U	5.00 U
Vanadium (µg/L)	**Total**	100 U	5.00 U	NA	NA	NA	NA	65.9	165
	Dissolved	100 U	1.57 J	5.00 U	10.0 U	10.0 U	390	49.5	172
Zinc (µg/L)	**Total**	2,390,000	14.1 J	NA	NA	NA	NA	67,200	161,000
	Dissolved	2,460,000	10.8	51,500	67,700	67,500	199,000	61,700	161,000

* Sample initially labeled Argentine Shaft but are shown on this table with the correct location name, 517 Shaft.
U The analyte was not detected at or above the Method Detection Limit
J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit.
mg/L milligrams per liter
µg/L micrograms per liter

TABLE 5
Surface Water Quality Analytical Results

Location		DR-3	DR-3	DR-7	SC-068	SC-068	SC-198	SC-198	SC-275	SC-351	SC-351	SC-404	SC-404	SC-4040	SC-493	SC-493	SC-699	SC-699	SC-895	SC-895	SC-EF	SC-1094 (SVS12)	SC-1094 (SVS12)	SC-1131	SC-1131
Date		6/23/ 2011	10/20/ 2011	6/23/ 2011	6/23/ 2011	10/7/ 2011	6/23/ 2011	10/7/ 2011	10/7/ 2011	6/23/ 2011	10/7/ 2011	6/24/ 2011	10/7/ 2011	6/24/ 2011	6/23/ 2011	10/7/ 2011	6/23/ 2011	10/7/ 2011	6/23/ 2011	10/7/ 2011	6/23/ 2011	6/23/ 2011	10/7/ 2011	6/23/ 2011	10/7/ 2011
pH		6.7	7.4	7.9	8.5	8.2	8.5	8.3	8.3	8.5	8.3	7.1	8.4	7.1	8.5	8.4	8.5	8.2	8.6	7.9	8.5	7.9	7.8	8.7	8.2
Aluminum (µg/L)	Total	1040	195	372	146	29.5 J	136	49.3 J	57.3	136	62.1	145	69.7	156	176	58.2	182	72.3	184	47.2 J	60	200 U	95.1	191	49.1 J
	Diss.	351	30.2	85.4	53.4	40.8 J	51.9	35 J	33.5 J	54	42.7 J	53.4	50.6	56.4	65.7	47.6 J	72.3	43.7 J	65.9	38.9 J	50.6	200 U	63.5	68.3	43 J
Antimony (µg/L)	Total	5.00 U	5.00 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	5.00 U	2.50 U	2.50 U	2.50 U
	Diss.	5.00 U	5.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U	0.500 U
Arsenic (µg/L)	Total	5.00 U	5.00 U	2.50 U	2.50 U	3.56 J	2.50 U	2.50 U	2.72 J	2.50 U	3.48 J	2.50 U	2.50 U	2.50 U	2.50 U	4.27 J	2.50 U	3.31 J	2.50 U	2.50 U	2.50 U	5.00 U	2.50 U	2.50 U	2.50 U
	Diss.	5.00 U	5.00 U	0.500 U	1.76 J	13.6	1.67 J	12.8	12.1	1.7 J	12.1	0.641 J	12.4	0.635 J	1.71 J	12	1.63 J	11.5	1.54 J	10.2	0.500 U	5.00 U	0.500 U	1.51 J	8.91
Barium (µg/L)	Total	50.0 U	50.0 U	40.3 J	79.4	120	78.8	121	121	78.9	121	82.1	124	82.8	84.3	121	78.6	119	75.2	109	51.2	50.0 U	25.0 U	74.6	102
	Diss.	50.0 U	50.0 U	36.3	74.6	121	76.7	121	122	76	121	79.9	120	78.4	77	119	76.5	120	70.5	110	50.2	50.0 U	7.65 J	71.7	103
Beryllium (µg/L)	Total	1.23 J	2.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U	0.500 U	0.500 U	0.500 U
	Diss.	1.00 U	2.00 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U	0.100 U
Cadmium (µg/L)	Total	54.8	18.2	1.11	0.500 U	3.16	0.500 U	0.872 J	1.8	0.500 U	2.44	0.500 U	2.29	0.500 U	0.574 J	2.23	0.677 J	2.2	0.694 J	2.36	1.29	1.00 U	1.18 J	0.685 J	2.43
	Diss.	52	17.5	0.819	0.100 U	0.100 U	0.100 U	0.217	1.22	0.187 J	1.53	0.242	1.68	0.212	0.293	1.73	0.333	1.74	0.424	1.93	0.958	1.00 U	0.553	0.467	1.92
Calcium (µg/L)	Total	242,000	211,000	24,300	18,000	37,000	18,200	38,100	38,500	18,600	38,500	19,900	39,200	19,900	18,300	39,300	18,400	39,600	19,100	41,800	25,900	360,000	314,000	19,800	51,000
	Diss.	250,000	221,000	24,400	18,300	36,100	18,400	38,000	38,600	18,400	39,200	19,900	39,300	20,000	18,300	39,200	18,300	39,200	19,300	42,500	26,000	355,000	320,000	19,900	51,300
Chromium (µg/L)	Total	5.00 U	5.00 U	2.50 U	2.50 U	6.91	2.50 U	5.48	4.81 J	2.50 U	2.50 U	2.50 U	2.88 J	2.50 U	2.50 U	3.67 J	2.50 U	3.83 J	2.50 U	4.43 J	2.50 U	5.00 U	3.64 J	2.50 U	5.44
	Diss.	5.00 U	10.4	1.75	1.81	3.46	1.95	3.24	3.26	1.94	3.37	1.9	2.84	1.93	1.65	3.31	1.91	2.52	1.86	3.32	2.15	7.52 J	5.06	1.85	3.46
Cobalt (µg/L)	Total	4.81	1.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U	0.500 U	0.500 U	0.500 U
	Diss.	4.72	1.16	0.100 U	0.12 J	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U	0.100 U
Copper (µg/L)	Total	153	20.7	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	3.18 J	2.50 U	3.36 J	2.50 U	3.08 J	2.50 U	3.03 J	5.00 U	2.50 U	4.44 J	2.50 U
	Diss.	55.2	5.00 U	0.519	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.591 J	0.500 U	0.589 J	0.813 J	0.500 U	2.12	1.24	2.78	1.37	2.57	1.07	2.51	5.00 U	0.500 U	2.78	0.98 J
Hardness (mg/L)		723	631	75	52	105	53	111	114	53	116	57	116	58	53	116	53	116	55	125	71	1160	1030	57	154
Iron (µg/L)	Total	4960	3620	300	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	163 J	100 U	181 J	100 U	182 J	100 U	100 U	1000 U	949	193 J	100 U
	Diss.	445	1090	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	111 J	100 U	100 U	100 U	100 U	1000 U	100 U	100 U	100 U
Lead (µg/L)	Total	3.28	1.2	0.933 J	0.742 J	0.500 U	0.89 J	0.502 J	0.853 J	1.48	3.87	2.13	3.27	2.13	2.18	3.1	2.15	2.86	2.47	2.27	2.26	1.00 U	0.554 J	2.77	1.86
	Diss.	1.00 U	1.00 U	1.42	1.00	0.221	0.100 U	0.123 J	0.432	1.41	1.8	0.28	1.95	0.274	1.61	1.84	0.642	1.68	0.387	1.39	1.27	1.00 U	0.100 U	0.554	1.02
Magnesium (µg/L)	Total	24,500	18,400	3460	1680	3690	1700	3910	4270	1760	4270	1890	4320	1900	1750	4340	1770	4390	1760	4550	1370	66,200	55,800	1870	6190
	Diss.	24200	19300	3390	1670	3630	1700	3910	4270	1710	4330	1870	4350	1880	1730	4350	1740	4330	1750	4610	1380	65300	55400	1850	6240
Manganese (µg/L)	Total	4160	2190	77.6	2.11 J	3.68 J	2.2 J	2.91 J	10.5	4.55	24.2	5.57	39.6	6.54	11.6	41.2	13.4	36.9	12.4	26.1	3.59	5020	3950	18.5	126
	Diss.	4270	2250	77.4	0.947	3.77 J	0.200 U	3.54 J	11	2.89	24.5	2.74	40	2.98	9.04	41.7	11.4	37.2	9.78	26.5	3.57	5140	3950	14.1	128
Molybdenum (µg/L)	Total	7.42	14.1	0.571 J	0.500 U	0.500 U	0.500 U	0.524 J	0.534 J	0.500 U	0.526 J	0.500 U	0.577 J	0.500 U	0.500 U	0.500 U	0.500 U	0.519 J	0.500 U	0.500 U	0.500 U	1.00 U	0.556 J	0.500 U	0.500 U
	Diss.	6	13.5	0.579	0.212	0.509	0.178	0.513	0.493	0.193 J	0.517	0.179 J	0.562	0.192 J	0.185 J	0.56	0.186 J	0.534	0.184 J	0.508	0.404	1.00 U	0.607	0.197 J	0.529
Nickel (µg/L)	Total	9.29 J	5.00 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	3.98 J	2.50 U	5.00 U	2.50 U	2.50 U	2.50 U
	Diss.	8.73 J	5.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U	0.500 U

TABLE 5
Surface Water Quality Analytical Results

Location		DR-3	DR-3	DR-7	SC-068	SC-068	SC-198	SC-198	SC-275	SC-351	SC-351	SC-404	SC-404	SC-4040	SC-493	SC-493	SC-699	SC-699	SC-895	SC-895	SC-EF	SC-1094 (SVS12)	SC-1094 (SVS12)	SC-1131	SC-1131
Potassium (µg/L)	Total	1760	1600	642 J	470 J	619 J	461 J	608 J	609 J	472 J	605 J	437 J	606 J	445 J	477 J	599 J	468 J	596 J	481 J	595 J	498 J	3740 J	2970	483 J	695 J
	Diss.	1680	1630	568 J	443 J	578 J	442 J	594 J	592 J	422 J	591 J	423 J	587 J	418 J	432 J	614 J	440 J	578 J	433 J	617 J	495 J	3750 J	2920	436 J	682 J
Selenium (µg/L)	Total	5.00 U	5.00 U	2.50 U	2.50 U	25	2.50 U	17.6	21.5	2.50 U	19.5	2.50 U	19.4	2.50 U	2.50 U	21.4	2.50 U	20.4	2.50 U	14.1	2.50 U	5.00 U	2.62 J	2.50 U	12.5
	Diss.	5.00 U	5.00 U	0.500 U	5.42	60.3	5.16	56.7	53.5	5.09	53.8	0.500 U	55.4	0.500 U	5.11	53.4	5.1	51.3	4.66	45.1	0.500 U	5.00 U	0.943 J	4.53	40.1
Silver (µg/L)	Total	1.00 U	5.00 U	0.500 U	0.500 U	2.50 U	0.500 U	2.50 U	2.50 U	0.500 U	2.50 U	0.500 U	2.50 U	0.500 U	0.500 U	2.50 U	0.500 U	2.50 U	0.500 U	2.50 U	0.500 U	1.00 U	2.50 U	0.500 U	2.50 U
	Diss.	2.97 J	5.00 U	0.100 U	0.100 U	0.500 U	0.100 U	0.500 U	0.500 U	0.100 U	0.500 U	0.100 U	0.500 U	0.100 U	0.100 U	0.500 U	0.100 U	0.500 U	0.100 U	0.500 U	0.100 U	1.00 U	0.500 U	0.100 U	0.500 U
Sodium (µg/L)	Total	9510	9200	1540	900	3740	898	3630	3560	927	3520	2050	3550	12,900	893	3480	905	3570	847	3130	552	3010 J	2470	878	3020
	Diss.	9100	9520	1540	917	3670	914	3570	3490	892	3470	8370	3500	9710	912	3450	914	3420	858	3120	583	3020 J	2410	874	3020
Thallium (µg/L)	Total	5.00 U	5.00 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	5.00 U	2.50 U	2.50 U	2.50 U
	Diss.	5.00 U	5.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U	0.500 U
Vanadium (µg/L)	Total	10.0 U	10.0 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U	5.00 U	5.00 U	5.00 U
	Diss.	10.0 U	10.0 U	1.00 U	1.00 U	1.13 J	1.00 U	1.1 J	1.06 J	1.00 U	1.08 J	1.00 U	1.00 U	1.00 U	1.00 U	1.03 J	1.00 U	1.00 U	1.00 U	1.02 J	1.00 U	10.0 U	1.36 J	1.00 U	1.03 J
Zinc (µg/L)	Total	10,200	3720	149	10.0 U	35.6	11.8 J	98.8	304	44.4	349	55.7	376	58.9	60.9	384	67.2	367	85.9	457	91.8	3780	3810	92.8	561
	Diss.	10,200	3810	149	4.79 J	10.0 U	8.28	94.5	307	39.3	359	52.6	382	53	55.7	384	61.2	377	78.9	477	89.2	3550	3780	83.2	570

U The analyte was not detected at or above the Method Detection Limit
J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit.
mg/L milligrams per liter
µg/L micrograms per liter

TABLE 6
Anions Analytical Results

Location	Date	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate as SO_4 (mg/L)
Argentine Tunnel	6/23/2011	20.0 U	100 U	30.3	6180
517 Shaft* Tunnel Hoist Room Pipe	6/23/2011	0.2 U	1.1 J	0.2 U	38.9
517 Shaft*	8/4/2011	0.2 U	1.0 U	0.9	149
517 Shaft* 455 feet	10/3/2011	20.0 U	100 U	10.9 J	1630
517 Shaft* 475 feet	10/3/2011	20.0 U	100 U	11.1 J	1650
Blaine Inflow1	10/6/2011	20.0 U	100 U	80.9	9690
Blaine Tunnel	8/4/2011	0.2 U	1.0 U	1.8	279
Blaine Tunnel	10/3/2011	20.0 U	100 U	29.2	6370
DR-3	6/23/2011	2.0 U	10.0 U	3.5	618
DR-3	10/20/2011	0.2 U	1.0 U	0.2	53.5
DR-7	6/23/2011	0.2 U	1.0 U	0.2	29.6
SC-068	6/23/2011	0.6	1.0 U	0.2 U	3.3 J
SC-068	10/7/2011	6.4	1.1 J	0.1 U	9.0
SC-198	6/23/2011	0.6	1.0 U	0.2 U	3.8 J
SC-198	10/7/2011	6	1.1 J	0.1 U	11.0
SC-275	10/7/2011	5.9	1.1 J	0.1 U	14.3
SC-351	6/23/2011	0.6	1.0 U	0.2 U	3.9 J
SC-351	10/7/2011	5.9	1.1 J	0.2	15.3
SC-404	6/24/2011	0.2 U	2.9	0.2 U	4.3 J
SC-404	10/7/2011	5.8	1.1 J	0.1 U	16.0
SC-4040	6/24/2011	0.2 U	14.6	0.2 U	4.3 J
SC-493	6/23/2011	0.6	1.0 U	0.2 U	4.3 J
SC-493	10/7/2011	5.8	1.1 J	0.1 J	16.0
SC-699	6/23/2011	0.6	1.0 U	0.2 U	4.5 J
SC-699	10/7/2011	5.7	1.1 J	0.1 U	16.0
SC-895	6/23/2011	0.5	1.0 U	0.2 U	5.8
SC-895	10/7/2011	4.9	1.1 J	0.1 J	23.2
SCEF	6/23/2011	0.2 U	1.0 U	0.2 U	10.4
SC-1094 (SVS-12)	6/23/2011	2.0 U	10.0 U	7	918
SC-1094 (SVS-12)	10/7/2011	2.0 U	10.0 U	5	758
SC-1131	6/23/2011	0.5	1.0 U	0.2 U	7.1
SC-1131	10/7/2011	4.5	1.1 J	0.3	49.4

* Sample originally identified as Argentine Shaft but shown here with correct location name, 517 Shaft
U The analyte was not detected at or above the Method Detection Limit
J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit
mg/L milligrams per liter

TABLE 7
Isotopes Data

SAMPLE LOCATION	Date	Time	d ^{18}O (per mill)	d ^{18}O (1 sigma)	d Deuterium (per mill)	d Deuterium (1 sigma)	D-Excess (per mill)	Tritium (TU)	Tritium (1 sigma)
Mine Workings									
Argentine Tunnel lower acidic pool main tunnel	6/23/2011	13:50	-14.14	0.06	-102.06	0.49	11.03	9.2	0.4
517 Shaft (450' below access point)	8/4/2011	13:30	-14.18	0.03	-103.78	0.75	9.69	6.5	0.3
517 Shaft	10/3/2011	17:00	-14.27	0.04	-103.07	0.13	11.10	NA	NA
517 Shaft Access Tunnel - Hoist Room Pipe	6/23/2011	10:30	-14.24	0.03	-104.28	0.33	9.68	5.8	0.4
Blaine Tunnel	8/4/2011	16:00	-14.09	0.07	-104.34	0.18	8.39	5.9	0.3
Blaine Tunnel	10/3/2011	14:00	-14.43	0.04	-104.82	0.31	10.63	5.90	0.30
Blaine Inflow	10/6/2011	13:00	-14.53	0.04	-104.58	0.10	11.69	6	0.4
St. Louis Tunnel									
St. Louis Mine Outflow	5/18/2011	--	-14.77	0.01	-106.27	0.14	11.89	NA	NA
St. Louis Mine Outflow	6/23/2011	14:00	-14.85	0.01	-106.47	0.08	12.29	5.6	0.4
St. Louis Mine Outflow	8/4/2011	18:00	-14.81	0.04	-107.69	0.20	10.79	NA	NA
St. Louis Mine Outflow	10/11/2011	12:00	-14.89	0.03	-107.05	0.09	12.08	5.40	0.30
Silver Creek/Dolores River									
Silver Creek Above Fault	5/17/2011	--	-14.65	0.08	-106.11	0.36	11.12	NA	NA
Silver Creek Below Fault	5/17/2011	--	-14.59	0.02	-105.37	0.22	11.38	NA	NA
SC-68	6/23/2011	16:00	-15.35	0.03	-110.68	0.27	12.08	NA	NA
SC-68	8/4/2011	16:00	-14.43	0.04	-104.03	0.20	11.38	7.7	0.4
SC-198	6/23/2011	16:00	-15.33	0.05	-110.66	0.14	11.96	NA	NA
SC-351	6/23/2011	16:01	-15.33	0.04	-110.62	0.03	12.00	NA	NA
SC-493	6/23/2011	16:09	-15.37	0.04	-110.87	0.12	12.09	NA	NA
SC-493	10/4/2011	12:00	-14.26	0.03	-102.62	0.07	11.47	7.5	0.4

TABLE 7
Isotopes Data

SAMPLE LOCATION	Date	Time	d ^{18}O (per mill)	d ^{18}O (1 sigma)	d Deuterium (per mill)	d Deuterium (1 sigma)	D-Excess (per mill)	Tritium (TU)	Tritium (1 sigma)
SC-699	6/23/2011	16:17	-15.34	0.04	-110.68	0.15	12.08	NA	NA
East Fork Silver Creek	6/23/2011	10:30	-15.27	0.04	-110.16	0.06	11.97	NA	NA
SC-895	6/23/2011	16:52	-15.36	0.04	-111.13	0.16	11.79	NA	NA
SC-1131	6/23/2011	16:41	-15.34	0.02	-110.67	0.11	12.03	NA	NA
Silver Creek @ Hwy145	5/18/2011	--	-14.57	0.06	-105.30	0.25	11.27	NA	NA
Dolores River below Ponds (DR-7)	6/23/2011	14:20	-15.50	0.04	-112.60	0.13	11.41	8.7	0.4
Argentine Tailings Seep									
Mine Tailings Seep	6/23/2011	16:00	-14.15	0.04	-103.47	0.01	9.70	6.5	0.4
Mine Tailings Seep	8/4/2011	17:00	-14.04	0.05	-103.38	0.19	8.93	NA	NA
Mine Tailings Seep	10/5/2011	08:00	-14.40	0.02	-104.73	0.16	10.50	6.5	0.4
Rain – Northern San Juan Range									
6/28/2011 to 7/1/2011	7/1/2011	--	-6.00	0.04	-37.71	0.28	10.30	NA	NA
7/1/2011 to 7/7/2011	7/7/2011	--	-3.58	0.04	-25.22	0.12	3.42	NA	NA
7/7/2011 to 7/14/2011	7/14/2011	--	-7.12	0.03	-48.26	0.14	8.72	NA	NA
7/41/2011 to 7/19/2011	7/19/2011	--	-7.51	0.05	-46.30	0.42	13.75	NA	NA
7/19/2011 to 7/21/2011	7/21/2011	--	-8.32	0.04	-54.20	0.17	12.34	NA	NA
7/21/2011 to 7/29/2011	7/29/2011	--	-6.53	0.04	-43.11	0.25	9.12	NA	NA
7/29/2011 to 8/5/2011	8/5/2011	--	-7.82	0.09	-47.45	0.36	15.11	NA	NA
8/5/2011 to 8/18/2011	8/18/2011	--	-4.84	0.07	-36.51	0.30	2.21	NA	NA
8/18/2011 to 8/20/2011	8/20/2011	--	-5.78	0.02	-33.9	0.12	12.30	NA	NA
Mean	**6/28-8/20**	**--**	**-6.39**	**--**	**-41.41**	**--**	**9.70**	--	--
Snow – Spruce Fen									
Snow Pit 145-105 New Snow	5/2/2011	--	-28.96	0.03	-215.46	0.37	16.20	NA	NA

TABLE 7
Isotopes Data

SAMPLE LOCATION	Date	Time	d ^{18}O (per mill)	d ^{18}O (1 sigma)	d Deuterium (per mill)	d Deuterium (1 sigma)	D-Excess (per mill)	Tritium (TU)	Tritium (1 sigma)
Snow Pit 145-105	5/2/2011	--	-18.51	0.07	-138.32	0.30	9.75	NA	NA
Snow Pit 105-90	5/2/2011	--	-14.77	0.01	-110.48	0.11	7.70	NA	NA
Snow Pit 90-76	5/2/2011	--	-16.37	0.05	-121.93	0.11	9.00	NA	NA
Snow Pit 76-35	5/2/2011	--	-21.48	0.05	-160.88	0.11	10.93	NA	NA
Snow Pit 35-0	5/2/2011	--	-19.36	0.04	-143.14	0.11	11.75	NA	NA
Snow Pit DI A	5/2/2011	--	-18.98	0.00	-141.04	0.06	10.79	NA	NA
Snow Pit DI B	5/2/2011	--	-17.92	0.05	-133.23	0.10	10.12	NA	NA
Mean	**--**	**--**	**-19.54**	**--**	**-145.56**	**--**	**10.78**	**--**	**--**

NA Not Analyzed
TU Tritium Units
Per mill Per million

TABLE 8
Summary of Sodium Chloride Slug Additions to Silver Creek - June 21-24, 2011

Date	Time	Addition Point (meters)	Observation Point (meters)	NaCl added (grams)	Duration (seconds)	Background Spec. Cond. (µS/cm)	Calculated Streamflow (cfs)	Observed Flow Loss (cfs)
06/21/2011	20:23	0	106	1480	17	93	35.90	
06/21/2011	19:53	493	636	1480	18	97	36.49	-0.59
06/22/2011	16:06	0	106	1480	16	99	38.01	
06/22/2011	15:35	493	636	1480	13	104	32.44	5.57
06/23/2011	14:49	0	106	1480	16	101	37.75	
06/23/2011	14:24	118	198	1480	14	103	33.11	4.64
06/23/2011	14:01	351	493	1480	15	106	30.89	6.86
06/23/2011	13:40	493	636	1480	12	107	30.74	7.01
06/24/2011	11:57	0	198	2960	10	104	33.97	
06/24/2011	11:33	198	404	2960	18	105	31.68	2.30
06/24/2011	10:56	493	636	2960	16	106	32.65	1.32

µS/cm microSiemens per centimeter
cfs cubic feet per second

TABLE 9
Data Used to Develop Chloride -Conductivity Relationship – June 22, 2011

Location	Date	Time	Decimal Time	Specific Conductivity (µS/cm)	Chloride (mg/L)	Background Corrected	
						Specific Conductivity (µS/cm)	Chloride (mg/L)
Calibration Solution	06/21/2011	DNS	--	151	15.460	47.000	15.321
SC-636	06/22/2011	15:36:00	15.6	104	0.303	0.000	0.164
SC-636	06/22/2011	15:37:15	15.621	156	7.646	52.000	7.507
SC-636	06/22/2011	15:37:30	15.625	154.5	14.768	50.500	14.629
SC-636	06/22/2011	15:37:45	15.629	140	9.551	36.000	9.412
SC-636	06/22/2011	15:38:15	15.638	115	3.999	11.000	3.860
SC-636	06/22/2011	15:38:30	15.642	110	1.967	6.000	1.828
SC-636	06/22/2011	15:39:00	15.65	107	0.869	3.000	0.730
SC-636	06/22/2011	15:39:30	15.658	105	0.429	1.000	0.290
SC-636	06/22/2011	15:40:00	15.667	104	0.242	0.000	0.103
SC-636	06/22/2011	15:40:30	15.675	104	0.181	0.000	0.042
SC-636	06/22/2011	15:44:30	15.742	104	0.139	0.000	0.000

µS/cm microSiemens per centimeter
mg/L milligrams per liter

TABLE 10
Streamflow Measurements, June 2011

Date	Time	Flow (cfs)	Stage (feet) (Staff gage)	Stage (feet) (p-trans)	Offset (feet)
SC-68					
6/9/2011	16:30	48.44	1.5	1.77	--
6/15/2011	11:15	45.98	1.24	1.6	--
6/17/2011	10:45	47.69	1.25	1.66	--
6/22/2011	10:15	27.14	0.92	1.24	--
6/23/2011	10:15	29.85	0.98	1.34	--
SC-493					
6/9/2011	17:00	59.71	1.833	--	--
6/9/2011	12:00	49.12	1.667	--	--
6/15/2011	10:15	48.41	1.583	--	--
6/17/2011	10:30	50.97	1.625	0.985	0.640
6/22/2011	9:30	30.60	1.333	0.736	0.597
6/23/2011	8:45	34.39	1.375	0.811	0.564
6/23/2011	16:00	39.11	1.458	0.938	0.520

cfs cubic feet per second

Table 11
Estimates of Flow Loss, June 2011

Date	Observation point [m]	Observed Flow (cfs)	Adjusted Flow (cfs)	Obs Flow Loss (cfs)	Adjusted Flow Loss (cfs)	Adjusted Flow Loss (percent)	Loss per Distance (cfs/km)
Day 1							
06/21/2011	106	35.90	39.37				
06/21/2011	636	36.49	36.49	-0.59	2.88	7.3%	5.4
Day 2							
06/22/2011	106	38.01	34.95				
06/22/2011	636	32.44	32.44	5.57	2.51	7.2%	4.7
Day 3							
06/23/2011	106	37.75	33.78				
06/23/2011	198	33.11	32.23	4.64	1.55		
06/23/2011	493	30.89	29.27	6.86	4.51		
06/23/2011	636	30.74	30.74	7.01	3.04	9.0%	5.7
Day 4							
06/24/2011	198	33.97	34.46				
06/24/2011	404	31.68	31.62	2.30	2.84		
06/24/2011	636	32.65	32.65	1.32	1.81	5.3%	4.1

cfs cubic feet per second
km kilometer

TABLE 12
Summary of Sodium Chloride Slug Additions to Silver Creek – October 3-7, 2011

Date	Time	Addition Point (meters)	Observation Point (meters)	NaCl added (grams)	Duration (seconds)	Background Spec. Cond. (µS/cm)	Calculated Streamflow (cfs)	Observed Flow Loss (cfs)
10/03/2011	19:52	0	106	1480	25	211	0.864	
10/03/2011	18:41	198	321	1480	26	228-231	0.923	-0.059
10/03/2011	17:47	384	493	1480	30	234	0.785	0.079
10/03/2011	16:51	493	636	1480	40	235	0.736	0.128
10/04/2011	11:44	0	106	1480	35	210	1.090	
10/04/2011	10:36	220	321	1480	25	230	0.927	0.163
10/04/2011	09:40	384	493	1480	20	231	0.877	0.213
10/04/2011	08:48	530	636	1480	20	228	0.807	0.283
10/06/2011	16:03	0	106	700	10	209	1.579	
10/06/2011	15:06	530	636	700	25	227-229	1.048	0.532
10/07/2011	18:14	0	106	1400	22	212	1.392	
10/07/2011	17:20	530	636	1400	20	227	1.340	0.051

µS/cm microSiemens per centimeter
mg/L milligrams per liter

TABLE 13
Data Used to Develop Chloride – Conductivity Relationship – October 6, 2011

Location	Date	Time	Decimal time	Specific Conductivity (µS/cm)	Chloride (mg/L)	Background Corrected	
						Specific Conductivity (µS/cm)	Chloride (mg/L)
SC-636	10/6/2011	15:03	15.050	226	0.495	-0.122	0.000
SC-636	10/6/2011	15:14	15.233	230	1.103	2.938	0.608
SC-636	10/6/2011	15:15:30	15.258	272	18.579	44.809	18.084
SC-636	10/6/2011	15:16:40	15.278	333	40.333	105.710	39.838
SC-636	10/6/2011	15:17:50	15.297	363.5	42.846	136.110	42.351
SC-636	10/6/2011	15:19:30	15.325	334.5	28.22	106.968	27.725
SC-636	10/6/2011	15:21:15	15.354	286	13.712	58.318	13.217
SC-636	10/6/2011	15:22:20	15.372	267	8.423	39.225	7.928
SC-636	10/6/2011	15:24:35	15.410	244	3.766	16.033	3.271
SC-636	10/6/2011	15:28	15.467	234	1.592	5.741	1.097
SC-636	10/6/2011	15:40	15.667	229	0.636	-0.285	0.141

µS/cm microSiemens per centimeter
mg/L milligrams per liter

Table 14
Estimates of Flow Loss, October 2011

Date	Observation point [m]	Observed Flow (cfs)	Adjusted Flow (cfs)	Observed Flow Loss (cfs)	Adjusted Flow Loss (cfs)	Adjusted Flow Loss (percent)	Loss per Distance (cfs/km)
Day 1							
10/3/2011	106	0.864	0.957				
10/3/2011	321	0.923	0.983	-0.059	-0.027		
10/3/2011	493	0.785	0.825	0.079	0.132		
10/3/2011	636	0.736	0.736	0.128	0.221	23%	0.42
Day 2							
10/4/2011	106	1.090	1.034				
10/4/2011	321	0.927	0.887	0.163	0.146		
10/4/2011	493	0.877	0.837	0.213	0.197		
10/4/2011	636	0.807	0.807	0.283	0.227	22%	0.43
Day 3							
10/6/2011	106	1.579	1.466				
10/6/2011	636	1.048	1.048	0.532	0.418	29%	0.79
Day 4							
10/7/2011	106	1.392	1.438				
10/7/2011	636	1.340	1.340	0.052	0.098	7%	0.18

Cfs cubic feet per second
M meters
Cfs/km cubic feet per second per kilometer

TABLE 15
Historic and Current Dissolved Metal Concentrations - St. Louis Tunnel Discharge

Location	Date	Arsenic (µg/L)	Cadmium (µg/L)	Copper (µg/L)	Lead (µg/L)	Manganese (µg/L)	Zinc (µg/L)	Hardness (mg/L)
DR-3 – St. Louis Adit, at portal	10/24/1999	--	12	10 U	1.4	2,200	6,650	490
	10/25/1999	--	12	10 U	1.4	2,200	6,650	689
	6/26/2000	--	18	30	0.5 U	2,660	3,600	639
	6/27/2001	--	21.8	20 B	0.1 U	2,300	4,510	685
	10/18/2001	--	15.7	20 B	0.1 U	2,150	3,560	685
	7/16/2002	--	13 B	20	16.7	2,050	3,430	742
	10/8/2002	--	13.8	22	13.2	1,830	2,970	762
	10/30/2003	--	21.3	20.6	0.1 U	2,170	5,190	730
	12/2/2003	--	22	8.2	0.1 B	1,930	4,000	687
	1/7/2004	--	16.7	14.1	0.2 U	1,820	3,550	716
	2/3/2004	--	17.7	29.5	0.1 U	1,780	3,450	707
	3/2/2004	--	15.6	28	0.119 B	1,850	3,320	729
	4/27/2004	--	20.0	27.3	0.1 U	1,830	4,180	738
	6/1/2004	--	80.4	217	0.101 B	4,320	13,900	724
	7/6/2004	--	35.9	18.6 B	0.1 U	2,750	5,700	613
	12/7/2004	0.8 B	24.5	18.5	0.1 U	2,230	4,200	680
	6/2/2010*	4.4 U	52	91	2.6 U	2,400	7,700	670
	11/16/2010*	2.5 U	16.3	9.17	0.5 U	1,760	3,580	687
	4/15/2011	3.8 U	15	3.8 U	3.8 U	1,700	3,200	760
	5/25/2011	0.5 U	43.7	26.7	0.11	2,760	7,830	723
	6/15/2011	0.50 U	66.6	194	0.10 U	4,300	11,700	726
	6/23/2011*	5.0 U	52	55.2	1.0 U	4,270	10,200	723
	7/20/2011	0.5 U	29.8	13.5	0.10 U	3,190 (total)	6,180 (total)	639
	8/17/2011	0.50 U	19.4	4.4	0.10 U	2,920	4,630	619

TABLE 15
Historic and Current Dissolved Metal Concentrations - St. Louis Tunnel Discharge

Location	Date	Arsenic (µg/L)	Cadmium (µg/L)	Copper (µg/L)	Lead (µg/L)	Manganese (µg/L)	Zinc (µg/L)	Hardness (mg/L)
	9/15/2011	0.50 U	18.2	3.9	0.11	2,250	3,740	600
	10/20/2011	0.50 U	17.1	2.6	0.10 U	2,380	3,690	668
	11/10/2011	0.5 U	16.6	5.8	0.10 U	2,310	3,340	661

Data provided by AR/SEH except as noted.
* Data from EPA
-- No data available
µg/L micrograms per liter
mg/L milligrams per liter
U Analyte not detected at or above the detection limit
B Value is an estimated quantity

APPENDIX A

Photolog

PHOTO 1 – Upper gaugehouse.

PHOTO 2 – Transducer in upper gaugehouse.

PHOTO 3 – Lower gauging station at SC-493, facing downstream.

PHOTO 4 – Continuous sodium bromide injection setup at SC-0.

PHOTO 5 – 517 Shaft Access Tunnel Hoist Room.

PHOTO 6 – Pool behind Blaine Tunnel coffer dam.

PHOTO 7 – First collapse behind Blaine coffer dam pool.

PHOTO 8 – Raise above first blockage behind Blaine coffer dam.

PHOTO 9 – Blaine coffer dam, facing into the Blaine Tunnel.

PHOTO 10 – Dye injection in 517 Shaft.

PHOTO 11 – ISCO sampler setup in St. Louis Tunnel portal structure before dye injection.

PHOTO 12 - ISCO sampler setup in St. Louis Tunnel portal structure after dye injection.

PHOTO 13 – Fluoride injection into pool behind coffer dam.

PHOTO 14 – Blaine coffer dam with pipe for pumping.

PHOTO 15 – Pump for moving water past blockage behind coffer dam after dye injection.

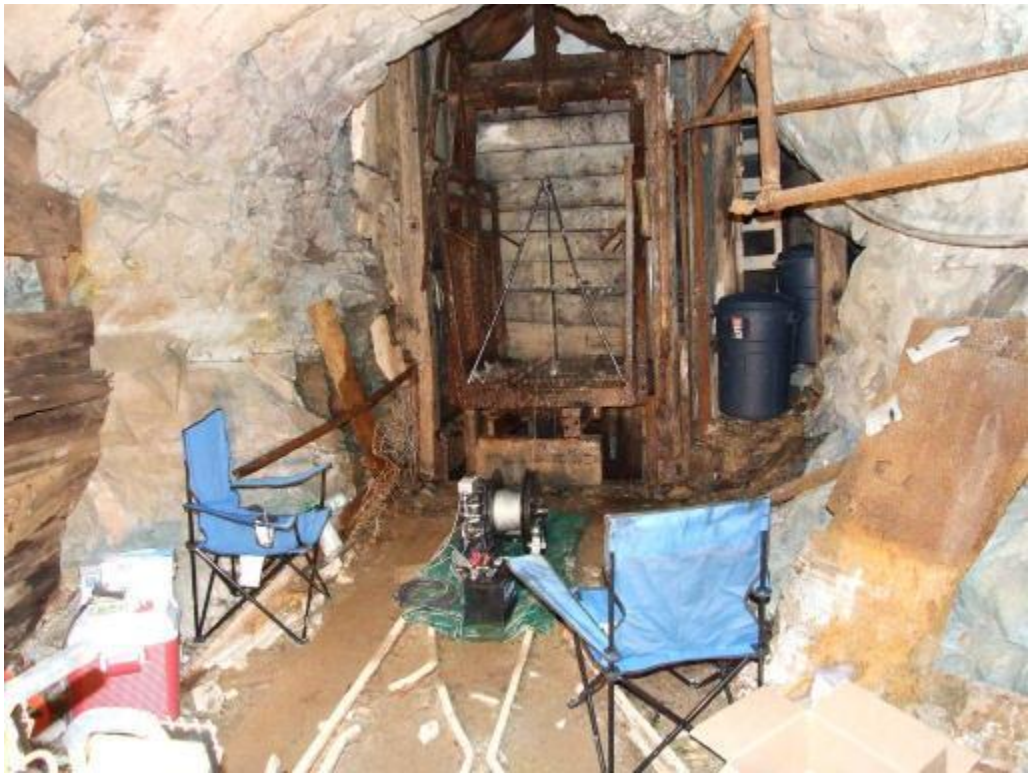


PHOTO 16 – 517 Shaft sampling setup.

PHOTO 17 - 517 Shaft sampling setup.

PHOTO 18 – ISCO sampler setup in Silver Creek at SC-493.

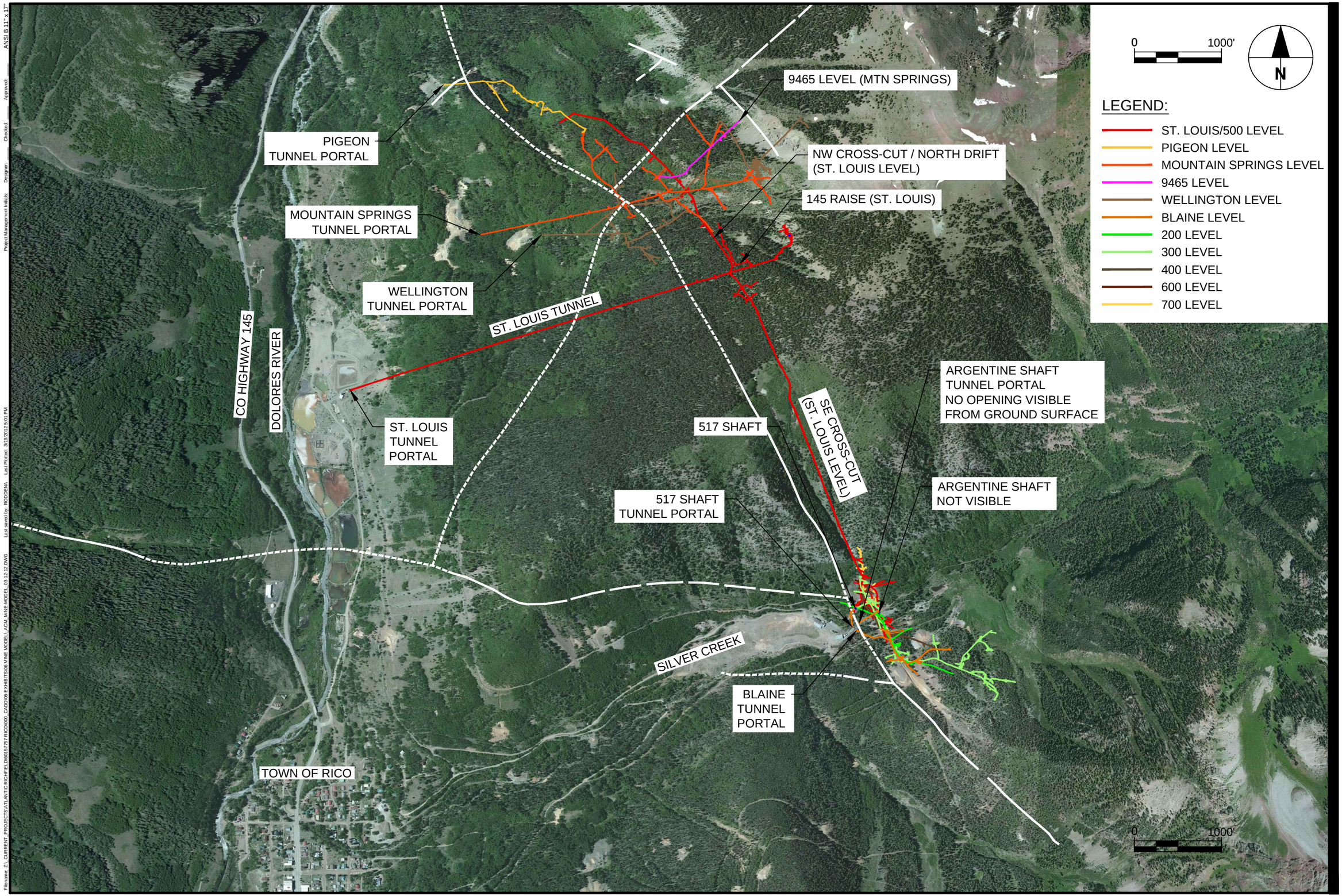
PHOTO 19 – Flume conveys Argentine Tailings seep.

PHOTO 20 – ISCO sampler and flume at Argentine Tailings seep.

