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ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND PILOT SCALE TEST COMPLETION REPORT

Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01
Dolores County, Colorado

Prepared for:
Atlantic Richfield Company
La Palma, California

Prepared by:
AMEC Environment & Infrastructure, Inc.
Rancho Cordova, California

November 2013

Project No. SA11161314

Atlantic Richfield Company

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November 4, 2013

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
U.S. EPA, Region 8
1595 Wynkoop Street
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RE: St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01
Dolores County, Colorado

Dear Mr. Way:

On behalf of Atlantic Richfield Company (Atlantic Richfield), please find enclosed the *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report* (Completion Report) prepared for the Rico-Argentine Mine Site (site). The pilot scale test was performed pursuant to the requirements in Task F – Water Treatment System Analysis and Design / Subtask F2 – Treatment System Conceptual Designs and Additional Investigations of the Remedial Action Work Plan accompanying the Unilateral Administrative Order for Removal Action, Rico-Argentine Site, Dolores County, United States Environmental Protection Agency, Region 8, (U.S. EPA), dated March 9, 2011 (Docket No. CERCLA-08-2011-0005).

As described in the *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Work Plan*, the pilot scale test was designed to assess the treatability of mine water discharging from the St. Louis Tunnel using a passive treatment system as a potential final treatment or polishing step to reduce manganese, cadmium, and zinc concentrations prior to discharge to the Dolores River. Pilot scale test construction activities and as-built conditions are described in the *Construction and Pre-Implementation Report* submitted to U.S. EPA on June 12, 2013. The Completion Report describes subsequent pilot testing activities and results for matrix sampling conducted in December 2012 and May 2013; winter pilot test runs conducted at target effluent flow rates of 1.5 gallons per minute (gpm), 3 gpm, and 6 gpm between January and April 2013; and one summer pilot test run conducted at an effluent flow rate of approximately 2 gpm between May and September 2013. Addenda to this Completion Report will be provided to summarize the results of filtrate sediment samples submitted for laboratory scanning electron microscopy analysis in September 2013 and to describe any future matrix sampling that may be conducted.

If you have any questions regarding this Completion Report, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

Tony Brown
Project Manager Mining
Atlantic Richfield Company

Enclosures: *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report*

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Rico-Argentine Mine Site – Rico Tunnels
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La Palma, California

Prepared by:
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Rancho Cordova, California

November 2013

Project No. SA11161314

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ABBREVIATIONS

AMEC	AMEC Environment & Infrastructure, Inc.
Atlantic Richfield	Atlantic Richfield Company
BOD_5	five-day biochemical oxygen demand
Cd	cadmium
constructed wetland	St. Louis Tunnel Discharge Constructed Wetland
DO	dissolved oxygen
ft/d	foot per day
g/d/gpm	gram per day per gallon per minute
gpm	gallon per minute
H_2S	hydrogen sulfide
HDPE	high-density polyethylene
HRT	hydraulic residence time
IDLH	Immediately Dangerous to Life and Health
MDL	method detection limit
mg/L	milligram per liter
mL	milliliter
mmol SO_4^{2-}/m^3/day	millimole of sulfate per cubic meter per day
Mn	manganese
mV	millivolt
NH_3-N	ammonia as nitrogen
ORP	oxidation reduction potential
Pace	Pace Analytical Laboratory
pilot test	St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test
PPE	personal protective equipment
ppm	part per million
PWTASR	*Preliminary Water Treatment Alternatives Screening Report*
RAWP	Removal Action Work Plan
Report	*St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report*
rhodamine	Rhodamine WT dye
RL	laboratory reporting limit
Rock Drain In	flow control box sampling and monitoring location
Rock Drain MP	rock drain monitoring port
SAP	Sampling and Analysis Plan
SEC	specific electrical conductance
site	Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01, Dolores County, Colorado
Solinst	Solinst water level meter
sonde	YSI 6920 multi-parameter sonde
SOP	Standard Operating Procedure
SRB	sulfate-reducing bacteria
SSF	subsurface flow
su	standard unit
TSEA	Task Safety Environmental Analysis
TOC	total organic carbon
U.S. EPA	United States Environmental Protection Agency
Wetland MP-1	wetland cell monitoring port number one
Wetland MP-2	wetland cell monitoring port number two

ABBREVIATIONS (CONTINUED)

Wetland Out	wetland outlet discharge point sampling and monitoring location
Work Plan	*St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Work Plan*
YSI 556	YSI 556 multi-probe system
Zn	zinc
°C	degree Celsius
µg/L	microgram per liter
-	negative
%	percent
+	positive

EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, Inc., on behalf of Atlantic Richfield Company, prepared this *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report* (Report) to describe activities and results of the St. Louis Tunnel Discharge Constructed Wetland (constructed wetland) Pilot Scale Test (pilot test). As described in the *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Work Plan* (Atlantic Richfield, 2012), the pilot test was designed to assess the treatability of mine water discharging from the St. Louis Tunnel using passive treatment to reduce metals concentrations. The constructed wetland was installed near Pond 9 and consists of an aerobic rock drain for manganese removal, followed by an anaerobic subsurface flow wetland for cadmium and zinc removal.

Constructed wetland construction activities were completed between September and December 2012, concurrent to a microbial colonization period for growth of rock drain manganese-oxidizing bacteria and wetland cell sulfate-reducing bacteria. Baseline matrix sampling was conducted on December 6, 2012. On January 3, 2013, influent and effluent flow rate observations indicated that the constructed wetland had reached steady-state operation and leaked at a rate of approximately 1.6 gallons per minute (gpm; AMEC, 2013a). Baseline water samples were collected on January 4, 2013, and pilot testing commenced as follows.

- January 4 to February 5, 2013 – Target effluent flow rate was 1.5 gpm. Average measured effluent flow rate was 1.6 gpm; average influent flow rate was 3.1 gpm.
- February 5 to March 6, 2013 – Target effluent flow rate was 3 gpm. Average measured effluent flow rate was 2.9 gpm; average influent flow rate was 4.7 gpm.
- March 6 to April 18, 2013 – Target effluent flow rate was 6 gpm. Average measured effluent flow rate was 5.5 gpm; average influent flow rate was 7.4 gpm. On April 11 and 18, the water level in the rock drain had risen such that water flowed over the top of the rock drain geomembrane near the northeastern corner of the cell, preventing continuation of the pilot test at higher flow rates.
- April 18 to May 16, 2013 – Flow reduction and troubleshooting. Flow was shut off and the constructed wetland drained on May 1. Matrix sampling was conducted on May 2 and 3. The constructed wetland was refilled with water on May 16.
- May 17 to September 19, 2013 – Summer pilot testing period. Average measured effluent flow rate was 2.2 gpm; average influent flow rate was 2.7 gpm.

Water levels in the rock drain and wetland cell rose steadily throughout the 3 gpm and 6 gpm test runs. Increasing water levels were attributed to low hydraulic conductivity through the wetland cell, preventing water from exiting the wetland cell as fast as it entered and causing water to back up into the rock drain. Decreased hydraulic conductivity likely was caused by

accumulation of particulate iron, suspended solids, precipitated metal sulfides, and/ or biomass within the wetland cell matrix and filling of matrix pore spaces by entrapment of fine sediment that had been mobilized by increased flow rates.

An initial flush of dissolved iron and arsenic from the rock drain at the start of the pilot test indicated that iron and arsenic present in the rock drain matrix inoculum was released when manganese from the inoculum was dissolved. Gravitational settling of influent particulate iron was observed in the rock drain and interfered with colonization of manganese-oxidizing bacteria, thereby impairing initial manganese removal. Maximum iron deposition was observed during low flow (quiescent) conditions and periods when deeper standing water columns existed above the matrix. Based on these observations, removal of influent iron prior to treatment in a rock drain or anaerobic wetland is recommended. The following additional design considerations are recommended for a larger-scale wetland to address the hydraulic conductivity issues observed during the pilot test:

- Slope the flowpath for both the top and bottom matrix surfaces;
- Improve the inlet flow control structure design to distribute influent laterally;
- Improve hydraulic controls to allow water level adjustments for each cell; and
- Modify the wetland cell matrix by increasing the volume of inert rock and using 1.5-inch or larger diameter rock and wood chips.

Despite the hydraulic limitations of the constructed wetland, metals removal was successful. The aerobic rock drain effectively reduced dissolved manganese concentrations from an average influent of 1,640 µg/L (greater than 99 percent [%] dissolved) to less than 100 micrograms per liter (µg/L). The lowest detected dissolved manganese concentration at the downstream end of the rock drain was 6.8 µg/L (Y-flagged by the laboratory to indicate that method quality control criteria were exceeded).

Both the rock drain and wetland cells effectively removed influent cadmium and zinc. As much as 85% of dissolved cadmium and 65% of dissolved zinc were removed through the rock drain, likely due to sorption to manganese oxides formed in the rock drain. The wetland cell further removed as much as 95% of dissolved cadmium and more than 99% of dissolved zinc entering from the rock drain. Effluent dissolved cadmium and zinc concentrations were consistently less than the laboratory reporting limits of 0.5 µg/L and 10 µg/L, respectively. These results indicate that organic carbon degradation and biological sulfate reduction, and consequent removal of cadmium and zinc sulfide precipitates, can effectively occur at water temperatures between 2 degrees Celsius (°C) and 15°C, which is below the optimal temperature range of 15°C to 25°C.

ST. LOUIS TUNNEL DISCHARGE
CONSTRUCTED WETLAND PILOT SCALE TEST
COMPLETION REPORT

Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01
Dolores County, Colorado

1.0 INTRODUCTION

AMEC Environment & Infrastructure, Inc. (AMEC), on behalf of Atlantic Richfield Company (Atlantic Richfield), has prepared this *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Completion Report* (Report) to describe the activities and results of the St. Louis Tunnel Discharge Constructed Wetland (constructed wetland) Pilot Scale Test (pilot test). This Report was developed pursuant to Task F Subtask F2 of the *Removal Action Work Plan* (RAWP) attached to the *Unilateral Administrative Order* issued to Atlantic Richfield by the United States Environmental Protection Agency (U.S. EPA) on March 9, 2011 (Docket No. 08-2011-0005; U.S. EPA, 2011) for the Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01, Dolores County, Colorado (site; Figures 1 and 2). The RAWP requires that design studies be performed following the completion of a Preliminary Water Treatment Alternatives Screening Report (PWTASR) to compare alternatives and support water treatment system designs. The PWTASR was submitted to U.S. EPA in November 2011 and identified a number of data gaps pertaining to the screening of technologies and alternatives (Copper, 2011).

As described in the *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Work Plan* (Work Plan; Atlantic Richfield, 2012), the pilot test was designed to assess the treatability of mine water discharging from the St. Louis Tunnel using a passive treatment system as a potential final treatment or polishing step to reduce manganese (Mn), cadmium (Cd), and zinc (Zn) concentrations prior to discharge to the Dolores River. The pilot test passive treatment system was constructed near Pond 9 (Figure 3) during the autumn of 2012 and consists of an aerobic rock drain for manganese removal, followed in series by an anaerobic subsurface flow wetland for cadmium and zinc removal (Figure 4). Additional information regarding pilot test objectives, process chemistry, conceptual design, and evaluation criteria are available in the Work Plan. Construction activities and as-built conditions are described in the *Construction and Pre-Implementation Report* (AMEC, 2013).

This Report describes pilot testing activities and results for baseline sampling conducted in December 2012; test runs conducted at target effluent flow rates of 1.5 gpm, 3 gpm, and 6 gpm

between January and April 2013 (winter pilot testing); and one test run conducted at an effluent flow rate of approximately 2 gpm between May and September 2013 (summer pilot testing).