APPENDIX B

Conceptual Mine Workings Maps

(Prepared by AECOM for Atlantic Richfield Company)



AECOM
MARCH 20, 2012
60239806

PRELIMINARY

RICO-ARGENTINE SITE-OU01

MINE WATER MODEL PLAN OVERVIEW

FIGURE 1

ANSI B 11" x 17"

Approved:

Checked:

Designer:

Project Management Initials:

Last Plotted: 3/19/2012 5:01 PM

Last saved by: ROD/DENA

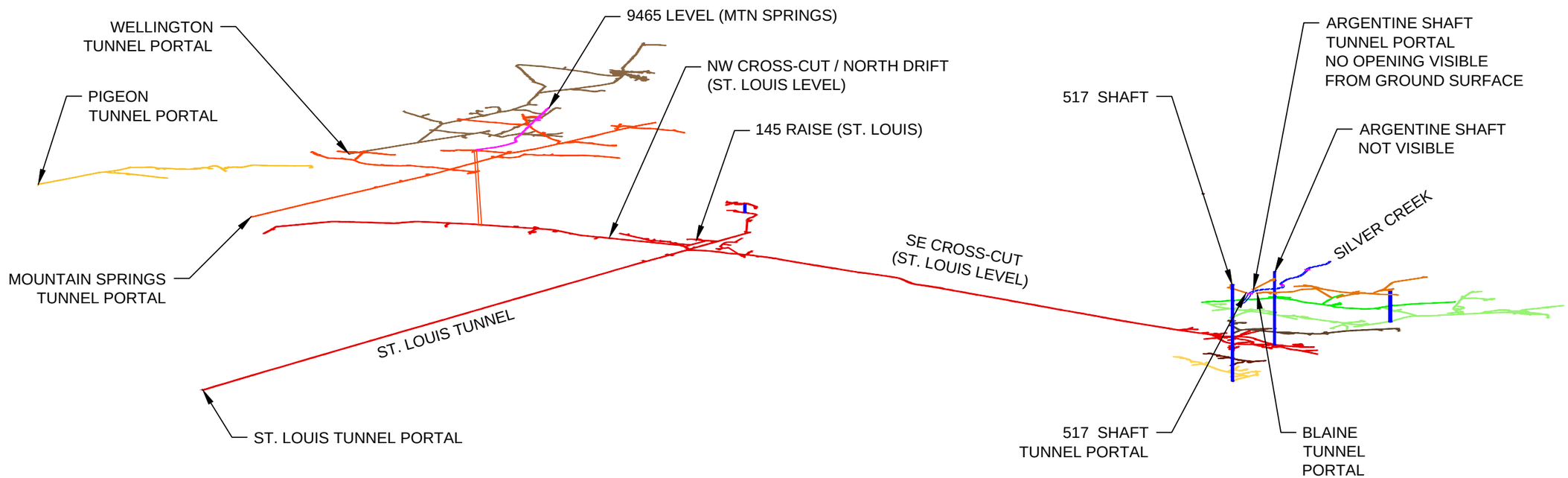
Filename: Z:_CURRENT_PROJECTS\ATLANTIC RICHFIELD\60157757 RICO\000_CADD\06-EXHIBITS\06 MINE MODEL\ACM_MINE-MODEL_03-12-12.DWG

NOTES:

1. SILVER CREEK, ALL MINE WORKINGS AND BRIDGES TRACED FROM "comp_Plan.tif", EXCEPT THE FOLLOWING:
   - A. ARGENTINE SHAFT TUNNEL PER "scan02.tif" ("ARGENTINE MINE AND ST. LOUIS TUNNEL", DRAWN 5-21-55, P.L.J.)
   - B. 517 SHAFT LOCATED PER "scan08.tif" ("USGS/McKNIGHT PROFESSIONAL PAPER 723, PLATE 3")
   - C. BUILDING FOOTPRINTS AT ARGENTINE TAILINGS PER "rico area proposed drilling site.tif" ("PROPOSED DRILLING HOLES, SILVER CREEK MO TARGET PLAN", NOV. 1980)
   - D. ST. LOUIS SOUTHEAST CROSS CUT PER "00120110602202157.PDF" ("ST. LOUIS LEVEL, SHEET 2", DEC. 1959 - R.T.)
2. ALL LOCATIONS/DIMENSIONS/ELEVATIONS APPROXIMATE ONLY; ELEVATIONS MAY BE ON DIFFERENT VERTICAL DATUMS.
3. ALL MINE LEVELS SHOWN AT SINGLE ELEVATION SEPERATED BY 100-FEET FOR CLARITY. FURTHER REFINEMENT, IF NECESSARY IS DEPENDENT UPON ABILITY TO VERIFY ELEVATIONS.
4. NO EVIDENCE FOUND TO DATE ON HISTORIC MINE MAPS OF 517 SHAFT EXTENDING TO GROUND SURFACE.

LEGEND:

- ST. LOUIS/500 LEVEL
- PIGEON LEVEL
- MOUNTAIN SPRINGS LEVEL
- 9465 LEVEL
- WELLINGTON LEVEL
- BLAINE LEVEL
- 200 LEVEL
- 300 LEVEL
- 400 LEVEL
- 600 LEVEL
- 700 LEVEL



AECOM
MARCH 20, 2012
60239806

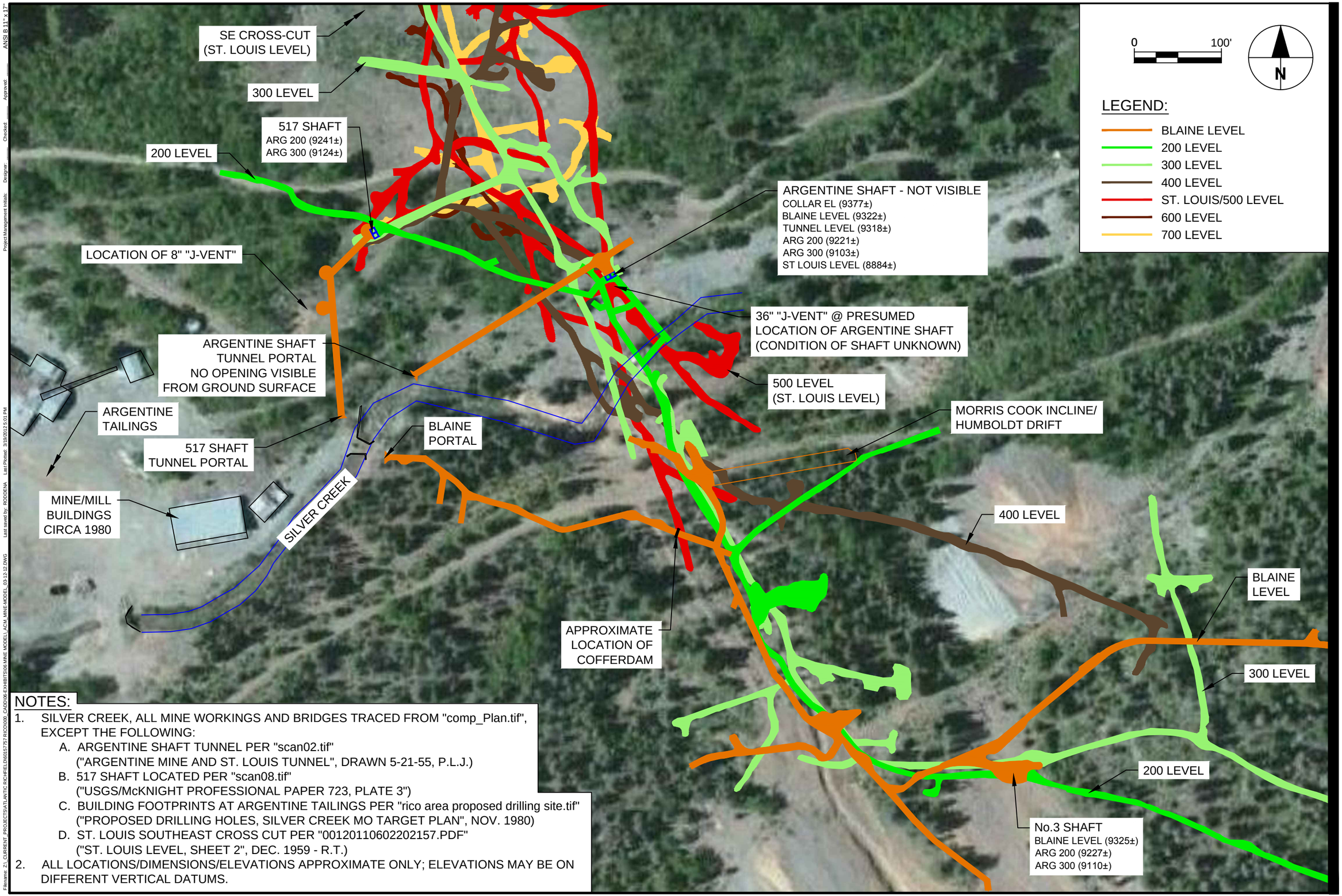
PRELIMINARY

RICO-ARGENTINE SITE-OU01

MINE WATER MODEL PERSPECTIVE OVERVIEW

FIGURE 2

Filename: Z:_CURRENT_PROJECTS\ATLANTIC RICHFIELD\60157757 RICO\000_CADD\06-EXHIBITS\06 MINE MODEL_ACM_MINE-MODEL_03-12-12.DWG Last saved by: RODDENA Last Plotted: 3/19/2012 5:01 PM
Project Management Initials: Designer: Checked: Approved: ANSI B 11" x 17"



NOTES:

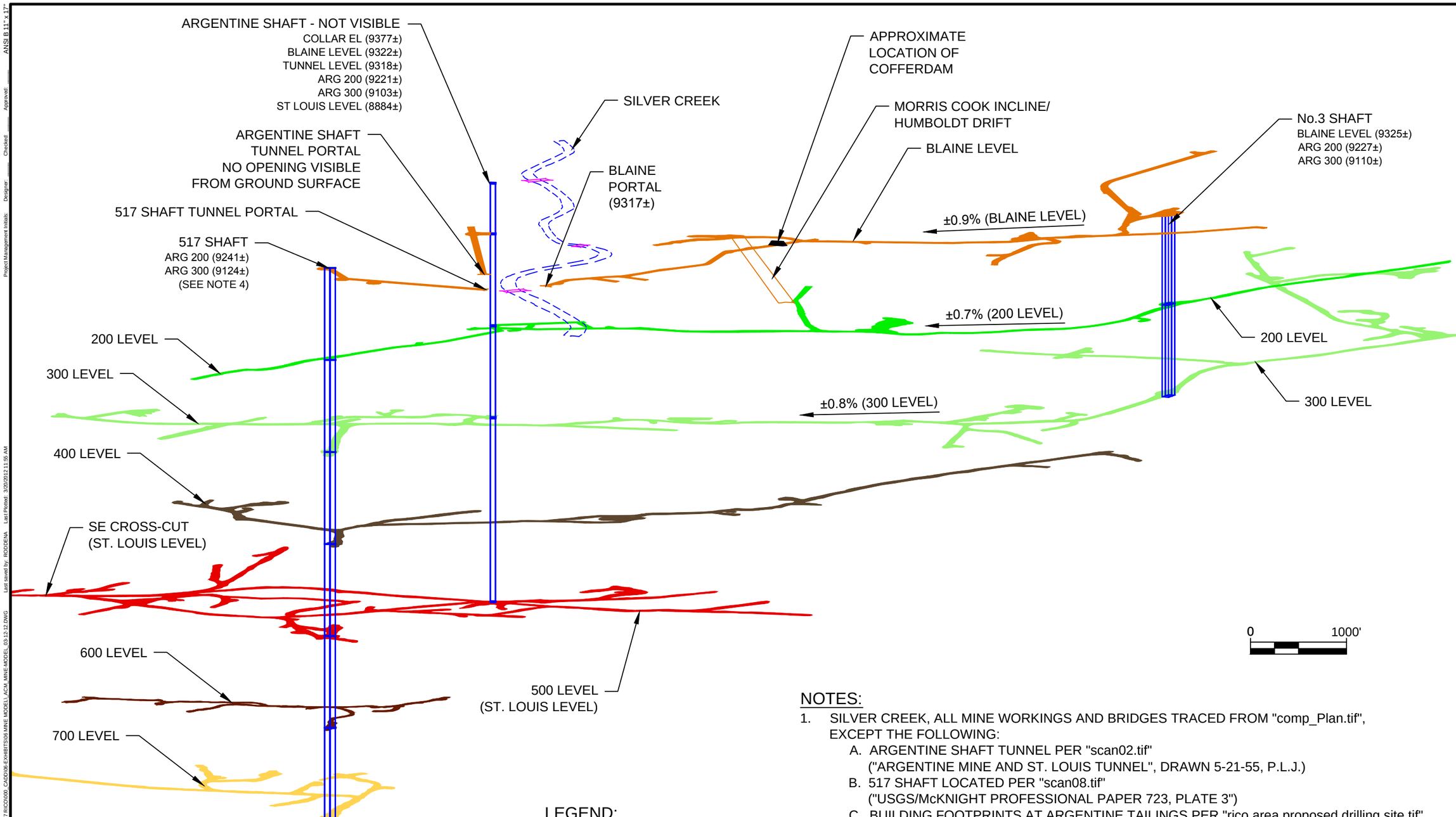
1. SILVER CREEK, ALL MINE WORKINGS AND BRIDGES TRACED FROM "comp_Plan.tif", EXCEPT THE FOLLOWING:
   A. ARGENTINE SHAFT TUNNEL PER "scan02.tif" ("ARGENTINE MINE AND ST. LOUIS TUNNEL", DRAWN 5-21-55, P.L.J.)
   B. 517 SHAFT LOCATED PER "scan08.tif" ("USGS/McKNIGHT PROFESSIONAL PAPER 723, PLATE 3")
   C. BUILDING FOOTPRINTS AT ARGENTINE TAILINGS PER "rico area proposed drilling site.tif" ("PROPOSED DRILLING HOLES, SILVER CREEK MO TARGET PLAN", NOV. 1980)
   D. ST. LOUIS SOUTHEAST CROSS CUT PER "00120110602202157.PDF" ("ST. LOUIS LEVEL, SHEET 2", DEC. 1959 - R.T.)
2. ALL LOCATIONS/DIMENSIONS/ELEVATIONS APPROXIMATE ONLY; ELEVATIONS MAY BE ON DIFFERENT VERTICAL DATUMS.

AECOM
MARCH 20, 2012
60239806

PRELIMINARY

RICO-ARGENTINE SITE-OU01
MINE WATER MODEL PLAN - BLAINE/ARGENTINE AREA
FIGURE 3

ANSI B 11" x 17"
Approved:
Checked:
Designer:
Project Management Initials:
Last Plotted: 3/19/2012 5:01 PM
Last saved by: ROD.DENA
Filename: Z:_CURRENT_PROJECTS\ATLANTIC RICHFIELD\60157757 RICO\000_CADD\06-EXHIBITS\06 MINE MODEL_ACM_MINE-MODEL_03-12-12.DWG



LEGEND:

- BLAINE LEVEL
- 200 LEVEL
- 300 LEVEL
- 400 LEVEL
- ST. LOUIS/500 LEVEL
- 600 LEVEL
- 700 LEVEL

NOTES:

1. SILVER CREEK, ALL MINE WORKINGS AND BRIDGES TRACED FROM "comp_Plan.tif", EXCEPT THE FOLLOWING:
   A. ARGENTINE SHAFT TUNNEL PER "scan02.tif" ("ARGENTINE MINE AND ST. LOUIS TUNNEL", DRAWN 5-21-55, P.L.J.)
   B. 517 SHAFT LOCATED PER "scan08.tif" ("USGS/McKNIGHT PROFESSIONAL PAPER 723, PLATE 3")
   C. BUILDING FOOTPRINTS AT ARGENTINE TAILINGS PER "rico area proposed drilling site.tif" ("PROPOSED DRILLING HOLES, SILVER CREEK MO TARGET PLAN", NOV. 1980)
   D. ST. LOUIS SOUTHEAST CROSS CUT PER "00120110602202157.PDF" ("ST. LOUIS LEVEL, SHEET 2", DEC. 1959 - R.T.)
2. ALL LOCATIONS/DIMENSIONS/ELEVATIONS APPROXIMATE ONLY; ELEVATIONS MAY BE ON DIFFERENT VERTICAL DATUMS.
3. ALL MINE LEVELS SHOWN AT SINGLE ELEVATION SEPERATED BY 100-FEET FOR CLARITY. FURTHER REFINEMENT, IF NECESSARY IS DEPENDENT UPON ABILITY TO VERIFY ELEVATIONS.
4. NO EVIDENCE FOUND TO DATE ON HISTORIC MINE MAPS OF 517 SHAFT EXTENDING TO GROUND SURFACE.

AECOM
MARCH 20, 2012
60239806

PRELIMINARY

RICO-ARGENTINE SITE-OU01
MINE WATER MODEL PERSPECTIVE - BLAINE/ARGENTINE AREA
FIGURE 4

ANSI B 11" x 17"
Approved:
Checked:
Designer:
Project Management Initials:
Last Plotted: 3/20/2012 11:55 AM
Last saved by: ROD DENA
Filename: Z:_CURRENT_PROJECTS\ATLANTIC RICHFIELD\60157757 RICO\000_CADD\06-EXHIBITS\06 MINE MODEL_ACM_MINE-MODEL_03-12-12.DWG

APPENDIX C

Quality Assurance/Quality Control Evaluation and Laboratory Data Package

APPENDIX C-1 **Laboratory Data Packages, Samples Collected June 2011**

APPENDIX C-2 **Laboratory Data Package, Samples Collected August 2011**

APPENDIX C-3 **Laboratory Data Packages, Samples Collected October 2011**

SUMMARY

The results of field Quality Assurance/Quality Control (QA/QC) samples are shown in Table C-1. The field blank sample collected in June showed no detectable concentrations of site contaminants with the exception of lead in the total fraction. The relative percent differences (RPD) calculated for duplicate samples collected during June and October are shown in Table C-1. RPD's greater than 20 percent are shown in bold on Table C-1.

On October 20, 2011, duplicate samples were collected at DR-3 for EPA by UOS and for AR by Anderson Engineering. The UOS samples were submitted to the EPA Region 8 Laboratory operated by the ESAT contractor and the AR samples were submitted to Pace Analytical Laboratories in Lenexa, Kansas. The results are presented on Table C-2. Analytes where the relative percent difference calculated for any of the pairs of duplicates is greater than 20 percent are shown in bold on Table C-2.

Data sent to the EPA Region 8 Laboratory were reviewed by a chemist and determined to be acceptable for the intended use with some qualifications. Review memos are provided below.

The data packages are provided below. The sample identifications may vary compared to the names shown in the report data tables due to identifying the correct name of the 517 Shaft, removing date characters, or for clarification/consistency.

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
Aluminum (µg/L)	Total	20.0 U	127,000	127,000	0	29.5 J	35.3	17.9	145	156	7.3
	Dissolved	20.0 U	124,000	123,000	0.8	40.8 J	25.6	**45.8**	53.4	56.4	5.5
Antimony (µg/L)	Total	2.50 U	5.00 U	5.00 U	NA	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Arsenic (µg/L)	Total	2.50 U	1220	1210	0.8	3.56 J	4.31	19.1	2.50 U	2.50 U	NA
	Dissolved	0.500 U	1190	1200	0.8	13.6	12.8	6.1	0.641 J	0.635 J	0.9
Barium (µg/L)	Total	25.0 U	50.0 U	50.0 U	NA	120	121	0.8	82.1	82.8	0.8
	Dissolved	5.00 U	50.0 U	50.0 U	NA	121	122	0.8	79.9	78.4	1.9
Beryllium (µg/L)	Total	0.500 U	12.3	12.8	4.0	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	16.1	13.7	16.1	0.100 U	0.100 U	NA	0.100 U	0.100 U	NA
Bromide (mg/L)	--	0.5 U	20.0 U	20.0 U	NA	6.4	6.5	1.6	0.5 U	0.5 U	NA
Cadmium (µg/L)	Total	0.500 U	967	965	0.2	3.16	0.88	**112.9**	0.500 U	0.500 U	NA
	Dissolved	0.100 U	953	967	1.5	0.100 U	0.100 U	NA	0.242	0.212	13.2
Calcium (µg/L)	Total	100 U	373,000	378,000	1.3	37,000	36,500	1.4	19,900	19,900	0.0
	Dissolved	100 U	366,000	365,000	0.3	36,100	36,700	NA	19,900	20,000	0.5
Chloride (mg/L)	--	2.0 U	100 U	200 U	NA	1.1 J	1.1 J	0	2.9	14.6	**133**
Chromium (µg/L)	Total	2.50 U	103	103	0.0	6.91	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	105	103	1.9	3.46	3.21	NA	1.9	1.93	1.6
Cobalt (µg/L)	Total	0.500 U	145	153	5.4	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	152	155	2.0	0.100 U	0.100 U	NA	0.100 U	0.100 U	NA
Copper (µg/L)	Total	2.50 U	14,500	15,100	4.1	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	15,800	15,600	1.3	0.500 U	0.500 U	NA	0.589 J	0.500 U	NA
Fluoride (mg/L)	--	0.2 U	29.2	30.0	2.7	0.2 U	0.2 U	NA	0.2 U	0.2 U	NA
Hardness	--	2 U	1480	1480	0.0	105	107	1.9	57	58	1.7

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
(mg/L)											
Iron (µg/L)	Total	100 U	1,420,000	1,440,000	1.4	100 U	100 U	NA	100 U	100 U	NA
	Dissolved	100 U	1,390,000	1,390,000	0.0	100 U	100 U	NA	100 U	100 U	NA
Lead (µg/L)	Total	0.545	771	672	13.7	0.500 U	0.500 U	NA	2.13	2.13	0.0
	Dissolved	0.100 U	404	397	1.7	0.221	0.107	**69.5**	0.28	0.274	2.2
Magnesium (µg/L)	Total	100 U	140,000	142,000	1.4	3690	3650	1.1	1890	1900	0.5
	Dissolved	100 U	138,000	137,000	0.7	3630	3960	8.7	1870	1880	0.5
Manganese (µg/L)	Total	1.00 U	61,500	62,300	1.3	3.68 J	3.93	6.6	5.57	6.54	16.0
	Dissolved	0.200 U	61,600	61,700	0.2	3.77 J	6.74	**56.5**	2.74	2.98	8.4
Molybdenum (µg/L)	Total	0.500 U	23.4	22	6.2	0.500 U	0.502	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	19	19.5	2.6	0.509	0.519	1.9	0.179 J	0.192 J	7.0
Nickel (µg/L)	Total	2.50 U	197	199	1.0	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	214	208	2.8	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Potassium (µg/L)	Total	250 U	7810 J	7760 J	0.6	619 J	592 J	4.5	437 J	445 J	1.8
	Dissolved	250 U	7010 J	6840 J	2.5	578 J	589 J	1.9	423 J	418 J	1.2
Selenium (µg/L)	Total	2.50 U	33.6	29.6	12.7	25	18.6	29.4	2.50 U	2.50 U	NA
	Dissolved	0.500 U	35.3	33.2	6.1	60.3	56.7	6.2	0.500 U	0.500 U	NA
Silver (µg/L)	Total	0.500 U	5.00 U	5.00 U	NA	2.50 U	2.50 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.100 U	0.100 U	NA
Sodium (µg/L)	Total	250 U	4790 J	4760 J	0.6	3740	3700	1.1	2050	12,900	**145.2**
	Dissolved	250 U	4650 J	4640 J	0.2	3670	3730	1.6	8370	9710	14.8
Sulfate (mg/L)	-	5.0 U	6370	6240	0.4	9.0	9.1	1.1	4.3	4.3	0
Thallium (µg/L)	Total	2.50 U	9.42	6.21	**41.1**	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Vanadium	Total	5.00 U	165	165	0.0	5.00 U	5.00 U	NA	5.00 U	5.00 U	NA

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
(µg/L)	Dissolved	1.00 U	172	169	1.8	1.13 J	1.12 J	0.9	1.00 U	1.00 U	NA
Zinc (µg/L)	Total	10.0 U	161,000	163,000	1.2	35.6	25.2	**34.2**	55.7	58.9	5.6
	Dissolved	2.00 U	161,000	162,000	0.6	10.0 U	24.8	NA	52.6	53	0.8

* Duplicate sample SC-4040 was collected the morning after the primary sample (SC-404). The anions results may vary widely due to injection of stream tracer (sodium chloride and sodium bromide) the day the duplicate sample was collected.

U The analyte was not detected at or above the Method Detection Limit

J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit

mg/L milligrams per liter

µg/L micrograms per liter.

TABLE C-2
Comparison of AR data and UOS Data

Location		DR-3 (Collected by EPA)	DR-3 (Collected by AR)	DR-8 (Duplicate of DR-3 collected by AR)
Date		10/20/2011	10/20/2011	10/20/2011
Aluminum (µg/L)	Total	195	215	197
	Diss.	30.2	26.5	26.9
Antimony (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Arsenic (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Barium (µg/L)	Total	50.0 U	19.1	19.2
	Diss.	50.0 U	18.6	18.5
Beryllium (µg/L)	Total	2.00 U	0.53	0.62
	Diss.	2.00 U	0.4	0.33
Cadmium (µg/L)	Total	18.2	18.1	17.9
	Diss.	17.5	17.1	17.0
Calcium (µg/L)	Total	211,000	235,000	236,000
	Diss.	**221,000**	**274,000**	**228,000**
Chromium (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	10.4	0.5 U	0.5 U
Cobalt (µg/L)	Total	1.00 U	NA	NA
	Diss.	1.16	NA	NA
Copper (µg/L)	**Total**	**20.7**	**27.6**	**25.9**
	Diss.	5.00 U	2.6	2.4
Hardness (mg/L)		631	668	670
Iron (µg/L)	Total	3620	4040	3910
	Diss.	1090	1050	1060
Lead (µg/L)	Total	1.2	1.3	1.2
	Diss.	1.00 U	0.1 U	0.10 U
Magnesium (µg/L)	Total	18,400	20,000	19,800
	Diss.	19,300	19,500	19,200
Manganese (µg/L)	**Total**	**2190**	**3530**	**3400**
	Diss.	**2250**	**2380**	**3110**
Molybdenum (µg/L)	Total	14.1	NA	NA
	Diss.	13.5	NA	NA
Nickel (µg/L)	Total	5.00 U	6.2	6.0
	Diss.	5.00 U	6.0	6.0
Potassium (µg/L)	Total	1600	1620	1590
	Diss.	1630	1430	1600
Selenium (µg/L)	Total	5.00 U	0.5 U	0.5 U

TABLE C-2
Comparison of AR data and UOS Data

Location		DR-3 (Collected by EPA)	DR-3 (Collected by AR)	DR-8 (Duplicate of DR-3 collected by AR)
	Diss.	5.00 U	0.5 U	0.5 U
Silver (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Sodium (µg/L)	Total	9200	9480	9380
	Diss.	9520	9250	9060
Thallium (µg/L)	Total	5.00 U	0.1 U	0.1 U
	Diss.	5.00 U	0.1 U	0.1 U
Vanadium (µg/L)	Total	10.0 U	0.1 U	0.1 U
	Diss.	10.0 U	0.1 U	0.1 U
Zinc (µg/L)	Total	3720	3850	3880
	Diss.	3810	3690	3700

U The analyte was not detected at or above the Method Detection Limit
J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit
mg/L milligrams per liter
µg/L micrograms per liter

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Kim Ohlson

DATE: December 16, 2011

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected June 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine project**.

Summary: The data are acceptable with further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Sixteen water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in August of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable with the following suggestions. All quality control criteria were met, except for the following anomalies were observed:

Metals Analysis:

Blank Contamination: Several continuing calibration blanks and method blanks contained both positive and negative contamination for metals. Antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, thallium, vanadium, and zinc were positive blank contaminants and potentially biased the associated metal results to be high. The aluminum, arsenic, beryllium, selenium, and sodium concentration in associated samples are biased low because of negative blank contamination.

Check Sample Interferences: Several metals were documented to have interference in the check sample. Barium, chromium, copper, selenium, and zinc have positive interference and the dissolved sample results associated with these metals are potentially biased high. Barium, chromium, copper, and zinc have positive interference and the total recoverable sample results associated with these metals are potentially biased high. Cobalt, lead, manganese, nickel, potassium, silver, and vanadium have negative interference and several dissolved sample results associated with these metals are potentially biased low. Arsenic, cobalt, lead, manganese, nickel, potassium, and vanadium have negative interference and several total recoverable

sample results associated with these metals are potentially biased low.

Serial Dilution Issue: The chromium, potassium, and zinc percent differences between the original sample and the five-fold serial dilution sample result were greater than 10%. This may indicate matrix interference for chromium, potassium, and zinc. All sample results for chromium, potassium, and zinc should be considered estimated concentrations.

Sample Dilutions: The 100 and 50 fold dilutions were appropriate for the Argentine Tunnel Main sample because of the high concentration of aluminum, calcium, magnesium, and iron. This sample was diluted to reduce the metal interference in order to acquire accurate results for other metal analytes.

Action:

Data are to be used with qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist.

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Kim Ohlson

DATE: December 16, 2011

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected August 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine project**.

Summary: The data are acceptable with further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Two water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in September of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable with the following suggestions. All quality control criteria were met, except for the following anomalies were observed:

Metals Analysis:

Blank Contamination: Several continuing calibration blanks and method blanks contained both positive and negative contamination for metals. Antimony, arsenic, barium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, potassium, selenium, and silver were positive blank contaminants and potentially biased the associated metal results to be high. The aluminum, beryllium, cadmium, calcium, chromium, vanadium, and zinc concentration in associated samples are biased low because of negative blank contamination.

Check Sample Interferences: Several metals were documented to have interference in the check sample. Barium, chromium, copper, lead, selenium, and zinc have positive interference and the sample results associated with these metals are potentially biased high. Beryllium, cobalt, manganese, nickel, potassium, silver, and vanadium have negative interference and several sample results associated with

these metals are potentially biased low.

Matrix Spike Issues: The silver percent recoveries were below the QC limit in the MS and MSD These problems may indicate matrix interference for silver, indicating that all sample results are biased low for silver.

Action:

Data are to be used with qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist.

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Jenifer Patureau

DATE: February 23, 2012

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected August 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine (RS) project**.

Summary: The data are acceptable without further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Sixteen water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in October of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable, noting the following suggestions. All quality control criteria were met, with the exception of the following observations:

Total Metals Analysis:

Serial Dilution: The laboratory serial dilution detection limits were reported as 50µg/L for all analytes except cadmium. These detection limits are an anomaly; however, the data remain useable.

Blank Contamination: Positive contamination was found in method blank and continuing calibration blanks for zinc, cadmium, chromium, selenium, and silver. Sample results are potentially biased high for these analytes. The laboratory case narrative identified the presence of cadmium in the prep blank at a level less than two times the PQL. The reporting limit was raised to 0.30µg/L, but no qualifiers were assigned.

Interference Check Sample: Positive interferences were identified in the check

sample analysis for cadmium and chromium. Sample results are potentially biased high for these analytes. Negative interference was identified in the check sample for cobalt, indicating sample results may be biased low for this analyte.

Dissolved Metals Analysis:

Duplicate Sample Analysis: Laboratory duplicate analysis was found to be outside of QC limits for lead in ICP-MS. Both lead sample result values as well as the difference between the values are above the PQL for lead by ICP-MS (0.1µg/L for a dilution factor of 1). Lead sample results are therefore considered to be an estimate with unknown bias.

Blank Contamination: Positive contamination was found in method blank and continuing calibration blanks for silver. Sample results are potentially biased high for this analyte.

Interference Check Sample: Positive interferences were identified in the check sample analysis for cadmium and copper. Sample results are potentially biased high for these analytes. Negative interference was identified in the check sample for cobalt, indicating sample results may be biased low for this analyte.

Action:

Data are to be used with qualifiers attached by laboratory and the recommendations above from the reviewing UOS chemist.

APPENDIX C-1

Laboratory Data Packages

Samples Collected June 2011

(on attached CD)

APPENDIX C-2

Laboratory Data Package

Samples Collected August 2011

(on attached CD)

APPENDIX C-3

Laboratory Data Packages

Samples Collected October 2011

(on attached CD)

APPENDIX C

Quality Assurance/Quality Control Evaluation and Laboratory Data Package

APPENDIX C-1 **Laboratory Data Packages, Samples Collected June 2011**

APPENDIX C-2 **Laboratory Data Package, Samples Collected August 2011**

APPENDIX C-3 **Laboratory Data Packages, Samples Collected October 2011**

SUMMARY

The results of field Quality Assurance/Quality Control (QA/QC) samples are shown in Table C-1. The field blank sample collected in June showed no detectable concentrations of site contaminants with the exception of lead in the total fraction. The relative percent differences (RPD) calculated for duplicate samples collected during June and October are shown in Table C-1. RPD's greater than 20 percent are shown in bold on Table C-1.

On October 20, 2011, duplicate samples were collected at DR-3 for EPA by UOS and for AR by Anderson Engineering. The UOS samples were submitted to the EPA Region 8 Laboratory operated by the ESAT contractor and the AR samples were submitted to Pace Analytical Laboratories in Lenexa, Kansas. The results are presented on Table C-2. Analytes where the relative percent difference calculated for any of the pairs of duplicates is greater than 20 percent are shown in bold on Table C-2.

Data sent to the EPA Region 8 Laboratory were reviewed by a chemist and determined to be acceptable for the intended use with some qualifications. Review memos are provided below.

The data packages are provided below. The sample identifications may vary compared to the names shown in the report data tables due to identifying the correct name of the 517 Shaft, removing date characters, or for clarification/consistency.

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
Aluminum (µg/L)	Total	20.0 U	127,000	127,000	0	29.5 J	35.3	17.9	145	156	7.3
	Dissolved	20.0 U	124,000	123,000	0.8	40.8 J	25.6	**45.8**	53.4	56.4	5.5
Antimony (µg/L)	Total	2.50 U	5.00 U	5.00 U	NA	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Arsenic (µg/L)	Total	2.50 U	1220	1210	0.8	3.56 J	4.31	19.1	2.50 U	2.50 U	NA
	Dissolved	0.500 U	1190	1200	0.8	13.6	12.8	6.1	0.641 J	0.635 J	0.9
Barium (µg/L)	Total	25.0 U	50.0 U	50.0 U	NA	120	121	0.8	82.1	82.8	0.8
	Dissolved	5.00 U	50.0 U	50.0 U	NA	121	122	0.8	79.9	78.4	1.9
Beryllium (µg/L)	Total	0.500 U	12.3	12.8	4.0	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	16.1	13.7	16.1	0.100 U	0.100 U	NA	0.100 U	0.100 U	NA
Bromide (mg/L)	--	0.5 U	20.0 U	20.0 U	NA	6.4	6.5	1.6	0.5 U	0.5 U	NA
Cadmium (µg/L)	Total	0.500 U	967	965	0.2	3.16	0.88	**112.9**	0.500 U	0.500 U	NA
	Dissolved	0.100 U	953	967	1.5	0.100 U	0.100 U	NA	0.242	0.212	13.2
Calcium (µg/L)	Total	100 U	373,000	378,000	1.3	37,000	36,500	1.4	19,900	19,900	0.0
	Dissolved	100 U	366,000	365,000	0.3	36,100	36,700	NA	19,900	20,000	0.5
Chloride (mg/L)	--	2.0 U	100 U	200 U	NA	1.1 J	1.1 J	0	2.9	14.6	**133**
Chromium (µg/L)	Total	2.50 U	103	103	0.0	6.91	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	105	103	1.9	3.46	3.21	NA	1.9	1.93	1.6
Cobalt (µg/L)	Total	0.500 U	145	153	5.4	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	152	155	2.0	0.100 U	0.100 U	NA	0.100 U	0.100 U	NA
Copper (µg/L)	Total	2.50 U	14,500	15,100	4.1	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	15,800	15,600	1.3	0.500 U	0.500 U	NA	0.589 J	0.500 U	NA
Fluoride (mg/L)	--	0.2 U	29.2	30.0	2.7	0.2 U	0.2 U	NA	0.2 U	0.2 U	NA
Hardness	--	2 U	1480	1480	0.0	105	107	1.9	57	58	1.7

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
(mg/L)											
Iron (µg/L)	Total	100 U	1,420,000	1,440,000	1.4	100 U	100 U	NA	100 U	100 U	NA
	Dissolved	100 U	1,390,000	1,390,000	0.0	100 U	100 U	NA	100 U	100 U	NA
Lead (µg/L)	Total	0.545	771	672	13.7	0.500 U	0.500 U	NA	2.13	2.13	0.0
	Dissolved	0.100 U	404	397	1.7	0.221	0.107	**69.5**	0.28	0.274	2.2
Magnesium (µg/L)	Total	100 U	140,000	142,000	1.4	3690	3650	1.1	1890	1900	0.5
	Dissolved	100 U	138,000	137,000	0.7	3630	3960	8.7	1870	1880	0.5
Manganese (µg/L)	Total	1.00 U	61,500	62,300	1.3	3.68 J	3.93	6.6	5.57	6.54	16.0
	Dissolved	0.200 U	61,600	61,700	0.2	3.77 J	6.74	**56.5**	2.74	2.98	8.4
Molybdenum (µg/L)	Total	0.500 U	23.4	22	6.2	0.500 U	0.502	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	19	19.5	2.6	0.509	0.519	1.9	0.179 J	0.192 J	7.0
Nickel (µg/L)	Total	2.50 U	197	199	1.0	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	214	208	2.8	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Potassium (µg/L)	Total	250 U	7810 J	7760 J	0.6	619 J	592 J	4.5	437 J	445 J	1.8
	Dissolved	250 U	7010 J	6840 J	2.5	578 J	589 J	1.9	423 J	418 J	1.2
Selenium (µg/L)	Total	2.50 U	33.6	29.6	12.7	25	18.6	29.4	2.50 U	2.50 U	NA
	Dissolved	0.500 U	35.3	33.2	6.1	60.3	56.7	6.2	0.500 U	0.500 U	NA
Silver (µg/L)	Total	0.500 U	5.00 U	5.00 U	NA	2.50 U	2.50 U	NA	0.500 U	0.500 U	NA
	Dissolved	0.100 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.100 U	0.100 U	NA
Sodium (µg/L)	Total	250 U	4790 J	4760 J	0.6	3740	3700	1.1	2050	12,900	**145.2**
	Dissolved	250 U	4650 J	4640 J	0.2	3670	3730	1.6	8370	9710	14.8
Sulfate (mg/L)	-	5.0 U	6370	6240	0.4	9.0	9.1	1.1	4.3	4.3	0
Thallium (µg/L)	Total	2.50 U	9.42	6.21	**41.1**	2.50 U	2.50 U	NA	2.50 U	2.50 U	NA
	Dissolved	0.500 U	5.00 U	5.00 U	NA	0.500 U	0.500 U	NA	0.500 U	0.500 U	NA
Vanadium	Total	5.00 U	165	165	0.0	5.00 U	5.00 U	NA	5.00 U	5.00 U	NA

TABLE C-1
Comparison of Results of Quality Assurance/Quality Control Samples

Location	Fraction	Blank	Blaine Tunnel 10/3/2011			SC-68 10/7/2011			SC-404 * 6/24/2011		
		SC-B	Sample	Duplicate (BTD)	RPD	Sample	Duplicate (SC-68D)	RPD	Sample	Duplicate (SC-4040)	RPD
(µg/L)	Dissolved	1.00 U	172	169	1.8	1.13 J	1.12 J	0.9	1.00 U	1.00 U	NA
Zinc (µg/L)	Total	10.0 U	161,000	163,000	1.2	35.6	25.2	**34.2**	55.7	58.9	5.6
	Dissolved	2.00 U	161,000	162,000	0.6	10.0 U	24.8	NA	52.6	53	0.8

* Duplicate sample SC-4040 was collected the morning after the primary sample (SC-404). The anions results may vary widely due to injection of stream tracer (sodium chloride and sodium bromide) the day the duplicate sample was collected.

U The analyte was not detected at or above the Method Detection Limit

J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit

mg/L milligrams per liter

µg/L micrograms per liter.

TABLE C-2
Comparison of AR data and UOS Data

Location		DR-3 (Collected by EPA)	DR-3 (Collected by AR)	DR-8 (Duplicate of DR-3 collected by AR)
Date		10/20/2011	10/20/2011	10/20/2011
Aluminum (µg/L)	Total	195	215	197
	Diss.	30.2	26.5	26.9
Antimony (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Arsenic (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Barium (µg/L)	Total	50.0 U	19.1	19.2
	Diss.	50.0 U	18.6	18.5
Beryllium (µg/L)	Total	2.00 U	0.53	0.62
	Diss.	2.00 U	0.4	0.33
Cadmium (µg/L)	Total	18.2	18.1	17.9
	Diss.	17.5	17.1	17.0
Calcium (µg/L)	Total	211,000	235,000	236,000
	Diss.	**221,000**	**274,000**	**228,000**
Chromium (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	10.4	0.5 U	0.5 U
Cobalt (µg/L)	Total	1.00 U	NA	NA
	Diss.	1.16	NA	NA
Copper (µg/L)	**Total**	**20.7**	**27.6**	**25.9**
	Diss.	5.00 U	2.6	2.4
Hardness (mg/L)		631	668	670
Iron (µg/L)	Total	3620	4040	3910
	Diss.	1090	1050	1060
Lead (µg/L)	Total	1.2	1.3	1.2
	Diss.	1.00 U	0.1 U	0.10 U
Magnesium (µg/L)	Total	18,400	20,000	19,800
	Diss.	19,300	19,500	19,200
Manganese (µg/L)	**Total**	**2190**	**3530**	**3400**
	Diss.	**2250**	**2380**	**3110**
Molybdenum (µg/L)	Total	14.1	NA	NA
	Diss.	13.5	NA	NA
Nickel (µg/L)	Total	5.00 U	6.2	6.0
	Diss.	5.00 U	6.0	6.0
Potassium (µg/L)	Total	1600	1620	1590
	Diss.	1630	1430	1600
Selenium (µg/L)	Total	5.00 U	0.5 U	0.5 U

TABLE C-2
Comparison of AR data and UOS Data

Location		DR-3 (Collected by EPA)	DR-3 (Collected by AR)	DR-8 (Duplicate of DR-3 collected by AR)
	Diss.	5.00 U	0.5 U	0.5 U
Silver (µg/L)	Total	5.00 U	0.5 U	0.5 U
	Diss.	5.00 U	0.5 U	0.5 U
Sodium (µg/L)	Total	9200	9480	9380
	Diss.	9520	9250	9060
Thallium (µg/L)	Total	5.00 U	0.1 U	0.1 U
	Diss.	5.00 U	0.1 U	0.1 U
Vanadium (µg/L)	Total	10.0 U	0.1 U	0.1 U
	Diss.	10.0 U	0.1 U	0.1 U
Zinc (µg/L)	Total	3720	3850	3880
	Diss.	3810	3690	3700

U The analyte was not detected at or above the Method Detection Limit
J Estimated value. Value is greater than or equal to the method detection limit but less than the practical quantitation limit
mg/L milligrams per liter
µg/L micrograms per liter

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Kim Ohlson

DATE: December 16, 2011

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected June 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine project**.

Summary: The data are acceptable with further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Sixteen water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in August of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable with the following suggestions. All quality control criteria were met, except for the following anomalies were observed:

Metals Analysis:

Blank Contamination: Several continuing calibration blanks and method blanks contained both positive and negative contamination for metals. Antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, thallium, vanadium, and zinc were positive blank contaminants and potentially biased the associated metal results to be high. The aluminum, arsenic, beryllium, selenium, and sodium concentration in associated samples are biased low because of negative blank contamination.

Check Sample Interferences: Several metals were documented to have interference in the check sample. Barium, chromium, copper, selenium, and zinc have positive interference and the dissolved sample results associated with these metals are potentially biased high. Barium, chromium, copper, and zinc have positive interference and the total recoverable sample results associated with these metals are potentially biased high. Cobalt, lead, manganese, nickel, potassium, silver, and vanadium have negative interference and several dissolved sample results associated with these metals are potentially biased low. Arsenic, cobalt, lead, manganese, nickel, potassium, and vanadium have negative interference and several total recoverable

sample results associated with these metals are potentially biased low.

Serial Dilution Issue: The chromium, potassium, and zinc percent differences between the original sample and the five-fold serial dilution sample result were greater than 10%. This may indicate matrix interference for chromium, potassium, and zinc. All sample results for chromium, potassium, and zinc should be considered estimated concentrations.

Sample Dilutions: The 100 and 50 fold dilutions were appropriate for the Argentine Tunnel Main sample because of the high concentration of aluminum, calcium, magnesium, and iron. This sample was diluted to reduce the metal interference in order to acquire accurate results for other metal analytes.

Action:

Data are to be used with qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist.

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Kim Ohlson

DATE: December 16, 2011

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected August 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine project**.

Summary: The data are acceptable with further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Two water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in September of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable with the following suggestions. All quality control criteria were met, except for the following anomalies were observed:

Metals Analysis:

Blank Contamination: Several continuing calibration blanks and method blanks contained both positive and negative contamination for metals. Antimony, arsenic, barium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, potassium, selenium, and silver were positive blank contaminants and potentially biased the associated metal results to be high. The aluminum, beryllium, cadmium, calcium, chromium, vanadium, and zinc concentration in associated samples are biased low because of negative blank contamination.

Check Sample Interferences: Several metals were documented to have interference in the check sample. Barium, chromium, copper, lead, selenium, and zinc have positive interference and the sample results associated with these metals are potentially biased high. Beryllium, cobalt, manganese, nickel, potassium, silver, and vanadium have negative interference and several sample results associated with

these metals are potentially biased low.

Matrix Spike Issues: The silver percent recoveries were below the QC limit in the MS and MSD These problems may indicate matrix interference for silver, indicating that all sample results are biased low for silver.

Action:

Data are to be used with qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist.

URS OPERATING SERVICES, INC.

START3 - REGION 8

MEMORANDUM

TO: File

FROM: Jenifer Patureau

DATE: February 23, 2012

SUBJECT: Rico-Argentine Data Review – DG-264, Samples Collected August 2011

Purpose: This memo is a response to a request for a review of the data associated with the **Rico-Argentine (RS) project**.

Summary: The data are acceptable without further qualification for their intended use.

Discussion: All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.

Sixteen water samples related to SDG DG-264 were analyzed at Environmental Services Assistance Team Laboratory (ESAT) in October of 2011. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable, noting the following suggestions. All quality control criteria were met, with the exception of the following observations:

Total Metals Analysis:

Serial Dilution: The laboratory serial dilution detection limits were reported as 50µg/L for all analytes except cadmium. These detection limits are an anomaly; however, the data remain useable.

Blank Contamination: Positive contamination was found in method blank and continuing calibration blanks for zinc, cadmium, chromium, selenium, and silver. Sample results are potentially biased high for these analytes. The laboratory case narrative identified the presence of cadmium in the prep blank at a level less than two times the PQL. The reporting limit was raised to 0.30µg/L, but no qualifiers were assigned.

Interference Check Sample: Positive interferences were identified in the check

sample analysis for cadmium and chromium. Sample results are potentially biased high for these analytes. Negative interference was identified in the check sample for cobalt, indicating sample results may be biased low for this analyte.

Dissolved Metals Analysis:

Duplicate Sample Analysis: Laboratory duplicate analysis was found to be outside of QC limits for lead in ICP-MS. Both lead sample result values as well as the difference between the values are above the PQL for lead by ICP-MS (0.1µg/L for a dilution factor of 1). Lead sample results are therefore considered to be an estimate with unknown bias.

Blank Contamination: Positive contamination was found in method blank and continuing calibration blanks for silver. Sample results are potentially biased high for this analyte.

Interference Check Sample: Positive interferences were identified in the check sample analysis for cadmium and copper. Sample results are potentially biased high for these analytes. Negative interference was identified in the check sample for cobalt, indicating sample results may be biased low for this analyte.

Action:

Data are to be used with qualifiers attached by laboratory and the recommendations above from the reviewing UOS chemist.

APPENDIX C-1

Laboratory Data Packages

Samples Collected June 2011

U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis

Ref: 8TMS-L

MEMORANDUM

Date: 10/14/11

Subject: Analytical Results--- **Rico-Argentine_Surface Waters_AUG 2011_D264 / DG-264**

From: Don Goodrich; EPA Region 8 Analytical Chemistry WAM

To: Steve Way
Superfund
1595 Wynkoop Street

Received Sample Set(s), [Work Order : Date Received]:
[C110805 : 08/10/2011]

Attached are the analytical results for the samples received from the Rico-Argentine_Surface Waters_AUG 2011_D264 sampling event, according to TDF DG-264. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality asessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004, referred to as "NFGI".

Case Narrative

C110805

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

Other: It was noted during sample login that the cooler temperature was 7 degrees celcius.

1. Initial and Continuing calibration blanks (ICBs and CCBs).
   Exceptions: In ICP-MS sequence 1109045 and 1109046, molybdenum was detected in CCB1. As a result, the reporting limit for molybdenum was raised from 0.20 ug/L to 0.30 ug/L. In ICP-MS sequence 1109045 and 1109046, silver was detected in the ICB, CCB2, and CCB3. As a result, the reporting limit for silver was raised to 2.0 ug/L. No qualifiers were assigned.
2. Preparation (PB) / Method blanks (MB)
   Exceptions: None.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
   Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs and CCVs).
   Exceptions: None.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
   Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes. PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
   Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
   Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
   Exceptions: None.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
   Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
    Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
    Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
    Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result.
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit (MDL)
mg/L	Parts per million (millligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	*USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.

Method(s) Summary:

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP-OE (ICP).
- Method 200.8 / 6020 using a Perkin-Elmer Elan 6000 ICP-MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin-Elmer FIMS CVAA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg (milligram) equivalent $CaCO_3$ per liter (L) determined as follows:

Calculated hardness = 2.497 * (Calcium, mg/L) + 4.118 * (Magnesium, mg/L).

From *EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography*, Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: ArgentineShaft **Date / Time Sampled:** 08/04/11 13:30 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-C **Matrix:** Water **Lab Number:** C110805-02 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	08/15/2011	SV	1108056
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	08/15/2011	SV	1108056
EPA 300.0	**Fluoride**	**0.9**		mg/L	0.1	1	08/15/2011	SV	1108056
EPA 300.0	**Sulfate as SO4**	**149**		mg/L	2.0	1	08/15/2011	SV	1108056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: BlaineTunnel **Date / Time Sampled:** 08/04/11 16:00 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-C **Matrix:** Water **Lab Number:** C110805-05 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	08/15/2011	SV	1108056
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	08/15/2011	SV	1108056
EPA 300.0	**Fluoride**	**1.8**		mg/L	0.1	1	08/15/2011	SV	1108056
EPA 300.0	**Sulfate as SO4**	**279**		mg/L	2.0	1	08/15/2011	SV	1108056

"J" Qualifier indicates an estimated value

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Classical Chemistry by EPA/ASTM/APHA Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ESAT Dionex IC									
Batch 1108056 - No Prep Req			***Water***						**ESAT Dionex IC**
Method Blank (1108056-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 08/15/11			
Fluoride	< 0.1	0.2	mg/L						
Chloride	< 1.0	2.0	"						
Bromide	< 0.2	0.5	"						
Sulfate as SO4	< 2.0	5.0	"						
Method Blank Spike (1108056-BS1)		Dilution Factor: 1				Prepared & Analyzed: 08/15/11			
Fluoride	4.6	0.2	mg/L	5.00		93	80-120		
Chloride	24.1	2.0	"	25.0		96	80-120		
Bromide	9.9	0.5	"				80-120		
Sulfate as SO4	23.5	5.0	"	25.0		94	80-120		
Duplicate (1108056-DUP1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Fluoride	0.8	0.2	mg/L		0.9			5	20
Chloride	< 1.0	2.0	"		< 1.0				20
Bromide	< 0.2	0.5	"		< 0.2				20
Sulfate as SO4	149	5.0	"		149			0.3	20
Matrix Spike (1108056-MS1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Fluoride	5.4	0.2	mg/L	5.00	0.9	91	80-120		
Chloride	24.4	2.0	"	25.0	< 1.0	98	80-120		
Bromide	10.2	0.5	"		< 0.2		80-120		
Sulfate as SO4	171	5.0	"	25.0	149	85	80-120		
Matrix Spike Dup (1108056-MSD1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Fluoride	5.4	0.2	mg/L	5.00	0.9	91	80-120	0.4	20
Chloride	24.5	2.0	"	25.0	< 1.0	98	80-120	0.3	20
Bromide	10.0	0.5	"		< 0.2		80-120	2	20
Sulfate as SO4	172	5.0	"	25.0	149	91	80-120	0.8	20

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography

Instrument: **ESAT Dionex IC** Work Order: Nu C110805

Analytical Sequence: 1108079 **Dissolved** Concentration Units: mg/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Fluoride	0.00	1	2	3	4	1108056-BLK1	NA	0.20
		0.00				0.00	NA	
		5	6	7	8			
Chloride	0.00	1	2	3	4	1108056-BLK1	NA	2.00
		0.00				0.00	NA	
		5	6	7	8			
Bromide	0.00	1	2	3	4	1108056-BLK1	NA	0.50
		0.00				0.00	NA	
		5	6	7	8			
Sulfate as SO4	0.00	1	2	3	4	1108056-BLK1	NA	5.00
		0.00				0.00	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ESAT Dionex IC Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography 2010

Sequence: 1108079 Work Order: C110805 Units: mg/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Bromide	50.1	49.4	98.6		1			2			3	
				10.0	10.0	100.0						
					4			5			6	
					7			8			9	
Chloride	15.1	14.5	96.0		1			2			3	
				40.0	40.1	100.3						
					4			5			6	
					7			8			9	
Fluoride	9.98	9.8	98.2		1			2			3	
				4.00	3.7	92.5						
					4			5			6	
					7			8			9	
Sulfate as SO4	75.2	78.5	104.4		1			2			3	
				100	101	101.0						
					4			5			6	
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

ICP Interference Check Sample

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence:	Analysis:					

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Detection Limit (PQL) Standard

Sequence:

Analyte	True	Found	%R	Units

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: EPA 300.0 **Dissolved** **Sequence ID#:** 1108079

Instrument ID #: ESAT Dionex IC Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108079-ICV1	Initial Cal Check	08/15/11	10:46
1108079-ICB1	Initial Cal Blank	08/15/11	11:03
1108056-BLK1	Blank	08/15/11	11:21
1108056-BS1		08/15/11	11:39
C110805-02	ArgentineShaft	08/15/11	11:56
1108056-DUP1	Duplicate	08/15/11	12:14
1108056-MS1	Matrix Spike	08/15/11	12:31
1108056-MSD1	Matrix Spike Dup	08/15/11	12:49
C110805-05	BlaineTunnel	08/15/11	13:06
1108079-CCV1	Calibration Check	08/15/11	13:24
1108079-CCB1	Calibration Blank	08/15/11	13:42

U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis

Ref: 8TMS-L

MEMORANDUM

Date: 08/03/11

Subject: Analytical Results--- **Rico-Argentine_Surface Waters_JUN 2011_D264 / DG-264**

From: Don Goodrich; EPA Region 8 Analytical Chemistry WAM

To: Steve Way
Superfund
1595 Wynkoop Street

Received Sample Set(s), [Work Order : Date Received]:
[C110616 : 06/28/2011]

Attached are the analytical results for the samples received from the Rico-Argentine_Surface Waters_JUN 2011_D264 sampling event, according to TDF DG-264. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality asessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004, referred to as "NFGI".

Case Narrative

C110616

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

1. Initial and Continuing calibration blanks (ICBs and CCBs).
   Exceptions: In ICP-MS sequence 1108012, silver was detected in the ICB just above the PQL. As a result, the reporting limit for lead was raised from 0.50 ug/L to 0.60 ug/L. No qualifiers were assigned.
2. Preparation (PB) / Method blanks (MB)
   Exceptions: None.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
   Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs and CCVs).
   Exceptions: In ICP-MS sequence 1108008, beryllium recovered low in CCV5 and CCV7. In ICP-MS sequence 1108012, lead recovered high by 1% in CCV2. No qualifiers were assigned.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
   Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes. PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
   Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
   Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
   Exceptions: None.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
   Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
    Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
    Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
    Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result.
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit (MDL)
mg/L	Parts per million (millligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	*USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.

Method(s) Summary:

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP-OE (ICP).
- Method 200.8 / 6020 using a Perkin-Elmer Elan 6000 ICP-MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin-Elmer FIMS CVAA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg (milligram) equivalent $CaCO_3$ per liter (L) determined as follows:

Calculated hardness = 2.497 * (Calcium, mg/L) + 4.118 * (Magnesium, mg/L).

From *EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography*, Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Argentine Shaft Tunnel **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-01 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**30.2**	J	ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**85200**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**5100**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**998**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**1180**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**48.7**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**5.64**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Copper	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.140**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Manganese	< 0.500	U	ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**1.28**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**0.806**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Vanadium**	**1.57**	J	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**10.8**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**234**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Argentine Tunnel Main **Date / Time Sampled:** 06/23/11 13:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-04 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**656000**		ug/L	1000	50	08/01/2011	SW	1108003
200.7	**Calcium**	**435000**		ug/L	5000	50	08/01/2011	SW	1108003
200.7	**Iron**	**1950000**		ug/L	5000	50	08/01/2011	SW	1108003
200.7	**Magnesium**	**1250000**		ug/L	5000	50	08/01/2011	SW	1108003
200.7	Potassium	< 50000	U	ug/L	12500	50	08/01/2011	SW	1108003
200.7	Sodium	< 25000	U	ug/L	12500	50	08/01/2011	SW	1108003
200.8	Antimony	< 100	U	ug/L	50.0	100	08/01/2011	SV	1108004
200.8	**Arsenic**	**83.8**	J	ug/L	50.0	100	08/01/2011	SV	1108004
200.8	Barium	< 1000	U	ug/L	500	100	08/01/2011	SV	1108004
200.8	**Beryllium**	**172**		ug/L	10.0	100	08/01/2011	SV	1108004
200.8	**Cadmium**	**12000**		ug/L	10.0	100	08/01/2011	SV	1108004
200.8	**Chromium**	**336**		ug/L	50.0	100	08/01/2011	SV	1108004
200.8	**Cobalt**	**531**		ug/L	10.0	100	08/01/2011	SV	1108004
200.8	**Copper**	**349000**		ug/L	50.0	100	08/01/2011	SV	1108004
200.8	**Lead**	**239**		ug/L	10.0	100	08/01/2011	SV	1108004
200.8	**Manganese**	**294000**		ug/L	20.0	100	08/01/2011	SV	1108004
200.8	Molybdenum	< 20.0	U	ug/L	10.0	100	08/01/2011	SV	1108004
200.8	**Nickel**	**882**		ug/L	50.0	100	08/01/2011	SV	1108004
200.8	**Selenium**	**248**		ug/L	50.0	100	08/01/2011	SV	1108004
200.8	Silver	< 50.0	U	ug/L	10.0	100	08/01/2011	SV	1108004
200.8	Thallium	< 100	U	ug/L	50.0	100	08/01/2011	SV	1108004
200.8	Vanadium	< 200	U	ug/L	100	100	08/01/2011	SV	1108004
200.8	**Zinc**	**2460000**		ug/L	200	100	08/01/2011	SV	1108004
2340B	**Hardness**	**6230**		mg/L	75	50	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: DR-3 **Date / Time Sampled:** 06/23/11 14:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-07 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**351**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**250000**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Iron**	**445**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**24200**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**1680**		ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**9100**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Barium	< 100	U	ug/L	50.0	10	08/01/2011	SV	1108004
200.8	Beryllium	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Cadmium**	**52.0**		ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Chromium	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	**Cobalt**	**4.72**		ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Copper**	**55.2**		ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Lead	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Manganese**	**4270**		ug/L	2.00	10	08/01/2011	SV	1108004
200.8	**Molybdenum**	**6.00**		ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Nickel**	**8.73**	J	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Selenium	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	**Silver**	**2.97**	J	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	08/01/2011	SV	1108004
200.8	**Zinc**	**10200**		ug/L	20.0	10	08/01/2011	SV	1108004
2340B	**Hardness**	**723**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: DR-7 **Date / Time Sampled:** 06/23/11 14:20 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-10 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**85.4**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**24400**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**3390**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**568**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**1540**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**36.3**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.819**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.75**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**0.519**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**1.42**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**77.4**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.579**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Selenium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**149**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**75**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-068 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-13 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**53.4**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**18300**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1670**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**443**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**917**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.76**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**74.6**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.81**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Cobalt**	**0.120**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Copper	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**1.00**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**0.947**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.212**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**5.42**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**4.79**	J	ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**52**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-1131 **Date / Time Sampled:** 06/23/11 16:41 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-16 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**68.3**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**19900**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1850**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**436**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**874**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.51**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**71.7**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.467**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.85**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**2.78**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.554**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**14.1**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.197**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**4.53**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**83.2**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**57**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-198 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-19 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**51.9**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**18400**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1700**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**442**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**914**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.67**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**76.7**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.95**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Copper	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Manganese	< 0.500	U	ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.178**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**5.16**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**8.28**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**53**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-351 **Date / Time Sampled:** 06/23/11 16:02 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-22 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**54.0**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**18400**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1710**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**422**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**892**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.70**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**76.0**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.187**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.94**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**0.591**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**1.41**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**2.89**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.193**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**5.09**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**39.3**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**53**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-404 **Date / Time Sampled:** 06/24/11 11:40 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-25 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**53.4**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**19900**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1870**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**423**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**8370**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**0.641**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**79.9**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.242**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.90**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**0.589**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.280**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**2.74**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.179**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Selenium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**52.6**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**57**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-4040 **Date / Time Sampled:** 06/24/11 11:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-28 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**56.4**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**20000**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1880**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**418**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**9710**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**0.635**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**78.4**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.212**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.93**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Copper	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.274**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**2.98**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.192**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Selenium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**53.0**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**58**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-493 **Date / Time Sampled:** 06/23/11 16:10 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-31 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**65.7**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**18300**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1730**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**432**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**912**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.71**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**77.0**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.293**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.65**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**2.12**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**1.61**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**9.04**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.185**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**5.11**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**55.7**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**53**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-699 **Date / Time Sampled:** 06/23/11 16:17 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-34 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**72.3**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**18300**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Iron**	**111**	J	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1740**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**440**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**914**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.63**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**76.5**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.333**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.91**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**2.78**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.642**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**11.4**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.186**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**5.10**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**61.2**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**53**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-895 **Date / Time Sampled:** 06/23/11 16:56 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-37 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**65.9**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**19300**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1750**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**433**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**858**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Arsenic**	**1.54**	J	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**70.5**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.424**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**1.86**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**2.57**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**0.387**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**9.78**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.184**	J	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Selenium**	**4.66**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**78.9**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**55**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC-B **Date / Time Sampled:** 06/23/11 16:15 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-40 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/01/2011	SW	1108003
200.7	Calcium	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	Magnesium	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	Potassium	< 1000	U	ug/L	250	1	08/01/2011	SW	1108003
200.7	Sodium	< 500	U	ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Barium	< 10.0	U	ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Chromium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Copper	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Manganese	< 0.500	U	ug/L	0.200	1	08/01/2011	SV	1108004
200.8	Molybdenum	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Selenium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	Zinc	< 5.00	U	ug/L	2.00	1	08/01/2011	SV	1108004
2340B	Hardness	< 2		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SCEF **Date / Time Sampled:** 06/23/11 10:45 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-43 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**50.6**		ug/L	20.0	1	08/01/2011	SW	1108003
200.7	**Calcium**	**26000**		ug/L	100	1	08/01/2011	SW	1108003
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1108003
200.7	**Magnesium**	**1380**		ug/L	100	1	08/01/2011	SW	1108003
200.7	**Potassium**	**495**	J	ug/L	250	1	08/01/2011	SW	1108003
200.7	**Sodium**	**583**		ug/L	250	1	08/01/2011	SW	1108003
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Barium**	**50.2**		ug/L	5.00	1	08/01/2011	SV	1108004
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Cadmium**	**0.958**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Chromium**	**2.15**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Copper**	**2.51**		ug/L	0.500	1	08/01/2011	SV	1108004
200.8	**Lead**	**1.27**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	**Manganese**	**3.57**		ug/L	0.200	1	08/01/2011	SV	1108004
200.8	**Molybdenum**	**0.404**		ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Selenium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Silver	< 0.500	U	ug/L	0.100	1	08/01/2011	SV	1108004
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/01/2011	SV	1108004
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	08/01/2011	SV	1108004
200.8	**Zinc**	**89.2**		ug/L	2.00	1	08/01/2011	SV	1108004
2340B	**Hardness**	**71**		mg/L	2	1	08/01/2011	SW	1108003

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SVS-12 **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-A **Matrix:** Surface Water **Lab Number:** C110616-46 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 500	U	ug/L	200	10	08/01/2011	SW	1108003
200.7	**Calcium**	**355000**		ug/L	1000	10	08/01/2011	SW	1108003
200.7	Iron	< 2500	U	ug/L	1000	10	08/01/2011	SW	1108003
200.7	**Magnesium**	**65300**		ug/L	1000	10	08/01/2011	SW	1108003
200.7	**Potassium**	**3750**	J	ug/L	2500	10	08/01/2011	SW	1108003
200.7	**Sodium**	**3020**	J	ug/L	2500	10	08/01/2011	SW	1108003
200.8	Antimony	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Barium	< 100	U	ug/L	50.0	10	08/01/2011	SV	1108004
200.8	Beryllium	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Cadmium	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Chromium**	**7.52**	J	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Cobalt	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Copper	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Lead	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	**Manganese**	**5140**		ug/L	2.00	10	08/01/2011	SV	1108004
200.8	Molybdenum	< 2.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Nickel	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Selenium	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Silver	< 5.00	U	ug/L	1.00	10	08/01/2011	SV	1108004
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/01/2011	SV	1108004
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	08/01/2011	SV	1108004
200.8	**Zinc**	**3550**		ug/L	20.0	10	08/01/2011	SV	1108004
2340B	**Hardness**	**1160**		mg/L	15	10	08/01/2011	SW	1108003

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Argentine Shaft Tunnel **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-03 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**40.6**	J	ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**84200**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**5090**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**986**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**1220**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**51.1**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**1.60**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Manganese	< 2.50	U	ug/L	1.00	5	08/02/2011	SV	1107126
200.8	**Molybdenum**	**1.35**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**14.1**	J	ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Argentine Tunnel Main **Date / Time Sampled:** 06/23/11 13:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-06 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**677000**		ug/L	1000	50	08/01/2011	SW	1107126
200.7	**Calcium**	**445000**		ug/L	5000	50	08/01/2011	SW	1107126
200.7	**Iron**	**2010000**		ug/L	5000	50	08/01/2011	SW	1107126
200.7	**Magnesium**	**1290000**		ug/L	5000	50	08/01/2011	SW	1107126
200.7	Potassium	< 50000	U	ug/L	12500	50	08/01/2011	SW	1107126
200.7	Sodium	< 25000	U	ug/L	12500	50	08/01/2011	SW	1107126
200.8	Antimony	< 100	U	ug/L	50.0	100	08/02/2011	SV	1107126
200.8	**Arsenic**	**98.4**	J	ug/L	50.0	100	08/02/2011	SV	1107126
200.8	Barium	< 1000	U	ug/L	500	100	08/02/2011	SV	1107126
200.8	**Beryllium**	**197**		ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Cadmium**	**11900**		ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Chromium**	**331**		ug/L	50.0	100	08/02/2011	SV	1107126
200.8	**Cobalt**	**520**		ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Copper**	**350000**		ug/L	50.0	100	08/02/2011	SV	1107126
200.8	**Lead**	**473**		ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Manganese**	**270000**		ug/L	20.0	100	08/02/2011	SV	1107126
200.8	Molybdenum	< 20.0	U	ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Nickel**	**848**		ug/L	50.0	100	08/02/2011	SV	1107126
200.8	**Selenium**	**295**		ug/L	50.0	100	08/02/2011	SV	1107126
200.8	**Silver**	**33.8**	J	ug/L	10.0	100	08/02/2011	SV	1107126
200.8	**Thallium**	**81.2**	J	ug/L	50.0	100	08/02/2011	SV	1107126
200.8	Vanadium	< 200	U	ug/L	100	100	08/02/2011	SV	1107126
200.8	**Zinc**	**2390000**		ug/L	200	100	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: DR-3 **Date / Time Sampled:** 06/23/11 14:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-09 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**1040**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**242000**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**4960**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**24500**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**1760**		ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**9510**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Barium	< 100	U	ug/L	50.0	10	08/02/2011	SV	1107126
200.8	**Beryllium**	**1.23**	J	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	**Cadmium**	**54.8**		ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Chromium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	**Cobalt**	**4.81**		ug/L	1.00	10	08/02/2011	SV	1107126
200.8	**Copper**	**153**		ug/L	5.00	10	08/02/2011	SV	1107126
200.8	**Lead**	**3.28**		ug/L	1.00	10	08/02/2011	SV	1107126
200.8	**Manganese**	**4160**		ug/L	2.00	10	08/02/2011	SV	1107126
200.8	**Molybdenum**	**7.42**		ug/L	1.00	10	08/02/2011	SV	1107126
200.8	**Nickel**	**9.29**	J	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Selenium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Silver	< 6.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	08/02/2011	SV	1107126
200.8	**Zinc**	**10200**		ug/L	20.0	10	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: DR-7 **Date / Time Sampled:** 06/23/11 14:20 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-12 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**372**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**24300**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**300**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**3460**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**642**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**1540**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**40.3**	J	ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**1.11**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**0.933**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**77.6**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	**Molybdenum**	**0.571**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**149**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-068 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-15 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**146**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**18000**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1680**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**470**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**900**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**79.4**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**0.742**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**2.11**	J	ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	Zinc	< 25.0	U	ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-1131 **Date / Time Sampled:** 06/23/11 16:41 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-18 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**191**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**19800**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**193**	J	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1870**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**483**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**878**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**74.6**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**0.685**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Copper**	**4.44**	J	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.77**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**18.5**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**92.8**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-198 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-21 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**136**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**18200**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1700**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**461**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**898**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**78.8**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**0.890**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**2.20**	J	ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**11.8**	J	ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-351 **Date / Time Sampled:** 06/23/11 16:02 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-24 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**136**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**18600**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1760**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**472**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**927**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**78.9**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**1.48**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**4.55**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**44.4**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-404 **Date / Time Sampled:** 06/24/11 11:40 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-27 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**145**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**19900**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1890**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**437**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**2050**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**82.1**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.13**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**5.57**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**55.7**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-4040 **Date / Time Sampled:** 06/24/11 11:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-30 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**156**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**19900**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1900**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**445**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**12900**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**82.8**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.13**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**6.54**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**58.9**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-493 **Date / Time Sampled:** 06/23/11 16:10 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-33 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**176**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**18300**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**163**	J	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1750**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**477**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**893**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**84.3**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**0.574**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Copper**	**3.18**	J	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.18**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**11.6**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**60.9**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-699 **Date / Time Sampled:** 06/23/11 16:17 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-36 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**182**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**18400**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**181**	J	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1770**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**468**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**905**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**78.6**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**0.677**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Copper**	**3.36**	J	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.15**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**13.4**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**67.2**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-895 **Date / Time Sampled:** 06/23/11 16:56 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-39 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**184**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**19100**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Iron**	**182**	J	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1760**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**481**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**847**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**75.2**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**0.694**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Copper**	**3.08**	J	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.47**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**12.4**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**85.9**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC-B **Date / Time Sampled:** 06/23/11 16:15 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-42 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/01/2011	SW	1107126
200.7	Calcium	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	Magnesium	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	Potassium	< 1000	U	ug/L	250	1	08/01/2011	SW	1107126
200.7	Sodium	< 500	U	ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**0.545**	J	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Manganese	< 2.50	U	ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	Zinc	< 25.0	U	ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SCEF **Date / Time Sampled:** 06/23/11 10:45 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-45 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**60.0**		ug/L	20.0	1	08/01/2011	SW	1107126
200.7	**Calcium**	**25900**		ug/L	100	1	08/01/2011	SW	1107126
200.7	Iron	< 250	U	ug/L	100	1	08/01/2011	SW	1107126
200.7	**Magnesium**	**1370**		ug/L	100	1	08/01/2011	SW	1107126
200.7	**Potassium**	**498**	J	ug/L	250	1	08/01/2011	SW	1107126
200.7	**Sodium**	**552**		ug/L	250	1	08/01/2011	SW	1107126
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Barium**	**51.2**		ug/L	25.0	5	08/02/2011	SV	1107126
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Cadmium**	**1.29**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Chromium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Copper**	**3.03**	J	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	**Lead**	**2.26**		ug/L	0.500	5	08/02/2011	SV	1107126
200.8	**Manganese**	**3.59**		ug/L	1.00	5	08/02/2011	SV	1107126
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Selenium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Silver	< 3.00	U	ug/L	0.500	5	08/02/2011	SV	1107126
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/02/2011	SV	1107126
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	08/02/2011	SV	1107126
200.8	**Zinc**	**91.8**		ug/L	10.0	5	08/02/2011	SV	1107126

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SVS-12 **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-C **Matrix:** Surface Water **Lab Number:** C110616-48 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 500	U	ug/L	200	10	08/01/2011	SW	1107126
200.7	**Calcium**	**360000**		ug/L	1000	10	08/01/2011	SW	1107126
200.7	Iron	< 2500	U	ug/L	1000	10	08/01/2011	SW	1107126
200.7	**Magnesium**	**66200**		ug/L	1000	10	08/01/2011	SW	1107126
200.7	**Potassium**	**3740**	J	ug/L	2500	10	08/01/2011	SW	1107126
200.7	**Sodium**	**3010**	J	ug/L	2500	10	08/01/2011	SW	1107126
200.8	Antimony	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Barium	< 100	U	ug/L	50.0	10	08/02/2011	SV	1107126
200.8	Beryllium	< 2.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Cadmium	< 2.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Chromium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Cobalt	< 2.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Copper	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Lead	< 2.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	**Manganese**	**5020**		ug/L	2.00	10	08/02/2011	SV	1107126
200.8	Molybdenum	< 2.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Nickel	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Selenium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Silver	< 6.00	U	ug/L	1.00	10	08/02/2011	SV	1107126
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/02/2011	SV	1107126
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	08/02/2011	SV	1107126
200.8	**Zinc**	**3780**		ug/L	20.0	10	08/02/2011	SV	1107126

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: Argentine Shaft Tunnel **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-02 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**38.9**		mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: Argentine Tunnel Main **Date / Time Sampled:** 06/23/11 13:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-05 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	07/18/2011	NP	1107063
EPA 300.0	Chloride	< 200	U	mg/L	100	100	07/18/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**6180**		mg/L	200	100	07/18/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: DR-3 **Date / Time Sampled:** 06/23/11 14:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-08 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 5.0	U	mg/L	2.0	10	07/18/2011	NP	1107063
EPA 300.0	Chloride	< 20.0	U	mg/L	10.0	10	07/18/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**618**		mg/L	20.0	10	07/18/2011	NP	1107063

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: DR-7 **Date / Time Sampled:** 06/23/11 14:20 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-11 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**29.6**		mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-068 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-14 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.6**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**3.3**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-1131 **Date / Time Sampled:** 06/23/11 16:41 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-17 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.5**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**7.1**		mg/L	2.0	1	07/15/2011	NP	1107063

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-198 **Date / Time Sampled:** 06/23/11 16:00 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-20 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.6**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**3.8**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-351 **Date / Time Sampled:** 06/23/11 16:02 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-23 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.6**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**3.9**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-404 **Date / Time Sampled:** 06/24/11 11:40 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-26 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	**Chloride**	**2.9**		mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**4.3**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-4040 **Date / Time Sampled:** 06/24/11 11:50 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-29 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	**Chloride**	**14.6**		mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**4.3**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-493 **Date / Time Sampled:** 06/23/11 16:10 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-32 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.6**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**4.3**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-699 **Date / Time Sampled:** 06/23/11 16:17 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-35 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.6**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**4.5**	J	mg/L	2.0	1	07/15/2011	NP	1107063

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-895 **Date / Time Sampled:** 06/23/11 16:56 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-38 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**0.5**		mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**5.8**		mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC-B **Date / Time Sampled:** 06/23/11 16:15 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-41 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	Sulfate as SO4	< 5.0	U	mg/L	2.0	1	07/15/2011	NP	1107063

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SCEF **Date / Time Sampled:** 06/23/11 10:45 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-44 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	07/15/2011	NP	1107063
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	07/15/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**10.4**		mg/L	2.0	1	07/15/2011	NP	1107063

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SVS-12 **Date / Time Sampled:** 06/23/11 10:30 **Workorder:** C110616
EPA Tag No.: No Tag Prefix-B **Matrix:** Surface Water **Lab Number:** C110616-47 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 5.0	U	mg/L	2.0	10	07/18/2011	NP	1107063
EPA 300.0	Chloride	< 20.0	U	mg/L	10.0	10	07/18/2011	NP	1107063
EPA 300.0	**Sulfate as SO4**	**918**		mg/L	20.0	10	07/18/2011	NP	1107063

"J" Qualifier indicates an estimated value

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1108004 - No Lab Prep Reqd			***Water***						**ICPMS-PE DRC-II**
Method Blank (1108004-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 08/01/11			
Beryllium	< 0.100	0.200	ug/L						
Vanadium	< 1.00	2.00	"						
Chromium	< 0.500	1.00	"						
Manganese	< 0.200	0.500	"						
Cobalt	< 0.100	0.200	"						
Nickel	< 0.500	1.00	"						
Copper	< 0.500	1.00	"						
Zinc	< 2.00	5.00	"						
Arsenic	< 0.500	2.00	"						
Selenium	< 0.500	1.00	"						
Molybdenum	< 0.100	0.200	"						
Silver	< 0.100	0.500	"						
Cadmium	< 0.100	0.200	"						
Antimony	< 0.500	1.00	"						
Barium	< 5.00	10.0	"						
Thallium	< 0.500	1.00	"						
Lead	< 0.100	0.200	"						
Method Blank Spike (1108004-BS1)		Dilution Factor: 1				Prepared & Analyzed: 08/01/11			
Beryllium	104	0.200	ug/L	100		104	85-115		
Vanadium	102	2.00	"	100		102	85-115		
Chromium	97.7	1.00	"	100		98	85-115		
Manganese	99.8	0.500	"	100		100	85-115		
Cobalt	101	0.200	"	100		101	85-115		
Nickel	102	1.00	"	100		102	85-115		
Copper	98.5	1.00	"	100		98	85-115		
Zinc	104	5.00	"	100		104	85-115		
Arsenic	105	2.00	"	100		105	85-115		
Selenium	523	1.00	"	500		105	85-115		
Molybdenum	99.7	0.200	"	100		100	85-115		
Silver	103	0.500	"	100		103	85-115		
Cadmium	103	0.200	"	100		103	85-115		
Antimony	104	1.00	"	100		104	85-115		
Barium	102	10.0	"	100		102	85-115		
Thallium	104	1.00	"	100		104	85-115		
Lead	104	0.200	"	100		104	85-115		

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

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Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1108004 - No Lab Prep Reqd			*Water*						**ICPMS-PE DRC-II**
Duplicate (1108004-DUP1)		Dilution Factor: 1	**Source: C110616-01**			Prepared & Analyzed: 08/01/11			
Beryllium	< 0.100	0.200	ug/L		< 0.100				20
Vanadium	1.72	2.00	"		1.57			9	20
Chromium	6.15	1.00	"		5.64			9	20
Manganese	< 0.200	0.500	"		< 0.200				20
Cobalt	< 0.100	0.200	"		< 0.100				20
Nickel	< 0.500	1.00	"		< 0.500				20
Copper	< 0.500	1.00	"		< 0.500				20
Zinc	10.8	5.00	"		10.8			0.09	20
Arsenic	< 0.500	2.00	"		< 0.500				20
Selenium	0.798	1.00	"		0.806			1	20
Molybdenum	1.31	0.200	"		1.28			2	20
Silver	< 0.100	0.500	"		< 0.100				20
Cadmium	< 0.100	0.200	"		< 0.100				20
Antimony	< 0.500	1.00	"		< 0.500				20
Barium	48.8	10.0	"		48.7			0.2	20
Thallium	< 0.500	1.00	"		< 0.500				20
Lead	0.130	0.200	"		0.140			8	20
Matrix Spike (1108004-MS1)		Dilution Factor: 1	**Source: C110616-01**			Prepared & Analyzed: 08/01/11			
Beryllium	101	0.200	ug/L	100	< 0.100	101	75-125		
Vanadium	98.7	2.00	"	100	1.57	97	75-125		
Chromium	99.3	1.00	"	100	5.64	94	75-125		
Manganese	92.2	0.500	"	100	< 0.200	92	75-125		
Cobalt	89.4	0.200	"	100	< 0.100	89	75-125		
Nickel	92.4	1.00	"	100	< 0.500	92	75-125		
Copper	87.6	1.00	"	100	< 0.500	88	75-125		
Zinc	112	5.00	"	100	10.8	101	75-125		
Arsenic	120	2.00	"	100	< 0.500	120	75-125		
Selenium	607	1.00	"	500	0.806	121	75-125		
Molybdenum	103	0.200	"	100	1.28	102	75-125		
Silver	99.7	0.500	"	100	< 0.100	100	75-125		
Cadmium	103	0.200	"	100	< 0.100	103	75-125		
Antimony	106	1.00	"	100	< 0.500	106	75-125		
Barium	148	10.0	"	100	48.7	100	75-125		
Thallium	103	1.00	"	100	< 0.500	103	75-125		
Lead	104	0.200	"	100	0.140	104	75-125		

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Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1108004 - No Lab Prep Reqd			*Water*						**ICPMS-PE DRC-II**
Matrix Spike Dup (1108004-MSD1)		Dilution Factor: 1	**Source: C110616-01**			Prepared & Analyzed: 08/01/11			
Beryllium	98.5	0.200	ug/L	100	< 0.100	98	75-125	3	20
Vanadium	101	2.00	"	100	1.57	99	75-125	2	20
Chromium	103	1.00	"	100	5.64	97	75-125	3	20
Manganese	97.3	0.500	"	100	< 0.200	97	75-125	5	20
Cobalt	98.4	0.200	"	100	< 0.100	98	75-125	10	20
Nickel	97.6	1.00	"	100	< 0.500	98	75-125	6	20
Copper	91.3	1.00	"	100	< 0.500	91	75-125	4	20
Zinc	113	5.00	"	100	10.8	102	75-125	1	20
Arsenic	115	2.00	"	100	< 0.500	115	75-125	4	20
Selenium	608	1.00	"	500	0.806	121	75-125	0.07	20
Molybdenum	102	0.200	"	100	1.28	101	75-125	0.4	20
Silver	100	0.500	"	100	< 0.100	100	75-125	0.3	20
Cadmium	102	0.200	"	100	< 0.100	102	75-125	0.7	20
Antimony	105	1.00	"	100	< 0.500	105	75-125	1	20
Barium	149	10.0	"	100	48.7	100	75-125	0.5	20
Thallium	104	1.00	"	100	< 0.500	104	75-125	1	20
Lead	103	0.200	"	100	0.140	103	75-125	0.7	20
Batch 1108008 - 1108004			*Water*						**ICPMS-PE DRC-II**
Serial Dilution (1108008-SRD1)		Dilution Factor: 5	**Source: C110616-01**			Prepared & Analyzed: 08/01/11			
Beryllium	< 0.500	1.00	ug/L		< 0.10				10
Vanadium	< 5.00	10.0	"		1.57				10
Chromium	6.84	5.00	"		5.64			19	10
Manganese	< 1.00	2.50	"		< 0.20				10
Cobalt	< 0.500	1.00	"		< 0.10				10
Nickel	< 2.50	5.00	"		< 0.50				10
Copper	< 2.50	5.00	"		< 0.50				10
Zinc	11.4	25.0	"		10.8			5	10
Arsenic	< 2.50	10.0	"		< 0.50				10
Selenium	< 2.50	5.00	"		0.806				10
Molybdenum	1.22	1.00	"		1.28			5	10
Silver	< 0.500	2.50	"		< 0.10				10
Cadmium	< 0.500	1.00	"		< 0.10				10
Antimony	< 2.50	5.00	"		< 0.50				10
Barium	48.3	50.0	"		48.7			0.9	10
Thallium	< 2.50	5.00	"		< 0.50				10
Lead	< 0.500	1.00	"		0.140				10

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Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

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Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPOE - PE Optima									
Batch 1108003 - No Lab Prep Reqd			*Water*						**ICPOE - PE Optima**
Method Blank (1108003-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 08/01/11			
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Sodium	< 250	500	"						
Method Blank Spike (1108003-BS1)		Dilution Factor: 1				Prepared & Analyzed: 08/01/11			
Aluminum	10210	50.0	ug/L	10000		102	85-115		
Calcium	10260	250	"	10000		103	85-115		
Iron	10230	250	"	10000		102	85-115		
Potassium	10290	1000	"	10000		103	85-115		
Magnesium	10380	250	"	10000		104	85-115		
Sodium	10400	500	"	10000		104	85-115		
Duplicate (1108003-DUP1)		Dilution Factor: 1	**Source: C110616-07**			Prepared & Analyzed: 08/01/11			
Aluminum	348.1	50.0	ug/L		350.5			0.7	20
Calcium	251800	250	"		249500			0.9	20
Iron	446.8	250	"		445.5			0.3	20
Potassium	1678	1000	"		1680			0.1	20
Magnesium	24180	250	"		24160			0.06	20
Sodium	9086	500	"		9101			0.2	20
Matrix Spike (1108003-MS1)		Dilution Factor: 1	**Source: C110616-07**			Prepared & Analyzed: 08/01/11			
Aluminum	10410	50.0	ug/L	10000	350.5	101	75-125		
Calcium	251500	250	"	10000	249500	20	75-125		
Iron	10830	250	"	10000	445.5	104	75-125		
Potassium	11850	1000	"	10000	1680	102	75-125		
Magnesium	33800	250	"	10000	24160	96	75-125		
Sodium	19070	500	"	10000	9101	100	75-125		