All tasks described herein were performed in accordance with the Task Specific Health and Safety Plans prepared by Atlantic Richfield's contractors. Risk Assessments, Task Safety Environmental Analyses (TSEAs), Standard Operating Procedures (SOPs), and any required permits were completed prior to initiating the work described herein.

2.0 TEST RUN IMPLEMENTATION DESCRIPTIONS

The section provides a general summary of the construction, pre-implementation, and field operation and monitoring activities conducted in support of the pilot test. Construction of the constructed wetland commenced in September 2012. After completing most general construction activities in November 2012, hydraulic testing and associated repairs and improvements were conducted during November and December 2012, concurrent to a microbial colonization period for growth of manganese-oxidizing bacteria in the rock drain cell and sulfate-reducing bacteria (SRB) in the wetland cell. On December 6, 2012, baseline matrix sampling was conducted. Hydraulic testing and subsequent monitoring demonstrated that the rock drain cell leaked at a rate of approximately 1.6 gpm (AMEC, 2013). Therefore, on December 13, 2012, the system influent flow rate was set to 3.5 gpm, as measured by an electromagnetic flowmeter (Figure 4), to target the first pilot test run effluent rate of 1.5 gpm, based on bucket testing the wetland effluent.

When personnel returned to the treatment system on January 3, 2013, the influent flow rate was 3.3 gpm, and the effluent flow rate was approximately 1.7 gpm (based on bucket testing). On January 4, 2013, baseline analytical samples were collected, field sulfide testing was performed, and water quality parameters were measured using a calibrated YSI 556 multi-probe system (YSI 556) in general accordance with the Sampling and Analysis Plan (SAP; Appendix A of Atlantic Richfield, 2012) procedures at the following locations (Figure 4).

- Flow control box (referred to as "Rock Drain In")
- Monitoring port at the effluent (southern) end of the rock drain ("Rock Drain MP")
- Wetland cell monitoring port number one, located at the influent (northern) end of the wetland cell ("Wetland MP-1")
- Wetland cell monitoring port number two, located at the effluent (southern) end of the wetland cell ("Wetland MP-2")
- Wetland outlet discharge point ("Wetland Out")

The following sections describe the specific flow rates and activities conducted during each phase of the pilot test. A summary of pilot test activities by date is provided in Table 1. Photographs documenting changes to the system over time are provided in Appendix A.

2.1 WINTER TEST RUN: 1.5 GPM

The first pilot test run targeted an effluent flow rate of 1.5 gpm. To accommodate for the approximately 1.6 gpm loss, the influent flow rate to the rock drain cell was set to approximately 3.1 gpm for the duration of the test run by adjusting the gate valve located upgradient of the electromagnetic flowmeter on the rock drain inlet pipe (Figure 4). The 1.5 gpm test run commenced on January 4, 2013, following the collection of baseline water samples. Subsequent water sampling was conducted on January 9, 16, and 22 and February 5, 2013.

Wetland inspections and general maintenance were performed throughout the test run. On January 8, 2013, wetland outlet piping construction was completed to include a vertical four-inch section of polyvinyl chloride (PVC) pipe that would allow continuous in-situ water quality monitoring using a YSI 6920 multi-parameter sonde (sonde). Five sondes were deployed on January 8, 2013, at the Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out monitoring locations and programmed to record hourly water quality parameters. Wetland inspections, sonde calibration checks, and general maintenance were performed throughout the test run.

Hydrogen sulfide (H_2S) gas surveys were conducted on January 15 and 16, 2013, to determine if H_2S gas was present at the constructed wetland. The 1.5 gpm test run concluded on February 5, 2013, after five weeks of pilot testing. Week five water samples were collected, and the influent flow rate was increased to begin the subsequent test run.

2.2 WINTER TEST RUN: 3 GPM

The second pilot test run targeted an effluent flow rate of 3 gpm. To accommodate for the approximately 1.6 gpm loss through the rock drain cell, the influent flow rate to the rock drain cell was set to approximately 4.6 gpm on February 5, 2013. To maintain the target effluent flow rate, influent flow rate adjustments were made on February 6, 13, and 19, 2013, by slightly closing (February 6) or opening (February 13 and 19) the gate valve on the rock drain inlet pipe (Figure 4). Subsequent water sampling was conducted on February 13, 19, and 27 and March 6, 2013. A H_2S gas survey was conducted on February 6, 2013. The first of two tracer studies conducted through the wetland cell commenced on February 19, 2013. During inspections, water levels in both the rock drain and wetland cells were observed to rise gradually throughout the test run.

Wetland inspections, sonde calibration checks, and general maintenance were performed throughout the test run. Due to observed interferences between dissolved oxygen (DO) membrane sensors and H_2S gas present in the constructed wetland, on February 13, 2013, sondes were removed from the Rock Drain MP, Wetland MP-1, Wetland MP-2 (removed on February 6, 2013), and Wetland Out monitoring locations and shipped to the manufacturer for installation of optical DO sensors. Sondes were calibrated and re-installed on February 19, 2013.

The 3 gpm test run concluded on March 6, 2013, after four weeks of pilot testing. Week four water samples were collected, and the influent flow rate was increased to begin the subsequent test run.

2.3 WINTER TEST RUN: 6 GPM

The third pilot test run targeted an effluent flow rate of 6 gpm. To accommodate for the approximately 1.6 gpm loss through the rock drain cell, the influent flow rate to the rock drain cell was set to approximately 7.8 gpm on March 6, 2013. To maintain the target effluent flow rate, influent flow rate adjustments were made on March 7 and 13, 2013, by closing the gate valve on the rock drain inlet pipe (Figure 4). Water sampling was conducted on March 12, 19, and 26 and April 1, 11, and 18, 2013. A H_2S gas survey was conducted on March 13, 2013.

During inspections, water levels in both the rock drain and wetland cell were observed to rise steadily throughout the test run, resulting in standing water near both Wetland MP-1 and the center of the wetland cell. On March 13, 2013, hay bales were broken apart and placed across the northern end of the wetland cell to minimize surface flow across the top of the matrix material. Slug testing was performed on March 12 and 14, 2013, to quantify hydraulic conductivity through the wetland cell. The second of two wetland cell tracer studies commenced on March 14, 2013.

Wetland inspections and general maintenance were performed throughout the test run. Small leaks at wetland effluent bulkhead fittings installed as part of the outlet manifold (Figure 4) were observed and mitigated on both March 12 and 26, 2013, by tightening hose clamps on the rubber gaskets. A minor leak also was observed at the flow control box overflow pipe fitting on April 11, 2013. This leak did not affect system performance.

On April 11, 2013, the water level in the rock drain had risen to an elevation that permitted water to flow over the top of the rock drain geomembrane near the northeast corner of the cell. During a subsequent inspection on April 18, 2013, water was again observed to be flowing over the top of the rock drain geomembrane near the northeast corner of the cell. Therefore, the 6 gpm test

run concluded on April 18, 2013, after six weeks of pilot testing. The final water sampling event was conducted on April 18, 2013.

2.4 FLOW REDUCTION AND TROUBLESHOOTING

Due to the overflow conditions observed in the rock drain, the anticipated 10 gpm test run was canceled. In an attempt to decrease water levels and mitigate the overflow conditions, the influent flow rate was decreased to 4.7 gpm after completing water sampling activities on April 18, 2013. Sediment also was bailed from the bottoms of the Wetland MP-1 and Wetland MP-2 standpipes. A H_2S gas survey was conducted on April 25, 2013, and flow was shut off to the constructed wetland on May 1, 2013, to perform rock drain and wetland cell matrix sampling on May 2 and 3, 2013. Due to concerns that rock from the rock drain may have filled the divider wall bulkhead fittings between the rock drain and wetland cell (Figure 4) and restricted flow, the flow remained shut off to facilitate repairs.

On May 16, 2013, 0.5-inch plastic mesh netting was installed over the openings to the rock drain inlet pipe and the divider wall bulkhead fittings on both the rock drain and wetland cell sides to mitigate potential blockages. A wetland inspection was performed, and flow was returned to the constructed wetland at an influent flow rate of approximately 3.2 gpm to target an effluent flow rate of 1.5 gpm.

Subsequent inspections were performed on May 17, 2013, to confirm flow rates and conditions. The wetland cell still appeared to be filling the morning of May 17, as indicated by increasing effluent flow rates with each bucket test. By that afternoon, the effluent flow rate appeared to have stabilized at approximately 2.3 gpm, indicating that the constructed wetland had reached steady-state.

2.5 SUMMER TEST RUN: 2 GPM

Summer pilot testing commenced the afternoon of May 17, 2013, with an effluent flow rate of approximately 2.3 gpm and an influent flow rate of approximately 2.9 gpm. This indicated that the constructed wetland leak had decreased from approximately 1.6 gpm during winter pilot testing to approximately 0.6 gpm. An average[1] flow loss of 0.5 gpm was noted for the duration of summer pilot testing. During inspections performed on both May 17 and 21, 2013, the wetland cell effluent appeared black, likely due to entrainment of organic matter and/or metal sulfides. The effluent color had returned to normal (clear) by May 29, 2013.

[1] All average calculations were time-weighted with the exception of thermister temperature data, which was collected hourly and therefore did not require time-weighting.

During summer pilot testing, flow rates were adjusted on July 26 and August 14, 2013, to maintain a minimum effluent flow rate of 2 gpm. This flow rate was selected to avert the overflow conditions experienced during higher flow rate test runs. Influent flow rate adjustments were made by closing the gate valve on the rock drain inlet pipe (Figure 4). The screen covering the rock drain inlet pipe in the flow control box was cleaned by wiping away deposited iron and sediment on May 17, July 26, August 14, and August 27.

Summer pilot test water sampling and H_2S gas surveys were conducted approximately monthly on June 18, July 10, August 14, and September 19, 2013. Additional constructed wetland inspections were performed approximately every two weeks. During inspections, water levels in both the rock drain and wetland cell were observed to rise steadily. Minimal standing water was observed near Wetland MP-1 and the center of the wetland cell at the start of the summer pilot test; by September 19, 2013, standing water also was observed in the rock drain. However, overflow conditions never were approached.

Summer pilot testing concluded with a final water sampling event on September 19, 2013, after approximately 18 weeks of testing.

3.0 FIELD OBSERVATIONS AND MONITORING

To monitor the constructed wetland and develop an understanding of system operations, field inspections were performed approximately weekly during the winter pilot test and every two weeks during summer pilot testing. Field observations were noted and photographed and system parameters were recorded during inspections and in conjunction with each sampling event. The following sections describe field observations, field monitoring parameters, measurement methods, and results for each test run.

3.1 FIELD OBSERVATIONS

This section briefly describes the visual observations made during periodic inspections of the constructed wetland. Photographs taken during these inspections are presented in Appendix A.

3.1.1 Rock Drain

Throughout the winter pilot test, as water levels rose in the rock drain, it was observed that the black, high-density polyethylene (HDPE) balls placed atop the rock matrix began to float. This resulted in a uniform flat surface covered by the HDPE balls in low areas of the rock matrix surface, as indicated in photographs of the rock drain beginning March 6, 2013 (Appendix A). By April 11, 2013, nearly all of the HDPE balls appeared to be floating, indicating that the water level in the rock drain was rising (Section 3.2.3) and that most of the rock drain was submerged.

During winter pilot testing, snow drifts accumulated on the western side of the rock drain, which was shadowed from the afternoon sun. Little snow appeared to accumulate across the rest of the rock drain, and snow that did accumulate appeared to melt quickly. Snowmelt and other precipitation events were considered nominal inputs to the constructed wetland overall and therefore were not quantified in metals removal calculations (Section 4.0).