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Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1108003 - No Lab Prep Reqd			***Water***						**ICPOE - PE Optima**
Matrix Spike Dup (1108003-MSD1)		Dilution Factor: 1	**Source: C110616-07**			Prepared & Analyzed: 08/01/11			
Aluminum	10670	50.0	ug/L	10000	350.5	103	75-125	2	20
Calcium	249200	250	"	10000	249500	NR	75-125	0.9	20
Iron	10920	250	"	10000	445.5	105	75-125	0.9	20
Potassium	12140	1000	"	10000	1680	105	75-125	2	20
Magnesium	34060	250	"	10000	24160	99	75-125	0.8	20
Sodium	19460	500	"	10000	9101	104	75-125	2	20
Batch 1108005 - 1108003			***Water***						**ICPOE - PE Optima**
Serial Dilution (1108005-SRD1)		Dilution Factor: 5	**Source: C110616-07**			Prepared & Analyzed: 08/01/11			
Aluminum	< 500	1250	ug/L		350.5				10
Calcium	231000	1250	"		249500			8	10
Iron	< 500	1250	"		445.5				10
Potassium	1498	1250	"		1680			11	10
Magnesium	24190	1250	"		24160			0.1	10
Sodium	9301	1250	"		9101			2	10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1107126 - EPA 200.2 TR Met			***Water***						**ICPMS-PE DRC-II**
Method Blank (1107126-BLK2)		Dilution Factor: 5				Prepared: 07/29/11 Analyzed: 08/02/11			
Beryllium	< 0.500	1.00	ug/L						
Vanadium	< 5.00	10.0	"						
Chromium	< 2.50	5.00	"						
Manganese	< 1.00	2.50	"						
Cobalt	< 0.500	1.00	"						
Nickel	< 2.50	5.00	"						
Copper	< 2.50	5.00	"						
Zinc	< 10.0	25.0	"						
Arsenic	< 2.50	10.0	"						
Selenium	< 2.50	5.00	"						
Molybdenum	< 0.500	1.00	"						
Silver	< 0.500	3.00	"						
Cadmium	< 0.500	1.00	"						
Antimony	< 2.50	5.00	"						
Barium	< 25.0	50.0	"						
Thallium	< 2.50	5.00	"						
Lead	< 0.500	1.00	"						
Duplicate (1107126-DUP2)		Dilution Factor: 5	**Source: C110616-03**			Prepared: 07/29/11 Analyzed: 08/02/11			
Beryllium	< 0.500	1.00	ug/L		< 0.500				20
Vanadium	< 5.00	10.0	"		< 5.00				20
Chromium	< 2.50	5.00	"		< 2.50				20
Manganese	< 1.00	2.50	"		< 1.00				20
Cobalt	< 0.500	1.00	"		< 0.500				20
Nickel	< 2.50	5.00	"		< 2.50				20
Copper	< 2.50	5.00	"		< 2.50				20
Zinc	14.59	25.0	"		14.10			3	20
Arsenic	< 2.50	10.0	"		< 2.50				20
Selenium	< 2.50	5.00	"		< 2.50				20
Molybdenum	1.372	1.00	"		1.345			2	20
Silver	< 0.500	3.00	"		< 0.500				20
Cadmium	< 0.500	1.00	"		< 0.500				20
Antimony	< 2.50	5.00	"		< 2.50				20
Barium	51.79	50.0	"		51.07			1	20
Thallium	< 2.50	5.00	"		< 2.50				20
Lead	2.422	1.00	"		1.596			41	20

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1107126 - EPA 200.2 TR Met			*Water*						**ICPMS-PE DRC-II**
Matrix Spike (1107126-MS2)		Dilution Factor: 5	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/02/11		
Beryllium	178.3	1.00	ug/L	200	< 0.500	89	75-125		
Vanadium	292.9	10.0	"	300	< 5.00	98	75-125		
Chromium	387.9	5.00	"	400	< 2.50	97	75-125		
Manganese	186.1	2.50	"	200	< 1.00	93	75-125		
Cobalt	191.2	1.00	"	200	< 0.500	96	75-125		
Nickel	490.2	5.00	"	500	< 2.50	98	75-125		
Copper	297.5	5.00	"	300	< 2.50	99	75-125		
Zinc	225.6	25.0	"	200	14.10	106	75-125		
Arsenic	844.9	10.0	"	800	< 2.50	106	75-125		
Selenium	2095	5.00	"	2000	< 2.50	105	75-125		
Molybdenum	397.6	1.00	"	400	1.345	99	75-125		
Silver	69.36	3.00	"	75.0	< 0.500	92	75-125		
Cadmium	201.9	1.00	"	200	< 0.500	101	75-125		
Antimony	845.5	5.00	"	800	< 2.50	106	75-125		
Barium	261.1	50.0	"	200	51.07	105	75-125		
Thallium	2121	5.00	"	2000	< 2.50	106	75-125		
Lead	1065	1.00	"	1000	1.596	106	75-125		
Matrix Spike Dup (1107126-MSD2)		Dilution Factor: 5	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/02/11		
Beryllium	172.4	1.00	ug/L	200	< 0.500	86	75-125	3	20
Vanadium	291.5	10.0	"	300	< 5.00	97	75-125	0.5	20
Chromium	386.2	5.00	"	400	< 2.50	97	75-125	0.4	20
Manganese	190.4	2.50	"	200	< 1.00	95	75-125	2	20
Cobalt	190.3	1.00	"	200	< 0.500	95	75-125	0.4	20
Nickel	473.4	5.00	"	500	< 2.50	95	75-125	3	20
Copper	287.9	5.00	"	300	< 2.50	96	75-125	3	20
Zinc	221.8	25.0	"	200	14.10	104	75-125	2	20
Arsenic	839.6	10.0	"	800	< 2.50	105	75-125	0.6	20
Selenium	2120	5.00	"	2000	< 2.50	106	75-125	1	20
Molybdenum	395.1	1.00	"	400	1.345	98	75-125	0.6	20
Silver	68.88	3.00	"	75.0	< 0.500	92	75-125	0.7	20
Cadmium	200.9	1.00	"	200	< 0.500	100	75-125	0.5	20
Antimony	825.1	5.00	"	800	< 2.50	103	75-125	2	20
Barium	257.0	50.0	"	200	51.07	103	75-125	2	20
Thallium	2079	5.00	"	2000	< 2.50	104	75-125	2	20
Lead	1064	1.00	"	1000	1.596	106	75-125	0.05	20

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

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Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1107126 - EPA 200.2 TR Met			*Water*						**ICPMS-PE DRC-II**
Post Spike (1107126-PS2)		Dilution Factor: 5	**Source: C110616-03**			Prepared: 07/29/11 Analyzed: 08/02/11			
Beryllium	98.89		ug/L	100	-0.04925	99	80-120		
Vanadium	93.76		"	100	-2.746	97	80-120		
Chromium	98.26		"	100	1.856	96	80-120		
Manganese	95.13		"	100	-2.632	98	80-120		
Cobalt	94.64		"	100	-1.078	96	80-120		
Nickel	95.23		"	100	-1.609	97	80-120		
Copper	94.89		"	100	-2.128	97	80-120		
Zinc	117.9		"	100	14.10	104	80-120		
Arsenic	108.2		"	100	-0.09870	108	80-120		
Selenium	527.4		"	500	0.5698	105	80-120		
Molybdenum	98.33		"	100	1.345	97	80-120		
Silver	91.77		"	100	-0.2152	92	80-120		
Cadmium	100.5		"	100	0.2911	100	80-120		
Antimony	101.7		"	100	0.1902	102	80-120		
Barium	152.3		"	100	51.07	101	80-120		
Thallium	119.3		"	100	0.02240	119	80-120		
Lead	110.8		"	100	1.596	109	80-120		
Reference (1107126-SRM2)		Dilution Factor: 2				Prepared: 07/29/11 Analyzed: 08/02/11			
Beryllium	868.1	4.00	ug/L	1000		87	80-120		
Vanadium	987.7	40.0	"	1000		99	80-120		
Chromium	1003	20.0	"	1000		100	80-120		
Manganese	989.6	10.0	"	1000		99	80-120		
Cobalt	984.1	4.00	"	1000		98	80-120		
Nickel	1000	20.0	"	1000		100	80-120		
Copper	1092	20.0	"	1000		109	80-120		
Zinc	1110	100	"	1000		111	80-120		
Arsenic	2081	40.0	"	2000		104	80-120		
Selenium	1059	20.0	"	1000		106	80-120		
Molybdenum	1011	4.00	"	1000		101	80-120		
Silver	222.6	12.0	"	250		89	80-120		
Cadmium	1040	4.00	"	1000		104	80-120		
Antimony	2091	20.0	"	2000		105	80-120		
Barium	1027	200	"	1000		103	80-120		
Thallium	5197	20.0	"	5000		104	80-120		
Lead	2134	4.00	"	2000		107	80-120		

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1108012 - 1107126			*Water*						**ICPMS-PE DRC-II**
Serial Dilution (1108012-SRD1)		Dilution Factor: 2	**Source: C110616-03**			Prepared: 07/29/11 Analyzed: 08/02/11			
Beryllium	< 5.00	12.5	ug/L		< 1.00				10
Vanadium	< 5.00	12.5	"		< 1.00				10
Chromium	< 5.00	12.5	"		< 1.00				10
Manganese	< 5.00	12.5	"		< 1.00				10
Cobalt	< 5.00	12.5	"		< 1.00				10
Nickel	< 5.00	12.5	"		< 1.00				10
Copper	< 5.00	12.5	"		< 1.00				10
Zinc	6.368	12.5	"		14.10			76	10
Arsenic	< 5.00	12.5	"		< 1.00				10
Selenium	< 5.00	12.5	"		< 1.00				10
Molybdenum	< 5.00	12.5	"		1.345				200
Silver	< 2.50	15.0	"		< 0.50				10
Cadmium	< 5.00	12.5	"		< 1.00				10
Antimony	< 5.00	12.5	"		< 1.00				10
Barium	48.17	12.5	"		51.07			6	10
Thallium	< 5.00	12.5	"		< 1.00				10
Lead	< 5.00	12.5	"		1.596				10

ICPOE - PE Optima

Batch 1107126 - EPA 200.2 TR Met			*Water*						**ICPOE - PE Optima**
Method Blank (1107126-BLK1)		Dilution Factor: 1				Prepared: 07/29/11 Analyzed: 08/01/11			
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Sodium	< 250	500	"						

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1107126 - EPA 200.2 TR Met			*Water*						ICPOE - PE Optima
Duplicate (1107126-DUP1)		Dilution Factor: 1	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	41.06	50.0	ug/L		40.65			1	20
Calcium	85800	250	"		84170			2	20
Iron	< 100	250	"		< 100				20
Potassium	1017	1000	"		986.4			3	20
Magnesium	5153	250	"		5087			1	20
Sodium	1237	500	"		1217			2	20
Matrix Spike (1107126-MS1)		Dilution Factor: 1	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	2080	50.0	ug/L	2000	40.65	102	75-125		
Calcium	85810	250	"	1000	84170	163	75-125		
Iron	3047	250	"	3000	< 100	102	75-125		
Potassium	11450	1000	"	10000	986.4	105	75-125		
Magnesium	7197	250	"	2000	5087	106	75-125		
Sodium	4448	500	"	3000	1217	108	75-125		
Matrix Spike Dup (1107126-MSD1)		Dilution Factor: 1	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	2071	50.0	ug/L	2000	40.65	102	75-125	0.4	20
Calcium	84720	250	"	1000	84170	54	75-125	1	20
Iron	3022	250	"	3000	< 100	101	75-125	0.8	20
Potassium	11350	1000	"	10000	986.4	104	75-125	0.8	20
Magnesium	7114	250	"	2000	5087	101	75-125	1	20
Sodium	4413	500	"	3000	1217	107	75-125	0.8	20
Post Spike (1107126-PS1)		Dilution Factor: 1	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	10140		ug/L	10100	40.65	100	80-120		
Calcium	92610		"	10100	84170	83	80-120		
Iron	9905		"	10100	9.851	98	80-120		
Potassium	11220		"	10100	986.4	101	80-120		
Magnesium	15120		"	10100	5087	99	80-120		
Sodium	11580		"	10100	1217	103	80-120		

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1107126 - EPA 200.2 TR Met			*Water*						**ICPOE - PE Optima**
Reference (1107126-SRM1)		Dilution Factor: 1				Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	1014	50.0	ug/L	1000		101	80-120		
Calcium	951.4	250	"	1000		95	80-120		
Iron	959.5	250	"	1000		96	80-120		
Potassium	4948	1000	"	5000		99	80-120		
Magnesium	1029	250	"	1000		103	80-120		
Sodium	980.1	500	"	1000		98	80-120		
Batch 1108006 - 1107126			*Water*						**ICPOE - PE Optima**
Serial Dilution (1108006-SRD1)		Dilution Factor: 5	**Source: C110616-03**			Prepared: 07/29/11	Analyzed: 08/01/11		
Aluminum	< 100	250	ug/L		40.65				10
Calcium	84450	1250	"		84170			0.3	10
Iron	< 500	1250	"		< 100.00				10
Potassium	< 1250	5000	"		986.4				10
Magnesium	5161	1250	"		5087			1	10
Sodium	1261	2500	"		1217				10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Classical Chemistry by EPA/ASTM/APHA Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ESAT Dionex IC									
Batch 1107063 - No Prep Req			***Water***						**ESAT Dionex IC**
Method Blank (1107063-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 07/15/11			
Chloride	< 1.0	2.0	mg/L						
Bromide	< 0.2	0.5	"						
Sulfate as SO4	< 2.0	5.0	"						
Method Blank Spike (1107063-BS1)		Dilution Factor: 1				Prepared & Analyzed: 07/15/11			
Chloride	24.2	2.0	mg/L	25.0		97	80-120		
Bromide	10.0	0.5	"				80-120		
Sulfate as SO4	23.5	5.0	"	25.0		94	80-120		
Duplicate (1107063-DUP1)		Dilution Factor: 1	**Source: C110614-AO**			Prepared & Analyzed: 07/15/11			
Chloride	< 1.0	2.0	mg/L		< 1.0				20
Bromide	< 0.2	0.5	"		< 0.2				20
Sulfate as SO4	19.4	5.0	"		19.4			0.2	20
Matrix Spike (1107063-MS1)		Dilution Factor: 1	**Source: C110614-AO**			Prepared & Analyzed: 07/15/11			
Chloride	25.5	2.0	mg/L	25.0	< 1.0	102	80-120		
Bromide	< 0.2	0.5	"		< 0.2		80-120		
Sulfate as SO4	44.7	5.0	"	25.0	19.4	101	80-120		
Matrix Spike Dup (1107063-MSD1)		Dilution Factor: 1	**Source: C110614-AO**			Prepared & Analyzed: 07/15/11			
Chloride	25.6	2.0	mg/L	25.0	< 1.0	103	80-120	0.5	20
Bromide	< 0.2	0.5	"		< 0.2		80-120		20
Sulfate as SO4	44.8	5.0	"	25.0	19.4	101	80-120	0.07	20

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography

Instrument: **ESAT Dionex IC** Work Order: Nu C110616

Analytical Sequence: 1107120 **Dissolved** Concentration Units: mg/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Chloride	0.00	1	2	3	4	1107063-BLK1	NA	2.00
		0.00	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			
		0.00						
Bromide	0.00	1	2	3	4	1107063-BLK1	NA	0.50
		0.00	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			
		0.00						
Sulfate as SO4	0.00	1	2	3	4	1107063-BLK1	NA	5.00
		0.00	1.19	0.00	0.00	0.00	NA	
		5	6	7	8			
		0.00						

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C110616

Analytical Sequence: 1108005 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-1.19	1	2	3	4	1108003-BLK1	NA	50.00
		-0.65	0.36	-0.99	0.01	0.32	NA	
		5	6	7	8			
		0.80	0.84	0.26				
Calcium	1.11	1	2	3	4	1108003-BLK1	NA	250.00
		2.49	2.17	2.21	-0.29	0.80	NA	
		5	6	7	8			
		2.45	1.89	3.17				
Iron	3.69	1	2	3	4	1108003-BLK1	NA	250.00
		28.68	20.25	21.49	11.66	8.42	NA	
		5	6	7	8			
		18.97	15.27	8.95				
Potassium	14.14	1	2	3	4	1108003-BLK1	NA	1,000.00
		5.83	25.32	20.07	13.96	29.09	NA	
		5	6	7	8			
		27.95	15.01	24.16				
Magnesium	0.39	1	2	3	4	1108003-BLK1	NA	250.00
		1.01	1.82	1.37	1.27	0.52	NA	
		5	6	7	8			
		1.77	1.31	1.54				
Sodium	-0.56	1	2	3	4	1108003-BLK1	NA	500.00
		-1.65	-0.40	1.94	-0.98	-2.57	NA	
		5	6	7	8			
		-2.05	-1.20	-0.82				

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C110616

Analytical Sequence: 1108006 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-1.19	1	2	3	4	1107126-BLK1	NA	50.00
		-0.65	0.36	-0.99	0.01	0.09	NA	
		5	6	7	8			
		0.80	0.84	0.26				
Calcium	1.11	1	2	3	4	1107126-BLK1	NA	250.00
		2.49	2.17	2.21	-0.29	3.34	NA	
		5	6	7	8			
		2.45	1.89	3.17				
Iron	3.69	1	2	3	4	1107126-BLK1	NA	250.00
		28.68	20.25	21.49	11.66	13.63	NA	
		5	6	7	8			
		18.97	15.27	8.95				
Potassium	14.14	1	2	3	4	1107126-BLK1	NA	1,000.00
		5.83	25.32	20.07	13.96	15.82	NA	
		5	6	7	8			
		27.95	15.01	24.16				
Magnesium	0.39	1	2	3	4	1107126-BLK1	NA	250.00
		1.01	1.82	1.37	1.27	2.04	NA	
		5	6	7	8			
		1.77	1.31	1.54				
Sodium	-0.56	1	2	3	4	1107126-BLK1	NA	500.00
		-1.65	-0.40	1.94	-0.98	-4.45	NA	
		5	6	7	8			
		-2.05	-1.20	-0.82				

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108008 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	-0.02	1	2	3	4	1108004-BLK1	NA	0.20
		0.01	-0.01	0.00	-0.01	0.01	NA	
		5	6	7	8			
		-0.01	-0.04	-0.01				
Vanadium	0.02	1	2	3	4	1108004-BLK1	NA	2.00
		0.01	0.05	0.01	0.01	0.00	NA	
		5	6	7	8			
		0.04	0.04	0.05				
Chromium	-0.01	1	2	3	4	1108004-BLK1	NA	1.00
		0.07	0.08	0.06	0.04	0.04	NA	
		5	6	7	8			
		0.04	0.04	0.09				
Manganese	0.02	1	2	3	4	1108004-BLK1	NA	0.50
		0.01	0.03	0.05	0.01	0.01	NA	
		5	6	7	8			
		0.07	0.04	0.06				
Cobalt	0.00	1	2	3	4	1108004-BLK1	NA	0.20
		0.01	0.01	0.01	0.01	0.00	NA	
		5	6	7	8			
		0.01	0.01	0.01				
Nickel	0.01	1	2	3	4	1108004-BLK1	NA	1.00
		0.02	0.02	0.02	0.01	0.01	NA	
		5	6	7	8			
		0.01	0.02	0.02				
Copper	0.09	1	2	3	4	1108004-BLK1	NA	1.00
		0.06	0.05	0.04	0.04	0.01	NA	
		5	6	7	8			
		0.36	0.11	0.13				
Zinc	0.03	1	2	3	4	1108004-BLK1	NA	5.00
		0.10	0.13	0.05	0.09	0.01	NA	
		5	6	7	8			
		0.58	0.14	0.34				

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108008 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Arsenic	-0.03	1	2	3	4	1108004-BLK1	NA	2.00
		0.01	-0.06	-0.05	-0.03	-0.04	NA	
		5	6	7	8			
		-0.03	-0.02	-0.03				
Selenium	0.05	1	2	3	4	1108004-BLK1	NA	1.00
		0.08	-0.01	-0.11	0.00	-0.04	NA	
		5	6	7	8			
		-0.03	0.05	0.03				
Molybdenum	0.01	1	2	3	4	1108004-BLK1	NA	0.20
		0.02	0.00	0.00	0.00	-0.01	NA	
		5	6	7	8			
		0.01	0.01	0.02				
Silver	0.44	1	2	3	4	1108004-BLK1	NA	0.50
		0.38	0.36	0.27	0.28	-0.04	NA	
		5	6	7	8			
		0.33	0.19	0.19				
Cadmium	0.01	1	2	3	4	1108004-BLK1	NA	0.20
		0.00	0.02	0.00	0.00	0.02	NA	
		5	6	7	8			
		0.00	0.04	0.03				
Antimony	0.03	1	2	3	4	1108004-BLK1	NA	1.00
		0.04	0.04	0.04	0.04	0.00	NA	
		5	6	7	8			
		0.05	0.05	0.06				
Barium	0.01	1	2	3	4	1108004-BLK1	NA	10.00
		0.01	0.00	0.01	0.00	0.01	NA	
		5	6	7	8			
		0.01	0.00	0.02				
Thallium	0.01	1	2	3	4	1108004-BLK1	NA	1.00
		0.00	0.12	0.03	0.02	0.01	NA	
		5	6	7	8			
		0.01	0.01	0.01				

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108008 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
		1	2	3	4	1108004-BLK1	NA	
Lead	0.00	-0.01	0.01	0.01	0.00	0.00	NA	0.20
		5	6	7	8			
		0.03	0.01	0.02				

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108012 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	0.01	1	2	3	4	NA	1107126-BLK2	0.20
		0.01	-0.01	0.02	0.02	NA	0.01	
		5	6	7	8			
Vanadium	0.02	1	2	3	4	NA	1107126-BLK2	2.00
		-0.01	-0.01	0.01	-0.01	NA	-1.18	
		5	6	7	8			
Chromium	0.03	1	2	3	4	NA	1107126-BLK2	1.00
		-0.03	-0.10	-0.08	-0.04	NA	0.49	
		5	6	7	8			
Manganese	-0.02	1	2	3	4	NA	1107126-BLK2	0.50
		-0.03	0.00	0.00	-0.02	NA	0.01	
		5	6	7	8			
Cobalt	0.01	1	2	3	4	NA	1107126-BLK2	0.20
		0.01	0.01	0.01	0.01	NA	0.00	
		5	6	7	8			
Nickel	0.02	1	2	3	4	NA	1107126-BLK2	1.00
		0.01	0.00	0.00	0.00	NA	-0.02	
		5	6	7	8			
Copper	0.11	1	2	3	4	NA	1107126-BLK2	1.00
		0.06	0.18	0.06	0.05	NA	0.02	
		5	6	7	8			
Zinc	0.04	1	2	3	4	NA	1107126-BLK2	5.00
		0.01	0.26	0.06	0.07	NA	0.96	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108012 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Arsenic	0.05	1	2	3	4	NA	1107126-BLK2	2.00
		0.03	0.04	0.03	0.03	NA	-0.04	
		5	6	7	8			
Selenium	0.04	1	2	3	4	NA	1107126-BLK2	1.00
		0.02	0.02	0.00	0.04	NA	-0.03	
		5	6	7	8			
Molybdenum	0.03	1	2	3	4	NA	1107126-BLK2	0.20
		0.03	0.02	0.02	0.02	NA	0.00	
		5	6	7	8			
Silver	0.52	1	2	3	4	NA	1107126-BLK2	0.60
		0.45	0.46	0.43	0.36	NA	0.03	
		5	6	7	8			
Cadmium	0.04	1	2	3	4	NA	1107126-BLK2	0.20
		0.02	0.04	0.04	0.05	NA	0.07	
		5	6	7	8			
Antimony	0.03	1	2	3	4	NA	1107126-BLK2	1.00
		0.05	0.05	0.06	0.05	NA	0.03	
		5	6	7	8			
Barium	0.02	1	2	3	4	NA	1107126-BLK2	10.00
		0.01	0.02	0.01	0.02	NA	0.03	
		5	6	7	8			
Thallium	0.00	1	2	3	4	NA	1107126-BLK2	1.00
		0.00	0.21	0.05	0.03	NA	0.01	
		5	6	7	8			

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110616

Analytical Sequence: 1108012 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
		1	2	3	4	NA	1107126-BLK2	
Lead	-0.01	0.00	0.04	0.00	0.01	NA	0.07	0.20
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ESAT Dionex IC Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography 2010

Sequence: 1107120 Work Order: C110616 Units: mg/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Bromide	50.1	49.7	99.2		1			2			3	
				10.0	10.4	104.0	10.0	10.4	104.0	10.0	10.4	104.0
					4			5			6	
				10.0	10.3	103.0	10.0	10.3	103.0			
					7			8			9	
Chloride	15.1	15.8	104.6		1			2			3	
				40.0	41.5	103.8	40.0	41.6	104.0	40.0	41.7	104.3
					4			5			6	
				40.0	41.2	103.0	40.0	41.1	102.8			
					7			8			9	
Sulfate as SO4	75.2	78.8	104.8		1			2			3	
				100	106	106.0	100	105	105.0	100	105	105.0
					4			5			6	
				100	104	104.0	100	104	104.0			
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Sequence: 1108005 Work Order: C110616 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	1002	100.2		1			2			3	
				12500	12820	102.6	12500	12690	101.5	12500	12660	101.3
					4			5			6	
				12500	12660	101.3	12500	12770	102.2	12500	12640	101.1
					7			8			9	
				12500	12780	102.2						
Calcium	1000	961.7	96.2		1			2			3	
				12500	12930	103.4	12500	12820	102.6	12500	12710	101.7
					4			5			6	
				12500	12790	102.3	12500	12840	102.7	12500	12610	100.9
					7			8			9	
				12500	12750	102.0						
Iron	1000	971.3	97.1		1			2			3	
				12500	12920	103.4	12500	12680	101.4	12500	12570	100.6
					4			5			6	
				12500	12720	101.8	12500	12800	102.4	12500	12580	100.6
					7			8			9	
				12500	12720	101.8						
Magnesium	1000	1020	102.0		1			2			3	
				12500	12950	103.6	12500	12820	102.6	12500	12790	102.3
					4			5			6	
				12500	12790	102.3	12500	12900	103.2	12500	12770	102.2
					7			8			9	
				12500	12910	103.3						
Potassium	5000	4930	98.6		1			2			3	
				25000	25430	101.7	25000	25230	100.9	25000	25200	100.8
					4			5			6	
				25000	25090	100.4	25000	25300	101.2	25000	25230	100.9
					7			8			9	
				25000	25410	101.6						
Sodium	1000	965.4	96.5		1			2			3	
				12500	12790	102.3	12500	12710	101.7	12500	12720	101.8
					4			5			6	
				12500	12690	101.5	12500	12810	102.5	12500	12770	102.2
					7			8			9	
				12500	12900	103.2						

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Sequence: 1108006 Work Order: C110616 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	1002	100.2		1			2			3	
				12500	12820	102.6	12500	12690	101.5	12500	12660	101.3
					4			5			6	
				12500	12660	101.3	12500	12770	102.2	12500	12640	101.1
					7			8			9	
				12500	12780	102.2						
Calcium	1000	961.7	96.2		1			2			3	
				12500	12930	103.4	12500	12820	102.6	12500	12710	101.7
					4			5			6	
				12500	12790	102.3	12500	12840	102.7	12500	12610	100.9
					7			8			9	
				12500	12750	102.0						
Iron	1000	971.3	97.1		1			2			3	
				12500	12920	103.4	12500	12680	101.4	12500	12570	100.6
					4			5			6	
				12500	12720	101.8	12500	12800	102.4	12500	12580	100.6
					7			8			9	
				12500	12720	101.8						
Magnesium	1000	1020	102.0		1			2			3	
				12500	12950	103.6	12500	12820	102.6	12500	12790	102.3
					4			5			6	
				12500	12790	102.3	12500	12900	103.2	12500	12770	102.2
					7			8			9	
				12500	12910	103.3						
Potassium	5000	4930	98.6		1			2			3	
				25000	25430	101.7	25000	25230	100.9	25000	25200	100.8
					4			5			6	
				25000	25090	100.4	25000	25300	101.2	25000	25230	100.9
					7			8			9	
				25000	25410	101.6						
Sodium	1000	965.4	96.5		1			2			3	
				12500	12790	102.3	12500	12710	101.7	12500	12720	101.8
					4			5			6	
				12500	12690	101.5	12500	12810	102.5	12500	12770	102.2
					7			8			9	
				12500	12900	103.2						

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1108008 Work Order: C110616 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.5	99.0		1			2			3	
				50.0	49.5	99.0	50.0	50.6	101.2	50.0	49.9	99.8
					4			5			6	
				50.0	50.4	100.8	50.0	50.1	100.2	50.0	51.1	102.2
					7			8			9	
				50.0	51.1	102.2						
Arsenic	50.0	50.5	101.0		1			2			3	
				50.0	48.3	96.6	50.0	49.2	98.4	50.0	49.7	99.4
					4			5			6	
				50.0	49.0	98.0	50.0	49.0	98.0	50.0	50.5	101.0
					7			8			9	
				50.0	49.3	98.6						
Barium	50.0	49.8	99.6		1			2			3	
				50.0	49.1	98.2	50.0	49.0	98.0	50.0	48.9	97.8
					4			5			6	
				50.0	50.0	100.0	50.0	49.7	99.4	50.0	50.1	100.2
					7			8			9	
				50.0	50.1	100.2						
Beryllium	50.0	50.2	100.4		1			2			3	
				50.0	46.4	92.8	50.0	46.7	93.4	50.0	46.1	92.2
					4			5			6	
				50.0	45.7	91.4	50.0	44.2	88.4	50.0	50.4	100.8
					7			8			9	
				50.0	43.7	87.4						
Cadmium	50.0	49.1	98.2		1			2			3	
				50.0	50.2	100.4	50.0	50.7	101.4	50.0	49.5	99.0
					4			5			6	
				50.0	49.2	98.4	50.0	49.3	98.6	50.0	50.4	100.8
					7			8			9	
				50.0	50.5	101.0						
Chromium	50.0	48.7	97.4		1			2			3	
				50.0	50.3	100.6	50.0	49.9	99.8	50.0	50.5	101.0
					4			5			6	
				50.0	49.5	99.0	50.0	48.7	97.4	50.0	49.7	99.4
					7			8			9	
				50.0	50.9	101.8						

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1108008 Work Order: C110616 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	47.6	95.2		1			2			3	
				50.0	48.9	97.8	50.0	51.7	103.4	50.0	49.1	98.2
					4			5			6	
				50.0	52.2	104.4	50.0	51.3	102.6	50.0	47.5	95.0
					7			8			9	
				50.0	53.1	106.2						
Copper	50.0	49.8	99.6		1			2			3	
				50.0	51.4	102.8	50.0	51.9	103.8	50.0	52.7	105.4
					4			5			6	
				50.0	51.7	103.4	50.0	51.1	102.2	50.0	47.0	94.0
					7			8			9	
				50.0	54.5	109.0						
Lead	50.0	49.0	98.0		1			2			3	
				50.0	50.1	100.2	50.0	50.1	100.2	50.0	49.9	99.8
					4			5			6	
				50.0	52.5	105.0	50.0	53.5	107.0	50.0	51.4	102.8
					7			8			9	
				50.0	52.1	104.2						
Manganese	50.0	47.4	94.8		1			2			3	
				50.0	49.6	99.2	50.0	50.7	101.4	50.0	49.1	98.2
					4			5			6	
				50.0	51.4	102.8	50.0	52.2	104.4	50.0	48.8	97.6
					7			8			9	
				50.0	53.1	106.2						
Molybdenum	50.0	49.2	98.4		1			2			3	
				50.0	49.0	98.0	50.0	49.9	99.8	50.0	49.1	98.2
					4			5			6	
				50.0	48.2	96.4	50.0	48.0	96.0	50.0	50.1	100.2
					7			8			9	
				50.0	49.9	99.8						
Nickel	50.0	50.7	101.4		1			2			3	
				50.0	50.0	100.0	50.0	51.7	103.4	50.0	51.6	103.2
					4			5			6	
				50.0	52.9	105.8	50.0	51.3	102.6	50.0	48.2	96.4
					7			8			9	
				50.0	54.2	108.4						

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1108008 Work Order: C110616 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Selenium	250	250	100.0		1			2			3	
				50.0	46.5	93.0	50.0	50.4	100.8	50.0	48.9	97.8
					4			5			6	
				50.0	49.5	99.0	50.0	49.1	98.2	50.0	49.0	98.0
					7			8			9	
				50.0	48.7	97.4						
Silver	50.0	50.1	100.2		1			2			3	
				50.0	49.1	98.2	50.0	49.5	99.0	50.0	47.3	94.6
					4			5			6	
				50.0	47.5	95.0	50.0	47.5	95.0	50.0	49.7	99.4
					7			8			9	
				50.0	48.8	97.6						
Thallium	50.0	49.0	98.0		1			2			3	
				50.0	50.9	101.8	50.0	50.4	100.8	50.0	49.3	98.6
					4			5			6	
				50.0	51.7	103.4	50.0	52.7	105.4	50.0	51.6	103.2
					7			8			9	
				50.0	52.7	105.4						
Vanadium	50.0	51.0	102.0		1			2			3	
				50.0	50.8	101.6	50.0	49.9	99.8	50.0	50.5	101.0
					4			5			6	
				50.0	49.8	99.6	50.0	48.9	97.8	50.0	52.1	104.2
					7			8			9	
				50.0	52.0	104.0						
Zinc	50.0	49.7	99.4		1			2			3	
				50.0	50.9	101.8	50.0	51.8	103.6	50.0	52.2	104.4
					4			5			6	
				50.0	51.6	103.2	50.0	52.8	105.6	50.0	52.4	104.8
					7			8			9	
				50.0	52.0	104.0						

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1108012 Work Order: C110616 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.68	99.4		1			2			3	
				50.0	49.62	99.2	50.0	50.07	100.1	50.0	49.74	99.5
					4			5			6	
				50.0	50.04	100.1						
					7			8			9	
Arsenic	50.0	50.54	101.1		1			2			3	
				50.0	50.46	100.9	50.0	52.25	104.5	50.0	51.07	102.1
					4			5			6	
				50.0	49.63	99.3						
					7			8			9	
Barium	50.0	50.88	101.8		1			2			3	
				50.0	49.79	99.6	50.0	50.97	101.9	50.0	50.13	100.3
					4			5			6	
				50.0	50.28	100.6						
					7			8			9	
Beryllium	50.0	47.53	95.1		1			2			3	
				50.0	51.38	102.8	50.0	48.69	97.4	50.0	46.91	93.8
					4			5			6	
				50.0	48.50	97.0						
					7			8			9	
Cadmium	50.0	50.11	100.2		1			2			3	
				50.0	51.09	102.2	50.0	50.14	100.3	50.0	50.17	100.3
					4			5			6	
				50.0	50.02	100.0						
					7			8			9	
Chromium	50.0	52.19	104.4		1			2			3	
				50.0	49.79	99.6	50.0	49.35	98.7	50.0	48.13	96.3
					4			5			6	
				50.0	48.64	97.3						
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1108012 Work Order: C110616 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	52.44	104.9		1			2			3	
				50.0	51.33	102.7	50.0	50.21	100.4	50.0	46.21	92.4
					4			5			6	
				50.0	47.60	95.2						
					7			8			9	
Copper	50.0	53.10	106.2		1			2			3	
				50.0	53.52	107.0	50.0	52.05	104.1	50.0	48.30	96.6
					4			5			6	
				50.0	49.90	99.8						
					7			8			9	
Lead	50.0	49.26	98.5		1			2			3	
				50.0	51.37	102.7	50.0	55.35	110.7	50.0	51.71	103.4
					4			5			6	
				50.0	52.63	105.3						
					7			8			9	
Manganese	50.0	52.18	104.4		1			2			3	
				50.0	49.99	100.0	50.0	50.29	100.6	50.0	45.72	91.4
					4			5			6	
				50.0	48.45	96.9						
					7			8			9	
Molybdenum	50.0	50.28	100.6		1			2			3	
				50.0	49.77	99.5	50.0	49.66	99.3	50.0	49.51	99.0
					4			5			6	
				50.0	48.70	97.4						
					7			8			9	
Nickel	50.0	53.26	106.5		1			2			3	
				50.0	52.60	105.2	50.0	50.06	100.1	50.0	46.72	93.4
					4			5			6	
				50.0	48.99	98.0						
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1108012 Work Order: C110616 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Selenium	250	258.1	103.2		1			2			3	
				50.0	51.22	102.4	50.0	54.05	108.1	50.0	52.81	105.6
					4			5			6	
				50.0	49.85	99.7						
					7			8			9	
Silver	50.0	51.25	102.5		1			2			3	
				50.0	50.45	100.9	50.0	48.86	97.7	50.0	48.08	96.2
					4			5			6	
				50.0	48.69	97.4						
					7			8			9	
Thallium	50.0	48.68	97.4		1			2			3	
				50.0	49.63	99.3	50.0	54.21	108.4	50.0	51.39	102.8
					4			5			6	
				50.0	50.74	101.5						
					7			8			9	
Vanadium	50.0	51.70	103.4		1			2			3	
				50.0	48.80	97.6	50.0	48.88	97.8	50.0	47.52	95.0
					4			5			6	
				50.0	48.24	96.5						
					7			8			9	
Zinc	50.0	52.53	105.1		1			2			3	
				50.0	52.08	104.2	50.0	52.17	104.3	50.0	51.89	103.8
					4			5			6	
				50.0	51.75	103.5						
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1108008	Analysis: ICPMS Diss. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.0	ug/L			2.00
	IFB1	19.3	ug/L	20	96	2.00
Barium	IFA1	0.2	ug/L			10.0
	IFB1	0.2	ug/L			10.0
Beryllium	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	19.7	ug/L	20	98	0.200
Chromium	IFA1	0.3	ug/L			1.00
	IFB1	20.1	ug/L	20	100	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	19.1	ug/L	20	96	0.200
Copper	IFA1	0.3	ug/L			1.00
	IFB1	20.3	ug/L	20	102	1.00
Lead	IFA1	-0.2	ug/L			0.200
	IFB1	-0.2	ug/L			0.200
Manganese	IFA1	-0.2	ug/L			0.500
	IFB1	19.0	ug/L	20	95	0.500
Molybdenum	IFA1	198.4	ug/L	200	99	0.200
	IFB1	200.3	ug/L	200	100	0.200
Nickel	IFA1	-0.1	ug/L			1.00
	IFB1	19.8	ug/L	20	99	1.00
Selenium	IFA1	0.1	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Silver	IFA1	-0.1	ug/L			0.500
	IFB1	17.6	ug/L	20	88	0.500
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	-0.1	ug/L			2.00
	IFB1	-0.4	ug/L			2.00
Zinc	IFA1	1.2	ug/L			5.00

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1108008	Analysis: ICPMS Diss. Metals-2010					
Zinc	IFB1	20.7	ug/L	20	103	5.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1108012	Analysis: ICP-MS Tot. Rec. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	-0.1	ug/L			2.00
	IFB1	20.0	ug/L	20	100	2.00
Barium	IFA1	0.2	ug/L			10.0
	IFB1	0.2	ug/L			10.0
Beryllium	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	20.2	ug/L	20	101	0.200
Chromium	IFA1	0.3	ug/L			1.00
	IFB1	19.4	ug/L	20	97	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	20.0	ug/L	20	100	0.200
Copper	IFA1	0.3	ug/L			1.00
	IFB1	20.8	ug/L	20	104	1.00
Lead	IFA1	-0.2	ug/L			0.200
	IFB1	-0.2	ug/L			0.200
Manganese	IFA1	-0.1	ug/L			0.500
	IFB1	19.5	ug/L	20	98	0.500
Molybdenum	IFA1	198.1	ug/L	200	99	0.200
	IFB1	205.8	ug/L	200	103	0.200
Nickel	IFA1	-0.1	ug/L			1.00
	IFB1	19.8	ug/L	20	99	1.00
Selenium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Silver	IFA1	0.0	ug/L			0.500
	IFB1	17.9	ug/L	20	89	0.500
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	-0.1	ug/L			2.00
	IFB1	-0.2	ug/L			2.00
Zinc	IFA1	0.9	ug/L			5.00

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1108012	Analysis: ICP-MS Tot. Rec. Metals-2010					
Zinc	IFB1	20.7	ug/L	20	104	5.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPOE - PE Optima

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1108005 Analysis: ICPOE Diss. Metals-2010						
Aluminum	IFA1	61,244.0	ug/L	60,000	102	50.0
	IFB1	61,436.6	ug/L	60,000	102	50.0
Calcium	IFA1	299,731.2	ug/L	300,000	100	250
	IFB1	298,862.9	ug/L	300,000	100	250
Iron	IFA1	228,206.5	ug/L	250,000	91	250
	IFB1	228,113.9	ug/L	250,000	91	250
Magnesium	IFA1	145,727.6	ug/L	150,000	97	250
	IFB1	146,447.9	ug/L	150,000	98	250
Potassium	IFA1	-81.2	ug/L			1000
	IFB1	21,096.2	ug/L	20,000	105	1000
Sodium	IFA1	52,479.8	ug/L	50,000	105	500
	IFB1	52,690.8	ug/L	50,000	105	500

*Criteria = 80-120%R of True Value or +/- PQL
See raw data for complete analyte list and results.

Sequence: 1108006 Analysis: ICPOE Tot. Rec Metals-2010						
Aluminum	IFA1	61,244.0	ug/L	60,000	102	50.0
	IFB1	61,436.6	ug/L	60,000	102	50.0
Calcium	IFA1	299,731.2	ug/L	300,000	100	250
	IFB1	298,862.9	ug/L	300,000	100	250
Iron	IFA1	228,206.5	ug/L	250,000	91	250
	IFB1	228,113.9	ug/L	250,000	91	250
Magnesium	IFA1	145,727.6	ug/L	150,000	97	250
	IFB1	146,447.9	ug/L	150,000	98	250
Potassium	IFA1	-81.2	ug/L			1000
	IFB1	21,096.2	ug/L	20,000	105	1000
Sodium	IFA1	52,479.8	ug/L	50,000	105	500
	IFB1	52,690.8	ug/L	50,000	105	500

*Criteria = 80-120%R of True Value or +/- PQL
See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1108008

Analyte	True	Found	%R	Units
Antimony	1.00	0.989	99	ug/L
Arsenic	2.00	2.00	100	ug/L
Barium	0.500	0.524	105	ug/L
Beryllium	0.200	0.219	109	ug/L
Cadmium	0.200	0.196	98	ug/L
Chromium	1.00	1.08	108	ug/L
Cobalt	0.200	0.217	108	ug/L
Copper	1.00	1.13	113	ug/L
Lead	0.200	0.190	95	ug/L
Manganese	0.200	0.204	102	ug/L
Molybdenum	0.200	0.182	91	ug/L
Nickel	1.00	1.11	111	ug/L
Selenium	1.00	0.910	91	ug/L
Silver	0.500	0.560	112	ug/L
Thallium	0.200	0.188	94	ug/L
Vanadium	2.00	2.18	109	ug/L
Zinc	5.00	5.20	104	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1108005

Analyte	True	Found	%R	Units
Aluminum	100	103.1	103	ug/L
Calcium	250	264.3	106	ug/L
Iron	100	108.6	109	ug/L
Magnesium	1000	1093	109	ug/L
Potassium	1000	1094	109	ug/L
Sodium	1000	1098	110	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1108012

Analyte	True	Found	%R	Units
Antimony	1.00	0.9720	97	ug/L
Arsenic	2.00	1.988	99	ug/L
Barium	0.500	0.5765	115	ug/L
Beryllium	0.200	0.2448	122	ug/L
Cadmium	0.200	0.2082	104	ug/L
Chromium	1.00	0.8609	86	ug/L
Cobalt	0.200	0.1977	99	ug/L
Copper	1.00	1.065	106	ug/L
Lead	0.200	0.1679	84	ug/L
Manganese	0.200	0.1621	81	ug/L
Molybdenum	0.200	0.1870	93	ug/L
Nickel	1.00	1.027	103	ug/L
Selenium	1.00	0.9510	95	ug/L
Silver	0.500	0.6188	124	ug/L
Thallium	0.200	0.1936	97	ug/L
Vanadium	2.00	1.941	97	ug/L
Zinc	5.00	5.184	104	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1108006

Analyte	True	Found	%R	Units
Aluminum	100	103.1	103	ug/L
Calcium	250	264.3	106	ug/L
Iron	100	108.6	109	ug/L
Magnesium	1000	1093	109	ug/L
Potassium	1000	1094	109	ug/L
Sodium	1000	1098	110	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: EPA 300.0 **Dissolved** **Sequence ID#:** 1107120

Instrument ID #: ESAT Dionex IC Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1107120-ICV1	Initial Cal Check	07/15/11	11:49
1107120-ICB1	Initial Cal Blank	07/15/11	12:06
1107063-BLK1	Blank	07/15/11	14:16
1107063-BS1		07/15/11	15:26
1107063-DUP1	Duplicate	07/15/11	16:01
1107063-MS1	Matrix Spike	07/15/11	16:19
1107063-MSD1	Matrix Spike Dup	07/15/11	16:36
C110616-02	Argentine Shaft Tunnel	07/15/11	17:29
1107120-CCV1	Calibration Check	07/15/11	18:22
1107120-CCB1	Calibration Blank	07/15/11	18:39
C110616-11	DR-7	07/15/11	19:14
C110616-14	SC-068	07/15/11	19:32
C110616-17	SC-1131	07/15/11	19:50
C110616-20	SC-198	07/15/11	20:07
C110616-23	SC-351	07/15/11	20:25
C110616-26	SC-404	07/15/11	20:42
C110616-29	SC-4040	07/15/11	21:00
C110616-32	SC-493	07/15/11	21:17
C110616-35	SC-699	07/15/11	21:35
1107120-CCV2	Calibration Check	07/15/11	21:53
1107120-CCB2	Calibration Blank	07/15/11	22:10
C110616-38	SC-895	07/15/11	22:28
C110616-41	SC-B	07/15/11	22:45
C110616-44	SCEF	07/15/11	23:03
1107120-CCV3	Calibration Check	07/15/11	23:56
1107120-CCB3	Calibration Blank	07/16/11	00:13
1107120-CCV4	Calibration Check	07/18/11	09:57
1107120-CCB4	Calibration Blank	07/18/11	10:59
C110616-05	Argentine Tunnel Main	07/18/11	11:17
C110616-08	DR-3	07/18/11	11:34
C110616-47	SVS-12	07/18/11	11:52
1107120-CCV5	Calibration Check	07/18/11	12:10
1107120-CCB5	Calibration Blank	07/18/11	12:27

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Dissolved** **Sequence ID#:** 1108005

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108005-ICV1	Initial Cal Check	08/01/11	09:50
1108005-ICB1	Initial Cal Blank	08/01/11	09:53
1108005-CRL1	Instrument RL Check	08/01/11	09:56
1108005-IFA1	Interference Check A	08/01/11	09:59
1108005-IFB1	Interference Check B	08/01/11	10:02
1108005-CCV1	Calibration Check	08/01/11	10:07
1108005-CCB1	Calibration Blank	08/01/11	10:10
1108003-BLK1	Blank	08/01/11	10:13
1108003-BS1		08/01/11	10:16
C110616-07	DR-3	08/01/11	10:19
1108003-DUP1	Duplicate	08/01/11	10:23
1108005-SRD1	Serial Dilution	08/01/11	10:27
1108003-MS1	Matrix Spike	08/01/11	10:30
1108003-MSD1	Matrix Spike Dup	08/01/11	10:34
C110616-01	Argentine Shaft Tunnel	08/01/11	10:38
1108005-CCV2	Calibration Check	08/01/11	10:49
1108005-CCB2	Calibration Blank	08/01/11	10:52
C110616-10	DR-7	08/01/11	10:55
C110616-13	SC-068	08/01/11	10:58
C110616-16	SC-1131	08/01/11	11:01
C110616-19	SC-198	08/01/11	11:04
C110616-22	SC-351	08/01/11	11:07
C110616-25	SC-404	08/01/11	11:10
C110616-28	SC-4040	08/01/11	11:13
C110616-31	SC-493	08/01/11	11:16
C110616-34	SC-699	08/01/11	11:19
1108005-CCV3	Calibration Check	08/01/11	11:25
1108005-CCB3	Calibration Blank	08/01/11	11:29
C110616-37	SC-895	08/01/11	11:32
C110616-40	SC-B	08/01/11	11:35
C110616-43	SCEF	08/01/11	11:38
1108005-CCV4	Calibration Check	08/01/11	12:04
1108005-CCB4	Calibration Blank	08/01/11	12:07
1108005-CCV5	Calibration Check	08/01/11	12:42
1108005-CCB5	Calibration Blank	08/01/11	12:45
1108005-CCV6	Calibration Check	08/01/11	13:19
1108005-CCB6	Calibration Blank	08/01/11	13:22
C110616-04	Argentine Tunnel Main	08/01/11	13:24
C110616-46	SVS-12	08/01/11	13:27
1108005-CCV7	Calibration Check	08/01/11	13:34
1108005-CCB7	Calibration Blank	08/01/11	13:37

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Total Recoverable** **Sequence ID#:** 1108006

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108006-ICV1	Initial Cal Check	08/01/11	09:50
1108006-ICB1	Initial Cal Blank	08/01/11	09:53
1108006-CRL1	Instrument RL Check	08/01/11	09:56
1108006-IFA1	Interference Check A	08/01/11	09:59
1108006-IFB1	Interference Check B	08/01/11	10:02
1108006-CCV1	Calibration Check	08/01/11	10:07
1108006-CCB1	Calibration Blank	08/01/11	10:10
1108006-CCV2	Calibration Check	08/01/11	10:49
1108006-CCB2	Calibration Blank	08/01/11	10:52
1108006-CCV3	Calibration Check	08/01/11	11:25
1108006-CCB3	Calibration Blank	08/01/11	11:29
1107126-SRM1	Reference	08/01/11	11:48
C110616-03	Argentine Shaft Tunnel	08/01/11	11:51
1107126-DUP1	Duplicate	08/01/11	11:55
1108006-SRD1	Serial Dilution	08/01/11	11:58
1108006-CCV4	Calibration Check	08/01/11	12:04
1108006-CCB4	Calibration Blank	08/01/11	12:07
1107126-MS1	Matrix Spike	08/01/11	12:10
1107126-MSD1	Matrix Spike Dup	08/01/11	12:13
1107126-PS1	Post Spike	08/01/11	12:16
C110616-06	Argentine Tunnel Main	08/01/11	12:19
C110616-09	DR-3	08/01/11	12:22
C110616-12	DR-7	08/01/11	12:26
C110616-15	SC-068	08/01/11	12:29
C110616-18	SC-1131	08/01/11	12:32
C110616-21	SC-198	08/01/11	12:35
1108006-CCV5	Calibration Check	08/01/11	12:42
1108006-CCB5	Calibration Blank	08/01/11	12:45
C110616-24	SC-351	08/01/11	12:48
C110616-27	SC-404	08/01/11	12:51
C110616-30	SC-4040	08/01/11	12:54
C110616-33	SC-493	08/01/11	12:57
C110616-36	SC-699	08/01/11	13:00
C110616-39	SC-895	08/01/11	13:03
C110616-42	SC-B	08/01/11	13:06
C110616-45	SCEF	08/01/11	13:09
C110616-48	SVS-12	08/01/11	13:12
1108006-CCV6	Calibration Check	08/01/11	13:19
1108006-CCB6	Calibration Blank	08/01/11	13:22
1107126-BLK1	Blank	08/01/11	13:31
1108006-CCV7	Calibration Check	08/01/11	13:34
1108006-CCB7	Calibration Blank	08/01/11	13:37

Project Name: Rico-Argentine_Surface Waters_JUN 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Dissolved** **Sequence ID#:** 1108008

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108008-ICV1	Initial Cal Check	08/01/11	10:58
1108008-ICB1	Initial Cal Blank	08/01/11	11:01
1108008-CRL1	Instrument RL Check	08/01/11	11:04
1108008-IFA1	Interference Check A	08/01/11	11:07
1108008-IFB1	Interference Check B	08/01/11	11:10
1108008-CCV1	Calibration Check	08/01/11	11:13
1108008-CCB1	Calibration Blank	08/01/11	11:16
1108008-CCV2	Calibration Check	08/01/11	11:47
1108008-CCB2	Calibration Blank	08/01/11	11:50
1108008-CCV3	Calibration Check	08/01/11	12:21
1108008-CCB3	Calibration Blank	08/01/11	12:24
1108008-CCV4	Calibration Check	08/01/11	12:56
1108008-CCB4	Calibration Blank	08/01/11	12:59
1108004-BLK1	Blank	08/01/11	13:04
C110616-01	Argentine Shaft Tunnel	08/01/11	13:07
1108004-DUP1	Duplicate	08/01/11	13:10
1108008-SRD1	Serial Dilution	08/01/11	13:13
1108004-BS1		08/01/11	13:15
1108004-MS1	Matrix Spike	08/01/11	13:18
1108004-MSD1	Matrix Spike Dup	08/01/11	13:21
C110616-07	DR-3	08/01/11	13:27
1108008-CCV5	Calibration Check	08/01/11	13:32
1108008-CCB5	Calibration Blank	08/01/11	13:35
C110616-10	DR-7	08/01/11	13:38
C110616-13	SC-068	08/01/11	13:41
C110616-16	SC-1131	08/01/11	13:44
C110616-19	SC-198	08/01/11	13:47
C110616-22	SC-351	08/01/11	13:49
C110616-25	SC-404	08/01/11	13:52
C110616-28	SC-4040	08/01/11	13:55
C110616-31	SC-493	08/01/11	13:58
C110616-34	SC-699	08/01/11	14:01
1108008-CCV6	Calibration Check	08/01/11	14:06
1108008-CCB6	Calibration Blank	08/01/11	14:09
C110616-37	SC-895	08/01/11	14:12
C110616-40	SC-B	08/01/11	14:15
C110616-43	SCEF	08/01/11	14:18
C110616-46	SVS-12	08/01/11	14:21
C110616-04	Argentine Tunnel Main	08/01/11	14:26
1108008-CCV7	Calibration Check	08/01/11	14:41
1108008-CCB7	Calibration Blank	08/01/11	14:44

Project Name: **Rico-Argentine_Surface Waters_JUN 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Total Recoverable** **Sequence ID#:** 1108012

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108012-ICV1	Initial Cal Check	08/02/11	10:30
1108012-ICB1	Initial Cal Blank	08/02/11	10:33
1108012-CRL1	Instrument RL Check	08/02/11	10:36
1108012-IFA1	Interference Check A	08/02/11	10:39
1108012-IFB1	Interference Check B	08/02/11	10:42
1108012-CCV1	Calibration Check	08/02/11	10:45
1108012-CCB1	Calibration Blank	08/02/11	10:48
1107126-BLK2	Blank	08/02/11	10:51
C110616-03	Argentine Shaft Tunnel	08/02/11	10:54
1107126-DUP2	Duplicate	08/02/11	10:57
1108012-SRD1	Serial Dilution	08/02/11	11:00
1107126-SRM2	Reference	08/02/11	11:02
1107126-MS2	Matrix Spike	08/02/11	11:05
1107126-MSD2	Matrix Spike Dup	08/02/11	11:08
1107126-PS2	Post Spike	08/02/11	11:11
C110616-06	Argentine Tunnel Main	08/02/11	11:14
1108012-CCV2	Calibration Check	08/02/11	11:19
1108012-CCB2	Calibration Blank	08/02/11	11:22
C110616-09	DR-3	08/02/11	11:25
C110616-12	DR-7	08/02/11	11:28
C110616-15	SC-068	08/02/11	11:31
C110616-18	SC-1131	08/02/11	11:34
C110616-21	SC-198	08/02/11	11:36
C110616-24	SC-351	08/02/11	11:39
C110616-27	SC-404	08/02/11	11:42
C110616-30	SC-4040	08/02/11	11:45
C110616-33	SC-493	08/02/11	11:48
1108012-CCV3	Calibration Check	08/02/11	12:07
1108012-CCB3	Calibration Blank	08/02/11	12:10
C110616-36	SC-699	08/02/11	12:13
C110616-39	SC-895	08/02/11	12:16
C110616-42	SC-B	08/02/11	12:19
C110616-45	SCEF	08/02/11	12:22
C110616-48	SVS-12	08/02/11	12:25
1108012-CCV4	Calibration Check	08/02/11	12:30
1108012-CCB4	Calibration Blank	08/02/11	12:33

USEPA
DateShipped: 6/27/2011
CarrierName: FedEx
AirbillNo: 862786321906 and 862786321880

CHAIN OF CUSTODY RECORD
Rico-Argentine St. Louis Tunne/CO
Contact Name: Jan Christner
Contact Phone: 720-810-0759

C110616

No: 000001
Cooler #: 1 and 2
Lab: ESAT
Lab Phone: 303-312-6687

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
	SLSW-AM-06232011	Argentine Shaft Tunnel	Dissolved Metals	Surface Water	6/23/2011 10:30	1	500 mL poly	HNO3 pH<2	N
	SLSW-AM-06232011	Argentine Shaft Tunnel	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 10:30	1	500 mL poly	4 C	N
	SLSW-AM-06232011-TR	Argentine Shaft Tunnel	Total Metals	Surface Water	6/23/2011 10:30	1	500 mL poly	HNO3 pH<2	N
	SLSW-AT-06232011	Argentine Tunnel Main	Dissolved Metals	Surface Water	6/23/2011 13:50	1	500 mL poly	HNO3 pH<2	N
	SLSW-AT-06232011	Argentine Tunnel Main	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 13:50	1	500 mL poly	4 C	N
	SLSW-AT-06232011-TR	Argentine Tunnel Main	Total Metals	Surface Water	6/23/2011 13:50	1	500 mL poly	HNO3 pH<2	N
	SLSW-DR3-06232011	DR-3	Dissolved Metals	Surface Water	6/23/2011 14:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-DR3-06232011	DR-3	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 14:00	1	500 mL poly	4 C	N
	SLSW-DR3-06232011-TR	DR-3	Total Metals	Surface Water	6/23/2011 14:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-DR7-06232011	DR-7	Dissolved Metals	Surface Water	6/23/2011 14:20	1	500 mL poly	HNO3 pH<2	N

Special Instructions: Dissolved Metals and Bromide/Sulfate/Chloride samples have been filtered.

5.4°C
pH ✓

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
all	[signature]	8/27/11	[signature]	6/28/11	13:30						

USEPA
DateShipped: 6/27/2011
CarrierName: FedEx
AirbillNo: 862786321906 and 862786321880

CHAIN OF CUSTODY RECORD
Rico-Argentine St. Louis Tunne/CO
Contact Name: Jan Christner
Contact Phone: 720-810-0759

No: 000001
Cooler #: 1 and 2
Lab: ESAT
Lab Phone: 303-312-6687

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
	SLSW-DR7-06232011	DR-7	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 14:20	1	500 mL poly	4 C	N
	SLSW-DR7-06232011-TR	DR-7	Total Metals	Surface Water	6/23/2011 14:20	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC1131-06232011	SC-1131	Dissolved Metals	Surface Water	6/23/2011 16:41	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC1131-06232011	SC-1131	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:41	1	500 mL poly	4 C	N
	SLSW-SC1131-06232011-TR	SC-1131	Total Metals	Surface Water	6/23/2011 16:41	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC198-06232011	SC-198	Dissolved Metals	Surface Water	6/23/2011 16:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC198-06232011	SC-198	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:00	1	500 mL poly	4 C	N
	SLSW-SC198-06232011-TR	SC-198	Total Metals	Surface Water	6/23/2011 16:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC351-06232011	SC-351	Dissolved Metals	Surface Water	6/23/2011 16:02	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC351-06232011	SC-351	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:02	1	500 mL poly	4 C	N

Special Instructions: Dissolved Metals and Bromide/Sulfate/Chloride samples have been filtered.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
all	[signature]	8/27/11	[signature]	6/28/11	13:30						

USEPA

DateShipped: 6/27/2011

CarrierName: FedEx

AirbillNo: 862786321906 and 862786321880

CHAIN OF CUSTODY RECORD

Rico-Argentine St. Louis Tunne/CO

Contact Name: Jan Christner

Contact Phone: 720-810-0759

No: 000001

Cooler #: 1 and 2

Lab: ESAT

Lab Phone: 303-312-6687

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
	SLSW-SC351-06232011-TR	SC-351	Total Metals	Surface Water	6/23/2011 16:02	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC4040-06242011	SC-4040	Dissolved Metals	Surface Water	6/24/2011 11:50	1	1 L poly	HNO3 pH<2	N
	SLSW-SC4040-06242011	SC-4040	Bromide, Sulfate, Chloride	Surface Water	6/24/2011 11:50	1	1 L poly	4 C	N
	SLSW-SC4040-06242011-TR	SC-4040	Total Metals	Surface Water	6/24/2011 11:50	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC404-06242011	SC-404	Dissolved Metals	Surface Water	6/24/2011 11:40	1	1 L poly	HNO3 pH<2	N
	SLSW-SC404-06242011	SC-404	Bromide, Sulfate, Chloride	Surface Water	6/24/2011 11:40	1	1 L poly	4 C	N
	SLSW-SC404-06242011-TR	SC-404	Total Metals	Surface Water	6/24/2011 11:40	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC493-06232011	SC-493	Dissolved Metals	Surface Water	6/23/2011 16:10	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC493-06232011	SC-493	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:10	1	500 mL poly	4 C	N
	SLSW-SC493-06232011-TR	SC-493	Total Metals	Surface Water	6/23/2011 16:10	1	500 mL poly	HNO3 pH<2	N

Special Instructions: Dissolved Metals and Bromide/Sulfate/Chloride samples have been filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time		Items/Reason	Relinquished By	Date	Received by	Date	Time
ave	[signature]	8/27/11	[signature]	6/28/11	@13:30							

USEPA
DateShipped: 6/27/2011
CarrierName: FedEx
AirbillNo: 862786321906 and 862786321880

CHAIN OF CUSTODY RECORD
Rico-Argentine St. Louis Tunne/CO
Contact Name: Jan Christner
Contact Phone: 720-810-0759

No: 000001
Cooler #: 1 and 2
Lab: ESAT
Lab Phone: 303-312-6687

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
	SLSW-SC68-06232011	SC-068	Dissolved Metals	Surface Water	6/23/2011 16:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC68-06232011	SC-068	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:00	1	500 mL poly	4 C	N
	SLSW-SC68-06232011-TR	SC-068	Total Metals	Surface Water	6/23/2011 16:00	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC699-06232011	SC-699	Dissolved Metals	Surface Water	6/23/2011 16:17	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC699-06232011	SC-699	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:17	1	500 mL poly	4 C	N
	SLSW-SC699-06232011-TR	SC-699	Total Metals	Surface Water	6/23/2011 16:17	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC895-06232011	SC-895	Dissolved Metals	Surface Water	6/23/2011 16:56	1	500 mL poly	HNO3 pH<2	N
	SLSW-SC895-06232011	SC-895	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:56	1	500 mL poly	4 C	N
	SLSW-SC895-06232011-TR	SC-895	Total Metals	Surface Water	6/23/2011 16:56	1	500 mL poly	HNO3 pH<2	N
	SLSW-SCB-06232011	SC-B	Dissolved Metals	Surface Water	6/23/2011 16:15	1	500 mL poly	HNO3 pH<2	N

Not OK ~~RECEIVED~~ 6/28/11

Special Instructions: Dissolved Metals and Bromide/Sulfate/Chloride samples have been filtered.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	8/27/11	[signature]	6/28/11	13:30						

USEPA
DateShipped: 6/27/2011
CarrierName: FedEx
AirbillNo: 862786321906 and 862786321880

CHAIN OF CUSTODY RECORD
Rico-Argentine St. Louis Tunne/CO
Contact Name: Jan Christner
Contact Phone: 720-810-0759

No: 000001
Cooler #: 1 and 2
Lab: ESAT
Lab Phone: 303-312-6687

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
OK N									
NOT RECEIVED	SLSW-SCB-06232011	SC-B	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 16:15	1	500 mL poly	4 C	N
	SLSW-SCB-06232011-TR	SC-B	Total Metals	Surface Water	6/23/2011 16:15	1	500 mL poly	HNO3 pH<2	N
	SLSW-SCEF-06232011	SCEF	Dissolved Metals	Surface Water	6/23/2011 10:45	1	500 mL poly	HNO3 pH<2	N
	SLSW-SCEF-06232011	SCEF	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 10:45	1	500 mL poly	4 C	N
	SLSW-SCEF-06232011-TR	SCEF	Total Metals	Surface Water	6/23/2011 10:45	1	500 mL poly	HNO3 pH<2	N
	SLSW-SVS12-06232011	SVS-12	Dissolved Metals	Surface Water	6/23/2011 10:30	1	500 mL poly	HNO3 pH<2	N
	SLSW-SVS12-06232011	SVS-12	Bromide, Sulfate, Chloride	Surface Water	6/23/2011 10:30	1	500 mL poly	4 C	N
	SLSW-SVS12-06232011-TR	SVS-12	Total Metals	Surface Water	6/23/2011 10:30	1	500 mL poly	HNO3 pH<2	N

8 6/28/11

Special Instructions: Dissolved Metals and Bromide/Sulfate/Chloride samples have been filtered.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	8/27/11	[signature]	6/28/11	1330						

ESAT Technical Direction Form

Contract No. EPW06033
EPA Region 8
WO # 0110614

Site ID: 08BU
TDF ID: DG-264

Date Issued: 6/10/2011
Date Updated: 6/24/2011

Date Closed By:

Name: Rico-Argentine Superfund Site Samples

Details: The Contractor shall analyze approximately 20 water samples for total recoverable and dissolved metals including hardness as indicated in the analytical information section. The samples are expected to arrive at the R8 ESAT Laboratory following the sampling event which is tentatively scheduled for June 20-24, 2011.

UOS is expecting to drop off the samples to the laboratory on 6/27/11. The EPA OSC for this site is Steve Way.

Analytical

MATRIX

☑ Water ☐ Soils ☐ Vegetation ☐ Biota

WET CHEM

☐ TSS ☐ TDS ☐ DOC ☐ Alk ☑ Chloride ☑ Sulfate ☐ Fluoride ☐ Nitrate ☐ Nitrite
Other bromide

METALS

☑ Dissolved ☑ Total Recoverable ☐ Total ☑ Hardness (Calc)

200.7: ☐ Ag ☑ Al ☐ As ☐ Ba ☐ Be ☐ B ☑ Ca ☐ Cd ☐ Co ☐ Cr ☐ Cu ☑ Fe ☑ K ☑ Mg
☐ Mn ☐ Mo ☑ Na ☐ Ni ☐ Pb ☐ Sb ☐ Se ☐ Sr ☐ Ti ☐ Tl ☐ V ☐ Zn ☐ SiO2

200.8: ☑ Ag ☐ Al ☑ As ☑ Ba ☑ Be ☑ Cd ☑ Co ☑ Cr ☑ Cu ☑ Mn ☑ Mo ☑ Ni ☑ Pb ☑ Sb
☑ Se ☐ Th ☑ Tl ☐ U ☑ V ☑ Zn

7470/7471/747 ☐ Hg

FIBERS

☐ PLM ☐ TEM

Deliverable

ID	*Description*	*Due Date*	*Submission Date*
1	Provide final deliverable package to Task Monitor no later than 30 days after delivery of samples.		

APPENDIX C-2

Laboratory Data Package

Samples Collected August 2011

U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis

Ref: 8TMS-L

MEMORANDUM

Date: 10/05/11

Subject: Analytical Results--- **Rico-Argentine_Surface Waters_AUG 2011_D264 / DG-264**

From: Don Goodrich; EPA Region 8 Analytical Chemistry WAM

To: Steve Way
Superfund
1595 Wynkoop Street

Received Sample Set(s), [Work Order : Date Received]:
[C110805 : 08/10/2011]

Attached are the analytical results for the samples received from the Rico-Argentine_Surface Waters_AUG 2011_D264 sampling event, according to TDF DG-264. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality asessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004, referred to as "NFGI".

Case Narrative

C110805

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

Other: It was noted during sample login that the cooler temperature was 7 degrees celcius.

1. Initial and Continuing calibration blanks (ICBs and CCBs).
   Exceptions: In ICP-MS sequence 1109045 and 1109046, molybdenum was detected in CCB1. As a result, the reporting limit for molybdenum was raised from 0.20 ug/L to 0.30 ug/L. In ICP-MS sequence 1109045 and 1109046, silver was detected in the ICB, CCB2, and CCB3. As a result, the reporting limit for silver was raised to 2.0 ug/L. No qualifiers were assigned.
2. Preparation (PB) / Method blanks (MB)
   Exceptions: None.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
   Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs and CCVs).
   Exceptions: None.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
   Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes. PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
   Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
   Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
   Exceptions: None.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
   Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
    Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
    Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
    Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result.
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit (MDL)
mg/L	Parts per million (millligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	*USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.

Method(s) Summary:

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP-OE (ICP).
- Method 200.8 / 6020 using a Perkin-Elmer Elan 6000 ICP-MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin-Elmer FIMS CVAA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg(milligram) equivalent $CaCO_3$ per liter (L) determined as follows:

Calculated hardness = 2.497 * (Calcium, mg/L) + 4.118 * (Magnesium, mg/L).

From *EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography* , Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: ArgentineShaft **Date / Time Sampled:** 08/04/11 13:30 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-A **Matrix:** Water **Lab Number:** C110805-01 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**23600**		ug/L	100	5	09/15/2011	SW	1109043
200.7	**Calcium**	**332000**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Iron**	**46000**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Magnesium**	**56800**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Potassium**	**2820**	J	ug/L	1250	5	09/15/2011	SW	1109043
200.7	**Sodium**	**7430**		ug/L	1250	5	09/15/2011	SW	1109043
200.7	**Zinc**	**51500**		ug/L	50.0	5	09/15/2011	SW	1109043
200.8	Antimony	< 5.00	U	ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Arsenic**	**5.66**	J	ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Barium**	**74.0**		ug/L	25.0	5	09/15/2011	SV	1109044
200.8	**Beryllium**	**3.63**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Cadmium**	**285**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Chromium**	**16.7**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Cobalt**	**27.2**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Copper**	**2250**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Lead**	**227**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Manganese**	**17000**		ug/L	1.00	5	09/15/2011	SV	1109044
200.8	**Molybdenum**	**5.30**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Nickel**	**49.7**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Selenium**	**9.89**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Silver**	**47.8**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	Thallium	< 5.00	U	ug/L	2.50	5	09/15/2011	SV	1109044
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	09/15/2011	SV	1109044
2340B	**Hardness**	**1060**		mg/L	8	5	09/15/2011	SW	1109043

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: BlaineTunnel **Date / Time Sampled:** 08/04/11 16:00 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-A **Matrix:** Water **Lab Number:** C110805-03 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**41300**		ug/L	100	5	09/15/2011	SW	1109043
200.7	**Calcium**	**318000**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Iron**	**315000**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Magnesium**	**85900**		ug/L	500	5	09/15/2011	SW	1109043
200.7	**Potassium**	**6280**		ug/L	1250	5	09/15/2011	SW	1109043
200.7	**Sodium**	**4820**		ug/L	1250	5	09/15/2011	SW	1109043
200.7	**Zinc**	**61700**		ug/L	50.0	5	09/15/2011	SW	1109043
200.8	Antimony	< 5.00	U	ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Arsenic**	**19.4**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Barium**	**45.1**	J	ug/L	25.0	5	09/15/2011	SV	1109044
200.8	**Beryllium**	**10.4**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Cadmium**	**339**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Chromium**	**29.2**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Cobalt**	**46.8**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Copper**	**4140**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Lead**	**179**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Manganese**	**28200**		ug/L	1.00	5	09/15/2011	SV	1109044
200.8	**Molybdenum**	**3.37**		ug/L	0.500	5	09/15/2011	SV	1109044
200.8	**Nickel**	**81.4**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Selenium**	**10.9**		ug/L	2.50	5	09/15/2011	SV	1109044
200.8	Silver	< 10.0	U	ug/L	0.500	5	09/15/2011	SV	1109044
200.8	Thallium	< 5.00	U	ug/L	2.50	5	09/15/2011	SV	1109044
200.8	**Vanadium**	**49.5**		ug/L	5.00	5	09/15/2011	SV	1109044
2340B	**Hardness**	**1150**		mg/L	8	5	09/15/2011	SW	1109043

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: BlaineTunnel **Date / Time Sampled:** 08/04/11 16:00 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-B **Matrix:** Water **Lab Number:** C110805-04 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**55600**		ug/L	100	5	09/15/2011	SW	1109037
200.7	**Calcium**	**332000**		ug/L	500	5	09/15/2011	SW	1109037
200.7	**Iron**	**428000**		ug/L	500	5	09/15/2011	SW	1109037
200.7	**Magnesium**	**95400**		ug/L	500	5	09/15/2011	SW	1109037
200.7	**Potassium**	**6970**		ug/L	1250	5	09/15/2011	SW	1109037
200.7	**Sodium**	**4310**		ug/L	1250	5	09/15/2011	SW	1109037
200.7	**Zinc**	**67200**		ug/L	50.0	5	09/15/2011	SW	1109037
200.8	Antimony	< 5.00	U	ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Arsenic**	**37.9**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	Barium	< 50.0	U	ug/L	25.0	5	09/15/2011	SV	1109037
200.8	**Beryllium**	**9.70**		ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Cadmium**	**387**		ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Chromium**	**42.1**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Cobalt**	**56.8**		ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Copper**	**5370**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Lead**	**237**		ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Manganese**	**31400**		ug/L	1.00	5	09/15/2011	SV	1109037
200.8	**Molybdenum**	**4.70**		ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Nickel**	**95.6**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Selenium**	**12.4**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Silver**	**0.953**	J	ug/L	0.500	5	09/15/2011	SV	1109037
200.8	**Thallium**	**10.3**		ug/L	2.50	5	09/15/2011	SV	1109037
200.8	**Vanadium**	**65.9**		ug/L	5.00	5	09/15/2011	SV	1109037

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: ArgentineShaft **Date / Time Sampled:** 08/04/11 13:30 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-C **Matrix:** Water **Lab Number:** C110805-02 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	08/15/2011	ZZZ	1108056
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	08/15/2011	ZZZ	1108056
EPA 300.0	**Sulfate as SO4**	**149**		mg/L	2.0	1	08/15/2011	ZZZ	1108056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: BlaineTunnel **Date / Time Sampled:** 08/04/11 16:00 **Workorder:** C110805
EPA Tag No.: No Tag Prefix-C **Matrix:** Water **Lab Number:** C110805-05 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 0.5	U	mg/L	0.2	1	08/15/2011	ZZZ	1108056
EPA 300.0	Chloride	< 2.0	U	mg/L	1.0	1	08/15/2011	ZZZ	1108056
EPA 300.0	**Sulfate as SO4**	**279**		mg/L	2.0	1	08/15/2011	ZZZ	1108056

"J" Qualifier indicates an estimated value

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1109044 - No Lab Prep Reqd			***Water***						**ICPMS-PE DRC-II**
Method Blank (1109044-BLK1)		Dilution Factor: 1				Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	< 0.100	0.200	ug/L						
Vanadium	< 1.00	2.00	"						
Chromium	< 0.500	1.00	"						
Manganese	< 0.200	0.500	"						
Cobalt	< 0.100	0.200	"						
Nickel	< 0.500	1.00	"						
Copper	< 0.500	1.00	"						
Arsenic	< 0.500	2.00	"						
Selenium	< 0.500	1.00	"						
Molybdenum	< 0.100	0.300	"						
Silver	< 0.100	2.00	"						
Cadmium	< 0.100	0.200	"						
Antimony	< 0.500	1.00	"						
Barium	< 5.00	10.0	"						
Thallium	< 0.500	1.00	"						
Lead	< 0.100	0.200	"						
Method Blank Spike (1109044-BS1)		Dilution Factor: 1				Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	103	0.200	ug/L	100		103	85-115		
Vanadium	97.1	2.00	"	100		97	85-115		
Chromium	98.0	1.00	"	100		98	85-115		
Manganese	98.1	0.500	"	100		98	85-115		
Cobalt	98.2	0.200	"	100		98	85-115		
Nickel	98.8	1.00	"	100		99	85-115		
Copper	95.2	1.00	"	100		95	85-115		
Arsenic	103	2.00	"	100		103	85-115		
Selenium	508	1.00	"	500		102	85-115		
Molybdenum	99.4	0.300	"	100		99	85-115		
Silver	99.9	2.00	"	100		100	85-115		
Cadmium	103	0.200	"	100		103	85-115		
Antimony	102	1.00	"	100		102	85-115		
Barium	99.6	10.0	"	100		100	85-115		
Thallium	108	1.00	"	100		108	85-115		
Lead	106	0.200	"	100		106	85-115		

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109044 - No Lab Prep Reqd			*Water*						ICPMS-PE DRC-II
Duplicate (1109044-DUP1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	0.543	0.200	ug/L		0.546			0.5	20
Vanadium	1.47	2.00	"		1.46			0.6	20
Chromium	0.768	1.00	"		0.846			10	20
Manganese	514	0.500	"		514			0.007	20
Cobalt	32.2	0.200	"		31.8			1	20
Nickel	12.7	1.00	"		12.5			2	20
Copper	602	1.00	"		598			0.7	20
Arsenic	2010	2.00	"		1990			0.7	20
Selenium	1.16	1.00	"		1.06			9	20
Molybdenum	0.282	0.300	"		0.287			2	20
Silver	< 0.100	2.00	"		< 0.100				20
Cadmium	31.4	0.200	"		30.7			2	20
Antimony	21.2	1.00	"		20.6			3	20
Barium	6.24	10.0	"		6.16			1	20
Thallium	< 0.500	1.00	"		< 0.500				20
Lead	1110	0.200	"		1020			9	20
Matrix Spike (1109044-MS1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	106	0.200	ug/L	100	0.546	106	75-125		
Vanadium	94.8	2.00	"	100	1.46	93	75-125		
Chromium	94.0	1.00	"	100	0.846	93	75-125		
Manganese	593	0.500	"	100	514	79	75-125		
Cobalt	125	0.200	"	100	31.8	93	75-125		
Nickel	105	1.00	"	100	12.5	92	75-125		
Copper	669	1.00	"	100	598	72	75-125		
Arsenic	2040	2.00	"	100	1990	44	75-125		
Selenium	513	1.00	"	500	1.06	102	75-125		
Molybdenum	101	0.300	"	100	0.287	100	75-125		
Silver	63.8	2.00	"	100	< 0.100	64	75-125		
Cadmium	137	0.200	"	100	30.7	106	75-125		
Antimony	127	1.00	"	100	20.6	106	75-125		
Barium	110	10.0	"	100	6.16	104	75-125		
Thallium	115	1.00	"	100	< 0.500	115	75-125		
Lead	1150	0.200	"	100	1020	129	75-125		

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109044 - No Lab Prep Reqd			*Water*						**ICPMS-PE DRC-II**
Matrix Spike Dup (1109044-MSD1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	103	0.200	ug/L	100	0.546	102	75-125	4	20
Vanadium	93.8	2.00	"	100	1.46	92	75-125	1	20
Chromium	94.0	1.00	"	100	0.846	93	75-125	0.02	20
Manganese	591	0.500	"	100	514	77	75-125	0.4	20
Cobalt	124	0.200	"	100	31.8	92	75-125	0.9	20
Nickel	105	1.00	"	100	12.5	93	75-125	0.4	20
Copper	658	1.00	"	100	598	61	75-125	2	20
Arsenic	2040	2.00	"	100	1990	50	75-125	0.3	20
Selenium	517	1.00	"	500	1.06	103	75-125	0.8	20
Molybdenum	101	0.300	"	100	0.287	101	75-125	0.8	20
Silver	74.3	2.00	"	100	< 0.100	74	75-125	15	20
Cadmium	136	0.200	"	100	30.7	105	75-125	0.9	20
Antimony	127	1.00	"	100	20.6	106	75-125	0.04	20
Barium	109	10.0	"	100	6.16	103	75-125	1	20
Thallium	117	1.00	"	100	< 0.500	117	75-125	1	20
Lead	1150	0.200	"	100	1020	128	75-125	0.07	20
Batch 1109045 - 1109044			*Water*						**ICPMS-PE DRC-II**
Serial Dilution (1109045-SRD1)		Dilution Factor: 5	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Beryllium	< 2.50	5.00	ug/L		0.546				10
Vanadium	< 2.50	5.00	"		1.46				10
Chromium	< 2.50	5.00	"		0.846				10
Manganese	556	5.00	"		514			8	10
Cobalt	33.5	5.00	"		31.8			5	10
Nickel	13.1	5.00	"		12.5			5	10
Copper	615	5.00	"		598			3	10
Arsenic	1960	5.00	"		1990			2	10
Selenium	< 2.50	5.00	"		1.06				10
Molybdenum	< 0.500	1.50	"		0.287				10
Silver	< 0.500	10.0	"		< 0.10				10
Cadmium	31.6	5.00	"		30.7			3	10
Antimony	21.1	5.00	"		20.6			2	10
Barium	6.44	5.00	"		6.16			4	10
Thallium	< 2.50	5.00	"		< 0.50				10
Lead	1070	5.00	"		1020			4	10

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPOE - PE Optima									
Batch 1109043 - No Lab Prep Reqd			*Water*						**ICPOE - PE Optima**
Method Blank (1109043-BLK1)		Dilution Factor: 1				Prepared: 09/14/11	Analyzed: 09/15/11		
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Sodium	< 250	500	"						
Zinc	< 10.0	20.0	"						
Method Blank Spike (1109043-BS1)		Dilution Factor: 1				Prepared: 09/14/11	Analyzed: 09/15/11		
Aluminum	10040	50.0	ug/L	10100		99	85-115		
Calcium	10080	250	"	10100		100	85-115		
Iron	10150	250	"	10100		100	85-115		
Potassium	10290	1000	"	10100		102	85-115		
Magnesium	10180	250	"	10100		101	85-115		
Sodium	10250	500	"	10100		102	85-115		
Zinc	103.3	20.0	"	100		103	85-115		
Duplicate (1109043-DUP1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11	Analyzed: 09/15/11		
Aluminum	2344	50.0	ug/L		2340			0.1	20
Calcium	9683	250	"		9700			0.2	20
Iron	14940	250	"		14880			0.4	20
Potassium	2091	1000	"		2085			0.3	20
Magnesium	1738	250	"		1738			0.02	20
Sodium	2842	500	"		2867			0.9	20
Zinc	2321	20.0	"		2331			0.4	20
Matrix Spike (1109043-MS1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11	Analyzed: 09/15/11		
Aluminum	12490	50.0	ug/L	10100	2340	101	75-125		
Calcium	19670	250	"	10100	9700	99	75-125		
Iron	24600	250	"	10100	14880	96	75-125		
Potassium	12570	1000	"	10100	2085	104	75-125		
Magnesium	12120	250	"	10100	1738	103	75-125		
Sodium	13410	500	"	10100	2867	104	75-125		
Zinc	2342	20.0	"	100	2331	11	75-125		

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109043 - No Lab Prep Reqd			*Water*						**ICPOE - PE Optima**
Matrix Spike Dup (1109043-MSD1)		Dilution Factor: 1	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Aluminum	12600	50.0	ug/L	10100	2340	102	75-125	0.8	20
Calcium	19530	250	"	10100	9700	97	75-125	0.7	20
Iron	24390	250	"	10100	14880	94	75-125	0.8	20
Potassium	12590	1000	"	10100	2085	104	75-125	0.2	20
Magnesium	12230	250	"	10100	1738	104	75-125	0.9	20
Sodium	13510	500	"	10100	2867	105	75-125	0.7	20
Zinc	2363	20.0	"	100	2331	32	75-125	0.9	20
Batch 1109047 - 1109043			*Water*						**ICPOE - PE Optima**
Serial Dilution (1109047-SRD1)		Dilution Factor: 5	**Source: C110806-01**			Prepared: 09/14/11 Analyzed: 09/15/11			
Aluminum	2333	250	ug/L		2340			0.3	10
Calcium	9598	1250	"		9700			1	10
Iron	15030	1250	"		14880			1	10
Potassium	2153	5000	"		2085			3	10
Magnesium	1730	1250	"		1738			0.5	10
Sodium	2867	2500	"		2867			0.03	10
Zinc	2283	100	"		2331			2	10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1109037 - 200.2 - TR Metals			***Water***						**ICPMS-PE DRC-II**
Method Blank (1109037-BLK2)		Dilution Factor: 5				Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	< 0.500	1.00	ug/L						
Vanadium	< 5.00	10.0	"						
Chromium	2.774	5.00	"						
Manganese	< 1.00	2.50	"						
Cobalt	< 0.500	1.00	"						
Nickel	< 2.50	5.00	"						
Copper	< 2.50	5.00	"						
Arsenic	< 2.50	10.0	"						
Selenium	< 2.50	5.00	"						
Molybdenum	< 0.500	1.50	"						
Silver	< 0.500	10.0	"						
Cadmium	< 0.500	1.00	"						
Antimony	< 2.50	5.00	"						
Barium	< 25.0	50.0	"						
Thallium	< 2.50	5.00	"						
Lead	< 0.500	1.00	"						
Duplicate (1109037-DUP2)		Dilution Factor: 5	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	< 0.500	1.00	ug/L		0.5634				20
Vanadium	< 5.00	10.0	"		< 5.00				20
Chromium	7.262	5.00	"		5.942			20	20
Manganese	552.3	2.50	"		562.0			2	20
Cobalt	33.33	1.00	"		33.80			1	20
Nickel	12.64	5.00	"		13.40			6	20
Copper	612.9	5.00	"		617.0			0.7	20
Arsenic	9130	10.0	"		9259			1	20
Selenium	< 2.50	5.00	"		< 2.50				20
Molybdenum	0.5816	1.50	"		0.5730			1	20
Silver	< 0.500	10.0	"		< 0.500				20
Cadmium	30.86	1.00	"		31.95			3	20
Antimony	41.31	5.00	"		41.66			0.8	20
Barium	< 25.0	50.0	"		< 25.0				20
Thallium	< 2.50	5.00	"		< 2.50				20
Lead	1271	1.00	"		1267			0.4	20