Iron deposition was observed within the rock drain, with most notable accumulation observed near the northern, influent end (Appendix A). During potholing activities conducted on February 14, 2013, suspended particulate matter appeared to flow upward when disturbed from near the inlet pipe opening. Iron appeared to have settled on the top surfaces of rocks within the rock drain matrix, with decreasing deposition observed along the length of the rock drain. Also during potholing activities, manganese deposits were observed on the undersides of some of the rocks. More notable manganese deposition was observed during subsequent matrix sampling conducted in May 2013 (Section 5.1).

3.1.2 Wetland Cell

During winter pilot testing, snow drifts accumulated within the wetland cell, primarily in areas with no standing water. Little snow appeared to accumulate in areas with standing water, indicating the water temperatures remained warm enough to prevent surface water from freezing.

Surface water was observed in the wetland cell as early as January 3, 2013, though the presence of snow made it less apparent until approximately January 22. Throughout the winter pilot test, as water levels rose in the wetland cell, the presence of a transition zone at the influent end of the wetland cell became apparent, where aerated water from the rock drain entered the wetland cell. Small amounts of filamentous green algae and iron deposits were observed in the northeastern corner of the wetland cell as early as February 6, 2013 (Appendix A). These deposits expanded laterally as water levels slowly rose and soon were observed across the lateral extent of the northern end of the wetland cell. The placement of hay bales across the northern end of the wetland cell on March 12, 2013, helped contain the spread of these deposits. After the stagnant period in May 2013, green algae were not observed until the June 3, 2013, inspection. Thereafter, green algae and various aquatic macro-organisms were observed for the duration of summer pilot testing.

Saturated surface areas downgradient of the transition zone were observed to be black in color early as January 3, 2013 (Appendix A), indicating the presence of metals sulfides at the surface

of the matrix.[2] White deposits, believed to be elemental sulfur, were observed to coat some matrix material near the edges of standing water. The extent of these white deposits slowly increased over the duration of winter pilot testing, indicating a steep gradient for the oxic/anoxic zone near the water surface.

During summer pilot testing, black and white surface deposits were again observed on saturated areas of the surface of the wetland cell. These areas appeared to become colonized by photosynthetic purple sulfur bacteria in June 2013, as indicated by pink and purple surface deposits. By July 26, 2013, most saturated areas of the wetland cell appeared to have been colonized. On August 27, 2013, green surface deposits began to appear within the purple deposits, possibly indicating the presence of photosynthetic green sulfur bacteria.

Black and white surface deposits also were observed at the wetland effluent throughout the pilot test. Black deposits indicative of metal sulfides accumulated on the ground surface below the wetland effluent discharge point and along the effluent surface flow path to Pond 9. These black deposits were coated with creamy, white, filamentous deposits indicative of biofilm and elemental sulfur (Section 5.2). Black deposits also were observed within Pond 9, where a notable mixing zone was observed between the Pond 9 water (reddish in color) and the black and milky-white area affected by the wetland effluent. The detection of hydrogen sulfide in the wetland effluent implied that the black deposits in Pond 9 were metal sulfides and the white suspension was elemental sulfur.

3.2 FIELD PARAMETER METHODS

Field parameters measured during the winter pilot test included flow rates, water level elevations, monitoring port depths, and water quality parameters. In addition, thermisters installed in the rock drain and wetland cells data logged matrix temperatures at multiple depths and locations. Table 2 provides a summary of field parameters and methods. The following paragraphs describe the specific instruments and field methods employed during the pilot test.

3.2.1 Influent Flow Rate and Total Cumulative Volume

Influent flow rates and total cumulative volume into the constructed wetland were measured using an electromagnetic flowmeter. The flowmeter assembly was installed along the rock drain inlet pipe in a subterranean irrigation system valve box with a removable cover, located downstream of the gate valve and upstream of the rock drain cell (Figure 4). The flow meter

[2] The black material was collected in the field and found to have a sulfur odor, confirming that it was a metal sulfide.

indicated the influent flow rate and total cumulative flow in units of gpm and gallons, respectively.

3.2.2 Effluent Flow Rate

Effluent flow rates at Wetland Out were measured using a level plastic bucket with a pre-measured line indicating five gallons. Bucket tests were conducted by placing the bucket under the Wetland Out discharge point and measuring the amount of time needed to fill the bucket to the five-gallon mark. For each flow measurement, a minimum of three bucket tests were performed, and results were averaged to determine the approximate effluent rate.

3.2.3 Water Level Elevation

Water level elevations were determined for Rock Drain MP, Wetland MP-1, and Wetland MP-2 using a Solinst water level meter (Solinst). The Solinst provided depth-to-water readings from the tops of the monitoring port standpipes, which in turn were used to calculate the water surface elevations based on surveyed monitoring port elevations. Depths were measured from a single, marked point on each standpipe to ensure consistent readings. In addition to water levels within the monitoring ports, water levels outside the monitoring ports were measured to quantify changes in surface water depths as surface water levels increased in the rock drain and wetland cells.

3.2.4 Monitoring Port Total Depth

Monitoring port total depths were measured periodically to determine if material was accumulating in the monitoring port standpipes. Total depths were measured using a Solinst with the meter lowered to the bottom of the monitoring port; depths in turn were used to calculate bottom of monitoring port elevations based on surveyed monitoring port elevations. Corrections were made to depth measurements to accommodate for the Solinst sensor tip length of 3.25 inches.

3.2.5 Water Quality Parameters

Water quality monitoring was performed at Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out using a handheld YSI 556 calibrated prior to each use in general accordance with the manufacturer's specifications, the SAP (Appendix A of Atlantic Richfield, 2012), and associated SOPs. In addition, continuous data-logging sondes deployed at each of these locations recorded hourly water quality parameters during winter pilot testing. Sondes were removed for inspections and calibrations periodically during winter pilot testing (as identified in Table 1) and after winter pilot testing; sondes were re-deployed in July 2013 for summer pilot testing. Parameters measured included water temperature, specific electrical

conductance (SEC), DO, oxidation reduction potential (ORP), and pH. Sondes were inspected approximately weekly during winter pilot testing and approximately every two weeks during summer pilot testing and cleaned if necessary, following the manufacturer's recommendations. Sonde calibration checks were performed as-needed based on comparisons between real-time YSI 556 data and sonde data. Water quality parameter trends revealed that the measurements obtained by sondes generally were well-correlated to those measured in the field using the YSI 556.

Low DO concentrations were difficult to quantify in anoxic locations of the constructed wetland due to sensor fouling from sulfide precipitation and interferences from H_2S gas.[3] These factors caused erroneous DO measurements from sondes located at Wetland MP-2 and Wetland Out. Membrane sensors on all of the sondes were replaced with optical DO sensors during the 3 gpm test run. However, membrane fouling was still encountered at Wetland MP-2 and Wetland Out. Therefore, sonde DO data at those two locations was determined to be unreliable, and DO sensors were removed from the Wetland MP-2 and Wetland Out sondes. Where sonde DO data was unreliable or unavailable, YSI 556 data was reported.

During periodic sonde calibration checks, sondes were temporarily removed from monitoring locations to clean and calibrate the sensors. It was observed that after each such event, the response time required for ORP sensors to re-equilibrate in source water was slow; over periods of several hours to several days, ORP readings slowly climbed from near-neutral toward positive ORP measurements or slowly dropped toward negative ORP measurements.

3.2.6 Thermister Matrix Temperature Data

Thermisters consisting of 30-inch stainless steel probes (Omega brand) were installed vertically to monitor temperatures within the rock drain and wetland cell matrices (Figure 4). One thermister was installed near the western edge of the rock drain approximately midway along its length ("Rock Drain Thermister"). Two thermisters were installed along the western edge of the wetland cell, spaced approximately one third and two thirds of the distance along its length ("Northern Wetland Thermister" and "Southern Wetland Thermister"). Each thermister probe was configured with six thermocouples spaced at six-inch vertical intervals along the length of the probe, identified as "L1" through "L6". The L1 thermocouples were located deepest in the matrix material and measured temperatures a distance of one inch above the bottom tip of the probe. Thermocouples L2 through L5 also were buried in the matrix material, while

[3] Sensor fouling is inherent to taking measurements at the oxic/anoxic interface. Despite repeated attempts to clean the sensors, ORP measurements are more reliable and better indicators of anaerobic conditions in that environment.

thermocouples L6 (30 inches above the bottom tip of the probe) were exposed to the atmosphere.

Temperatures measured by the three thermisters were logged hourly beginning on January 22, 2013, and data was downloaded and reviewed periodically during routine inspections. The Northern Wetland Thermister L1 thermocouple lost calibration on February 8, 2013, at 17:00 and began logging erroneous data points. Therefore, subsequent Northern Wetland Thermister L1 data were omitted. The Southern Wetland Thermister L3 thermocouple lost calibration on July 16, 2013, at 20:00 and began logging erroneous data points; subsequent Southern Wetland Thermister L3 data were omitted.

3.3 Flow Rates and Water Level Elevations

The following sections describe the influent and effluent flow measurements, water level measurements, and trends observed during the pilot test. Influent and effluent flow rates, cumulative flow volumes, and monitoring port water elevations are presented in Table 3. Flow trends are displayed on Figure 5; water elevation trends are displayed on Figure 6.

3.3.1 Winter Test Run: 1.5 gpm

The 1.5 gpm test run was conducted over a period of 32 days between January 4 and February 5, 2013. The average effluent flow rate during the 1.5 gpm test run was 1.6 gpm, with measured effluent flow rates ranging from 1.4 gpm to 2.2 gpm. The average influent flow rate was 3.1 gpm, based on recorded influent flow rates ranging from 3.0 to 3.3 gpm. Both influent and effluent flow rates slightly decreased over the course of the test run. Water levels at both Rock Drain MP and Wetland MP-1 rose slightly over the course of the 1.5 gpm test run (less than one inch), while Wetland MP-2 water levels remained unchanged.

A total of approximately 145,000 gallons of influent was recorded during the 1.5 gpm test run, averaging approximately 4,400 gallons per day.

3.3.2 Winter Test Run: 3 gpm

The 3 gpm test run was conducted over a period of 29 days between February 5 and March 6, 2013. The average effluent flow rate during the 3 gpm test run was 2.9 gpm, with measured effluent flow rates ranging from 2.8 gpm to 3.3 gpm. The average influent flow rate was 4.7 gpm, and recorded influent flow rates ranged from 4.6 gpm to 4.8 gpm.

Influent flow rates gradually decreased between measurements over the course of the test run. Consequently, effluent flow rates also gradually decreased. To maintain the target effluent flow rate, the influent flow rate was adjusted using the gate valve on the rock drain inlet pipe

(Figure 4) on February 6, 13, and 19, 2013, as indicated by small jumps in flow rate (Figure 5). Water levels at both Rock Drain MP and Wetland MP-1 gradually increased over the course of the 3 gpm test run (1.6 inches and 1.2 inches, respectively), while Wetland MP-2 water levels remained essentially unchanged, similar to trends observed during the 1.5 gpm test run. As water levels rose during the 3 gpm test run, standing water above the matrix material began to be observed within the rock drain and wetland cells. Water surface elevations were measured outside of Rock Drain MP and Wetland MP-1 beginning on March 6, 2013, when standing water became deep enough to measure. In general, Rock Drain MP water surfaces inside and outside the monitoring port standpipes were well correlated throughout the 3 gpm and 6 gpm test runs. However, the water surface elevation outside Wetland MP-1 was observed to be as much as an inch higher than the water surface elevation inside the monitoring port (measured on March 19, 2013).

A total of approximately 195,000 gallons of influent was recorded during the 3 gpm test run, averaging approximately 6,700 gallons per day.

3.3.3 Winter Test Run: 6 gpm

The 6 gpm test run was conducted over a period of 43 days between March 6 and April 18, 2013. The average effluent flow rate during the 6 gpm test run was 5.5 gpm, with measured effluent flow rates ranging from 6.2 gpm near the start of the test run (March 13, 2013) to 4.2 gpm at the end of the test run (April 18, 2013). The average influent flow rate was 7.4 gpm, with recorded influent flow rates ranging from 7.8 gpm at the start of the test run (March 6, 2013) to 7.0 gpm at the end of the test run (April 18, 2013).

Both influent and effluent flow rates generally decreased between measurements over the course of the test run. To maintain the target effluent flow rate, the influent flow rate was adjusted by slightly opening the gate valve on the rock drain inlet pipe (Figure 4) on March 7, 13, 19, and 26, 2013. Thereafter, influent and effluent flow rates were allowed to steadily decrease for the remainder of the test run. During this time, it was observed that effluent flow rates decreased more rapidly than influent rates, which was attributed to the overflow of water observed over the rock drain geomembrane on April 11 and 18, 2013. Water levels at Rock Drain MP and Wetland MP-1 increased substantially during the 6 gpm test run (3.7 inches and 3.6 inches, respectively), resulting in the overflow of water over the top of the rock drain geomembrane. This overflow indicated that the constructed wetland had exceeded its hydraulic capacity. Wetland MP-2 water levels remained essentially unchanged, increasing by a mere 0.24 inch.

A total of approximately 456,000 gallons of influent was recorded during the 6 gpm test run, averaging approximately 10,600 gallons per day.

3.3.4 Flow Reduction and Troubleshooting

Flow reduction and troubleshooting commenced on April 18, 2013, when the influent flow rate was reduced to 4.7 gpm. Average effluent and influent flow rates over the following 13 days were 3.0 gpm and 4.4 gpm, respectively. After reducing the influent flow rate, water levels at both Rock Drain MP and Wetland MP-1 decreased immediately by 0.6 inch and 1.2 inches, respectively. Thereafter, water levels in Rock Drain MP decreased slightly, while Wetland MP-1 water levels increased steadily until flow to the constructed wetland was turned off on May 1, 2013.

A total of approximately 82,000 gallons of influent was recorded during the flow reduction period, averaging approximately 6,300 gallons per day.

3.3.5 Summer Test Run: 2 gpm

Summer pilot testing was conducted over a period of 125 days between May 17 and September 19, 2013. The average effluent flow rate during summer pilot testing was 2.2 gpm, with measured effluent flow rates ranging from 1.9 gpm to 2.9 gpm. The average influent flow rate was 2.7 gpm, and recorded influent flow rates ranged from 2.4 gpm to 3.3 gpm.

Influent flow rates gradually decreased between measurements over the course of summer pilot testing.[4] To maintain a minimum effluent flow rate of 2 gpm, the influent flow rate was adjusted by slightly opening the gate valve on the rock drain inlet pipe (Figure 4) on July 26 and August 14, 2013, as indicated by small jumps in flow rate (Figure 5). The screen covering the rock drain inlet pipe in the flow control box was cleaned by wiping away deposited iron and sediment on May 17, July 26, August 14, and August 27, 2013.

Water levels at both Rock Drain MP and Wetland MP-1 rose substantially over the course of summer pilot testing, increasing by 3.1 inches and 3.0 inches, respectively (Table 3 and Figure 6). Wetland MP-2 water levels remained essentially unchanged until the latter half of August 2013, after which time water levels rose by nearly 0.5 inch. As water levels rose, standing water above the matrix material again was observed within the rock drain and wetland cells. Although constructed wetland water levels were never high enough to permit measuring depth to water outside of the Rock Drain MP standpipe, standing water outside of Wetland MP-1 became deep enough to measure on August 27, 2013. Water surface elevations measured

[4] Flow rates drifted, the cause of which is presently unknown and could not be resolved.

inside and outside of Wetland MP-1 were the same, indicating that the substantial gradient observed during the higher flow rate test runs was not present at the 2 gpm flow rate. Standing water was never observed outside of the Wetland MP-2 standpipe.

A total of approximately 489,000 gallons of influent was recorded during summer pilot testing, averaging approximately 3,900 gallons per day.

3.3.6 Hydraulic Observations

Water levels in both the rock drain and wetland cells were observed to increase steadily throughout every test run (Figure 6). A generally upward linear trend in the Wetland MP-1 water level was observed over the course of pilot testing, with different slopes observed during each test run (Figure 6). Standing water was observed in areas of the wetland cell as early as January 2013. In contrast, water levels in Wetland MP-2 were relatively stable during each test run, increasing in a somewhat step-like fashion with each subsequent test run and never exceeding the surface of the wetland cell matrix (Figure 6).

The water levels observed in Rock Drain MP did not change as linearly as those in Wetland MP-1 (Figure 6). Consequently, the gradient between Rock Drain MP and Wetland MP-1 was somewhat erratic but increased over time from the start of the 3 gpm test run through approximately the first ten days of the 6 gpm test run. Between April 1 and April 11, 2013, the Rock Drain MP water level appeared to stabilize, and the gradient between Rock Drain MP and Wetland MP-1 decreased. These observations indicated that water backed up into the rock drain from the wetland cell. Rock Drain MP and Wetland MP-1 water levels continued to rise until overflow occurred at the lowest point in the constructed wetland geomembrane, which happened to be located in the northeast corner of the rock drain. Overflow was first observed on April 11, 2013. However, between March 26 and April 1, 2013, the constructed wetland effluent flow rate began to decrease (Figure 5), indicating that overflow from the constructed wetland may have commenced prior to the observed overflow on April 11, 2013.

Increasing water levels were attributed to decreasing hydraulic conductivity through the wetland cell, leading to an inability for water to exit the wetland cell as fast as it entered. Potential causes of decreased hydraulic conductivity may have included some or all of the following:

- Matrix consolidation,
- Accumulation of particulate iron, suspended solids, precipitated metal sulfides, and/or biomass within the wetland cell matrix (Sections 4.6 and 5.2), and
- Increased flow rates mobilizing and pushing fine sediment into pore spaces.

Matrix consolidation or compaction was observed during the colonization period (November and December 2013), shortly after the constructed wetland was first saturated. This resulted in the need to lower the wetland effluent bulkhead fitting elevations (AMEC, 2013). However, notable consolidation is not believed to have occurred after initial operation of the constructed wetland.

In order to more effectively evaluate the constructed wetland hydraulics, the constructed wetland apparent hydraulic conductivities throughout pilot testing were calculated using Darcy's law. The apparent hydraulic conductivity does not necessarily bear any resemblance to the actual hydraulic conductivity of the media because of many potential inconsistencies between the field conditions and the assumptions associated with Darcy's law (e.g., steady state conditions, no change in storage, no transient flow effects). However, it does provide a "relative" look at what may be happening in the media.

Three stages in the apparent hydraulic conductivity curve were observed during winter pilot testing (Figure 7). During the first "filling" stage, filling of available storage in the media likely played a significant role in keeping the hydraulic gradient artificially low, which yielded unreasonably high initial hydraulic conductivity values (approximately 13,000 feet per day [ft/d] to 31,000 ft/d). Hydraulic conductivity decreased as water levels gradually increased and voids within the matrix filled with water. The second "equilibrium" stage occurred during the 3 gpm test run as the apparent hydraulic conductivity bounced around in a relatively small range from approximately 6,300 ft/d to 10,000 ft/d. During the third "overflow" stage, the apparent hydraulic conductivity appeared to decline linearly, dropping to approximately 3,000 ft/d by the end of the 6 gpm test run. These values may have been even lower due to the presence of surface water short-circuiting over the top of the matrix in some locations.

During the start of the summer test run, effluent flow rates increased to as high as 2.9 gpm on May 29, 2013, before slowly decreasing again (Figure 5). Corresponding to this increase and subsequent decrease of flow rates was an increase and subsequent decrease of water levels measured at Rock Drain MP[5] (Figure 6). As was observed during winter pilot testing, apparent hydraulic conductivities calculated for the summer pilot test indicated "filling" and "equilibrium" stages. Filling of available storage within the media during the month of May 2013 likely yielded artificially high apparent hydraulic conductivity values (approximately 20,000 ft/d). These apparent hydraulic conductivity values decreased as water levels gradually increased and voids within the matrix re-filled with water. Equilibrium appears to have been achieved near the end of July 2013, as the apparent hydraulic conductivity values stabilized at approximately 3,200 ft/d. One interpretation of the increasing water levels observed throughout the summer pilot test

[5] The Wetland MP-1 water level measurement on June 3, 2013, was anomalous but likely correlated well to the water level measured at Rock Drain MP.

(Figure 6) is that, despite the stabilized hydraulic conductivity, overflow conditions may be imminent at a flow rate of approximately 2 gpm. Another interpretation is that the stable apparent hydraulic conductivity may correspond to a gradual stabilization of water levels, indicating that the constructed wetland may have been approaching steady-state conditions for this flow rate near the end of the summer pilot test.

It appears that accumulation of particulate iron, suspended solids, metal sulfides, and/or biomass within the wetland cell matrix, as indicated by the observation of iron deposition at the upgradient end of the wetland cell and accumulation of black metal sulfides within the wetland cell matrix (Appendix A), may have caused pore spaces to become plugged.[6] This would have resulted in the observed decline in hydraulic conductivity and the substantial increase in water levels at Rock Drain MP and Wetland MP-1 when influent flow rates increased (Figures 5 and 6). The sudden increase in water levels indicated that the matrix was not able to move horizontally the amount of water that was being supplied to it. Therefore, a head increase was required to accommodate the flow. This was confirmed by field observations of increasing surface flow at the upgradient end of the wetland cell over the durations of both winter and summer pilot testing (Appendix A). Additionally, slug tests performed at the end of the first week of the winter 6 gpm test run (Section 7.0) indicated that the hydraulic conductivity at Wetland MP-2 was approximately one order of magnitude higher than at Wetland MP-1. The overflow observed in the rock drain confirmed that the constructed wetland was operating in excess of its hydraulic capacity. As the constructed wetland water level was fixed by the elevation of bulkhead fittings at the southern (effluent) end of the wetland cell, no adjustments could be made easily to the outlet elevation to accommodate for the overflow conditions. Therefore, pilot testing could not be conducted at higher flow rates (8 gpm and 10 gpm) as originally planned.

3.4 MONITORING PORT BOTTOM OF STANDPIPE ELEVATIONS

Monitoring port bottom of standpipe elevations were measured throughout the pilot test to quantify any changes to the total depths due to accumulation of sediments. Results are presented in Table 3 and on Figure 6. Due to measurement inconsistencies, only the initial (January 4, 2013) and final (April 18 and September 19, 2013) winter and summer pilot testing elevations are shown on Figure 6.

The Rock Drain MP bottom of standpipe elevation decreased by approximately 0.5 inch over the course of winter pilot testing and an additional 0.6 inch over the course of summer pilot testing. Similarly, the Wetland MP-2 bottom of standpipe elevation decreased by approximately 0.4 inch during winter pilot testing. No notable change was observed during summer pilot testing. These

[6] Available data are not sufficient to distinguish between these possibilities.

decreases in standpipe elevations may have been attributable to measurement error caused by using the Solinst water level sounder to "feel" the bottom of the standpipe; flexibility in the Solinst tape decreased measurement accuracy for this application. They also may have been indicative of slow settlement of the constructed wetland subgrade over time.