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109037 - 200.2 - TR Metals			*Water*						**ICPMS-PE DRC-II**
Matrix Spike (1109037-MS2)		Dilution Factor: 5	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	180.3	1.00	ug/L	200	0.5634	90	75-125		
Vanadium	283.5	10.0	"	300	< 5.00	95	75-125		
Chromium	384.8	5.00	"	400	5.942	95	75-125		
Manganese	741.0	2.50	"	200	562.0	90	75-125		
Cobalt	222.1	1.00	"	200	33.80	94	75-125		
Nickel	494.9	5.00	"	500	13.40	96	75-125		
Copper	912.5	5.00	"	300	617.0	98	75-125		
Arsenic	9852	10.0	"	800	9259	74	75-125		
Selenium	1932	5.00	"	2000	< 2.50	97	75-125		
Molybdenum	400.8	1.50	"	400	0.5730	100	75-125		
Silver	65.37	10.0	"	75.0	< 0.500	87	75-125		
Cadmium	235.4	1.00	"	200	31.95	102	75-125		
Antimony	860.1	5.00	"	800	41.66	102	75-125		
Barium	202.5	50.0	"	200	< 25.0	101	75-125		
Thallium	2118	5.00	"	2000	< 2.50	106	75-125		
Lead	2274	1.00	"	1000	1267	101	75-125		
Matrix Spike Dup (1109037-MSD2)		Dilution Factor: 5	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	177.1	1.00	ug/L	200	0.5634	88	75-125	2	20
Vanadium	286.0	10.0	"	300	< 5.00	95	75-125	0.8	20
Chromium	383.0	5.00	"	400	5.942	94	75-125	0.4	20
Manganese	749.2	2.50	"	200	562.0	94	75-125	1	20
Cobalt	224.0	1.00	"	200	33.80	95	75-125	0.9	20
Nickel	494.4	5.00	"	500	13.40	96	75-125	0.09	20
Copper	909.2	5.00	"	300	617.0	97	75-125	0.4	20
Arsenic	10260	10.0	"	800	9259	125	75-125	4	20
Selenium	2000	5.00	"	2000	< 2.50	100	75-125	3	20
Molybdenum	397.4	1.50	"	400	0.5730	99	75-125	0.8	20
Silver	66.97	10.0	"	75.0	< 0.500	89	75-125	2	20
Cadmium	235.8	1.00	"	200	31.95	102	75-125	0.2	20
Antimony	867.4	5.00	"	800	41.66	103	75-125	0.8	20
Barium	205.1	50.0	"	200	< 25.0	103	75-125	1	20
Thallium	2177	5.00	"	2000	< 2.50	109	75-125	3	20
Lead	2339	1.00	"	1000	1267	107	75-125	3	20

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109037 - 200.2 - TR Metals			*Water*						**ICPMS-PE DRC-II**
Post Spike (1109037-PS2)		Dilution Factor: 5	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	97.62		ug/L	100	0.5634	97	80-120		
Vanadium	91.28		"	100	-3.562	95	80-120		
Chromium	103.0		"	100	5.942	97	80-120		
Manganese	642.1		"	100	562.0	80	80-120		
Cobalt	126.8		"	100	33.80	93	80-120		
Nickel	108.3		"	100	13.40	95	80-120		
Copper	698.7		"	100	617.0	82	80-120		
Arsenic	9186		"	100	9259	NR	80-120		
Selenium	495.8		"	500	1.981	99	80-120		
Molybdenum	100.6		"	100	0.5730	100	80-120		
Silver	90.46		"	100	0.2586	90	80-120		
Cadmium	134.4		"	100	31.95	102	80-120		
Antimony	144.1		"	100	41.66	102	80-120		
Barium	105.1		"	100	6.258	99	80-120		
Thallium	129.3		"	100	0.3264	129	80-120		
Lead	1369		"	100	1267	102	80-120		
Reference (1109037-SRM2)		Dilution Factor: 2				Prepared: 09/13/11	Analyzed: 09/15/11		
Beryllium	907.8	4.00	ug/L	1000		91	80-120		
Vanadium	960.1	40.0	"	1000		96	80-120		
Chromium	976.2	20.0	"	1000		98	80-120		
Manganese	966.9	10.0	"	1000		97	80-120		
Cobalt	978.9	4.00	"	1000		98	80-120		
Nickel	983.1	20.0	"	1000		98	80-120		
Copper	1013	20.0	"	1000		101	80-120		
Arsenic	2072	40.0	"	2000		104	80-120		
Selenium	1017	20.0	"	1000		102	80-120		
Molybdenum	996.1	6.00	"	1000		100	80-120		
Silver	195.9	40.0	"	250		78	80-120		
Cadmium	1028	4.00	"	1000		103	80-120		
Antimony	2034	20.0	"	2000		102	80-120		
Barium	1003	200	"	1000		100	80-120		
Thallium	5227	20.0	"	5000		105	80-120		
Lead	2106	4.00	"	2000		105	80-120		

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109046 - 1109037			*Water*						**ICPMS-PE DRC-II**
Serial Dilution (1109046-SRD1)		Dilution Factor: 2	**Source: C110806-02**			Prepared: 09/13/11 Analyzed: 09/15/11			
Beryllium	< 12.5	25.0	ug/L		0.5634				10
Vanadium	< 12.5	25.0	"		< 2.50				10
Chromium	< 12.5	25.0	"		5.942				10
Manganese	563.3	25.0	"		562.0			0.2	10
Cobalt	34.59	25.0	"		33.80			2	10
Nickel	13.65	25.0	"		13.40			2	10
Copper	639.2	25.0	"		617.0			4	10
Arsenic	9132	25.0	"		9259			1	10
Selenium	< 12.5	25.0	"		< 2.50				10
Molybdenum	< 2.50	7.50	"		0.5730				200
Silver	< 2.50	50.0	"		< 0.50				10
Cadmium	28.94	25.0	"		31.95			10	10
Antimony	40.17	25.0	"		41.66			4	10
Barium	< 12.5	25.0	"		< 2.50				10
Thallium	< 12.5	25.0	"		< 2.50				10
Lead	1253	25.0	"		1267			1	10

ICPOE - PE Optima

Batch 1109037 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Method Blank (1109037-BLK1)		Dilution Factor: 1				Prepared: 09/13/11 Analyzed: 09/15/11			
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Sodium	< 250	500	"						
Zinc	< 10.0	20.0	"						

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Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109037 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Duplicate (1109037-DUP1)		Dilution Factor: 1	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Aluminum	2369	50.0	ug/L		2384			0.6	20
Calcium	9449	250	"		9548			1	20
Iron	22810	250	"		22880			0.3	20
Potassium	2067	1000	"		2085			0.9	20
Magnesium	1708	250	"		1726			1	20
Sodium	2804	500	"		2827			0.8	20
Zinc	2162	20.0	"		2198			2	20
Matrix Spike (1109037-MS1)		Dilution Factor: 1	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Aluminum	4364	50.0	ug/L	2000	2384	99	75-125		
Calcium	10530	250	"	1000	9548	99	75-125		
Iron	25890	250	"	3000	22880	100	75-125		
Potassium	12310	1000	"	10000	2085	102	75-125		
Magnesium	3770	250	"	2000	1726	102	75-125		
Sodium	5979	500	"	3000	2827	105	75-125		
Zinc	2366	20.0	"	200	2198	84	75-125		
Matrix Spike Dup (1109037-MSD1)		Dilution Factor: 1	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Aluminum	4361	50.0	ug/L	2000	2384	99	75-125	0.08	20
Calcium	10530	250	"	1000	9548	99	75-125	0.008	20
Iron	25990	250	"	3000	22880	104	75-125	0.4	20
Potassium	12230	1000	"	10000	2085	101	75-125	0.7	20
Magnesium	3753	250	"	2000	1726	101	75-125	0.4	20
Sodium	5952	500	"	3000	2827	104	75-125	0.5	20
Zinc	2359	20.0	"	200	2198	81	75-125	0.3	20
Post Spike (1109037-PS1)		Dilution Factor: 1	**Source: C110806-02**			Prepared: 09/13/11	Analyzed: 09/15/11		
Aluminum	12460		ug/L	10100	2384	100	80-120		
Calcium	19650		"	10100	9548	100	80-120		
Iron	32860		"	10100	22880	99	80-120		
Potassium	12540		"	10100	2085	103	80-120		
Magnesium	12010		"	10100	1726	102	80-120		
Sodium	13430		"	10100	2827	105	80-120		
Zinc	2227		"	100	2198	28	80-120		

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TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1109037 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Reference (1109037-SRM1)		Dilution Factor: 1				Prepared: 09/13/11 Analyzed: 09/15/11			
Aluminum	981.3	50.0	ug/L	1000		98	80-120		
Calcium	917.8	250	"	1000		92	80-120		
Iron	934.3	250	"	1000		93	80-120		
Potassium	4924	1000	"	5000		98	80-120		
Magnesium	996.4	250	"	1000		100	80-120		
Sodium	963.6	500	"	1000		96	80-120		
Zinc	1008	20.0	"	1000		101	80-120		
Batch 1109048 - 1109037			*Water*						**ICPOE - PE Optima**
Serial Dilution (1109048-SRD1)		Dilution Factor: 5	**Source: C110806-02**			Prepared: 09/13/11 Analyzed: 09/15/11			
Aluminum	2424	250	ug/L		2384			2	10
Calcium	9671	1250	"		9548			1	10
Iron	23470	1250	"		22880			3	10
Potassium	2054	5000	"		2085			2	10
Magnesium	1765	1250	"		1726			2	10
Sodium	2887	2500	"		2827			2	10
Zinc	2280	100	"		2198			4	10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Classical Chemistry by EPA/ASTM/APHA Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ESAT Dionex IC									
Batch 1108056 - No Prep Req			***Water***						**ESAT Dionex IC**
Method Blank (1108056-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 08/15/11			
Chloride	< 1.0	2.0	mg/L						
Bromide	< 0.2	0.5	"						
Sulfate as SO4	< 2.0	5.0	"						
Method Blank Spike (1108056-BS1)		Dilution Factor: 1				Prepared & Analyzed: 08/15/11			
Chloride	24.1	2.0	mg/L	25.0		96	80-120		
Bromide	9.9	0.5	"				80-120		
Sulfate as SO4	23.5	5.0	"	25.0		94	80-120		
Duplicate (1108056-DUP1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Chloride	< 1.0	2.0	mg/L		< 1.0				20
Bromide	< 0.2	0.5	"		< 0.2				20
Sulfate as SO4	149	5.0	"		149			0.3	20
Matrix Spike (1108056-MS1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Chloride	24.4	2.0	mg/L	25.0	< 1.0	98	80-120		
Bromide	10.2	0.5	"		< 0.2		80-120		
Sulfate as SO4	171	5.0	"	25.0	149	85	80-120		
Matrix Spike Dup (1108056-MSD1)		Dilution Factor: 1	**Source: C110805-02**			Prepared & Analyzed: 08/15/11			
Chloride	24.5	2.0	mg/L	25.0	< 1.0	98	80-120	0.3	20
Bromide	10.0	0.5	"		< 0.2		80-120	2	20
Sulfate as SO4	172	5.0	"	25.0	149	91	80-120	0.8	20

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography

Instrument: **ESAT Dionex IC** Work Order: Nu C110805

Analytical Sequence: 1108079 **Dissolved** Concentration Units: mg/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Chloride	0.00	1	2	3	4	1108056-BLK1	NA	2.00
		0.00				0.00	NA	
		5	6	7	8			
Bromide	0.00	1	2	3	4	1108056-BLK1	NA	0.50
		0.00				0.00	NA	
		5	6	7	8			
Sulfate as SO4	0.00	1	2	3	4	1108056-BLK1	NA	5.00
		0.00				0.00	NA	
		5	6	7	8			

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

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TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110805

Analytical Sequence: 1109045 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	-0.06	1	2	3	4	1109044-BLK1	NA	0.20
		-0.06	-0.04			-0.03	NA	
		5	6	7	8			
Vanadium	-0.02	1	2	3	4	1109044-BLK1	NA	2.00
		-0.01	-0.01			0.03	NA	
		5	6	7	8			
Chromium	-0.05	1	2	3	4	1109044-BLK1	NA	1.00
		0.01	-0.08			0.06	NA	
		5	6	7	8			
Manganese	0.03	1	2	3	4	1109044-BLK1	NA	0.50
		0.01	0.08			0.01	NA	
		5	6	7	8			
Cobalt	0.01	1	2	3	4	1109044-BLK1	NA	0.20
		0.00	0.01			0.01	NA	
		5	6	7	8			
Nickel	0.01	1	2	3	4	1109044-BLK1	NA	1.00
		0.00	0.00			0.02	NA	
		5	6	7	8			
Copper	0.05	1	2	3	4	1109044-BLK1	NA	1.00
		0.06	0.10			0.03	NA	
		5	6	7	8			
Arsenic	0.09	1	2	3	4	1109044-BLK1	NA	2.00
		0.08	0.11			0.06	NA	
		5	6	7	8			

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110805

Analytical Sequence: 1109045 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Selenium	0.14	1	2	3	4	1109044-BLK1	NA	1.00
		0.33	-0.03			0.17	NA	
		5	6	7	8			
Molybdenum	0.17	1	2	3	4	1109044-BLK1	NA	0.30
		0.28	0.15			0.08	NA	
		5	6	7	8			
Silver	0.51	1	2	3	4	1109044-BLK1	NA	2.00
		0.42	1.09			-0.02	NA	
		5	6	7	8			
Cadmium	-0.01	1	2	3	4	1109044-BLK1	NA	0.20
		-0.02	0.05			-0.04	NA	
		5	6	7	8			
Antimony	0.02	1	2	3	4	1109044-BLK1	NA	1.00
		0.05	0.06			0.12	NA	
		5	6	7	8			
Barium	0.02	1	2	3	4	1109044-BLK1	NA	10.00
		0.01	0.01			0.01	NA	
		5	6	7	8			
Thallium	0.00	1	2	3	4	1109044-BLK1	NA	1.00
		0.00	0.00			0.02	NA	
		5	6	7	8			
Lead	0.01	1	2	3	4	1109044-BLK1	NA	0.20
		0.01	0.01			0.02	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110805

Analytical Sequence: 1109046 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	-0.06	1	2	3	4	NA	1109037-BLK2	0.20
		-0.06	-0.04	-0.05		NA	-0.03	
		5	6	7	8			
Vanadium	-0.02	1	2	3	4	NA	1109037-BLK2	2.00
		-0.01	-0.01	-0.05		NA	-0.67	
		5	6	7	8			
Chromium	-0.05	1	2	3	4	NA	1109037-BLK2	1.00
		0.01	-0.08	-0.14		NA	0.55	
		5	6	7	8			
Manganese	0.03	1	2	3	4	NA	1109037-BLK2	0.50
		0.01	0.08	0.12		NA	0.13	
		5	6	7	8			
Cobalt	0.01	1	2	3	4	NA	1109037-BLK2	0.20
		0.00	0.01	0.01		NA	0.00	
		5	6	7	8			
Nickel	0.01	1	2	3	4	NA	1109037-BLK2	1.00
		0.00	0.00	0.01		NA	0.02	
		5	6	7	8			
Copper	0.05	1	2	3	4	NA	1109037-BLK2	1.00
		0.06	0.10	0.10		NA	0.31	
		5	6	7	8			
Arsenic	0.09	1	2	3	4	NA	1109037-BLK2	2.00
		0.08	0.11	0.13		NA	-0.25	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C110805

Analytical Sequence: 1109046 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Selenium	0.14	1	2	3	4	NA	1109037-BLK2	1.00
		0.33	-0.03	0.15		NA	0.06	
		5	6	7	8			
Molybdenum	0.17	1	2	3	4	NA	1109037-BLK2	0.30
		0.28	0.15	0.14		NA	-0.01	
		5	6	7	8			
Silver	0.51	1	2	3	4	NA	1109037-BLK2	2.00
		0.42	1.09	0.63		NA	-0.05	
		5	6	7	8			
Cadmium	-0.01	1	2	3	4	NA	1109037-BLK2	0.20
		-0.02	0.05	0.05		NA	0.09	
		5	6	7	8			
Antimony	0.02	1	2	3	4	NA	1109037-BLK2	1.00
		0.05	0.06	0.06		NA	0.03	
		5	6	7	8			
Barium	0.02	1	2	3	4	NA	1109037-BLK2	10.00
		0.01	0.01	0.01		NA	0.20	
		5	6	7	8			
Thallium	0.00	1	2	3	4	NA	1109037-BLK2	1.00
		0.00	0.00	0.24		NA	0.01	
		5	6	7	8			
Lead	0.01	1	2	3	4	NA	1109037-BLK2	0.20
		0.01	0.01	0.01		NA	0.06	
		5	6	7	8			

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C110805

Analytical Sequence: 1109047 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-0.52	1	2	3	4	1109043-BLK1	NA	50.00
		1.14	-1.77			-0.43	NA	
		5	6	7	8			
Calcium	-0.69	1	2	3	4	1109043-BLK1	NA	250.00
		1.87	1.24			-10.43	NA	
		5	6	7	8			
Iron	-1.48	1	2	3	4	1109043-BLK1	NA	250.00
		26.10	13.13			11.25	NA	
		5	6	7	8			
Potassium	18.24	1	2	3	4	1109043-BLK1	NA	1,000.00
		7.01	5.74			14.83	NA	
		5	6	7	8			
Magnesium	0.28	1	2	3	4	1109043-BLK1	NA	250.00
		1.15	0.91			-0.12	NA	
		5	6	7	8			
Sodium	-1.30	1	2	3	4	1109043-BLK1	NA	500.00
		6.41	0.53			1.66	NA	
		5	6	7	8			
Zinc	-1.71	1	2	3	4	1109043-BLK1	NA	20.00
		-1.16	0.03			-2.32	NA	
		5	6	7	8			

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C110805

Analytical Sequence: 1109048 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-0.52	1	2	3	4	1109037-BLK1	NA	50.00
		1.14	-1.77	-0.68		-0.70	NA	
		5	6	7	8			
Calcium	-0.69	1	2	3	4	1109037-BLK1	NA	250.00
		1.87	1.24	1.90		-12.64	NA	
		5	6	7	8			
Iron	-1.48	1	2	3	4	1109037-BLK1	NA	250.00
		26.10	13.13	26.10		13.36	NA	
		5	6	7	8			
Potassium	18.24	1	2	3	4	1109037-BLK1	NA	1,000.00
		7.01	5.74	7.13		24.89	NA	
		5	6	7	8			
Magnesium	0.28	1	2	3	4	1109037-BLK1	NA	250.00
		1.15	0.91	1.29		-0.35	NA	
		5	6	7	8			
Sodium	-1.30	1	2	3	4	1109037-BLK1	NA	500.00
		6.41	0.53	-1.23		2.36	NA	
		5	6	7	8			
Zinc	-1.71	1	2	3	4	1109037-BLK1	NA	20.00
		-1.16	0.03	0.89		4.66	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ESAT Dionex IC Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography 2010

Sequence: 1108079 Work Order: C110805 Units: mg/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Bromide	50.1	49.4	98.6		1			2			3	
				10.0	10.0	100.0						
					4			5			6	
					7			8			9	
Chloride	15.1	14.5	96.0		1			2			3	
				40.0	40.1	100.3						
					4			5			6	
					7			8			9	
Sulfate as SO4	75.2	78.5	104.4		1			2			3	
				100	101	101.0						
					4			5			6	
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1109045 Work Order: C110805 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.3	98.6		1			2			3	
				50.0	49.6	99.2	50.0	49.9	99.8			
					4			5			6	
					7			8			9	
Arsenic	50.0	50.5	101.0		1			2			3	
				50.0	49.8	99.6	50.0	50.7	101.4			
					4			5			6	
					7			8			9	
Barium	50.0	50.4	100.8		1			2			3	
				50.0	48.8	97.6	50.0	49.4	98.8			
					4			5			6	
					7			8			9	
Beryllium	50.0	49.3	98.6		1			2			3	
				50.0	51.5	103.0	50.0	49.4	98.8			
					4			5			6	
					7			8			9	
Cadmium	50.0	50.3	100.6		1			2			3	
				50.0	50.9	101.8	50.0	51.6	103.2			
					4			5			6	
					7			8			9	
Chromium	50.0	49.2	98.4		1			2			3	
				50.0	49.8	99.6	50.0	50.4	100.8			
					4			5			6	
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1109045 Work Order: C110805 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	49.3	98.6		1			2			3	
				50.0	48.7	97.4	50.0	50.3	100.6			
					4			5			6	
					7			8			9	
Copper	50.0	49.8	99.6		1			2			3	
				50.0	49.3	98.6	50.0	49.7	99.4			
					4			5			6	
					7			8			9	
Lead	50.0	49.6	99.2		1			2			3	
				50.0	50.4	100.8	50.0	52.8	105.6			
					4			5			6	
					7			8			9	
Manganese	50.0	48.6	97.2		1			2			3	
				50.0	49.3	98.6	50.0	50.4	100.8			
					4			5			6	
					7			8			9	
Molybdenum	50.0	50.1	100.2		1			2			3	
				50.0	50.1	100.2	50.0	50.2	100.4			
					4			5			6	
					7			8			9	
Nickel	50.0	49.7	99.4		1			2			3	
				50.0	50.5	101.0	50.0	50.9	101.8			
					4			5			6	
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1109045 Work Order: C110805 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Selenium	250	251	100.4		1			2			3	
				50.0	49.9	99.8	50.0	50.0	100.0			
					4			5			6	
					7			8			9	
Silver	50.0	50.2	100.4		1			2			3	
				50.0	49.9	99.8	50.0	50.1	100.2			
					4			5			6	
					7			8			9	
Thallium	50.0	51.6	103.2		1			2			3	
				50.0	51.7	103.4	50.0	53.6	107.2			
					4			5			6	
					7			8			9	
Vanadium	50.0	48.6	97.2		1			2			3	
				50.0	48.5	97.0	50.0	49.4	98.8			
					4			5			6	
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1109046 Work Order: C110805 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.26	98.5		1			2			3	
				50.0	49.64	99.3	50.0	49.88	99.8	50.0	50.21	100.4
					4			5			6	
					7			8			9	
Arsenic	50.0	50.47	100.9		1			2			3	
				50.0	49.82	99.6	50.0	50.69	101.4	50.0	50.64	101.3
					4			5			6	
					7			8			9	
Barium	50.0	50.41	100.8		1			2			3	
				50.0	48.77	97.5	50.0	49.45	98.9	50.0	49.90	99.8
					4			5			6	
					7			8			9	
Beryllium	50.0	49.33	98.7		1			2			3	
				50.0	51.53	103.1	50.0	49.36	98.7	50.0	50.52	101.0
					4			5			6	
					7			8			9	
Cadmium	50.0	50.35	100.7		1			2			3	
				50.0	50.87	101.7	50.0	51.55	103.1	50.0	52.04	104.1
					4			5			6	
					7			8			9	
Chromium	50.0	49.19	98.4		1			2			3	
				50.0	49.80	99.6	50.0	50.43	100.9	50.0	49.97	99.9
					4			5			6	
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1109046 Work Order: C110805 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	49.35	98.7		1			2			3	
				50.0	48.74	97.5	50.0	50.29	100.6	50.0	49.11	98.2
					4			5			6	
					7			8			9	
Copper	50.0	49.81	99.6		1			2			3	
				50.0	49.27	98.5	50.0	49.72	99.4	50.0	50.18	100.4
					4			5			6	
					7			8			9	
Lead	50.0	49.63	99.3		1			2			3	
				50.0	50.36	100.7	50.0	52.84	105.7	50.0	54.18	108.4
					4			5			6	
					7			8			9	
Manganese	50.0	48.57	97.1		1			2			3	
				50.0	49.31	98.6	50.0	50.43	100.9	50.0	49.82	99.6
					4			5			6	
					7			8			9	
Molybdenum	50.0	50.09	100.2		1			2			3	
				50.0	50.12	100.2	50.0	50.16	100.3	50.0	50.12	100.2
					4			5			6	
					7			8			9	
Nickel	50.0	49.66	99.3		1			2			3	
				50.0	50.51	101.0	50.0	50.94	101.9	50.0	50.46	100.9
					4			5			6	
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1109046 Work Order: C110805 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Selenium	250	250.9	100.4		1			2			3	
				50.0	49.89	99.8	50.0	49.99	100.0	50.0	50.81	101.6
					4			5			6	
					7			8			9	
Silver	50.0	50.24	100.5		1			2			3	
				50.0	49.92	99.8	50.0	50.08	100.2	50.0	49.41	98.8
					4			5			6	
					7			8			9	
Thallium	50.0	51.55	103.1		1			2			3	
				50.0	51.73	103.5	50.0	53.58	107.2	50.0	54.27	108.5
					4			5			6	
					7			8			9	
Vanadium	50.0	48.63	97.3		1			2			3	
				50.0	48.51	97.0	50.0	49.41	98.8	50.0	48.96	97.9
					4			5			6	
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Sequence: 1109047 Work Order: C110805 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	991.0	99.1		1			2			3	
				12500	12710	101.7	12500	12640	101.1			
					4			5			6	
					7			8			9	
Calcium	1000	948.0	94.8		1			2			3	
				12500	12580	100.6	12500	12440	99.5			
					4			5			6	
					7			8			9	
Iron	1000	948.0	94.8		1			2			3	
				12500	12760	102.1	12500	12590	100.7			
					4			5			6	
					7			8			9	
Magnesium	1000	1008	100.8		1			2			3	
				12500	12780	102.2	12500	12680	101.4			
					4			5			6	
					7			8			9	
Potassium	5000	4950	99.0		1			2			3	
				25000	25330	101.3	25000	25190	100.8			
					4			5			6	
					7			8			9	
Sodium	1000	962.3	96.2		1			2			3	
				12500	12740	101.9	12500	12750	102.0			
					4			5			6	
					7			8			9	

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Sequence: 1109047 Work Order: C110805 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Zinc	1000	1028	102.8	1			2			3		
				2500	2553	102.1	2500	2548	101.9			
				4			5			6		
				7			8			9		

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Sequence: 1109048 Work Order: C110805 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	991.0	99.1		1			2			3	
				12500	12710	101.7	12500	12640	101.1	12500	12650	101.2
					4			5			6	
					7			8			9	
Calcium	1000	948.0	94.8		1			2			3	
				12500	12580	100.6	12500	12440	99.5	12500	12400	99.2
					4			5			6	
					7			8			9	
Iron	1000	948.0	94.8		1			2			3	
				12500	12760	102.1	12500	12590	100.7	12500	12520	100.2
					4			5			6	
					7			8			9	
Magnesium	1000	1008	100.8		1			2			3	
				12500	12780	102.2	12500	12680	101.4	12500	12680	101.4
					4			5			6	
					7			8			9	
Potassium	5000	4950	99.0		1			2			3	
				25000	25330	101.3	25000	25190	100.8	25000	25240	101.0
					4			5			6	
					7			8			9	
Sodium	1000	962.3	96.2		1			2			3	
				12500	12740	101.9	12500	12750	102.0	12500	12830	102.6
					4			5			6	
					7			8			9	

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Sequence: 1109048 Work Order: C110805 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
					1			2			3	
				2500	2553	102.1	2500	2548	101.9	2500	2547	101.9
Zinc	1000	1028	102.8		4			5			6	
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1109045	Analysis: ICPMS Diss. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.0	ug/L			2.00
	IFB1	21.0	ug/L	20	105	2.00
Barium	IFA1	0.3	ug/L			10.0
	IFB1	0.4	ug/L			10.0
Beryllium	IFA1	-0.1	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	20.2	ug/L	20	101	0.200
Chromium	IFA1	0.6	ug/L			1.00
	IFB1	21.1	ug/L	20	105	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	19.8	ug/L	20	99	0.200
Copper	IFA1	0.6	ug/L			1.00
	IFB1	21.1	ug/L	20	105	1.00
Lead	IFA1	0.1	ug/L			0.200
	IFB1	0.1	ug/L			0.200
Manganese	IFA1	-0.3	ug/L			0.500
	IFB1	19.7	ug/L	20	98	0.500
Molybdenum	IFA1	205.0	ug/L	200	103	0.200
	IFB1	207.4	ug/L	200	104	0.200
Nickel	IFA1	-0.1	ug/L			1.00
	IFB1	20.3	ug/L	20	102	1.00
Selenium	IFA1	0.5	ug/L			1.00
	IFB1	0.3	ug/L			1.00
Silver	IFA1	-0.3	ug/L			1.00
	IFB1	17.0	ug/L	20	85	1.00
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	0.0	ug/L			2.00
	IFB1	-0.1	ug/L			2.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1109046	Analysis: ICP-MS Tot. Rec. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.0	ug/L			2.00
	IFB1	21.0	ug/L	20	105	2.00
Barium	IFA1	0.3	ug/L			10.0
	IFB1	0.4	ug/L			10.0
Beryllium	IFA1	-0.1	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	20.2	ug/L	20	101	0.200
Chromium	IFA1	0.6	ug/L			1.00
	IFB1	21.1	ug/L	20	105	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	19.8	ug/L	20	99	0.200
Copper	IFA1	0.6	ug/L			1.00
	IFB1	21.1	ug/L	20	105	1.00
Lead	IFA1	0.1	ug/L			0.200
	IFB1	0.1	ug/L			0.200
Manganese	IFA1	-0.3	ug/L			0.500
	IFB1	19.7	ug/L	20	98	0.500
Molybdenum	IFA1	205.0	ug/L	200	103	0.200
	IFB1	207.4	ug/L	200	104	0.200
Nickel	IFA1	-0.1	ug/L			1.00
	IFB1	20.3	ug/L	20	102	1.00
Selenium	IFA1	0.5	ug/L			1.00
	IFB1	0.3	ug/L			1.00
Silver	IFA1	-0.3	ug/L			1.00
	IFB1	17.0	ug/L	20	85	1.00
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	0.0	ug/L			2.00
	IFB1	-0.1	ug/L			2.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: Rico-Argentine_Surface Waters_AUG 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPOE - PE Optima

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1109047 Analysis: ICPOE Diss. Metals-2010						
Aluminum	IFA1	59,893.0	ug/L	60,000	100	50.0
	IFB1	60,392.7	ug/L	60,000	101	50.0
Calcium	IFA1	290,276.7	ug/L	300,000	97	250
	IFB1	290,821.5	ug/L	300,000	97	250
Iron	IFA1	225,637.6	ug/L	250,000	90	250
	IFB1	227,571.1	ug/L	250,000	91	250
Magnesium	IFA1	143,607.1	ug/L	150,000	96	250
	IFB1	144,846.1	ug/L	150,000	97	250
Potassium	IFA1	-90.4	ug/L			1000
	IFB1	21,220.2	ug/L	20,000	106	1000
Sodium	IFA1	51,405.9	ug/L	50,000	103	500
	IFB1	51,646.9	ug/L	50,000	103	500
Zinc	IFA1	6.4	ug/L			20.0
	IFB1	289.2	ug/L	300	96	20.0

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Sequence: 1109048 Analysis: ICPOE Tot. Rec Metals-2010						
Aluminum	IFA1	59,893.0	ug/L	60,000	100	50.0
	IFB1	60,392.7	ug/L	60,000	101	50.0
Calcium	IFA1	290,276.7	ug/L	300,000	97	250
	IFB1	290,821.5	ug/L	300,000	97	250
Iron	IFA1	225,637.6	ug/L	250,000	90	250
	IFB1	227,571.1	ug/L	250,000	91	250
Magnesium	IFA1	143,607.1	ug/L	150,000	96	250
	IFB1	144,846.1	ug/L	150,000	97	250
Potassium	IFA1	-90.4	ug/L			1000
	IFB1	21,220.2	ug/L	20,000	106	1000
Sodium	IFA1	51,405.9	ug/L	50,000	103	500
	IFB1	51,646.9	ug/L	50,000	103	500
Zinc	IFA1	6.4	ug/L			20.0
	IFB1	289.2	ug/L	300	96	20.0

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1109045

Analyte	True	Found	%R	Units
Antimony	1.00	1.00	100	ug/L
Arsenic	2.00	2.07	103	ug/L
Barium	0.500	0.560	112	ug/L
Beryllium	0.200	0.180	90	ug/L
Cadmium	0.200	0.211	105	ug/L
Chromium	1.00	0.989	99	ug/L
Cobalt	0.200	0.219	110	ug/L
Copper	1.00	1.11	111	ug/L
Lead	0.200	0.187	93	ug/L
Manganese	0.200	0.211	105	ug/L
Molybdenum	0.200	0.217	109	ug/L
Nickel	1.00	1.02	102	ug/L
Selenium	1.00	1.08	108	ug/L
Silver	0.500	0.414	83	ug/L
Thallium	0.200	0.184	92	ug/L
Vanadium	2.00	1.99	100	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1109047

Analyte	True	Found	%R	Units
Aluminum	100	100.5	101	ug/L
Calcium	250	249.6	100	ug/L
Iron	100	101.9	102	ug/L
Magnesium	1000	1072	107	ug/L
Potassium	1000	1098	110	ug/L
Sodium	1000	1079	108	ug/L
Zinc	50.0	56.26	113	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1109046

Analyte	True	Found	%R	Units
Antimony	1.00	1.005	100	ug/L
Arsenic	2.00	2.069	103	ug/L
Barium	0.500	0.5602	112	ug/L
Beryllium	0.200	0.1798	90	ug/L
Cadmium	0.200	0.2110	105	ug/L
Chromium	1.00	0.9889	99	ug/L
Cobalt	0.200	0.2192	110	ug/L
Copper	1.00	1.106	111	ug/L
Lead	0.200	0.1869	93	ug/L
Manganese	0.200	0.2106	105	ug/L
Molybdenum	0.200	0.2175	109	ug/L
Nickel	1.00	1.020	102	ug/L
Selenium	1.00	1.083	108	ug/L
Silver	0.500	0.4140	83	ug/L
Thallium	0.200	0.1842	92	ug/L
Vanadium	2.00	1.992	100	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1109048

Analyte	True	Found	%R	Units
Aluminum	100	100.5	101	ug/L
Calcium	250	249.6	100	ug/L
Iron	100	101.9	102	ug/L
Magnesium	1000	1072	107	ug/L
Potassium	1000	1098	110	ug/L
Sodium	1000	1079	108	ug/L
Zinc	50.0	56.26	113	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: EPA 300.0 **Dissolved** **Sequence ID#:** 1108079

Instrument ID #: ESAT Dionex IC Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1108079-ICV1	Initial Cal Check	08/15/11	10:46
1108079-ICB1	Initial Cal Blank	08/15/11	11:03
1108056-BLK1	Blank	08/15/11	11:21
1108056-BS1		08/15/11	11:39
C110805-02	ArgentineShaft	08/15/11	11:56
1108056-DUP1	Duplicate	08/15/11	12:14
1108056-MS1	Matrix Spike	08/15/11	12:31
1108056-MSD1	Matrix Spike Dup	08/15/11	12:49
C110805-05	BlaineTunnel	08/15/11	13:06
1108079-CCV1	Calibration Check	08/15/11	13:24
1108079-CCB1	Calibration Blank	08/15/11	13:42

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Dissolved** **Sequence ID#:** 1109045

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1109045-ICV1	Initial Cal Check	09/15/11	10:37
1109045-ICB1	Initial Cal Blank	09/15/11	10:40
1109045-CRL1	Instrument RL Check	09/15/11	10:43
1109045-IFA1	Interference Check A	09/15/11	10:46
1109045-IFB1	Interference Check B	09/15/11	10:49
1109045-CCV1	Calibration Check	09/15/11	10:52
1109045-CCB1	Calibration Blank	09/15/11	10:55
1109044-BLK1	Blank	09/15/11	10:58
1109044-DUP1	Duplicate	09/15/11	11:04
1109045-SRD1	Serial Dilution	09/15/11	11:06
1109044-BS1		09/15/11	11:09
1109044-MS1	Matrix Spike	09/15/11	11:12
1109044-MSD1	Matrix Spike Dup	09/15/11	11:15
C110805-01	ArgentineShaft	09/15/11	11:18
C110805-03	BlaineTunnel	09/15/11	11:20
1109045-CCV2	Calibration Check	09/15/11	11:41
1109045-CCB2	Calibration Blank	09/15/11	11:44

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Total Recoverable** **Sequence ID#:** 1109046

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1109046-ICV1	Initial Cal Check	09/15/11	10:37
1109046-ICB1	Initial Cal Blank	09/15/11	10:40
1109046-CRL1	Instrument RL Check	09/15/11	10:43
1109046-IFA1	Interference Check A	09/15/11	10:46
1109046-IFB1	Interference Check B	09/15/11	10:49
1109046-CCV1	Calibration Check	09/15/11	10:52
1109046-CCB1	Calibration Blank	09/15/11	10:55
1109046-CCV2	Calibration Check	09/15/11	11:41
1109046-CCB2	Calibration Blank	09/15/11	11:44
1109037-BLK2	Blank	09/15/11	11:47
1109037-DUP2	Duplicate	09/15/11	11:53
1109046-SRD1	Serial Dilution	09/15/11	11:56
1109037-SRM2	Reference	09/15/11	11:59
1109037-MS2	Matrix Spike	09/15/11	12:01
1109037-MSD2	Matrix Spike Dup	09/15/11	12:04
1109037-PS2	Post Spike	09/15/11	12:07
C110805-04	BlaineTunnel	09/15/11	12:10
1109046-CCV3	Calibration Check	09/15/11	12:22
1109046-CCB3	Calibration Blank	09/15/11	12:25

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Dissolved** **Sequence ID#:** 1109047

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1109047-ICV1	Initial Cal Check	09/15/11	08:49
1109047-ICB1	Initial Cal Blank	09/15/11	08:52
1109047-CRL1	Instrument RL Check	09/15/11	08:55
1109047-IFA1	Interference Check A	09/15/11	08:58
1109047-IFB1	Interference Check B	09/15/11	09:02
1109047-CCV1	Calibration Check	09/15/11	09:06
1109047-CCB1	Calibration Blank	09/15/11	09:09
1109043-BLK1	Blank	09/15/11	09:12
1109043-BS1		09/15/11	09:15
1109043-DUP1	Duplicate	09/15/11	09:21
1109047-SRD1	Serial Dilution	09/15/11	09:24
1109043-MS1	Matrix Spike	09/15/11	09:27
1109043-MSD1	Matrix Spike Dup	09/15/11	09:30
C110805-01	ArgentineShaft	09/15/11	09:32
C110805-03	BlaineTunnel	09/15/11	09:35
1109047-CCV2	Calibration Check	09/15/11	09:42
1109047-CCB2	Calibration Blank	09/15/11	09:45

Project Name: **Rico-Argentine_Surface Waters_AUG 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Total Recoverable** **Sequence ID#:** 1109048

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1109048-ICV1	Initial Cal Check	09/15/11	08:49
1109048-ICB1	Initial Cal Blank	09/15/11	08:52
1109048-CRL1	Instrument RL Check	09/15/11	08:55
1109048-IFA1	Interference Check A	09/15/11	08:58
1109048-IFB1	Interference Check B	09/15/11	09:02
1109048-CCV1	Calibration Check	09/15/11	09:06
1109048-CCB1	Calibration Blank	09/15/11	09:09
1109048-CCV2	Calibration Check	09/15/11	09:42
1109048-CCB2	Calibration Blank	09/15/11	09:45
1109037-BLK1	Blank	09/15/11	09:48
1109037-SRM1	Reference	09/15/11	09:51
1109037-DUP1	Duplicate	09/15/11	09:57
1109048-SRD1	Serial Dilution	09/15/11	10:00
1109037-MS1	Matrix Spike	09/15/11	10:03
1109037-MSD1	Matrix Spike Dup	09/15/11	10:06
1109037-PS1	Post Spike	09/15/11	10:08
C110805-04	BlaineTunnel	09/15/11	10:11
1109048-CCV3	Calibration Check	09/15/11	10:17
1109048-CCB3	Calibration Blank	09/15/11	10:20

USEPA
DateShipped: 8/9/2011
CarrierName: FedEx
TDF No: DG-220

CHAIN OF CUSTODY RECORD
St. Louis Tunnel - Rico
Contact Name: Jan Christner
Contact Phone: 720.810.0759

110805

No: 8-081011-165652-0002

Lab: ESAT - Region 8 Laboratory
Lab Phone: 303.312.7708

Lab #	Sample #	Location	Analyses	Matrix	Collection Method	Collected	Sample Time	Numb Cont	Container	Preservative	MS/MSD
	ArgentineShaft_080411	ArgentineShaft	Dissolved Metals	Water	Grab	8/4/2011	13:30	1	500 mL poly	HNO3 pH<2	
	ArgentineShaft_080411	ArgentineShaft	Br, Cl, SO4	Water	Grab	8/4/2011	13:30	1	500 mL poly	4 C	
	BlaineTunnel_080411	BlaineTunnel	Br, Cl, SO4	Water	Grab	8/4/2011	16:00	1	500 mL poly	4 C	
	BlaineTunnel_080411	BlaineTunnel	Dissolved Metals	Water	Grab	8/4/2011	16:00	1	500 mL poly	HNO3 pH<2	
	BlaineTunnel_080411	BlaineTunnel	Total Metals	Water	Grab	8/4/2011	16:00	1	500 mL poly	HNO3 pH<2	

Special Instructions: SEE ATTACHED COC

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time		Items/Reason	Relinquished By	Date	Received by	Date	Tim

C110805

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: ESAT Laboratory – EPA Region 8

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: TDF D6-264
Rico-Argentine

SITE MANAGER: Christner 720-810-0759
jan_christner@urscorp.com

SAMPLERS SIGNATURE: Ryan Conn

	STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	Total Metals	Dissolved Metals	SO_4, Br, Cl			Preservative REMARKS
1	BLAINE Tunnel TM	8/4/11	1600		X	BLAINE Tunnel Behind coffer DAM	1	X					Nitric Acid / No Filter
2	BLAINE Tunnel	8/4/11	1600		X	Blaine Tunnel Behind coffer DAM	1		X				Nitric Acid / Filter .45 um
3	BLAINE Tunnel	8/4/11	1600		X	BLAINE Tunnel Behind coffer DAM	1			X			None
4	ARG SHAFT	8/4/11	1330		X	Bottom ARGentine Shaft	1		X				Nitric Acid / No Filter
5	ARG SHAFT	8/4/11	1330		X	Bottom ARGentine Shaft	1			X			None

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Ryan Conn	8/8/11	1400					
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: AIRBILL NUMBER:	
			[illegible]	8/10/11	10:00		

71-50906.00
RSTART\Forms\Custody.Fm.bas

White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office DN 4765

COOLER TEMP 7.0 °C
NO CUSTODY SEALS

C110805

ESAT Technical Direction Form

Contract No. EPW06033
EPA Region 8

Site ID: 08BU
TDF ID: DG-264

Date Issued: 6/10/2011
Date Updated: 6/24/2011

Date Closed By:

Name: Rico-Argentine Superfund Site Samples

Details: The Contractor shall analyze approximately 20 water samples for total recoverable and dissolved metals including hardness as indicated in the analytical information section. The samples are expected to arrive at the R8 ESAT Laboratory following the sampling event which is tentatively scheduled for June 20-24, 2011.