The Wetland MP-1 bottom of standpipe elevation increased by approximately 2.2 inches over the course of winter pilot testing. This substantial change was caused by accumulation in the bottom of the standpipe of fine sediments that may have been the result of influent particulate iron, influent suspended solids, precipitated metal sulfides, biomass, and/or decomposition of the wetland cell matrix material. The production of fine sediment and its accumulation in the wetland matrix likely contributed to the reduction of hydraulic conductivity through the wetland cell (Section 3.3.6). Sediment was bailed from the bottom of the Wetland MP-1 standpipe on April 18, 2013, at the start of the flow reduction and troubleshooting period. Subsequently, the Wetland MP-1 bottom of standpipe elevation increased by approximately 0.6 inch over the course of summer pilot testing.

3.5 WATER QUALITY AND MATRIX PARAMETERS

Tabulated water quality data from pilot test inspections and sampling events are presented in Table 4. Water quality comparison trends for YSI 556 and sonde measurements recorded during inspections and sampling events at Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out are displayed graphically on Figures 8 through 12, respectively.

Minimum, average, and maximum water quality parameters for each monitoring location and test run were determined using in situ continuous monitoring data obtained by data-logging sondes.[7] These statistics are provided in Table 5 and vary somewhat from the data presented in Table 4 and on Figures 8 through 12 based on the larger data sets. Average sonde water quality parameter trends for temperature and SEC, DO and ORP, and pH are displayed graphically on Figures 13, 14, and 15, respectively. Continuous sonde data trends for each monitoring location are provided in Appendix B. The minimum, average, and maximum hourly temperatures recorded for each of the three thermisters are provided in Table 6. Temperature trends for each of the thermisters are presented on Figures 17, 18, and 19.

[7] Water quality parameter statistics were based on YSI 6920 multi-parameter sonde data with the exception of DO data at the Rock Drain MP (summer only), Wetland MP-1 (1.5 gpm test run), Wetland MP-2, and Wetland Out and all summer test run data at Wetland MP-1 and Wetland MP-2. For those locations, measurements from a calibrated YSI 556 collected during periodic inspections and sampling events were used (Table 4).

3.5.1 Temperature

Water and matrix temperatures measured by sondes and thermisters generally increased along the length of the constructed wetland for all three winter pilot test runs (Tables 5 and 6; Figures 8 through 12 and 17 through 19). These temperature increases were attributed to the presence of heat trace installed at approximately mid-matrix depth within each cell. Wetland Out water temperatures were slightly lower than Wetland MP-2 water temperatures, likely due to heat loss through effluent piping. Conversely, water temperatures appeared to decrease along the length of the constructed wetland during summer pilot testing, after heat trace was shut off on April 24, 2013 (Figure 13).

The coldest average temperatures at all monitoring locations and thermisters were recorded during the 3 gpm test run (with the exception of Rock Drain In, for which average water temperatures were coldest during the 1.5 gpm test run; Tables 5 and 6 and Figure 13). The warmest average winter pilot testing temperatures at all monitoring locations and thermisters were recorded during the 6 gpm test run (with the exception of Wetland MP-2 and the Wetland Southern Thermister, for which average water temperatures were warmest during the 1.5 gpm test run; Tables 5 and 6 and Figure 13). Both minimum and maximum recorded winter pilot testing temperatures were recorded at all monitoring locations and thermisters during the 6 gpm test run. All minimum matrix temperatures were recorded by the near-surface (L5) thermocouples. The low temperatures recorded on March 26, April 11, and April 18, 2013, corresponded to cold weather patterns in the site geographic area during those time periods (NRCS, 2013).[8] Maximum winter pilot testing temperatures were recorded between April 1 and 8, 2013, and corresponded to a warm weather pattern in the site geographic area (NRCS, 2013). After heat trace was turned off on April 24, 2013, water and matrix temperatures appeared to correlate well to ambient air temperatures (Figures 8 through12; NRCS, 2013).

Thermister data generally indicated that the constructed wetland experienced diurnal temperature swings, with the largest temperature variations in the near-surface (L4 and L5) thermocouples (Figures 17, 18, and 19). The deepest thermocouples, L1 and L2, experienced the least temperature variations. It appeared that periods with snow coverage may have provided insulation from diurnal temperature swings, as indicated by more consistent and generally warmer temperatures during periods following snow accumulation (for example, January 25 and February 21, 2013).

[8] Daily air temperature data from the Scotch Creek SNOTEL site (NRCS, 2013), located approximately four miles south of the site, were used for data analysis. These data are shown graphically on Figures 8 through 12 and are available tabulated in Appendix C.

Matrix temperature trends were not consistent with depth across the constructed wetland (Figures 17, 18, and 19). The deepest (L1) temperatures were generally cooler than the L2 through L5 temperatures for the Rock Drain and Wetland Southern Thermisters during the 1.5 gpm test run, while L1 temperatures generally were warmest at the Wetland Northern Thermister. During the 3 gpm test run, as water levels rose in both the rock drain and wetland cells, the L1 through L3 temperatures became closely correlated, and generally warmer than the L4 and L5 temperatures, for all three thermisters. During the 6 gpm test run, when water levels in the rock drain reached full capacity, temperature readings for all five of the thermocouples (L1 through L5) at the Rock Drain Thermister became well-correlated. Temperature readings remained well-correlated for thermocouples L1 through L3 for both of the wetland cell thermisters. These well-correlated temperatures indicated that vertical temperature gradients were present in the rock drain and wetland cells when water depths were shallower. As water depths increased, vertical temperature gradients became less notable.

Operational water temperatures in the wetland cell were generally lower than preferred for biological sulfate reduction during winter pilot testing. Sulfate reduction typically occurs following the decomposition of organic matter to simple sugars and other metabolic products, which in turn serve as electron donors to SRB. Organic carbon degradation is temperature-sensitive, proceeding much more rapidly between 15 degrees Celsius (°C) and 25°C than below 8°C. In contrast, the utilization of simple organic compounds by SRB is relatively insensitive to temperature and readily occurs below 4°C. Thus, the slow degradation of organic matter at low temperatures becomes the factor limiting sulfate reduction. The effects of temperature on SRB-based biological treatment systems have been demonstrated. Sulfate reduction in systems containing compost- or manure-based substrates averages 100 to 300 millimoles of sulfate per cubic meter per day (mmol SO_4^{2-}/m^3/day) in the winter and 300 to 1,500 mmol SO_4^{2-}/m^3/day in the summer (McIntire and Edenborn, 1990; Wildeman et al., 1998).

Water temperatures from the St. Louis Tunnel discharge historically have been observed to range from approximately 6°C to 21°C at the sampling location DR-3. These temperatures were observed to decrease through the pond system during winter pilot testing, with water temperatures measured at Rock Drain In, approximately 1,500 feet downgradient of DR-3 through the pond system, ranging from approximately 0°C to 13°C. Rock Drain In water temperatures ranged from approximately 13°C to 22°C during summer pilot testing, averaging 17°C (Table 5).

Water temperatures entering the wetland cell (measured at Wetland MP-1) ranged from approximately 2°C to 14°C during winter pilot testing and appeared to have warmed slightly through the rock drain, likely due to the presence of heat trace. Average temperatures

measured at Wetland MP-1 and the Wetland Northern Thermister during all of three of the winter pilot test runs were less than 10°C (Tables 5 and 6). Average temperatures at Wetland MP-2 and the Wetland Southern Thermister were slightly warmer, ranging from approximately 9°C to 11°C.

During summer pilot testing, water temperatures measured at both Wetland MP-1 and Wetland MP-2 ranged from approximately 11°C to 17°C. Average water and matrix temperatures measured at Wetland MP-1, Wetland MP-2, and the Wetland Northern and Southern Thermisters were all approximately 14°C, nearly within the optimal SRB temperature range.

3.5.2 Specific Electrical Conductance

SEC trends indicated generally stable SEC values at all of the monitoring locations over the course of pilot testing (Tables 4 and 5 and Figures 8 through 13). SEC generally increased along the length of the constructed wetland, with notably higher SEC measured at Wetland MP-2 and Wetland Out than at other monitoring locations during the 1.5 gpm and 3 gpm test runs. This increase across the wetland cell was attributed to a greater presence of ions in the wetland cell matrix material than in the influent or rock drain. One constituent of the wetland cell matrix in particular, manure, typically has chloride and nitrate salts present.

SEC appeared to increase slightly over the duration of the winter pilot test at the Rock Drain In, Rock Drain MP, and Wetland MP-1 monitoring locations, while SEC appeared to decrease slightly at Wetland MP-2 and Wetland Out (Figures 8 through 13). The convergence of SEC measurements was possibly caused by water backing up within the rock drain and wetland cells, causing minor mixing throughout the constructed wetland. Early fluctuations in SEC at Wetland MP-2 and Wetland Out reflected start-up processes, such as the consumption of nutrients by SRB within the wetland cell and the slow flushing of salts from the matrix. After several months of operation, the process dominating the production of solutes, reflected in SEC measurements, was the mineralization of organic matter.[9] This was indicated as SEC decreased at all monitoring locations over the course of summer pilot testing, with the lowest SEC values recorded at all locations occurring in August 2013.

SEC varied by less than 15 percent (%) at each monitoring location during each test run. The greatest variation between overall maximum and minimum recorded SEC at each monitoring location was approximately 22% (observed at Wetland Out).

[9] This process has been observed and documented in other treatment wetlands.

3.5.3 Dissolved Oxygen

DO concentrations within the constructed wetland generally decreased at all monitoring locations during the 1.5 gpm and 3 gpm test runs and then gradually began to increase toward the end of the 6 gpm test run (Table 4; Figures 8 through 12). Concentrations decreased sharply during the flow reduction period at all locations except Wetland Out. Summer pilot testing DO concentrations were notably lower than winter pilot testing concentrations, a trend attributed to increasing ambient air temperatures (Figures 8 through 12) and corresponding warmer water temperatures. Oxygen solubility in water tends to decrease as water temperature increases. Furthermore, warmer temperatures may have facilitated increased biological activity and oxygen consumption in the ponds upgradient of the constructed wetland.

Over the course of summer pilot testing, DO concentrations generally remained stable at Rock Drain In and Rock Drain MP, decreased notably at Wetland MP-1, and increased at Wetland MP-2 and Wetland Out. The highest average DO concentrations at all monitoring locations were recorded during the 1.5 gpm test run. Lowest average DO concentrations were measured during summer pilot testing at Rock Drain In, Rock Drain MP, and Wetland MP-1 and during the winter 6 gpm test run at Wetland MP-2 and Wetland Out (Table 5 and Figure 14).

DO concentrations were generally highest at Rock Drain In and decreased along the length of the constructed wetland, as was expected based on the constructed wetland design. Concentrations were lowest at Wetland MP-2 and slightly higher at Wetland Out, likely due to minor aeration in the effluent piping (Figure 14). Relatively high average DO concentrations (Table 5) indicated aerobic conditions in the influent and throughout the rock drain cell, as measured at Rock Drain In and Rock Drain MP, respectively (Figures 8, 9, and 14). This suggests that manganese oxidation was never limited by low DO. Average DO concentrations were greater than 8 milligrams per liter (mg/L) at Wetland MP-1 during winter pilot testing (Figures 10 and 14), indicating the presence of a transition zone at the influent end of the wetland cell, where aerated water from the rock drain entered the wetland cell. The wetland cell transitioned from aerobic to anaerobic conditions along its length, as indicated by average DO concentrations that were consistently less than 2.5 mg/L at Wetland MP-2 and Wetland Out (Figures 11, 12, and 14). Average Wetland MP-1 DO concentrations decreased notably during summer pilot testing, indicating a shorter transition zone and more rapid consumption of DO near the influent end of the wetland during the warmer summer months.

3.5.4 Oxidation Reduction Potential

ORP was monitored to provide insight into the chemical processes occurring within the rock drain and wetland cells. A positive ORP indicative of oxidizing conditions was desired at the

Rock Drain In and Rock Drain MP monitoring locations, where aerobic manganese-oxidizing bacteria were colonized. Biological manganese oxidation is favorable at ORP values ranging from approximately positive (+) 200 millivolts (mV) to +400 mV in water between pH 7 and pH 8 (Gage, *et al.*, 2001). Conversely, a negative ORP indicative of reducing conditions was desired at the Wetland MP-1 and Wetland MP-2 monitoring locations to allow SRB to reduce sulfate to sulfide under anaerobic conditions, thereby facilitating production of metal sulfides. Biological sulfate reduction normally occurs at ORP values ranging from approximately negative (-) 150 mV to -300 mV in water between pH 6 and pH 8 (Postgate, 1984).

Average ORP at Rock Drain In remained at approximately +250 mV for the duration of pilot testing (Table 5 and Figure 14). ORP measurements at Rock Drain MP generally were between +200 mV and +400 mV for all test runs (Tables 4 and 5 and Figures 9 and 14), indicating conditions favorable to biological manganese oxidation. Average Rock Drain MP and Wetland MP-1 ORP increased over the course of winter pilot testing and then decreased during the flow reduction and summer pilot testing periods. ORP at Wetland MP-1 was above 0 mV for the entire winter pilot test, indicating oxidizing conditions in a transition zone where aerated water from the rock drain entered the wetland cell. ORP then decreased to generally negative ORP values during summer pilot testing (Table 4 and Figures 10 and 14). ORP values at Wetland MP-2 and Wetland Out were consistently negative (Table 4 and Figures 11 and 12), indicating that the wetland cell became more reducing along its length. A slight increase in ORP was observed at Wetland Out during summer pilot testing. With the exception of a few isolated measurements, ORP at Wetland MP-2 and Wetland Out were between -200 mV and -450 mV for all test runs, indicating conditions favorable to biological sulfate reduction.

ORP was a difficult parameter to monitor during the pilot test; identical, calibrated ORP sensors were demonstrated to read nearly the same value in a known calibration standard but substantially different values immediately thereafter when placed in the same treatment water. Continuous in situ measurement of ORP by the sondes revealed that the response time required for ORP sensors to become equilibrated in treatment water was quite slow – on the order of hours or days. ORP measurements obtained by sondes after approximately two days in source water appeared to be reliable (Appendix B). Sonde ORP data recorded after equilibration appeared to be more reliable than ORP data obtained by the YSI 556 during routine inspections and water sampling events.

3.5.5 pH

Water pH generally appeared to be stable at all of the monitoring locations over the course of the pilot test (Table 4 and Figures 8 through 12). Water pH varied by less than 7% (0.6 standard unit [su]) at each monitoring location during each test run (Table 5). The greatest variation

between overall maximum and minimum recorded pH at each monitoring location during the pilot test was approximately 9% (0.7 su; observed at Wetland MP-1).

Water pH generally decreased along the length of the constructed wetland, with higher pH measured at Rock Drain In and lower pH measured at Wetland MP-2 and Wetland Out (Table 5 and Figure 15). The generally lower pH in the wetland cell (compared to the rock drain) was attributed to sulfide generation (Section 4.4); dissolved hydrogen sulfide produced through biological sulfate reduction contributed acidity to the wetland cell water.

Average pH increased slightly over time during winter pilot testing and decreased slightly during summer pilot testing at all of the monitoring locations (Table 5 and Figure 15). Increases during winter pilot testing may have been the result of increases in bicarbonate loading in the influent during each subsequent flow rate increase, which would have buffered the acidity generated in the wetland cell somewhat. The lower summer pilot testing flow rate would have resulted in a decrease in bicarbonate loading, thus reducing the buffering capacity of the wetland cell somewhat.

3.5.6 Comparison of Influent and DR-3 Water Quality

To determine if influent constructed wetland was representative of the St. Louis Tunnel discharge, a comparison was made between Rock Drain In pH measurements and measurements collected along the St. Louis Ponds System. Atlantic Richfield conducts monthly water sampling along the pond system at multiple locations, including near the St. Louis Tunnel discharge (DR-3), at the Pond 15 outfall (DR-4), and at the Pond 8 outfall (DR-5). Both DR-3 and DR-4 are located upstream of the constructed wetland, while DR-5 is located downstream (Figure 3).

Based on a subset of DR-3, DR-4, and DR-5 data from December 2010 to June 2013, it appears that pH typically increases through the upper half of the pond system, most likely due to increases in alkalinity from historical lime treatment solids present in the settling ponds, and then decreases in the lower half of the pond system (Figure 16). pH is generally higher at DR-4 than at DR-3 (by as much as 1.0 su). pH measurements at Rock Drain In also were consistently higher than at DR-3 (by as much as 1.2 su). The higher pH measured at Rock Drain In indicates that pilot test metal loading may be lower than metal loading at the St. Louis Tunnel. While pilot test analytical data do indicate the metals removal capabilities of an aerobic rock drain and an anaerobic subsurface flow wetland at the site, these data are not directly comparable to potential metals removal directly from the St. Louis Tunnel discharge. The potential for higher metals loading should be considered for design of a larger-scale wetland, in the event that a larger-scale wetland does not benefit from the pH increase observed through the pond system.

A comparison also was made to determine if alkaline solutions injected into the 517 Shaft (Figure 2) between September 26 and November 7, 2012, and between June 21 and July 9, 2013, may have impacted water quality during the pilot test. During both alkaline solution injection periods, observed pH increases at the St. Louis Tunnel discharge (measured at DR-3A; Figure 3) were minimal. The pH at DR-3A increased from 6.6 su to a maximum of 7.1 su in 2012 and from 6.8 su to a maximum of 7.0 su in 2013. Neither of these pH increases coincided with pH increases observed at the constructed wetland (Figure 16). Therefore, it was concluded that the injection of alkaline solutions into the 517 Shaft had little or no impact on pH at DR-3A and thus no interpreted impact on the pilot test.

4.0 ANALYTICAL RESULTS

Water samples were collected approximately once per week during winter pilot testing and monthly during summer pilot testing to characterize metals removal through the constructed wetland over time and as flow rates varied. Sampling was performed in general accordance with the SAP (Appendix A of Atlantic Richfield, 2012). Water samples were submitted to Pace Analytical Laboratory (Pace) in Lenexa, Kansas, for analysis of total and dissolved metals, sulfate, total organic carbon (TOC), and five-day biochemical oxygen demand (BOD_5). Field sulfide testing was performed immediately following sample collection. Upon completion of the winter pilot test, additional water samples were collected for nitrogen and phosphorus analysis. Table 2 provides a summary of sampling parameters and analytical methods. Analytical results are presented in Tables 7, 8, and 9, and laboratory reports are provided in Appendix D.

The following sections describe the laboratory analytical results and trends observed during the pilot test. Discussion of analytes is limited to those analytes considered to be most indicative of constructed wetland performance. Where laboratory analytical results were non-detect (i.e., less than the laboratory reporting limit [RL]), the RL was used for data analysis and presentation. Where the analytical laboratory provided estimated (J-flagged) values less than the RL but greater than the method detection limit (MDL), those values were used for data analysis and presentation in lieu of the RL. Y-flagged data indicating that laboratory method quality control criteria were exceeded also were incorporated into data analysis and presentation. Such data are flagged accordingly in Tables 7, 8, and 9.

4.1 BIOCHEMICAL OXYGEN DEMAND

BOD_5 samples were collected at the Rock Drain In and Wetland Out monitoring locations and analyzed using a five-day incubation period. BOD_5 results are provided in Table 7, and trends are displayed on Figure 20.

All BOD_5 results for Rock Drain In samples were less than the RL of 2.0 mg/L,[10] indicating little or no oxygen-demanding compounds in the water flowing through the St. Louis Ponds System and into the constructed wetland. In contrast, BOD_5 was consistently detectable in Wetland Out samples, ranging from 15.3 mg/L to 138 mg/L throughout the pilot test. BOD_5 increased from the inlet to the outlet due to dissolution of biodegradable manure and compost materials from the wetland cell matrix and hay bales placed near the inlet and outlet ends of the wetland cell. The trend towards generally decreasing BOD_5 at Wetland Out during the winter pilot test reflected the leaching or biological consumption of organic matter. Organic matter placed within any bioreactor or wetland will leach soluble organic carbon for the first three to six months of operation. Thereafter, leaching of organic carbon will be insignificant, reflected in low BOD_5 in the effluent. The notable increase in Wetland Out BOD_5 between the June and July 2013 sampling events may have been caused by increased BOD_5 contributions from growth of algae and wetland plants during early summer, degradation of more complex forms of organic matter due to warmer ambient temperatures, and/or transport of accumulated dissolved organic carbon through the wetland cell after flow was resumed on May 16, 2013.

4.2 TOTAL ORGANIC CARBON

TOC samples were collected at the Rock Drain In and Wetland Out monitoring locations. Analytical results are provided in Table 7, and trends are displayed on Figure 20.

Most TOC concentrations in Rock Drain In samples were estimated concentrations below the respective reporting limits, with the exception of two sampling results: 1.4 mg/L on April 1 and 2.1 mg/L on April 11, 2013. TOC in Wetland Out samples showed generally decreasing trends over the course of winter pilot testing, similar to BOD trends at this location. As with BOD, TOC present in the constructed wetland effluent was attributed to organic material from the manure, compost materials, and hay bales in the wetland cell. The notable increase in Wetland Out TOC between the April and June 2013 sampling events was attributed to the flow reduction period and stagnant conditions during May 2013, during which time organic carbon accumulated in the wetland cell. This accumulated dissolved organic carbon was gradually flushed out when flow resumed on May 16, 2013. TOC concentrations steadily decreased after June 2013. TOC and BOD_5 concentrations are expected to stabilize at low levels as readily leachable organic carbon sources in the wetland cell are depleted. However, there will remain a substantial source of organic carbon to support microbial activity for the design life of the constructed wetland.

[10] The single exception was the February 27, 2013 result of 4.9 mg/L. This result was flagged as exceeding laboratory method quality control criteria.

4.3 NITROGEN AND PHOSPHORUS

On April 18, 2013, upon completion of winter pilot testing, water samples were collected from Rock Drain In, Rock Drain MP, Wetland MP-1, and Wetland Out for laboratory analysis of ammonia as nitrogen (NH_3-N), nitrite/nitrate as nitrogen, and total phosphorus. Laboratory analytical results are provided in Table 7.

The nitrogen and phosphorus results indicate generally low levels of these nutrients in water samples from all locations in the system. The low levels of nutrients throughout the pilot system indicate that the influent from Pond 11 has very low nutrient levels. In a system with established biomass, bacterial activity has low requirements for nitrogen and phosphorus inputs. In this constructed wetland, even marginally detectable levels of nitrogen and phosphorus are adequate to maintain microbial activity.

Neither NH_3-N nor phosphorus was detected at Rock Drain In, Rock Drain MP, or Wetland MP-1. Ammonia as nitrogen and phosphorus were detected only at Wetland Out at concentrations of 0.15 mg/L and 0.29 mg/L, respectively. These were contributed principally by the fish fertilizer incorporated into the wetland cell matrix, with minor contributions from the manure. Analytical results are insufficient to determine the source of the low levels of nitrite/nitrate nitrogen that were detected at Rock Drain MP, Wetland MP-1, and Wetland Out (Table 7).

4.4 SULFATE AND SULFIDE

Samples collected throughout the pilot test from Rock Drain In, Rock Drain MP, and Wetland Out were analyzed for sulfate and sulfide. Sulfate was analyzed by Pace, and a YSI 9300 photometer was used to perform field measurements of sulfide in accordance with the manufacturer's specifications for Method PHOT.33.AUTO for sulfide in natural and waste waters. Analytical results for sulfate and sulfide are included in Table 7, and concentration trends are displayed on Figure 21.