UOS is expecting to drop off the samples to the laboratory on 6/27/11. The EPA OSC for this site is Steve Way.

Analytical

MATRIX

☑ Water ☐ Soils ☐ Vegetation ☐ Biota

WET CHEM

☐ TSS ☐ TDS ☐ DOC ☐ Alk ☑ Chloride ☑ Sulfate ☐ Fluoride ☐ Nitrate ☐ Nitrite
Other bromide

METALS

☑ Dissolved ☑ Total Recoverable ☐ Total ☑ Hardness (Calc)

200.7: ☐ Ag ☑ Al ☐ As ☐ Ba ☐ Be ☐ B ☑ Ca ☐ Cd ☐ Co ☐ Cr ☐ Cu ☑ Fe ☑ K ☑ Mg
☐ Mn ☐ Mo ☑ Na ☐ Ni ☐ Pb ☐ Sb ☐ Se ☐ Sr ☐ Ti ☐ Tl ☐ V ☑ Zn ☐ SiO2

200.8: ☑ Ag ☐ Al ☑ As ☑ Ba ☑ Be ☑ Cd ☑ Co ☑ Cr ☑ Cu ☑ Mn ☑ Mo ☑ Ni ☑ Pb ☑ Sb
☑ Se ☐ Th ☑ Tl ☐ U ☑ V ☑ Zn

7470/7471/747 ☐ Hg

hw 09/15/11

FIBERS

☐ PLM ☐ TEM

Deliverable

ID	*Description*	*Due Date*	*Submission Date*
1	Provide final deliverable package to Task Monitor no later than 30 days after delivery of samples.		

APPENDIX C-3

Laboratory Data Packages

Samples Collected October 2011

U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis

Ref: 8TMS-L

MEMORANDUM

Date: 12/21/11

Subject: Analytical Results--- **Rico-Argentine_Surface Waters_OCT 2011_D264 / DG-264**

From: Don Goodrich; EPA Region 8 Analytical Chemistry WAM

To: Steve Way
Superfund
1595 Wynkoop Street

Received Sample Set(s), [Work Order : Date Received]:
[C111002 : 10/11/2011]

Attached are the analytical results for the samples received from the Rico-Argentine_Surface Waters_OCT 2011_D264 sampling event, according to TDF DG-264. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality asessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004, referred to as "NFGI".

Case Narrative

C111002

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

1. Initial and Continuing calibration blanks (ICBs and CCBs).
   Exceptions: None.
2. Preparation (PB) / Method blanks (MB)
   Exceptions: In ICP-MS batch 1110070, cadmium was detected in the prep blank at a level less than twice the PQL. As a result, the reporting limit for cadmium was raised to 0.30 ug/L. No qualifiers were assigned.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
   Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs and CCVs).
   Exceptions: None.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
   Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes. PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
   Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
   Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
   Exceptions: None.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
   Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
    Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
    Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
    Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result.
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit (MDL)
mg/L	Parts per million (millligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	*USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.

Method(s) Summary:

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP-OE (ICP).
- Method 200.8 / 6020 using a Perkin-Elmer Elan 6000 ICP-MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin-Elmer FIMS CVAA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg(milligram) equivalent $CaCO_3$ per liter (L) determined as follows:

Calculated hardness = 2.497 * (Calcium, mg/L) + 4.118 * (Magnesium, mg/L).

From *EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography* , Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: ArgentineShaft455_100311 **Date / Time Sampled:** 10/03/11 15:25 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-01 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**28100**		ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**436000**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Iron**	**81700**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**73200**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**23300**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**1430**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**4680**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**67700**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110088
200.8	**Beryllium**	**4.63**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Cadmium**	**399**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Chromium**	**38.5**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Cobalt**	**37.1**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Copper**	**2700**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Lead**	**429**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Molybdenum**	**2.60**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Nickel**	**73.5**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Selenium**	**13.2**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Silver**	**6.82**	J	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Thallium	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	10/25/2011	SW	1110088
2340B	**Hardness**	**1390**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: ArgentineShaft475_100311 **Date / Time Sampled:** 10/03/11 15:55 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-03 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**27600**		ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**424000**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Iron**	**75300**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**70400**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**23400**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**1280**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**4470**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**67500**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110088
200.8	**Beryllium**	**4.26**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Cadmium**	**390**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Chromium**	**26.5**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Cobalt**	**36.9**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Copper**	**2810**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Lead**	**435**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	Molybdenum	< 2.00	U	ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Nickel**	**73.3**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Selenium**	**8.77**	J	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Thallium	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Vanadium	< 20.0	U	ug/L	10.0	10	10/25/2011	SW	1110088
2340B	**Hardness**	**1350**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: BlaineInflow1_100611 **Date / Time Sampled:** 10/06/11 14:30 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-05 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**303000**		ug/L	200	10	10/25/2011	SW	1110087
200.7	**Calcium**	**389000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Iron**	**2190000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Magnesium**	**229000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Manganese**	**115000**		ug/L	20.0	10	10/25/2011	SW	1110087
200.7	**Potassium**	**22100**		ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Sodium**	**5000**		ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Zinc**	**199000**		ug/L	100	10	10/25/2011	SW	1110087
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Arsenic**	**51.7**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110088
200.8	**Beryllium**	**20.6**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Cadmium**	**1180**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Chromium**	**225**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Cobalt**	**242**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Copper**	**30300**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Lead**	**290**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Molybdenum**	**7.55**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Nickel**	**420**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Selenium**	**43.6**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Thallium**	**5.61**	J	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Vanadium**	**390**		ug/L	10.0	10	10/25/2011	SW	1110088
2340B	**Hardness**	**1920**		mg/L	15	10	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: BlaineTunnel_100311 **Date / Time Sampled:** 10/03/11 16:30 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-08 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**124000**		ug/L	200	10	10/25/2011	SW	1110087
200.7	**Calcium**	**366000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Iron**	**1390000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Magnesium**	**138000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Manganese**	**61600**		ug/L	20.0	10	10/25/2011	SW	1110087
200.7	**Potassium**	**7010**	J	ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Sodium**	**4650**	J	ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Zinc**	**161000**		ug/L	100	10	10/25/2011	SW	1110087
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Arsenic**	**1190**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110088
200.8	**Beryllium**	**16.1**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Cadmium**	**953**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Chromium**	**105**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Cobalt**	**152**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Copper**	**15800**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Lead**	**404**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Molybdenum**	**19.0**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Nickel**	**214**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Selenium**	**35.3**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Thallium	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Vanadium**	**172**		ug/L	10.0	10	10/25/2011	SW	1110088
2340B	**Hardness**	**1480**		mg/L	15	10	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: BTD_100311 **Date / Time Sampled:** 10/03/11 14:30 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-11 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**123000**		ug/L	200	10	10/25/2011	SW	1110087
200.7	**Calcium**	**365000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Iron**	**1390000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Magnesium**	**137000**		ug/L	1000	10	10/25/2011	SW	1110087
200.7	**Manganese**	**61700**		ug/L	20.0	10	10/25/2011	SW	1110087
200.7	**Potassium**	**6840**	J	ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Sodium**	**4640**	J	ug/L	2500	10	10/25/2011	SW	1110087
200.7	**Zinc**	**162000**		ug/L	100	10	10/25/2011	SW	1110087
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Arsenic**	**1200**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110088
200.8	**Beryllium**	**13.7**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Cadmium**	**967**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Chromium**	**103**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Cobalt**	**155**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Copper**	**15600**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Lead**	**397**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Molybdenum**	**19.5**		ug/L	1.00	10	10/25/2011	SW	1110088
200.8	**Nickel**	**208**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Selenium**	**33.2**		ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	Thallium	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110088
200.8	**Vanadium**	**169**		ug/L	10.0	10	10/25/2011	SW	1110088
2340B	**Hardness**	**1480**		mg/L	15	10	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC068_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-14 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**40.8**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**36100**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**3630**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**3.77**	J	ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**578**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3670**		ug/L	250	1	10/25/2011	SW	1110087
200.7	Zinc	< 20.0	U	ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**13.6**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**121**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.46**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**0.221**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.509**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**60.3**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.13**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**105**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC068D_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Water **Lab Number:** C111002-17 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**25.6**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**36700**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**3690**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**6.74**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**589**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3730**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**24.8**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.8**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**122**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Cadmium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.21**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**0.107**	J	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.519**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**56.7**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.12**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**107**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC1094_100711 **Date / Time Sampled:** 10/07/11 09:26 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-20 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**63.5**		ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**320000**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**55400**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**3950**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**2920**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**2410**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**3780**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**7.65**	J	ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**0.553**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**5.06**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Lead	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.607**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**0.943**	J	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.36**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**1030**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC1131_100711 **Date / Time Sampled:** 10/07/11 09:25 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-23 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**43.0**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**51300**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**6240**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**128**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**682**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3020**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**570**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**8.91**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**103**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.92**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.46**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Copper**	**0.980**	J	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.02**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.529**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**40.1**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.03**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**154**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC198_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-26 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**35.0**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**38000**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**3910**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**3.54**	J	ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**594**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3570**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**94.5**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.8**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**121**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**0.217**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.24**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**0.123**	J	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.513**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**56.7**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.10**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**111**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC275_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-29 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**33.5**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**38600**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4270**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**11.0**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**592**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3490**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**307**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.1**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**122**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.22**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.26**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**0.432**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.493**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**53.5**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.06**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**114**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC351_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-32 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**42.7**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**39200**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4330**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**24.5**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**591**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3470**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**359**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.1**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**121**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.53**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.37**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Copper	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.80**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.517**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**53.8**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.08**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**116**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC404_100711 **Date / Time Sampled:** 10/07/11 09:13 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-35 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**50.6**		ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**39300**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4350**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**40.0**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**587**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3500**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**382**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.4**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**120**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.68**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**2.84**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Copper**	**0.813**	J	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.95**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.562**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**55.4**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**116**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC493_100711 **Date / Time Sampled:** 10/07/11 09:11 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-38 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**47.6**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**39200**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4350**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**41.7**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**614**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3450**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**384**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**12.0**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**119**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.73**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.31**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Copper**	**1.24**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.84**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.560**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**53.4**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.03**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**116**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC699_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-41 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**43.7**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**39200**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4330**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**37.2**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**578**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3420**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**377**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**11.5**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**120**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.74**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**2.52**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Copper**	**1.37**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.68**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.534**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**51.3**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Vanadium	< 2.00	U	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**116**		mg/L	2	1	10/25/2011	SW	1110087

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: SC895_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-B **Matrix:** Surface Water **Lab Number:** C111002-44 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**38.9**	J	ug/L	20.0	1	10/25/2011	SW	1110087
200.7	**Calcium**	**42500**		ug/L	100	1	10/25/2011	SW	1110087
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110087
200.7	**Magnesium**	**4610**		ug/L	100	1	10/25/2011	SW	1110087
200.7	**Manganese**	**26.5**		ug/L	2.00	1	10/25/2011	SW	1110087
200.7	**Potassium**	**617**	J	ug/L	250	1	10/25/2011	SW	1110087
200.7	**Sodium**	**3120**		ug/L	250	1	10/25/2011	SW	1110087
200.7	**Zinc**	**477**		ug/L	10.0	1	10/25/2011	SW	1110087
200.8	Antimony	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Arsenic**	**10.2**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Barium**	**110**		ug/L	5.00	1	10/25/2011	SW	1110088
200.8	Beryllium	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Cadmium**	**1.93**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Chromium**	**3.32**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Cobalt	< 0.200	U	ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Copper**	**1.07**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Lead**	**1.39**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	**Molybdenum**	**0.508**		ug/L	0.100	1	10/25/2011	SW	1110088
200.8	Nickel	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Selenium**	**45.1**		ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Silver	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	Thallium	< 1.00	U	ug/L	0.500	1	10/25/2011	SW	1110088
200.8	**Vanadium**	**1.02**	J	ug/L	1.00	1	10/25/2011	SW	1110088
2340B	**Hardness**	**125**		mg/L	2	1	10/25/2011	SW	1110087

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: BlaineTunnel_100311 **Date / Time Sampled:** 10/03/11 16:30 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Water **Lab Number:** C111002-07 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**127000**		ug/L	200	10	10/25/2011	SW	1110070
200.7	**Calcium**	**373000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Iron**	**1420000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Magnesium**	**140000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Manganese**	**61500**		ug/L	20.0	10	10/25/2011	SW	1110070
200.7	**Potassium**	**7810**	J	ug/L	2500	10	10/25/2011	SW	1110070
200.7	**Sodium**	**4790**	J	ug/L	2500	10	10/25/2011	SW	1110070
200.7	**Zinc**	**161000**		ug/L	100	10	10/25/2011	SW	1110070
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Arsenic**	**1220**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110070
200.8	**Beryllium**	**12.3**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Cadmium**	**967**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Chromium**	**103**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Cobalt**	**145**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Copper**	**14500**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Lead**	**771**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Molybdenum**	**23.4**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Nickel**	**197**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Selenium**	**33.6**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Thallium**	**9.42**	J	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Vanadium**	**165**		ug/L	10.0	10	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: BTD_100311 **Date / Time Sampled:** 10/03/11 14:30 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Water **Lab Number:** C111002-10 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**127000**		ug/L	200	10	10/25/2011	SW	1110070
200.7	**Calcium**	**378000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Iron**	**1440000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Magnesium**	**142000**		ug/L	1000	10	10/25/2011	SW	1110070
200.7	**Manganese**	**62300**		ug/L	20.0	10	10/25/2011	SW	1110070
200.7	**Potassium**	**7760**	J	ug/L	2500	10	10/25/2011	SW	1110070
200.7	**Sodium**	**4760**	J	ug/L	2500	10	10/25/2011	SW	1110070
200.7	**Zinc**	**163000**		ug/L	100	10	10/25/2011	SW	1110070
200.8	Antimony	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Arsenic**	**1210**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	Barium	< 100	U	ug/L	50.0	10	10/25/2011	SW	1110070
200.8	**Beryllium**	**12.8**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Cadmium**	**965**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Chromium**	**103**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Cobalt**	**153**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Copper**	**15100**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Lead**	**672**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Molybdenum**	**22.0**		ug/L	1.00	10	10/25/2011	SW	1110070
200.8	**Nickel**	**199**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Selenium**	**29.6**		ug/L	5.00	10	10/25/2011	SW	1110070
200.8	Silver	< 10.0	U	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Thallium**	**6.21**	J	ug/L	5.00	10	10/25/2011	SW	1110070
200.8	**Vanadium**	**165**		ug/L	10.0	10	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC068_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-13 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**29.5**	J	ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**37000**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**3690**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**3.68**	J	ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**619**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3740**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**35.6**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**3.56**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**120**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**3.16**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**6.91**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Lead	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**25.0**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC068D_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Water **Lab Number:** C111002-16 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**35.3**	J	ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**36500**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**3650**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**3.93**	J	ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**592**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3700**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**25.2**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**4.31**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**121**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**0.880**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Chromium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Lead	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.502**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**18.6**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC1094_100711 **Date / Time Sampled:** 10/07/11 09:26 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-19 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**95.1**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**314000**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Iron**	**949**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**55800**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**3950**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**2970**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**2470**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**3810**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Barium	< 50.0	U	ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**1.18**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**3.64**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**0.554**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.556**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**2.62**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC1131_100711 **Date / Time Sampled:** 10/07/11 09:25 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-22 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**49.1**	J	ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**51000**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**6190**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**126**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**695**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3020**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**561**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**102**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.43**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**5.44**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**1.86**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**12.5**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC198_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-25 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**49.3**	J	ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**38100**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**3910**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**2.91**	J	ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**608**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3630**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**98.8**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**121**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**0.872**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**5.48**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**0.502**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.524**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**17.6**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC275_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-28 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**57.3**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**38500**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4270**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**10.5**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**609**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3560**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**304**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**2.72**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**121**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**1.80**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**4.81**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**0.853**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.534**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**21.5**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC351_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-31 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**62.1**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**38500**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4270**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**24.2**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**605**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3520**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**349**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**3.48**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**121**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.44**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Chromium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**3.87**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.526**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**19.5**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC404_100711 **Date / Time Sampled:** 10/07/11 09:13 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-34 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**69.7**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**39200**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4320**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**39.6**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**606**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3550**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**376**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**124**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.29**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**2.88**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**3.27**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.577**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**19.4**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC493_100711 **Date / Time Sampled:** 10/07/11 09:11 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-37 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**58.2**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**39300**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4340**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**41.2**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**599**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3480**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**384**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**4.27**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**121**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.23**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**3.67**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**3.10**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**21.4**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC699_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-40 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**72.3**		ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**39600**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4390**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**36.9**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**596**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3570**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**367**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Arsenic**	**3.31**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**119**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.20**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**3.83**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**2.86**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Molybdenum**	**0.519**	J	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Nickel	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**20.4**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: SC895_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-A **Matrix:** Surface Water **Lab Number:** C111002-43 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	**Aluminum**	**47.2**	J	ug/L	20.0	1	10/25/2011	SW	1110070
200.7	**Calcium**	**41800**		ug/L	100	1	10/25/2011	SW	1110070
200.7	Iron	< 250	U	ug/L	100	1	10/25/2011	SW	1110070
200.7	**Magnesium**	**4550**		ug/L	100	1	10/25/2011	SW	1110070
200.7	**Manganese**	**26.1**		ug/L	2.00	1	10/25/2011	SW	1110070
200.7	**Potassium**	**595**	J	ug/L	250	1	10/25/2011	SW	1110070
200.7	**Sodium**	**3130**		ug/L	250	1	10/25/2011	SW	1110070
200.7	**Zinc**	**457**		ug/L	10.0	1	10/25/2011	SW	1110070
200.8	Antimony	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Barium**	**109**		ug/L	25.0	5	10/25/2011	SW	1110070
200.8	Beryllium	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Cadmium**	**2.36**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Chromium**	**4.43**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Copper	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Lead**	**2.27**		ug/L	0.500	5	10/25/2011	SW	1110070
200.8	Molybdenum	< 1.00	U	ug/L	0.500	5	10/25/2011	SW	1110070
200.8	**Nickel**	**3.98**	J	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	**Selenium**	**14.1**		ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Silver	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Thallium	< 5.00	U	ug/L	2.50	5	10/25/2011	SW	1110070
200.8	Vanadium	< 10.0	U	ug/L	5.00	5	10/25/2011	SW	1110070

"J" Qualifier indicates an estimated value

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: ArgentineShaft455_100311 **Date / Time Sampled:** 10/03/11 15:25 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-02 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 200	U	mg/L	100	100	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**10.9**	J	mg/L	10.0	100	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**1630**		mg/L	200	100	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: ArgentineShaft475_100311 **Date / Time Sampled:** 10/03/11 15:55 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-04 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 200	U	mg/L	100	100	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**11.1**	J	mg/L	10.0	100	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**1650**		mg/L	200	100	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: BlaineInflow1_100611 **Date / Time Sampled:** 10/06/11 14:30 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-06 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 200	U	mg/L	100	100	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**80.9**		mg/L	10.0	100	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**9690**		mg/L	200	100	10/18/2011	NP	1110056

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: BlaineTunnel_100311 **Date / Time Sampled:** 10/03/11 16:30 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-09 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 200	U	mg/L	100	100	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**29.2**		mg/L	10.0	100	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**6370**		mg/L	200	100	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: BTD_100311 **Date / Time Sampled:** 10/03/11 14:30 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-12 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 50.0	U	mg/L	20.0	100	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 200	U	mg/L	100	100	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**29.5**		mg/L	10.0	100	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**6240**		mg/L	200	100	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC068_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-15 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**6.4**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**9.0**		mg/L	2.0	1	10/18/2011	NP	1110056

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC068D_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Water **Lab Number:** C111002-18 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**6.5**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**9.1**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC1094_100711 **Date / Time Sampled:** 10/07/11 09:26 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-21 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	Bromide	< 5.0	U	mg/L	2.0	10	10/18/2011	NP	1110056
EPA 300.0	Chloride	< 20.0	U	mg/L	10.0	10	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**5.0**		mg/L	1.0	10	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**758**		mg/L	20.0	10	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC1131_100711 **Date / Time Sampled:** 10/07/11 09:25 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-24 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**4.5**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**0.3**		mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**49.4**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC198_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-27 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**6.0**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**11.0**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC275_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-30 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**5.9**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**14.3**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC351_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-33 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**5.9**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**0.2**		mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**15.3**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC404_100711 **Date / Time Sampled:** 10/07/11 09:13 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-36 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**5.8**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**16.0**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC493_100711 **Date / Time Sampled:** 10/07/11 09:11 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-39 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**5.8**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	**Fluoride**	**0.1**	J	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**16.0**		mg/L	2.0	1	10/18/2011	NP	1110056

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC699_100711 **Date / Time Sampled:** 10/07/11 09:10 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-42 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**5.7**		mg/L	0.2	1	10/18/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/18/2011	NP	1110056
EPA 300.0	Fluoride	< 0.2	U	mg/L	0.1	1	10/18/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**16.0**		mg/L	2.0	1	10/18/2011	NP	1110056

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

Classical Chemistry by EPA/ASTM/APHA Methods

Station ID: SC895_100711 **Date / Time Sampled:** 10/07/11 09:20 **Workorder:** C111002
EPA Tag No.: 8-C **Matrix:** Surface Water **Lab Number:** C111002-45 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
EPA 300.0	**Bromide**	**4.9**		mg/L	0.2	1	10/19/2011	NP	1110056
EPA 300.0	**Chloride**	**1.1**	J	mg/L	1.0	1	10/19/2011	NP	1110056
EPA 300.0	**Fluoride**	**0.1**	J	mg/L	0.1	1	10/19/2011	NP	1110056
EPA 300.0	**Sulfate as SO4**	**23.2**		mg/L	2.0	1	10/19/2011	NP	1110056

"J" Qualifier indicates an estimated value

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1110088 - No Lab Prep Reqd			***Water***						**ICPMS-PE DRC-II**
Method Blank (1110088-BLK1)		Dilution Factor: 1				Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	< 0.100	0.200	ug/L						
Vanadium	< 1.00	2.00	"						
Chromium	< 0.500	1.00	"						
Cobalt	< 0.100	0.200	"						
Nickel	< 0.500	1.00	"						
Copper	< 0.500	1.00	"						
Arsenic	< 0.500	2.00	"						
Selenium	< 0.500	1.00	"						
Molybdenum	< 0.100	0.200	"						
Silver	< 0.500	1.00	"						
Cadmium	< 0.100	0.200	"						
Antimony	< 0.500	1.00	"						
Barium	< 5.00	10.0	"						
Thallium	< 0.500	1.00	"						
Lead	< 0.100	0.200	"						
Method Blank Spike (1110088-BS1)		Dilution Factor: 1				Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	92.4	0.200	ug/L	100		92	85-115		
Vanadium	106	2.00	"	100		106	85-115		
Chromium	109	1.00	"	100		109	85-115		
Cobalt	109	0.200	"	100		109	85-115		
Nickel	106	1.00	"	100		106	85-115		
Copper	104	1.00	"	100		104	85-115		
Arsenic	99.8	2.00	"	100		100	85-115		
Selenium	510	1.00	"	500		102	85-115		
Molybdenum	99.2	0.200	"	100		99	85-115		
Silver	101	1.00	"	100		101	85-115		
Cadmium	98.9	0.200	"	100		99	85-115		
Antimony	98.6	1.00	"	100		99	85-115		
Barium	97.8	10.0	"	100		98	85-115		
Thallium	94.3	1.00	"	100		94	85-115		
Lead	95.6	0.200	"	100		96	85-115		

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110088 - No Lab Prep Reqd			*Water*						**ICPMS-PE DRC-II**
Duplicate (1110088-DUP1)		Dilution Factor: 1	**Source: C111002-14**			Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	< 0.100	0.200	ug/L		< 0.100				20
Vanadium	1.02	2.00	"		1.13			11	20
Chromium	2.89	1.00	"		3.46			18	20
Cobalt	< 0.100	0.200	"		< 0.100				20
Nickel	< 0.500	1.00	"		< 0.500				20
Copper	< 0.500	1.00	"		< 0.500				20
Arsenic	12.9	2.00	"		13.6			5	20
Selenium	57.2	1.00	"		60.3			5	20
Molybdenum	0.519	0.200	"		0.509			2	20
Silver	< 0.500	1.00	"		< 0.500				20
Cadmium	< 0.100	0.200	"		< 0.100				20
Antimony	< 0.500	1.00	"		< 0.500				20
Barium	122	10.0	"		121			0.7	20
Thallium	< 0.500	1.00	"		< 0.500				20
Lead	0.101	0.200	"		0.221			74	20
Matrix Spike (1110088-MS1)		Dilution Factor: 1	**Source: C111002-14**			Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	96.0	0.200	ug/L	100	< 0.100	96	75-125		
Vanadium	99.9	2.00	"	100	1.13	99	75-125		
Chromium	104	1.00	"	100	3.46	100	75-125		
Cobalt	101	0.200	"	100	< 0.100	101	75-125		
Nickel	99.0	1.00	"	100	< 0.500	99	75-125		
Copper	95.6	1.00	"	100	< 0.500	96	75-125		
Arsenic	121	2.00	"	100	13.6	108	75-125		
Selenium	595	1.00	"	500	60.3	107	75-125		
Molybdenum	102	0.200	"	100	0.509	102	75-125		
Silver	86.6	1.00	"	100	< 0.500	87	75-125		
Cadmium	98.4	0.200	"	100	< 0.100	98	75-125		
Antimony	104	1.00	"	100	< 0.500	104	75-125		
Barium	220	10.0	"	100	121	98	75-125		
Thallium	97.6	1.00	"	100	< 0.500	98	75-125		
Lead	95.7	0.200	"	100	0.221	95	75-125		

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110088 - No Lab Prep Reqd			*Water*						ICPMS-PE DRC-II
Matrix Spike Dup (1110088-MSD1)		Dilution Factor: 1	**Source: C111002-14**			Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	101	0.200	ug/L	100	< 0.100	101	75-125	5	20
Vanadium	106	2.00	"	100	1.13	105	75-125	6	20
Chromium	107	1.00	"	100	3.46	103	75-125	3	20
Cobalt	105	0.200	"	100	< 0.100	105	75-125	3	20
Nickel	103	1.00	"	100	< 0.500	103	75-125	4	20
Copper	101	1.00	"	100	< 0.500	101	75-125	6	20
Arsenic	126	2.00	"	100	13.6	112	75-125	3	20
Selenium	625	1.00	"	500	60.3	113	75-125	5	20
Molybdenum	105	0.200	"	100	0.509	105	75-125	3	20
Silver	88.0	1.00	"	100	< 0.500	88	75-125	2	20
Cadmium	101	0.200	"	100	< 0.100	101	75-125	3	20
Antimony	107	1.00	"	100	< 0.500	107	75-125	3	20
Barium	223	10.0	"	100	121	102	75-125	2	20
Thallium	99.0	1.00	"	100	< 0.500	99	75-125	1	20
Lead	99.4	0.200	"	100	0.221	99	75-125	4	20
Batch 1110091 - 1110088			*Water*						ICPMS-PE DRC-II
Serial Dilution (1110091-SRD1)		Dilution Factor: 5	**Source: C111002-14**			Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	< 0.500	1.00	ug/L		< 0.10				10
Vanadium	< 5.00	10.0	"		1.13				10
Chromium	2.72	5.00	"		3.46			24	10
Cobalt	< 0.500	1.00	"		< 0.10				10
Nickel	< 2.50	5.00	"		< 0.50				10
Copper	< 2.50	5.00	"		< 0.50				10
Arsenic	13.9	10.0	"		13.6			2	10
Selenium	61.6	5.00	"		60.3			2	10
Molybdenum	0.570	1.00	"		0.509			11	10
Silver	< 2.50	5.00	"		< 0.50				10
Cadmium	< 0.500	1.00	"		< 0.10				10
Antimony	< 2.50	5.00	"		< 0.50				10
Barium	124	50.0	"		121			3	10
Thallium	< 2.50	5.00	"		< 0.50				10
Lead	< 0.500	1.00	"		0.221				10

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPOE - PE Optima									
Batch 1110087 - No Lab Prep Reqd			***Water***						**ICPOE - PE Optima**
Method Blank (1110087-BLK1)		Dilution Factor: 1				Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Manganese	< 2.00	5.00	"						
Sodium	< 250	500	"						
Zinc	< 10.0	20.0	"						
Method Blank Spike (1110087-BS1)		Dilution Factor: 1				Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	10460	50.0	ug/L	10100		104	85-115		
Calcium	10570	250	"	10100		105	85-115		
Iron	10600	250	"	10100		105	85-115		
Potassium	10700	1000	"	10100		106	85-115		
Magnesium	10630	250	"	10100		105	85-115		
Manganese	99.01	5.00	"	100		99	85-115		
Sodium	10640	500	"	10100		105	85-115		
Zinc	105.4	20.0	"	100		105	85-115		
Duplicate (1110087-DUP1)		Dilution Factor: 1	**Source: C111002-14**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	32.03	50.0	ug/L		40.84			24	20
Calcium	37030	250	"		36130			2	20
Iron	< 100	250	"		< 100				20
Potassium	580.8	1000	"		577.8			0.5	20
Magnesium	3702	250	"		3633			2	20
Manganese	3.675	5.00	"		3.772			3	20
Sodium	3722	500	"		3667			2	20
Zinc	10.98	20.0	"		< 10.0				20

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Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110087 - No Lab Prep Reqd			*Water*						**ICPOE - PE Optima**
Matrix Spike (1110087-MS1)		Dilution Factor: 1		**Source: C111002-14**		Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	10250	50.0	ug/L	10100	40.84	101	75-125		
Calcium	46590	250	"	10100	36130	104	75-125		
Iron	10250	250	"	10100	< 100	102	75-125		
Potassium	11010	1000	"	10100	577.8	103	75-125		
Magnesium	13950	250	"	10100	3633	102	75-125		
Manganese	100.5	5.00	"	100	3.772	97	75-125		
Sodium	14040	500	"	10100	3667	103	75-125		
Zinc	109.9	20.0	"	100	< 10.0	110	75-125		
Matrix Spike Dup (1110087-MSD1)		Dilution Factor: 1		**Source: C111002-14**		Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	10600	50.0	ug/L	10100	40.84	105	75-125	3	20
Calcium	46970	250	"	10100	36130	107	75-125	0.8	20
Iron	10690	250	"	10100	< 100	106	75-125	4	20
Potassium	11360	1000	"	10100	577.8	107	75-125	3	20
Magnesium	14300	250	"	10100	3633	106	75-125	3	20
Manganese	104.0	5.00	"	100	3.772	100	75-125	3	20
Sodium	14390	500	"	10100	3667	106	75-125	2	20
Zinc	112.6	20.0	"	100	< 10.0	113	75-125	2	20
Batch 1110089 - 1110087			*Water*						**ICPOE - PE Optima**
Serial Dilution (1110089-SRD1)		Dilution Factor: 5		**Source: C111002-14**		Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	< 100	250	ug/L		40.84				10
Calcium	36700	1250	"		36130			2	10
Iron	< 500	1250	"		< 100.00				10
Potassium	< 1250	5000	"		577.8				10
Magnesium	3684	1250	"		3633			1	10
Manganese	< 10.0	25.0	"		3.772				10
Sodium	3751	2500	"		3667			2	10
Zinc	< 50.0	100	"		< 10.00				10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ICPMS-PE DRC-II									
Batch 1110070 - 200.2 - TR Metals			***Water***						**ICPMS-PE DRC-II**
Method Blank (1110070-BLK2)		Dilution Factor: 5				Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	< 0.500	1.00	ug/L						
Vanadium	< 5.00	10.0	"						
Chromium	3.263	5.00	"						
Cobalt	< 0.500	1.00	"						
Nickel	< 2.50	5.00	"						
Copper	< 2.50	5.00	"						
Arsenic	< 2.50	10.0	"						
Selenium	3.797	5.00	"						
Molybdenum	< 0.500	1.00	"						
Silver	< 2.50	5.00	"						
Cadmium	1.206	1.50	"						
Antimony	< 2.50	5.00	"						
Barium	< 25.0	50.0	"						
Thallium	< 2.50	5.00	"						
Lead	< 0.500	1.00	"						
Duplicate (1110070-DUP2)		Dilution Factor: 5	**Source: C111002-13**			Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	< 0.500	1.00	ug/L		< 0.500				20
Vanadium	< 5.00	10.0	"		< 5.00				20
Chromium	7.423	5.00	"		6.905			7	20
Cobalt	< 0.500	1.00	"		< 0.500				20
Nickel	< 2.50	5.00	"		< 2.50				20
Copper	< 2.50	5.00	"		< 2.50				20
Arsenic	3.783	10.0	"		3.563			6	20
Selenium	22.67	5.00	"		24.97			10	20
Molybdenum	< 0.500	1.00	"		< 0.500				20
Silver	< 2.50	5.00	"		< 2.50				20
Cadmium	1.899	1.50	"		3.158			50	20
Antimony	< 2.50	5.00	"		< 2.50				20
Barium	122.3	50.0	"		120.3			2	20
Thallium	< 2.50	5.00	"		< 2.50				20
Lead	< 0.500	1.00	"		< 0.500				20

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110070 - 200.2 - TR Metals			*Water*						**ICPMS-PE DRC-II**
Matrix Spike (1110070-MS2)		Dilution Factor: 5	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	179.8	1.00	ug/L	200	< 0.500	90	75-125		
Vanadium	302.7	10.0	"	300	< 5.00	101	75-125		
Chromium	418.2	5.00	"	400	6.905	103	75-125		
Cobalt	202.4	1.00	"	200	< 0.500	101	75-125		
Nickel	499.4	5.00	"	500	< 2.50	100	75-125		
Copper	297.9	5.00	"	300	< 2.50	99	75-125		
Arsenic	816.0	10.0	"	800	3.563	102	75-125		
Selenium	2094	5.00	"	2000	24.97	103	75-125		
Molybdenum	396.6	1.00	"	400	< 0.500	99	75-125		
Silver	71.83	5.00	"	75.0	< 2.50	96	75-125		
Cadmium	199.1	1.50	"	200	3.158	98	75-125		
Antimony	807.6	5.00	"	800	< 2.50	101	75-125		
Barium	328.7	50.0	"	200	120.3	104	75-125		
Thallium	2048	5.00	"	2000	< 2.50	102	75-125		
Lead	985.8	1.00	"	1000	< 0.500	99	75-125		
Matrix Spike Dup (1110070-MSD2)		Dilution Factor: 5	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	188.9	1.00	ug/L	200	< 0.500	94	75-125	5	20
Vanadium	312.6	10.0	"	300	< 5.00	104	75-125	3	20
Chromium	422.2	5.00	"	400	6.905	104	75-125	1	20
Cobalt	209.2	1.00	"	200	< 0.500	105	75-125	3	20
Nickel	526.4	5.00	"	500	< 2.50	105	75-125	5	20
Copper	318.8	5.00	"	300	< 2.50	106	75-125	7	20
Arsenic	821.3	10.0	"	800	3.563	102	75-125	0.6	20
Selenium	2077	5.00	"	2000	24.97	103	75-125	0.9	20
Molybdenum	400.6	1.00	"	400	< 0.500	100	75-125	1	20
Silver	72.76	5.00	"	75.0	< 2.50	97	75-125	1	20
Cadmium	205.7	1.50	"	200	3.158	101	75-125	3	20
Antimony	827.3	5.00	"	800	< 2.50	103	75-125	2	20
Barium	330.5	50.0	"	200	120.3	105	75-125	0.5	20
Thallium	2064	5.00	"	2000	< 2.50	103	75-125	0.8	20
Lead	987.9	1.00	"	1000	< 0.500	99	75-125	0.2	20

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110070 - 200.2 - TR Metals			*Water*						**ICPMS-PE DRC-II**
Post Spike (1110070-PS2)		Dilution Factor: 5	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	92.11		ug/L	100	-0.2354	92	80-120		
Vanadium	94.43		"	100	-14.64	109	80-120		
Chromium	105.3		"	100	6.905	98	80-120		
Cobalt	95.66		"	100	-0.4741	96	80-120		
Nickel	94.70		"	100	-0.4948	95	80-120		
Copper	94.17		"	100	0.07515	94	80-120		
Arsenic	105.0		"	100	3.563	101	80-120		
Selenium	523.7		"	500	24.97	100	80-120		
Molybdenum	96.16		"	100	0.4216	96	80-120		
Silver	94.13		"	100	-0.09545	94	80-120		
Cadmium	98.88		"	100	3.158	96	80-120		
Antimony	97.91		"	100	0.1516	98	80-120		
Barium	222.9		"	100	120.3	103	80-120		
Thallium	112.2		"	100	0.1290	112	80-120		
Lead	98.75		"	100	0.2965	98	80-120		
Reference (1110070-SRM2)		Dilution Factor: 2				Prepared: 10/24/11	Analyzed: 10/25/11		
Beryllium	923.4	4.00	ug/L	1000		92	80-120		
Vanadium	996.4	40.0	"	1000		100	80-120		
Chromium	1039	20.0	"	1000		104	80-120		
Cobalt	1035	4.00	"	1000		103	80-120		
Nickel	1035	20.0	"	1000		103	80-120		
Copper	1063	20.0	"	1000		106	80-120		
Arsenic	1982	40.0	"	2000		99	80-120		
Selenium	994.7	20.0	"	1000		99	80-120		
Molybdenum	986.6	4.00	"	1000		99	80-120		
Silver	241.7	20.0	"	250		97	80-120		
Cadmium	1002	6.00	"	1000		100	80-120		
Antimony	2027	20.0	"	2000		101	80-120		
Barium	1012	200	"	1000		101	80-120		
Thallium	4827	20.0	"	5000		97	80-120		
Lead	1970	4.00	"	2000		98	80-120		

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110092 - 1110070			*Water*						**ICPMS-PE DRC-II**
Serial Dilution (1110092-SRD1)		Dilution Factor: 2	**Source: C111002-13**			Prepared: 10/24/11 Analyzed: 10/25/11			
Beryllium	< 12.5	50.0	ug/L		< 2.50				10
Vanadium	< 12.5	50.0	"		< 2.50				10
Chromium	< 12.5	50.0	"		6.905				10
Cobalt	< 12.5	50.0	"		< 2.50				10
Nickel	< 12.5	50.0	"		< 2.50				10
Copper	< 12.5	50.0	"		< 2.50				10
Arsenic	< 12.5	50.0	"		3.563				10
Selenium	28.94	50.0	"		24.97			15	10
Molybdenum	< 12.5	50.0	"		< 2.50				200
Silver	< 12.5	50.0	"		< 2.50				10
Cadmium	< 2.50	7.50	"		3.158				10
Antimony	< 12.5	50.0	"		< 2.50				10
Barium	124.4	50.0	"		120.3			3	10
Thallium	< 12.5	50.0	"		< 2.50				10
Lead	< 12.5	50.0	"		< 2.50				10

ICPOE - PE Optima

Batch 1110070 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Method Blank (1110070-BLK1)		Dilution Factor: 1				Prepared: 10/24/11 Analyzed: 10/25/11			
Aluminum	< 20.0	50.0	ug/L						
Calcium	< 100	250	"						
Iron	< 100	250	"						
Potassium	< 250	1000	"						
Magnesium	< 100	250	"						
Manganese	< 2.00	5.00	"						
Sodium	< 250	500	"						
Zinc	14.90	20.0	"						

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110070 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Duplicate (1110070-DUP1)		Dilution Factor: 1	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	31.78	50.0	ug/L		29.48			8	20
Calcium	36470	250	"		37020			1	20
Iron	< 100	250	"		< 100				20
Potassium	606.8	1000	"		618.6			2	20
Magnesium	3643	250	"		3688			1	20
Manganese	3.591	5.00	"		3.681			2	20
Sodium	3679	500	"		3739			2	20
Zinc	28.86	20.0	"		35.64			21	20
Matrix Spike (1110070-MS1)		Dilution Factor: 1	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	1988	50.0	ug/L	2000	29.48	98	75-125		
Calcium	37850	250	"	1000	37020	83	75-125		
Iron	3023	250	"	3000	< 100	101	75-125		
Potassium	10710	1000	"	10000	618.6	101	75-125		
Magnesium	5698	250	"	2000	3688	100	75-125		
Manganese	204.9	5.00	"	200	3.681	101	75-125		
Sodium	6794	500	"	3000	3739	102	75-125		
Zinc	223.7	20.0	"	200	35.64	94	75-125		
Matrix Spike Dup (1110070-MSD1)		Dilution Factor: 1	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	2002	50.0	ug/L	2000	29.48	99	75-125	0.7	20
Calcium	37960	250	"	1000	37020	94	75-125	0.3	20
Iron	3042	250	"	3000	< 100	101	75-125	0.6	20
Potassium	10780	1000	"	10000	618.6	102	75-125	0.6	20
Magnesium	5717	250	"	2000	3688	101	75-125	0.3	20
Manganese	206.6	5.00	"	200	3.681	101	75-125	0.8	20
Sodium	6830	500	"	3000	3739	103	75-125	0.5	20
Zinc	222.7	20.0	"	200	35.64	94	75-125	0.5	20

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
Batch 1110070 - 200.2 - TR Metals			*Water*						**ICPOE - PE Optima**
Post Spike (1110070-PS1)		Dilution Factor: 1	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	10160		ug/L	10100	29.48	100	80-120		
Calcium	46700		"	10100	37020	96	80-120		
Iron	10320		"	10100	11.95	102	80-120		
Potassium	10950		"	10100	618.6	102	80-120		
Magnesium	13850		"	10100	3688	101	80-120		
Manganese	101.8		"	100	3.681	98	80-120		
Sodium	13990		"	10100	3739	101	80-120		
Zinc	120.6		"	100	35.64	85	80-120		
Reference (1110070-SRM1)		Dilution Factor: 1				Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	993.0	50.0	ug/L	1000		99	80-120		
Calcium	962.8	250	"	1000		96	80-120		
Iron	1001	250	"	1000		100	80-120		
Potassium	4932	1000	"	5000		99	80-120		
Magnesium	1010	250	"	1000		101	80-120		
Manganese	1024	5.00	"	1000		102	80-120		
Sodium	961.2	500	"	1000		96	80-120		
Zinc	1056	20.0	"	1000		106	80-120		
Batch 1110090 - 1110070			*Water*						**ICPOE - PE Optima**
Serial Dilution (1110090-SRD1)		Dilution Factor: 5	**Source: C111002-13**			Prepared: 10/24/11	Analyzed: 10/25/11		
Aluminum	< 100	250	ug/L		29.48				10
Calcium	37480	1250	"		37020			1	10
Iron	< 500	1250	"		< 100.00				10
Potassium	< 1250	5000	"		618.6				10
Magnesium	3757	1250	"		3688			2	10
Manganese	< 10.0	25.0	"		3.681				10
Sodium	3761	2500	"		3739			0.6	10
Zinc	< 50.0	100	"		35.64				10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

Classical Chemistry by EPA/ASTM/APHA Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	%R Limits	%D or RPD	%D or RPD Limit
ESAT Dionex IC									
Batch 1110056 - No Prep Req			***Water***						**ESAT Dionex IC**
Method Blank (1110056-BLK1)		Dilution Factor: 1				Prepared & Analyzed: 10/18/11			
Fluoride	< 0.1	0.2	mg/L						
Chloride	< 1.0	2.0	"						
Bromide	< 0.2	0.5	"						
Sulfate as SO4	< 2.0	5.0	"						
Method Blank Spike (1110056-BS1)		Dilution Factor: 1				Prepared & Analyzed: 10/18/11			
Fluoride	4.5	0.2	mg/L	5.00		90	80-120		
Chloride	23.9	2.0	"	25.0		95	80-120		
Bromide	9.7	0.5	"	10.0		97	80-120		
Sulfate as SO4	23.9	5.0	"	25.0		96	80-120		
Duplicate (1110056-DUP1)		Dilution Factor: 1	**Source: C111002-15**			Prepared & Analyzed: 10/18/11			
Fluoride	< 0.1	0.2	mg/L		< 0.1				20
Chloride	1.1	2.0	"		1.1			0.05	20
Bromide	6.4	0.5	"		6.4			0.7	20
Sulfate as SO4	9.0	5.0	"		9.0			0.03	20
Matrix Spike (1110056-MS1)		Dilution Factor: 1	**Source: C111002-15**			Prepared & Analyzed: 10/18/11			
Fluoride	4.6	0.2	mg/L	5.00	< 0.1	92	80-120		
Chloride	24.4	2.0	"	25.0	1.1	93	80-120		
Bromide	16.0	0.5	"	10.0	6.4	96	80-120		
Sulfate as SO4	32.9	5.0	"	25.0	9.0	96	80-120		
Matrix Spike Dup (1110056-MSD1)		Dilution Factor: 1	**Source: C111002-15**			Prepared & Analyzed: 10/18/11			
Fluoride	4.6	0.2	mg/L	5.00	< 0.1	92	80-120	0.2	20
Chloride	24.4	2.0	"	25.0	1.1	93	80-120	0.006	20
Bromide	16.0	0.5	"	10.0	6.4	96	80-120	0.04	20
Sulfate as SO4	33.0	5.0	"	25.0	9.0	96	80-120	0.1	20

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample .

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8
INORGANIC ANALYSES DATA SHEET
Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C111002

Analytical Sequence: 1110089 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-2.52	1	2	3	4	1110087-BLK1	NA	50.00
		1.31	0.76	1.49	0.31	4.55	NA	
		5	6	7	8			
Calcium	-1.17	1	2	3	4	1110087-BLK1	NA	250.00
		2.94	4.70	4.44	2.41	11.35	NA	
		5	6	7	8			
Iron	-4.88	1	2	3	4	1110087-BLK1	NA	250.00
		11.12	17.89	28.37	26.63	7.69	NA	
		5	6	7	8			
Potassium	15.83	1	2	3	4	1110087-BLK1	NA	1,000.00
		17.47	25.90	26.11	25.94	41.67	NA	
		5	6	7	8			
Magnesium	0.31	1	2	3	4	1110087-BLK1	NA	250.00
		0.80	0.95	1.36	1.49	0.77	NA	
		5	6	7	8			
Manganese	0.04	1	2	3	4	1110087-BLK1	NA	5.00
		-0.01	0.09	0.17	0.12	-0.04	NA	
		5	6	7	8			
Sodium	-0.32	1	2	3	4	1110087-BLK1	NA	500.00
		-1.47	1.45	-0.85	-2.99	4.83	NA	
		5	6	7	8			
Zinc	1.14	1	2	3	4	1110087-BLK1	NA	20.00
		0.57	3.07	4.73	3.62	0.82	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Instrument: **ICPOE - PE Optima** Work Order: Nu C111002

Analytical Sequence: 1110090 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	-2.52	1	2	3	4	1110070-BLK1	NA	50.00
		1.31	0.76	1.49	0.31	2.10	NA	
		5	6	7	8			
		-0.50	0.27					
Calcium	-1.17	1	2	3	4	1110070-BLK1	NA	250.00
		2.94	4.70	4.44	2.41	6.86	NA	
		5	6	7	8			
		7.18	5.11					
Iron	-4.88	1	2	3	4	1110070-BLK1	NA	250.00
		11.12	17.89	28.37	26.63	47.20	NA	
		5	6	7	8			
		8.27	13.57					
Potassium	15.83	1	2	3	4	1110070-BLK1	NA	1,000.00
		17.47	25.90	26.11	25.94	20.50	NA	
		5	6	7	8			
		24.39	33.67					
Magnesium	0.31	1	2	3	4	1110070-BLK1	NA	250.00
		0.80	0.95	1.36	1.49	0.93	NA	
		5	6	7	8			
		2.32	1.21					
Manganese	0.04	1	2	3	4	1110070-BLK1	NA	5.00
		-0.01	0.09	0.17	0.12	0.28	NA	
		5	6	7	8			
		0.20	0.06					
Sodium	-0.32	1	2	3	4	1110070-BLK1	NA	500.00
		-1.47	1.45	-0.85	-2.99	1.21	NA	
		5	6	7	8			
		-4.82	-3.84					
Zinc	1.14	1	2	3	4	1110070-BLK1	NA	20.00
		0.57	3.07	4.73	3.62	14.90	NA	
		5	6	7	8			
		1.82	3.33					

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C111002

Analytical Sequence: 1110091 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	0.00	1	2	3	4	1110088-BLK1	NA	0.20
		-0.02	-0.02	-0.02	0.04	0.01	NA	
		5	6	7	8			
Vanadium	-0.01	1	2	3	4	1110088-BLK1	NA	2.00
		0.01	-0.01	0.04	0.04	0.02	NA	
		5	6	7	8			
Chromium	-0.10	1	2	3	4	1110088-BLK1	NA	1.00
		-0.09	-0.07	0.01	-0.05	-0.10	NA	
		5	6	7	8			
Cobalt	0.01	1	2	3	4	1110088-BLK1	NA	0.20
		0.01	0.01	0.01	0.01	0.01	NA	
		5	6	7	8			
Nickel	0.00	1	2	3	4	1110088-BLK1	NA	1.00
		0.00	0.00	0.01	0.00	0.07	NA	
		5	6	7	8			
Copper	0.01	1	2	3	4	1110088-BLK1	NA	1.00
		0.01	0.12	0.09	0.05	0.02	NA	
		5	6	7	8			
Arsenic	0.05	1	2	3	4	1110088-BLK1	NA	2.00
		-0.03	0.04	0.07	0.01	-0.04	NA	
		5	6	7	8			
Selenium	-0.02	1	2	3	4	1110088-BLK1	NA	1.00
		-0.17	0.19	0.26	0.02	-0.11	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C111002

Analytical Sequence: 1110091 **Dissolved** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Molybdenum	0.01	1	2	3	4	1110088-BLK1	NA	0.20
		0.02	0.01	0.01	0.02	0.02	NA	
		5	6	7	8			
Silver	0.19	1	2	3	4	1110088-BLK1	NA	1.00
		0.23	0.24	0.18	0.22	0.06	NA	
		5	6	7	8			
Cadmium	0.00	1	2	3	4	1110088-BLK1	NA	0.20
		-0.01	0.01	0.01	-0.01	-0.01	NA	
		5	6	7	8			
Antimony	0.02	1	2	3	4	1110088-BLK1	NA	1.00
		0.04	0.04	0.03	0.05	0.13	NA	
		5	6	7	8			
Barium	0.01	1	2	3	4	1110088-BLK1	NA	10.00
		0.01	0.01	0.01	0.01	0.02	NA	
		5	6	7	8			
Thallium	0.01	1	2	3	4	1110088-BLK1	NA	1.00
		0.00	0.01	0.01	0.37	0.04	NA	
		5	6	7	8			
Lead	0.01	1	2	3	4	1110088-BLK1	NA	0.20
		0.01	0.01	0.01	0.01	0.04	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C111002

Analytical Sequence: 1110092 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Beryllium	0.00	1	2	3	4	NA	1110070-BLK2	0.20
		-0.02	-0.02	-0.02	0.04	NA	-0.02	
		5	6	7	8			
		-0.02	0.00					
Vanadium	-0.01	1	2	3	4	NA	1110070-BLK2	2.00
		0.01	-0.01	0.04	0.04	NA	-0.79	
		5	6	7	8			
		-0.03	0.02					
Chromium	-0.10	1	2	3	4	NA	1110070-BLK2	1.00
		-0.09	-0.07	0.01	-0.05	NA	0.65	
		5	6	7	8			
		-0.11	-0.08					
Cobalt	0.01	1	2	3	4	NA	1110070-BLK2	0.20
		0.01	0.01	0.01	0.01	NA	0.00	
		5	6	7	8			
		0.00	0.00					
Nickel	0.00	1	2	3	4	NA	1110070-BLK2	1.00
		0.00	0.00	0.01	0.00	NA	-0.01	
		5	6	7	8			
		-0.01	-0.02					
Copper	0.01	1	2	3	4	NA	1110070-BLK2	1.00
		0.01	0.12	0.09	0.05	NA	0.07	
		5	6	7	8			
		0.02	0.01					
Arsenic	0.05	1	2	3	4	NA	1110070-BLK2	2.00
		-0.03	0.04	0.07	0.01	NA	0.07	
		5	6	7	8			
		0.06	-0.01					
Selenium	-0.02	1	2	3	4	NA	1110070-BLK2	1.00
		-0.17	0.19	0.26	0.02	NA	0.76	
		5	6	7	8			
		-0.01	0.01					

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Instrument: **ICPMS-PE DRC-II** Work Order: Nu C111002

Analytical Sequence: 1110092 **Total Recoverable** Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Molybdenum	0.01	1	2	3	4	NA	1110070-BLK2	0.20
		0.02	0.01	0.01	0.02	NA	0.00	
		5	6	7	8			
		0.00	0.00					
Silver	0.19	1	2	3	4	NA	1110070-BLK2	1.00
		0.23	0.24	0.18	0.22	NA	-0.04	
		5	6	7	8			
		0.21	0.18					
Cadmium	0.00	1	2	3	4	NA	1110070-BLK2	0.30
		-0.01	0.01	0.01	-0.01	NA	0.24	
		5	6	7	8			
		-0.02	-0.01					
Antimony	0.02	1	2	3	4	NA	1110070-BLK2	1.00
		0.04	0.04	0.03	0.05	NA	-0.01	
		5	6	7	8			
		0.03	0.03					
Barium	0.01	1	2	3	4	NA	1110070-BLK2	10.00
		0.01	0.01	0.01	0.01	NA	0.02	
		5	6	7	8			
		0.01	0.00					
Thallium	0.01	1	2	3	4	NA	1110070-BLK2	1.00
		0.00	0.01	0.01	0.37	NA	0.01	
		5	6	7	8			
		0.08	0.04					
Lead	0.01	1	2	3	4	NA	1110070-BLK2	0.20
		0.01	0.01	0.01	0.01	NA	0.02	
		5	6	7	8			
		0.00	0.00					

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INORGANIC ANALYSES DATA SHEET

Intial and Continuing Calibration Blanks

Analytical Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography

Instrument: **ESAT Dionex IC** Work Order: Nu C111002

Analytical Sequence: 1110100 **Dissolved** Concentration Units: mg/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Fluoride	0.00	1	2	3	4	1110056-BLK1	NA	0.20
		0.00	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			
Chloride	0.00	1	2	3	4	1110056-BLK1	NA	2.00
		0.00	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			
Bromide	0.00	1	2	3	4	1110056-BLK1	NA	0.50
		0.14	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			
Sulfate as SO4	0.00	1	2	3	4	1110056-BLK1	NA	5.00
		0.00	0.00	0.00	0.00	0.00	NA	
		5	6	7	8			

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Sequence: 1110089 Work Order: C111002 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	983.1	98.3		1			2			3	
				12500	12800	102.4	12500	12780	102.2	12500	12780	102.2
					4			5			6	
				12500	12810	102.5						
					7			8			9	
Calcium	1000	952.1	95.2		1			2			3	
				12500	13130	105.0	12500	13080	104.6	12500	13130	105.0
					4			5			6	
				12500	13180	105.4						
					7			8			9	
Iron	1000	957.0	95.7		1			2			3	
				12500	13140	105.1	12500	12980	103.8	12500	13050	104.4
					4			5			6	
				12500	13110	104.9						
					7			8			9	
Magnesium	1000	1013	101.3		1			2			3	
				12500	12940	103.5	12500	12920	103.4	12500	12900	103.2
					4			5			6	
				12500	12920	103.4						
					7			8			9	
Manganese	1000	1026	102.6		1			2			3	
				1000	1039	103.9	1000	1036	103.6	1000	1040	104.0
					4			5			6	
				1000	1037	103.7						
					7			8			9	
Potassium	5000	4935	98.7		1			2			3	
				25000	25370	101.5	25000	25380	101.5	25000	25290	101.2
					4			5			6	
				25000	25350	101.4						
					7			8			9	

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Diss. Metals-2010

Sequence: 1110089 Work Order: C111002 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Sodium	1000	948.3	94.8		1			2			3	
				12500	12770	102.2	12500	12820	102.6	12500	12790	102.3
					4			5			6	
				12500	12840	102.7						
					7			8			9	
Zinc	1000	1032	103.2		1			2			3	
				2500	2608	104.3	2500	2625	105.0	2500	2653	106.1
					4			5			6	
				2500	2655	106.2						
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Sequence: 1110090 Work Order: C111002 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	1000	983.1	98.3		1			2			3	
				12500	12800	102.4	12500	12780	102.2	12500	12780	102.2
					4			5			6	
				12500	12810	102.5	12500	12820	102.6	12500	12800	102.4
					7			8			9	
Calcium	1000	952.1	95.2		1			2			3	
				12500	13130	105.0	12500	13080	104.6	12500	13130	105.0
					4			5			6	
				12500	13180	105.4	12500	13120	105.0	12500	13210	105.7
					7			8			9	
Iron	1000	957.0	95.7		1			2			3	
				12500	13140	105.1	12500	12980	103.8	12500	13050	104.4
					4			5			6	
				12500	13110	104.9	12500	13040	104.3	12500	13120	105.0
					7			8			9	
Magnesium	1000	1013	101.3		1			2			3	
				12500	12940	103.5	12500	12920	103.4	12500	12900	103.2
					4			5			6	
				12500	12920	103.4	12500	12940	103.5	12500	12930	103.4
					7			8			9	
Manganese	1000	1026	102.6		1			2			3	
				1000	1039	103.9	1000	1036	103.6	1000	1040	104.0
					4			5			6	
				1000	1037	103.7	1000	1043	104.3	1000	1030	103.0
					7			8			9	
Potassium	5000	4935	98.7		1			2			3	
				25000	25370	101.5	25000	25380	101.5	25000	25290	101.2
					4			5			6	
				25000	25350	101.4	25000	25420	101.7	25000	25320	101.3
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima Method: 200.7 Analysis Name: ICPOE Tot. Rec Metals-2010

Sequence: 1110090 Work Order: C111002 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Sodium	1000	948.3	94.8		1			2			3	
				12500	12770	102.2	12500	12820	102.6	12500	12790	102.3
					4			5			6	
				12500	12840	102.7	12500	12900	103.2	12500	12860	102.9
					7			8			9	
Zinc	1000	1032	103.2		1			2			3	
				2500	2608	104.3	2500	2625	105.0	2500	2653	106.1
					4			5			6	
				2500	2655	106.2	2500	2645	105.8	2500	2624	105.0
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1110091 Work Order: C111002 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.5	99.0		1			2			3	
				50.0	50.1	100.2	50.0	51.0	102.0	50.0	50.4	100.8
					4			5			6	
				50.0	50.6	101.2						
					7			8			9	
Arsenic	50.0	50.5	101.0		1			2			3	
				50.0	48.8	97.6	50.0	50.1	100.2	50.0	50.6	101.2
					4			5			6	
				50.0	50.7	101.4						
					7			8			9	
Barium	50.0	49.9	99.8		1			2			3	
				50.0	49.6	99.2	50.0	49.1	98.2	50.0	50.6	101.2
					4			5			6	
				50.0	50.5	101.0						
					7			8			9	
Beryllium	50.0	46.4	92.8		1			2			3	
				50.0	48.3	96.6	50.0	47.3	94.6	50.0	50.8	101.6
					4			5			6	
				50.0	51.6	103.2						
					7			8			9	
Cadmium	50.0	49.5	99.0		1			2			3	
				50.0	50.9	101.8	50.0	51.4	102.8	50.0	51.4	102.8
					4			5			6	
				50.0	51.4	102.8						
					7			8			9	
Chromium	50.0	53.0	106.0		1			2			3	
				50.0	54.9	109.8	50.0	54.2	108.4	50.0	53.7	107.4
					4			5			6	
				50.0	53.9	107.8						
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1110091 Work Order: C111002 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	53.5	107.0		1			2			3	
				50.0	51.4	102.8	50.0	54.6	109.2	50.0	51.8	103.6
					4			5			6	
				50.0	52.7	105.4						
					7			8			9	
Copper	50.0	52.4	104.8		1			2			3	
				50.0	53.9	107.8	50.0	53.8	107.6	50.0	51.3	102.6
					4			5			6	
				50.0	52.4	104.8						
					7			8			9	
Lead	50.0	49.5	99.0		1			2			3	
				50.0	51.1	102.2	50.0	49.9	99.8	50.0	49.7	99.4
					4			5			6	
				50.0	48.0	96.0						
					7			8			9	
Molybdenum	50.0	50.1	100.2		1			2			3	
				50.0	50.0	100.0	50.0	51.6	103.2	50.0	50.2	100.4
					4			5			6	
				50.0	49.6	99.2						
					7			8			9	
Nickel	50.0	52.8	105.6		1			2			3	
				50.0	54.4	108.8	50.0	53.8	107.6	50.0	52.1	104.2
					4			5			6	
				50.0	52.3	104.6						
					7			8			9	
Selenium	250	259	103.6		1			2			3	
				50.0	51.0	102.0	50.0	50.9	101.8	50.0	53.9	107.8
					4			5			6	
				50.0	53.1	106.2						
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICPMS Diss. Metals-2010

Sequence: 1110091 Work Order: C111002 Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Silver	50.0	51.1	102.2		1			2			3	
				50.0	50.9	101.8	50.0	50.6	101.2	50.0	49.5	99.0
					4			5			6	
				50.0	49.8	99.6						
					7			8			9	
Thallium	50.0	49.9	99.8		1			2			3	
				50.0	51.4	102.8	50.0	49.6	99.2	50.0	48.9	97.8
					4			5			6	
				50.0	48.7	97.4						
					7			8			9	
Vanadium	50.0	52.0	104.0		1			2			3	
				50.0	52.2	104.4	50.0	51.4	102.8	50.0	50.9	101.8
					4			5			6	
				50.0	52.1	104.2						
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1110092 Work Order: C111002 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	49.50	99.0		1			2			3	
				50.0	50.12	100.2	50.0	50.98	102.0	50.0	50.42	100.8
					4			5			6	
				50.0	50.62	101.2	50.0	49.93	99.9	50.0	50.95	101.9
					7			8			9	
Arsenic	50.0	50.49	101.0		1			2			3	
				50.0	48.78	97.6	50.0	50.10	100.2	50.0	50.63	101.3
					4			5			6	
				50.0	50.72	101.4	50.0	49.83	99.7	50.0	51.43	102.9
					7			8			9	
Barium	50.0	49.88	99.8		1			2			3	
				50.0	49.56	99.1	50.0	49.13	98.3	50.0	50.61	101.2
					4			5			6	
				50.0	50.52	101.0	50.0	50.55	101.1	50.0	50.24	100.5
					7			8			9	
Beryllium	50.0	46.42	92.8		1			2			3	
				50.0	48.34	96.7	50.0	47.34	94.7	50.0	50.75	101.5
					4			5			6	
				50.0	51.64	103.3	50.0	49.18	98.4	50.0	48.55	97.1
					7			8			9	
Cadmium	50.0	49.48	99.0		1			2			3	
				50.0	50.92	101.8	50.0	51.41	102.8	50.0	51.43	102.9
					4			5			6	
				50.0	51.42	102.8	50.0	50.80	101.6	50.0	51.53	103.1
					7			8			9	
Chromium	50.0	53.00	106.0		1			2			3	
				50.0	54.93	109.9	50.0	54.22	108.4	50.0	53.69	107.4
					4			5			6	
				50.0	53.94	107.9	50.0	52.13	104.3	50.0	52.84	105.7
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1110092 Work Order: C111002 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Cobalt	50.0	53.47	106.9		1			2			3	
				50.0	51.42	102.8	50.0	54.55	109.1	50.0	51.77	103.5
					4			5			6	
				50.0	52.73	105.5	50.0	53.24	106.5	50.0	53.33	106.7
					7			8			9	
Copper	50.0	52.38	104.8		1			2			3	
				50.0	53.93	107.9	50.0	53.85	107.7	50.0	51.32	102.6
					4			5			6	
				50.0	52.35	104.7	50.0	50.26	100.5	50.0	53.05	106.1
					7			8			9	
Lead	50.0	49.45	98.9		1			2			3	
				50.0	51.08	102.2	50.0	49.88	99.8	50.0	49.69	99.4
					4			5			6	
				50.0	48.02	96.0	50.0	52.90	105.8	50.0	49.38	98.8
					7			8			9	
Molybdenum	50.0	50.08	100.2		1			2			3	
				50.0	49.99	100.0	50.0	51.64	103.3	50.0	50.17	100.3
					4			5			6	
				50.0	49.64	99.3	50.0	48.81	97.6	50.0	50.04	100.1
					7			8			9	
Nickel	50.0	52.82	105.6		1			2			3	
				50.0	54.37	108.7	50.0	53.81	107.6	50.0	52.06	104.1
					4			5			6	
				50.0	52.27	104.5	50.0	52.48	105.0	50.0	53.06	106.1
					7			8			9	
Selenium	250	258.6	103.4		1			2			3	
				50.0	51.01	102.0	50.0	50.89	101.8	50.0	53.90	107.8
					4			5			6	
				50.0	53.13	106.3	50.0	52.05	104.1	50.0	53.80	107.6
					7			8			9	

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II Method: 200.8 Analysis Name: ICP-MS Tot. Rec. Metals-2010

Sequence: 1110092 Work Order: C111002 Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Silver	50.0	51.09	102.2		1			2			3	
				50.0	50.92	101.8	50.0	50.64	101.3	50.0	49.52	99.0
					4			5			6	
				50.0	49.79	99.6	50.0	48.89	97.8	50.0	49.77	99.5
					7			8			9	
Thallium	50.0	49.94	99.9		1			2			3	
				50.0	51.42	102.8	50.0	49.57	99.1	50.0	48.89	97.8
					4			5			6	
				50.0	48.72	97.4	50.0	50.99	102.0	50.0	47.93	95.9
					7			8			9	
Vanadium	50.0	51.99	104.0		1			2			3	
				50.0	52.25	104.5	50.0	51.43	102.9	50.0	50.95	101.9
					4			5			6	
				50.0	52.15	104.3	50.0	51.67	103.3	50.0	51.15	102.3
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ESAT Dionex IC Method: EPA 300.0 Analysis Name: WC - Anions by Ion Chromatography 2010

Sequence: 1110100 Work Order: C111002 Units: mg/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Bromide	50.1	49.2	98.2		1			2			3	
				10.0	10.1	101.0	10.0	10.1	101.0	10.0	10.1	101.0
					4			5			6	
				10.0	10.1	101.0						
					7			8			9	
Chloride	15.1	14.2	94.0		1			2			3	
				40.0	40.2	100.5	40.0	40.3	100.8	40.0	40.0	100.0
					4			5			6	
				40.0	40.2	100.5						
					7			8			9	
Fluoride	9.98	9.3	93.2		1			2			3	
				4.00	3.6	90.0	4.00	3.6	90.0	4.00	3.6	90.0
					4			5			6	
				4.00	3.6	90.0						
					7			8			9	
Sulfate as SO4	75.2	79.6	105.9		1			2			3	
				100	102	102.0	100	102	102.0	100	102	102.0
					4			5			6	
				100	102	102.0						
					7			8			9	

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria - ICV = 90 - 110%R, CCV = 80 - 120%R.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1110091	Analysis: ICPMS Diss. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.1	ug/L			2.00
	IFB1	19.5	ug/L	20	98	2.00
Barium	IFA1	0.1	ug/L			10.0
	IFB1	0.0	ug/L			10.0
Beryllium	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.1	ug/L			0.200
	IFB1	20.3	ug/L	20	102	0.200
Chromium	IFA1	0.5	ug/L			1.00
	IFB1	21.3	ug/L	20	106	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	20.7	ug/L	20	104	0.200
Copper	IFA1	0.2	ug/L			1.00
	IFB1	20.5	ug/L	20	103	1.00
Lead	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Molybdenum	IFA1	202.7	ug/L	200	101	0.200
	IFB1	203.1	ug/L	200	102	0.200
Nickel	IFA1	-0.2	ug/L			1.00
	IFB1	20.9	ug/L	20	104	1.00
Selenium	IFA1	0.1	ug/L			1.00
	IFB1	0.2	ug/L			1.00
Silver	IFA1	0.0	ug/L			1.00
	IFB1	19.4	ug/L	20	97	1.00
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	-0.1	ug/L			2.00
	IFB1	-0.6	ug/L			2.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: Rico-Argentine_Surface Waters_OCT 2011_D264 **Certificate of Analysis**

TDF #: DG-264

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1110092	Analysis: ICP-MS Tot. Rec. Metals-2010					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.1	ug/L			2.00
	IFB1	19.5	ug/L	20	98	2.00
Barium	IFA1	0.1	ug/L			10.0
	IFB1	0.0	ug/L			10.0
Beryllium	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Cadmium	IFA1	0.1	ug/L			0.200
	IFB1	20.3	ug/L	20	102	0.200
Chromium	IFA1	0.5	ug/L			1.00
	IFB1	21.3	ug/L	20	106	1.00
Cobalt	IFA1	-0.1	ug/L			0.200
	IFB1	20.7	ug/L	20	104	0.200
Copper	IFA1	0.2	ug/L			1.00
	IFB1	20.5	ug/L	20	103	1.00
Lead	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Molybdenum	IFA1	202.7	ug/L	200	101	0.200
	IFB1	203.1	ug/L	200	102	0.200
Nickel	IFA1	-0.2	ug/L			1.00
	IFB1	20.9	ug/L	20	104	1.00
Selenium	IFA1	0.1	ug/L			1.00
	IFB1	0.2	ug/L			1.00
Silver	IFA1	0.0	ug/L			1.00
	IFB1	19.4	ug/L	20	97	1.00
Thallium	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Vanadium	IFA1	-0.1	ug/L			2.00
	IFB1	-0.6	ug/L			2.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPOE - PE Optima

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1110089	Analysis: ICPOE Diss. Metals-2010					
Aluminum	IFA1	59,753.2	ug/L	60,000	100	50.0
	IFB1	60,591.1	ug/L	60,000	101	50.0
Calcium	IFA1	291,898.5	ug/L	300,000	97	250
	IFB1	294,405.5	ug/L	300,000	98	250
Iron	IFA1	225,770.9	ug/L	250,000	90	250
	IFB1	227,142.2	ug/L	250,000	91	250
Magnesium	IFA1	143,067.7	ug/L	150,000	95	250
	IFB1	145,158.7	ug/L	150,000	97	250
Manganese	IFA1	1.4	ug/L			5.00
	IFB1	197.9	ug/L	200	99	5.00
Potassium	IFA1	-65.8	ug/L			1000
	IFB1	21,357.2	ug/L	20,000	107	1000
Sodium	IFA1	51,340.7	ug/L	50,000	103	500
	IFB1	51,897.7	ug/L	50,000	104	500
Zinc	IFA1	8.1	ug/L			20.0
	IFB1	296.1	ug/L	300	99	20.0

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPOE - PE Optima

Analyte	Check Sample	Result*	Units	True	%R	PQL
Sequence: 1110090	Analysis: ICPOE Tot. Rec Metals-2010					
Aluminum	IFA1	59,753.2	ug/L	60,000	100	50.0
	IFB1	60,591.1	ug/L	60,000	101	50.0
Calcium	IFA1	291,898.5	ug/L	300,000	97	250
	IFB1	294,405.5	ug/L	300,000	98	250
Iron	IFA1	225,770.9	ug/L	250,000	90	250
	IFB1	227,142.2	ug/L	250,000	91	250
Magnesium	IFA1	143,067.7	ug/L	150,000	95	250
	IFB1	145,158.7	ug/L	150,000	97	250
Manganese	IFA1	1.4	ug/L			5.00
	IFB1	197.9	ug/L	200	99	5.00
Potassium	IFA1	-65.8	ug/L			1000
	IFB1	21,357.2	ug/L	20,000	107	1000
Sodium	IFA1	51,340.7	ug/L	50,000	103	500
	IFB1	51,897.7	ug/L	50,000	104	500
Zinc	IFA1	8.1	ug/L			20.0
	IFB1	296.1	ug/L	300	99	20.0

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1110091

Analyte	True	Found	%R	Units
Antimony	1.00	1.00	100	ug/L
Arsenic	2.00	2.06	103	ug/L
Barium	0.500	0.516	103	ug/L
Beryllium	0.200	0.255	127	ug/L
Cadmium	0.200	0.209	104	ug/L
Chromium	1.00	1.01	101	ug/L
Cobalt	0.200	0.217	108	ug/L
Copper	1.00	1.09	109	ug/L
Lead	0.200	0.212	106	ug/L
Molybdenum	0.200	0.210	105	ug/L
Nickel	1.00	1.08	108	ug/L
Selenium	1.00	0.964	96	ug/L
Silver	0.500	0.526	105	ug/L
Thallium	0.200	0.191	96	ug/L
Vanadium	2.00	2.21	110	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1110089

Analyte	True	Found	%R	Units
Aluminum	100	104.9	105	ug/L
Calcium	250	268.2	107	ug/L
Iron	100	104.0	104	ug/L
Magnesium	1000	1086	109	ug/L
Manganese	10.0	10.71	107	ug/L
Potassium	1000	1110	111	ug/L
Sodium	1000	1096	110	ug/L
Zinc	50.0	57.97	116	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPMS-PE DRC-II

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1110092

Analyte	True	Found	%R	Units
Antimony	1.00	1.003	100	ug/L
Arsenic	2.00	2.062	103	ug/L
Barium	0.500	0.5162	103	ug/L
Beryllium	0.200	0.2549	127	ug/L
Cadmium	0.200	0.2087	104	ug/L
Chromium	1.00	1.013	101	ug/L
Cobalt	0.200	0.2167	108	ug/L
Copper	1.00	1.090	109	ug/L
Lead	0.200	0.2118	106	ug/L
Molybdenum	0.200	0.2096	105	ug/L
Nickel	1.00	1.081	108	ug/L
Selenium	1.00	0.9636	96	ug/L
Silver	0.500	0.5261	105	ug/L
Thallium	0.200	0.1915	96	ug/L
Vanadium	2.00	2.209	110	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw, Inc. - ESAT Region 8
Detection Limit (PQL) Standard
ICPOE - PE Optima

Metals (Total Recov) by EPA 200/7000 Series Methods

Sequence: 1110090

Analyte	True	Found	%R	Units
Aluminum	100	104.9	105	ug/L
Calcium	250	268.2	107	ug/L
Iron	100	104.0	104	ug/L
Magnesium	1000	1086	109	ug/L
Manganese	10.0	10.71	107	ug/L
Potassium	1000	1110	111	ug/L
Sodium	1000	1096	110	ug/L
Zinc	50.0	57.97	116	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Dissolved** **Sequence ID#:** 1110089

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1110089-ICV1	Initial Cal Check	10/25/11	09:01
1110089-ICB1	Initial Cal Blank	10/25/11	09:04
1110089-CRL1	Instrument RL Check	10/25/11	09:07
1110089-IFA1	Interference Check A	10/25/11	09:10
1110089-IFB1	Interference Check B	10/25/11	09:14
1110089-CCV1	Calibration Check	10/25/11	09:18
1110089-CCB1	Calibration Blank	10/25/11	09:21
1110087-BLK1	Blank	10/25/11	09:24
1110087-BS1		10/25/11	09:27
C111002-14	SC068_100711	10/25/11	09:31
1110087-DUP1	Duplicate	10/25/11	09:34
1110089-SRD1	Serial Dilution	10/25/11	09:37
1110087-MS1	Matrix Spike	10/25/11	09:40
1110087-MSD1	Matrix Spike Dup	10/25/11	09:43
C111002-01	ArgentineShaft455_100311	10/25/11	09:46
C111002-03	ArgentineShaft475_100311	10/25/11	09:50
1110089-CCV2	Calibration Check	10/25/11	09:57
1110089-CCB2	Calibration Blank	10/25/11	10:00
C111002-17	SC068D_100711	10/25/11	10:15
C111002-20	SC1094_100711	10/25/11	10:18
C111002-23	SC1131_100711	10/25/11	10:22
C111002-26	SC198_100711	10/25/11	10:26
C111002-29	SC275_100711	10/25/11	10:29
C111002-32	SC351_100711	10/25/11	10:32
1110089-CCV3	Calibration Check	10/25/11	10:38
1110089-CCB3	Calibration Blank	10/25/11	10:41
C111002-35	SC404_100711	10/25/11	10:44
C111002-38	SC493_100711	10/25/11	10:47
C111002-41	SC699_100711	10/25/11	10:51
C111002-44	SC895_100711	10/25/11	10:54
C111002-05	BlaineInflow1_100611	10/25/11	11:02
C111002-08	BlaineTunnel_100311	10/25/11	11:05
C111002-11	BTD_100311	10/25/11	11:08
1110089-CCV4	Calibration Check	10/25/11	11:21
1110089-CCB4	Calibration Blank	10/25/11	11:24

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7 **Total Recoverable** **Sequence ID#:** 1110090

Instrument ID #: ICPOE - PE Optima Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1110090-ICV1	Initial Cal Check	10/25/11	09:01
1110090-ICB1	Initial Cal Blank	10/25/11	09:04
1110090-CRL1	Instrument RL Check	10/25/11	09:07
1110090-IFA1	Interference Check A	10/25/11	09:10
1110090-IFB1	Interference Check B	10/25/11	09:14
1110090-CCV1	Calibration Check	10/25/11	09:18
1110090-CCB1	Calibration Blank	10/25/11	09:21
1110090-CCV2	Calibration Check	10/25/11	09:57
1110090-CCB2	Calibration Blank	10/25/11	10:00
1110090-CCV3	Calibration Check	10/25/11	10:38
1110090-CCB3	Calibration Blank	10/25/11	10:41
1110070-BLK1	Blank	10/25/11	11:11
1110070-SRM1	Reference	10/25/11	11:15
1110090-CCV4	Calibration Check	10/25/11	11:21
1110090-CCB4	Calibration Blank	10/25/11	11:24
C111002-13	SC068_100711	10/25/11	11:27
1110070-DUP1	Duplicate	10/25/11	11:30
1110090-SRD1	Serial Dilution	10/25/11	11:33
1110070-MS1	Matrix Spike	10/25/11	11:36
1110070-MSD1	Matrix Spike Dup	10/25/11	11:40
1110070-PS1	Post Spike	10/25/11	11:43
C111002-07	BlaineTunnel_100311	10/25/11	11:45
C111002-10	BTD_100311	10/25/11	11:48
C111002-16	SC068D_100711	10/25/11	11:51
C111002-19	SC1094_100711	10/25/11	11:55
1110090-CCV5	Calibration Check	10/25/11	11:59
1110090-CCB5	Calibration Blank	10/25/11	12:02
C111002-22	SC1131_100711	10/25/11	12:05
C111002-25	SC198_100711	10/25/11	12:08
C111002-28	SC275_100711	10/25/11	12:15
C111002-31	SC351_100711	10/25/11	12:18
C111002-34	SC404_100711	10/25/11	12:21
C111002-37	SC493_100711	10/25/11	12:24
C111002-40	SC699_100711	10/25/11	12:27
C111002-43	SC895_100711	10/25/11	12:30
1110090-CCV6	Calibration Check	10/25/11	12:36
1110090-CCB6	Calibration Blank	10/25/11	12:40

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Dissolved** **Sequence ID#:** 1110091

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1110091-ICV1	Initial Cal Check	10/25/11	12:38
1110091-ICB1	Initial Cal Blank	10/25/11	12:41
1110091-CRL1	Instrument RL Check	10/25/11	12:44
1110091-IFA1	Interference Check A	10/25/11	12:47
1110091-IFB1	Interference Check B	10/25/11	12:50
1110091-CCV1	Calibration Check	10/25/11	12:53
1110091-CCB1	Calibration Blank	10/25/11	12:56
1110088-BLK1	Blank	10/25/11	12:59
C111002-14	SC068_100711	10/25/11	13:02
1110088-DUP1	Duplicate	10/25/11	13:05
1110091-SRD1	Serial Dilution	10/25/11	13:08
1110088-BS1		10/25/11	13:11
1110088-MS1	Matrix Spike	10/25/11	13:14
1110088-MSD1	Matrix Spike Dup	10/25/11	13:16
C111002-01	ArgentineShaft455_100311	10/25/11	13:19
C111002-03	ArgentineShaft475_100311	10/25/11	13:22
1110091-CCV2	Calibration Check	10/25/11	13:28
1110091-CCB2	Calibration Blank	10/25/11	13:31
C111002-05	BlaineInflow1_100611	10/25/11	13:34
C111002-08	BlaineTunnel_100311	10/25/11	13:37
C111002-11	BTD_100311	10/25/11	13:40
C111002-17	SC068D_100711	10/25/11	13:42
C111002-20	SC1094_100711	10/25/11	13:45
C111002-23	SC1131_100711	10/25/11	13:48
C111002-26	SC198_100711	10/25/11	13:51
C111002-29	SC275_100711	10/25/11	13:54
C111002-32	SC351_100711	10/25/11	13:56
C111002-35	SC404_100711	10/25/11	13:59
1110091-CCV3	Calibration Check	10/25/11	14:02
1110091-CCB3	Calibration Blank	10/25/11	14:05
C111002-38	SC493_100711	10/25/11	14:08
C111002-41	SC699_100711	10/25/11	14:11
C111002-44	SC895_100711	10/25/11	14:14
1110091-CCV4	Calibration Check	10/25/11	14:37
1110091-CCB4	Calibration Blank	10/25/11	14:40

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8 **Total Recoverable** **Sequence ID#:** 1110092

Instrument ID #: ICPMS-PE DRC-II Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1110092-ICV1	Initial Cal Check	10/25/11	12:38
1110092-ICB1	Initial Cal Blank	10/25/11	12:41
1110092-CRL1	Instrument RL Check	10/25/11	12:44
1110092-IFA1	Interference Check A	10/25/11	12:47
1110092-IFB1	Interference Check B	10/25/11	12:50
1110092-CCV1	Calibration Check	10/25/11	12:53
1110092-CCB1	Calibration Blank	10/25/11	12:56
1110092-CCV2	Calibration Check	10/25/11	13:28
1110092-CCB2	Calibration Blank	10/25/11	13:31
1110092-CCV3	Calibration Check	10/25/11	14:02
1110092-CCB3	Calibration Blank	10/25/11	14:05
1110070-BLK2	Blank	10/25/11	14:17
C111002-13	SC068_100711	10/25/11	14:20
1110070-DUP2	Duplicate	10/25/11	14:22
1110092-SRD1	Serial Dilution	10/25/11	14:25
1110070-SRM2	Reference	10/25/11	14:28
1110070-MS2	Matrix Spike	10/25/11	14:31
1110092-CCV4	Calibration Check	10/25/11	14:37
1110092-CCB4	Calibration Blank	10/25/11	14:40
1110070-MSD2	Matrix Spike Dup	10/25/11	14:43
1110070-PS2	Post Spike	10/25/11	14:45
C111002-07	BlaineTunnel_100311	10/25/11	14:48
C111002-10	BTD_100311	10/25/11	14:51
C111002-16	SC068D_100711	10/25/11	14:54
C111002-19	SC1094_100711	10/25/11	14:57
C111002-22	SC1131_100711	10/25/11	15:00
C111002-25	SC198_100711	10/25/11	15:02
C111002-28	SC275_100711	10/25/11	15:05
1110092-CCV5	Calibration Check	10/25/11	15:11
1110092-CCB5	Calibration Blank	10/25/11	15:14
C111002-31	SC351_100711	10/25/11	15:20
C111002-34	SC404_100711	10/25/11	15:23
C111002-37	SC493_100711	10/25/11	15:26
C111002-40	SC699_100711	10/25/11	15:28
C111002-43	SC895_100711	10/25/11	15:31
1110092-CCV6	Calibration Check	10/25/11	15:37
1110092-CCB6	Calibration Blank	10/25/11	15:40

Project Name: **Rico-Argentine_Surface Waters_OCT 2011_D264** **Certificate of Analysis**

TDF #: **DG-264**

TechLaw Inc., ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: EPA 300.0 **Dissolved** **Sequence ID#:** 1110100

Instrument ID #: ESAT Dionex IC Water **LSR #:** DG-264

Analysis ID	Sample Name	Analysis Date	Analysis Time
1110100-ICV1	Initial Cal Check	10/18/11	13:25
1110100-ICB1	Initial Cal Blank	10/18/11	13:42
1110056-BLK1	Blank	10/18/11	14:00
1110056-BS1		10/18/11	14:17
C111002-15	SC068_100711	10/18/11	14:35
1110056-DUP1	Duplicate	10/18/11	14:53
1110056-MS1	Matrix Spike	10/18/11	15:10
1110056-MSD1	Matrix Spike Dup	10/18/11	15:28
C111002-02	ArgentineShaft455_100311	10/18/11	15:45
C111002-04	ArgentineShaft475_100311	10/18/11	16:03
C111002-06	BlaineInflow1_100611	10/18/11	16:21
C111002-09	BlaineTunnel_100311	10/18/11	16:38
1110100-CCV1	Calibration Check	10/18/11	16:56
1110100-CCB1	Calibration Blank	10/18/11	17:13
C111002-12	BTD_100311	10/18/11	17:31
C111002-18	SC068D_100711	10/18/11	17:48
C111002-21	SC1094_100711	10/18/11	18:06
C111002-24	SC1131_100711	10/18/11	18:24
C111002-27	SC198_100711	10/18/11	18:41
C111002-30	SC275_100711	10/18/11	18:59
C111002-33	SC351_100711	10/18/11	19:16
C111002-36	SC404_100711	10/18/11	19:34
C111002-39	SC493_100711	10/18/11	19:51
C111002-42	SC699_100711	10/18/11	20:09
1110100-CCV2	Calibration Check	10/18/11	20:27
1110100-CCB2	Calibration Blank	10/18/11	20:44
1110100-CCV3	Calibration Check	10/19/11	11:20
1110100-CCB3	Calibration Blank	10/19/11	11:37
C111002-45	SC895_100711	10/19/11	11:55
1110100-CCV4	Calibration Check	10/19/11	12:12
1110100-CCB4	Calibration Blank	10/19/11	12:30