Sulfate concentrations were fairly consistent throughout the pilot test and at each monitoring location along the length of the constructed wetland (Figure 21). Average sulfate concentrations for Rock Drain In, Rock Drain MP, and Wetland Out were 647 mg/L, 643 mg/L, and 497 mg/L. These results demonstrate that sulfate concentrations did not change in the rock drain (generally aerobic conditions) but were decreased in the wetland cell. Sulfate concentrations decreased through the wetland cell more notably during summer pilot testing than winter pilot testing, with average decreases of 244 mg/L observed during summer pilot testing. Decreases in sulfate through the wetland cell indicate that the system was anaerobic with sufficient biodegradable organic material to support a population of SRB and that sulfate was retained as

metal sulfides in the wetland. Sulfate likely was converted to sulfide and retained in the wetland cell as metal sulfides. Other observations confirm this, including the production of sulfide through the system and the deposition of black metal sulfides within the wetland cell matrix. The decrease in sulfate concentrations through the wetland cell demonstrates that the sulfur prills in the wetland cell matrix did not cause a net increase in wetland cell effluent sulfate concentrations.

Sulfide concentrations also were fairly consistent and generally low at Rock Drain In and Rock Drain MP for the duration of the pilot test (Figure 21). The maximum detected sulfide concentrations at Rock Drain In and Rock Drain MP were 0.17 mg/L and 0.23 mg/L, respectively. In contrast, sulfide concentrations at Wetland Out varied more during the pilot test, with minimum, average, and maximum detected sulfide concentrations of 0.04 mg/L, 39 mg/L, and 160 mg/L, respectively.[11] The minimum of 0.04 mg/L was measured at the start of the winter pilot test; higher results measured later indicate acclimation of SRB. Sulfide results in samples from Wetland Out are a further indication that SRB were active in the anaerobic environment of the wetland cell.

4.5 ARSENIC

Total and dissolved arsenic laboratory analytical results are provided in Tables 8 and 9, respectively, and arsenic concentration trends are displayed on Figure 22. Total and dissolved arsenic concentrations followed similar trends and were fairly consistent at Rock Drain In and Rock Drain MP throughout the pilot test. The maximum Rock Drain In total and dissolved arsenic concentrations were 0.63 µg/L and 0.25 µg/L, respectively. These results indicate that arsenic in the influent to the constructed wetland was generally low. Dissolved arsenic averaged 33% and 71% of total arsenic in samples from Rock Drain In and Rock Drain MP, respectively, during pilot testing.[12]

Both total and dissolved arsenic were substantially higher in Wetland Out samples as compared to Rock Drain MP samples at the start of the 1.5 gpm test run. Wetland Out arsenic concentrations decreased gradually during the winter pilot test (Figure 22). Total arsenic concentrations at Wetland Out decreased by approximately 86% between January 4 and April 18, 2013, with total and dissolved arsenic concentrations less than the RL by the end of the 6 gpm test run.

[11] Concentrations exceeding the maximum detection limit (0.50 mg/L) were recorded on both February 5 and 19, 2013; no dilutions were performed on those samples to achieve quantifiable results.

[12] Dissolved fractions exclude analytical results indicating non-detected metals concentrations; laboratory estimated concentrations, indicated by a J-flag, were included in calculating dissolved fractions.

Due to the elevated arsenic concentrations detected at Wetland Out relative to concentrations at Rock Drain In and Rock Drain MP, a review of matrix material constituents, sources, and handling practices prior to construction was performed to identify a source of arsenic in the materials of the wetland cell matrix. No source of arsenic in the wetland matrix was identified.

There were dramatic increases in manganese and arsenic concentrations measured at Rock Drain MP and Wetland Out early on during winter pilot testing (Section 4.7). This was attributed to dissolution of the inoculum added to the rock drain matrix. Coincidentally, there was also an increase in arsenic concentrations measured at Wetland Out. Arsenic and manganese concentrations then decreased in unison at Wetland Out for the duration of the winter pilot test. A statistical analysis showed that the two constituents were highly correlated ($r^2 = 0.98$ at Wetland Out). Additionally, a chemical analysis of the rock drain inoculum indicated that arsenic was present. Therefore, it was concluded that arsenic present in the rock drain matrix inoculum was released when manganese from the inoculum was dissolved.

Furthermore, it is believed that the wetland cell matrix material may have adsorbed dissolved metals and filtered particulate metals, including arsenic, before anaerobic conditions were established. Once SRB became biologically active in the wetland cell, arsenic sorbed to the wetland matrix and contained in iron oxides within the matrix was released slowly by reductive dissolution from the wetland cell as water flushed through the system during pilot testing. This conclusion was supported by the increase and subsequent decrease in arsenic concentrations observed during the start of summer pilot testing. Arsenic concentration increases during the June and July 2013 sampling events were attributed to reductive dissolution from the wetland matrix material during the stagnant conditions in May 2013, followed by transport of solubilized arsenic from the system when flow was resumed.

4.6 IRON

Total and dissolved iron laboratory analytical results are provided in Tables 8 and 9, respectively, and concentration trends are displayed on Figure 23. Total iron concentrations were generally highest at Rock Drain In (averaging 1,710 µg/L over the course of the pilot test) and substantially lower at Rock Drain MP and Wetland Out (which averaged 362 µg/L and 44 µg/L, respectively). Total iron concentrations at Wetland Out were generally less than the RL.

Iron concentration trends were similar at Rock Drain MP and Rock Drain In, with simultaneous concentration decreases or increases observed at both locations. A notable increase in Rock Drain MP total iron concentrations was observed at the end of the 6 gpm test run. This coincided with both an increase in influent total iron, possibly associated with the start of the spring snowmelt period in mid-April, and increased water levels in the constructed wetland that

permitted water to flow over the top of the rock drain geomembrane (Section 2.3). As water levels rose, standing water present above the wetland cell matrix material may have resulted in increased iron transport and deposition, thereby clogging matrix pore spaces with iron deposits and further reducing conductivity through the matrix materials.

The notable decrease in total iron concentrations between Rock Drain In and Rock Drain MP was attributed to iron deposition on the rock drain matrix material. During routine inspections and matrix sampling activities, iron was observed to settle on the top surfaces of rocks in the rock drain (Appendix A). Based on this observation, it was determined that iron was primarily removed by gravitational settling; as much as 93% of influent total iron was removed through the rock drain prior to entering the wetland cell (Table 11). Settled iron interfered with the colonization of manganese-oxidizing bacteria, impairing manganese removal from the constructed wetland influent (Sections 4.7 and 5.1). Additionally, ferrous iron prevented manganese deposition by dissolving manganese oxide deposited on the rock matrix.

Iron deposition also was observed on the surface in the wetland cell transition zone (Section 5.2), along with a considerable amount of algae growth, during the 3 gpm, 6 gpm, and summer test runs. Field observations of matrix material sampled in the transition zone (Section 5.2) did not reveal iron sulfide deposits but did indicate that the conditions in the transition zone were between fully oxic and fully anaerobic conditions. The transition zone was sufficiently reducing to convert iron entering the wetland cell into dissolved ferrous iron but not reducing enough to produce iron sulfide. The soluble ferrous iron generated within the matrix either migrated to the wetland surface, where it precipitated as an orange iron oxide (visible deposit) or migrated into the more fully anaerobic portion of the matrix and was deposited as black iron sulfide. The extent of iron deposition in this transition zone was observed to increase significantly over the course of winter pilot testing; approximately 94% of total iron entering the wetland cell was removed, as measured between Rock Drain MP and Wetland Out (Table 11). During summer pilot testing, only about 60% of total iron was removed between Rock Drain MP and Wetland Out. Overall iron removal through the constructed wetland was greater than 97% of influent total iron for all test runs (Table 11).

The average dissolved fractions for the Rock Drain In, Rock Drain MP, and Wetland Out monitoring locations were 3%, 6%, and 41%, respectively, indicating that the majority of iron entering and leaving the constructed wetland was in a particulate form. Rock Drain In, Rock Drain MP, and Wetland Out dissolved iron concentrations were consistently low (generally less than the 50 µg/L RL) during the pilot test, with the exception of the initial dissolved iron concentrations detected at Rock Drain MP and the final dissolved iron concentration detected at Rock Drain In (Table 9 and Figure 23). The first three Rock Drain MP dissolved iron

concentrations were all higher than 100 µg/L and exceeded influent (Rock Drain In) concentrations. One particularly high Rock Drain MP dissolved iron concentration detected on January 16, 2013, was 282 µg/L. This result corresponded to a high influent (Rock Drain In) total iron concentration of 2,820 µg/L (Table 8 and Figure 23). Higher that typical influent concentrations also were measured for most other analytes on January 16, 2013 (Tables 8 and 9), and monthly surface water sampling indicated higher than typical analytical results for most analytes collected from the St. Louis Tunnel discharge monitoring location (DR-3) in January 2013 (AECI, 2012). Similarly, the high influent dissolved iron concentration detected in September 2013 corresponded with increases in other influent analytes, including manganese, cadmium, and zinc, and may have corresponded to the start of dredging activities in Pond 15, located upstream of the constructed wetland, on September 15, 2013.

As was observed with arsenic, the initial flush of dissolved iron from the rock drain may have indicated that iron present in the rock drain matrix inoculum was released when manganese from the inoculum was dissolved. It is likely that the event that flushed the inoculum also affected iron deposited in the rock drain and may have released manganese and arsenic bound to iron oxides.

Iron mass removal rates[13] were directly correlated to influent mass loading to the constructed wetland and increased with each subsequent flow rate increase (Table 11 and Figure 27). To normalize the results over the duration of the winter pilot test, mass removal rates were divided by average flow rates[14] (Table 11 and Figure 27). A comparison of normalized mass removal rates demonstrated that average particulate iron removal through the rock drain was highest (approximately 10 grams per day per gpm [g/d/gpm] total iron) during the 1.5 gpm test run and decreased with each subsequent flow rate increase. This supports the observation that particulate iron settled and was retained in the rock drain; as flow rates increased and hydraulic residence time (HRT) decreased, less iron was able to settle out of solution. Wetland cell particulate iron removal followed a similar trend during the 1.5 gpm and 3 gpm test runs. However, average particulate iron removal actually increased slightly (from approximately 1.9 g/d/gpm to 2.7 g/d/gpm total iron) between the 3 gpm and 6 gpm test runs. Peak particulate iron removal was observed for both the rock drain and wetland cells during the 1.5 gpm test run

[13] Metals loading rates were calculated by multiplying average metals concentrations for two subsequent sampling events against the corresponding average influent (for the rock drain) or effluent (for the wetland cell) flow rates. Rock drain metals removal rates were determined by subtracting Rock Drain MP mass loading rates from Rock Drain In mass loading rates. Wetland cell metals removal rates were determined by subtracting Wetland Out mass loading rates from Rock Drain MP mass loading rates. Average removal rates were time-weighted for the duration of each test run.

[14] Mass removal rates were normalized by dividing the mass removal rate by the average influent (rock drain) or effluent (wetland cell) flow rates corresponding to two subsequent sampling events. Average removal rates were time-weighted for the duration of each test run.

and at the end of the 6 gpm test run, at which time there was both an increase in influent total iron and increased water levels that permitted water to flow over the top of the rock drain geomembrane (Section 2.3). Therefore, it is concluded that iron removal by gravitational settling was maximized by both low flow (quiescent) conditions and deeper standing water columns above the matrix materials.

4.7 MANGANESE

The rock drain was designed to remove manganese from the constructed wetland influent via microbially mediated oxidation of dissolved manganese to form insoluble manganese oxide (Atlantic Richfield, 2012). Total and dissolved manganese laboratory analytical results are provided in Tables 8 and 9, respectively, and concentration trends are displayed on Figure 24. Influent manganese concentrations measured at Rock Drain In varied little throughout the pilot test. However, at the start of the 1.5 gpm test run, there were dramatic increases in manganese concentrations measured at Rock Drain MP and Wetland Out, far exceeding influent concentrations. These high concentrations were attributed to dissolution of the inoculum added to the rock drain matrix. Decreases in dissolved manganese concentrations also were well-correlated to decreases in dissolved iron concentrations, indicating that ferrous iron prevented manganese deposition by dissolving manganese oxide deposited on the rock matrix. Manganese concentrations at Rock Drain MP and Wetland Out were highest during the 1.5 gpm test run and decreased during the winter pilot test. Rock Drain MP manganese concentrations decreased below Rock Drain In concentrations near the end of the 1.5 gpm test run. Average total manganese concentrations at Rock Drain In and Rock Drain MP over the course of pilot testing were 1,650 micrograms per liter (µg/L) and 680 µg/L, respectively, indicating substantial removal of manganese through the rock drain as water passed through the cell.

Wetland Out concentrations decreased below Rock Drain In concentrations near the middle of the 3 gpm test run but remained greater than Rock Drain MP concentrations, with the exception of the January 16, 2013 result, for the duration of pilot testing (Figure 24). It is believed that the wetland cell matrix material initially may have adsorbed dissolved metals and filtered particulate metals, including manganese, before anaerobic conditions were established. Furthermore, the matrix materials of the wetland cell were initially oxidized and likely had manganese contained in iron oxides. Once SRB became biologically active in the wetland cell, manganese was released slowly from the wetland cell as water flushed through the system during pilot testing.

For all test runs, the dissolved manganese fraction constituted the majority of total manganese at Rock Drain In, Rock Drain MP, and Wetland Out. The average dissolved fractions for the Rock Drain In, Rock Drain MP, and Wetland Out monitoring locations over the duration of pilot testing were 99.5%, 96%, and 99.7%, respectively.

Manganese mass removal rates correlated well to influent mass loading and therefore increased with each subsequent flow rate increase (Table 12 and Figure 28). To normalize the results over the duration of the winter pilot test, mass removal rates were divided by average flow rates (Table 12 and Figure 28). A comparison of normalized mass removal rates demonstrated that manganese removal through the rock drain was initially negative during the 1.5 gpm test run, became positive at the very end of the 1.5 gpm test run, and remained consistent during the majority of the 3 gpm and 6 gpm test runs (Figure 28). These results indicate that manganese removal rates increased with each subsequent flow rate increase (Table 12 and Figure 28).

Negative manganese removal was observed in the rock drain during the 1.5 gpm test run and in the wetland cell during the 3 gpm, 6 gpm, and summer test runs. The apparent manganese generation was the result of higher manganese concentrations detected at Rock Drain MP and Wetland Out, as compared with Rock Drain In, and was attributed to the flush of dissociated manganese from the rock drain matrix inoculum. After the 1.5 gm test run, analytical data indicated that as much as 99% of manganese was removed through the rock drain (Table 12).

Wetland cell mass removal calculations were somewhat skewed during the 1.5 gpm test run by high influent manganese concentrations detected on January 16, 2013, resulting in an average of 57% total manganese removal (Table 12 and Figure 28). Thereafter, negative manganese removal was observed through the wetland cell, indicating that manganese had been adsorbed in the wetland cell and was slowly being released. While Wetland Out dissolved manganese concentrations decreased steadily and slowly during the pilot test, Rock Drain MP dissolved manganese concentrations decreased much more notably during summer pilot testing; the minimum detected Rock Drain MP dissolved manganese concentration was 6.8 µg/L on August 14, 2013 (Table 9 and Figure 24). Although essentially no manganese was entering the wetland cell during summer pilot testing, notable concentrations of manganese continued to desorb from the wetland cell matrix, resulting in an apparent generation of manganese in the wetland cell (Table 12 and Figure 28).

Manganese removal appeared to reach steady state during the 3 gpm, 6 gpm, and summer test runs, despite variations in flow rate (Figure 28). Breakthrough was not observed. However, steady-state manganese removal was not achieved during the 1.5 gpm test run, when the influent flow rate was approximately 3.1 gpm and removal rates progressively increased. Additional testing would be required to confirm if low influent rates would result in peak manganese removal or if peak removal would not have been achieved at the tested flow rates. Other factors potentially inhibiting manganese removal may have included deposition of particulate iron in the rock drain (Section 4.6), which may have inhibited widespread bacterial

colonization, and the presence of dissolved ferrous Fe in the influent, which reduces manganese (IV) and thereby dissolves manganese oxide.

4.8 CADMIUM

Cadmium is mobile in acidic or circumneutral aerobic waters and therefore requires different treatment processes than manganese (Atlantic Richfield, 2012). The wetland cell was designed to promote biological sulfate reduction in an anaerobic, organic-rich matrix, where the organic matter provides attachment sites and nutrients for SRB. As SRB reduce sulfate to sulfide, cadmium reacts strongly with aqueous sulfide to form insoluble cadmium sulfide, which is then filtered or otherwise retained by the wetland matrix material (Atlantic Richfield, 2012). This process can result in an extremely low dissolved cadmium concentration, but poor retention of the cadmium sulfide precipitate within the matrix can result in minimal cadmium present in the effluent.

Total and dissolved cadmium laboratory analytical results are provided in Tables 8 and 9, respectively, and cadmium concentration trends are displayed on Figure 25. Cadmium concentrations were consistently highest in Rock Drain In samples and decreased along the length of the system. Influent cadmium concentrations measured at Rock Drain In generally decreased throughout the 1.5 gpm and 3 gpm test runs. Notable increases in influent cadmium were observed during the 6 gpm test run, possibly associated with the start of the spring snowmelt period in mid-April, and at the end of summer pilot testing, possibly associated with the start of Pond 15 dredging activities on September 5, 2013. Concentration fluctuations generally occurred simultaneously at both Rock Drain In and Rock Drain MP. However, cadmium concentrations measured at Rock Drain MP at the start of the 1.5 gpm test run were markedly low, indicating notable cadmium removal through the rock drain, prior to removal through the wetland cell, at the onset of winter pilot testing. Cadmium concentrations were consistently lowest in samples from Wetland Out.

For all test runs, the dissolved cadmium fraction constituted the majority of total cadmium at both Rock Drain In and Rock Drain MP (with the exception of Rock Drain MP during the 1.5 gpm test run). The average dissolved fractions for Rock Drain In and Rock Drain MP were 89% and 90%, respectively. Wetland Out had extremely low dissolved cadmium concentrations throughout the pilot test, with all results below the 0.5 µg/L RL (Table 9). Only three Wetland Out concentration estimates were provided by the laboratory, all of which were less than 0.2 µg/L (Table 9). For these results, dissolved cadmium constituted between 9% and 73% of total cadmium. Low dissolved fractions in the wetland effluent are consistent with the expected precipitation of cadmium as an insoluble sulfide retained within the wetland matrix.

As much as 71% of total cadmium and 85% of dissolved cadmium were removed through the rock drain prior to entering the wetland cell (Table 13), likely due to sorption to manganese oxides formed in the rock drain. Subsequent SRB activity in the wetland cell resulted in removal of as much as 95% of remaining total and dissolved cadmium. Overall cadmium removal through the constructed wetland was as high as 98% and 97% of influent total and dissolved cadmium, respectively.

Cadmium mass removal rates were directly correlated to influent mass loading to the constructed wetland and increased with each subsequent flow rate increase (Table 13 and Figure 29). To normalize the results over the duration of the winter pilot test, mass removal rates were divided by average flow rates (Table 13 and Figure 29). A comparison of normalized mass removal rates demonstrated that cadmium removal through the rock drain was initially much higher than removal through the wetland cell during the 1.5 gpm test run. Cadmium removal through the wetland cell did not exceed removal through the rock drain until the start of the 6 gpm test, possibly indicating that iron deposition within the rock drain diminished the capacity for cadmium sorption to manganese sulfides over time or that there was insufficient retention time for adsorption to manganese oxides.

Normalized cadmium removal rates in the wetland cell increased with each test run (Table 13 and Figure 29). Peak cadmium removal from the wetland cell was observed at the end of the 6 gpm test run, when effluent flow rates had decreased from approximately 6 gpm at the start of the test run to approximately 4.6 gpm, indicating that the constructed wetland may have operated optimally at this flow rate. However, peak cadmium removal also corresponded to peak influent cadmium concentrations in mid-April, possibly associated with the start of the spring snowmelt period. The convergence of normalized cadmium removal rates from both the rock drain and wetland cell near the end of the 3 gpm and summer test runs (Figure 29) indicates that optimum cadmium removal for this constructed wetland may occur at mid-range flow rates. However, due to the hydraulic limitations of the constructed wetland, mid- to high-range effluent flow rates could not be maintained. No steady-state removal rates were achieved for any of the test runs. Therefore, the flow conditions associated with peak cadmium removal were not determined during the pilot test.

4.9 Zinc

As with cadmium, zinc is mobile in acidic or circumneutral aerobic waters and therefore requires different treatment processes than manganese (Atlantic Richfield, 2012). Zinc reacts strongly with aqueous sulfide to form insoluble metal sulfides, which are then filtered or retained by the organic matter present in the matrix (Atlantic Richfield, 2012). Additionally, (hydrous)

manganese oxides formed in the rock drain provide a large sorptive surface area that strongly adsorbs metals such as copper, nickel, and zinc (Atlantic Richfield, 2012).

Total and dissolved zinc laboratory analytical results are provided in Tables 8 and 9, respectively, and concentration trends are displayed on Figure 26. Total zinc concentrations were consistently highest in the system influent (Rock Drain In) and decreased along the length of the system. Fluctuations in total and dissolved zinc concentrations at both Rock Drain MP and Wetland Out were similar to those at Rock Drain In (Figure 26). Influent zinc concentrations varied somewhat over the duration of the pilot test. Notable increases in influent zinc were observed in mid-April 2013, possibly associated with the start of the spring snowmelt period, and at the end of summer pilot testing, possibly associated with the start of Pond 15 dredging activities.

For all test runs, the dissolved zinc fraction constituted the majority of total zinc at both Rock Drain In and Rock Drain MP, whereas particulate zinc constituted the majority of zinc detected at Wetland Out. The average dissolved fractions for the Rock Drain In, Rock Drain MP, and Wetland Out monitoring locations over the duration of the pilot test were 85%, 94%, and 9%, respectively.

Permitted effluent requirements typically necessitate dissolved zinc concentrations to be less than 500 µg/L due to zinc's toxicity. Observations during pilot testing indicated that low concentrations were attainable. The minimum dissolved zinc concentration detected at Wetland Out was 1.2 µg/L; the maximum dissolved zinc concentration detected at Wetland Out was 11.2 µg/L (Table 9). As much as 69% of influent zinc was removed through the rock drain prior to entering the wetland cell, likely due to sorption to manganese oxides formed in the rock drain (Table 14). Subsequent SRB activity in the wetland cell resulted in as much as 96% removal of remaining total zinc and greater than 99% removal of dissolved zinc. Overall zinc removal through the constructed wetland was as high as 99% of influent zinc.

Zinc mass removal rates were directly correlated to influent mass loading to the constructed wetland and increased with each subsequent flow rate increase (Table 14 and Figure 30). To normalize the results over the duration of the winter pilot test, mass removal rates were divided by average flow rates (Table 14 and Figure 30). A comparison of normalized mass removal rates demonstrated that zinc removal through the rock drain was higher than removal through the wetland cell during the 1.5 gpm test run. Total zinc removal through the rock drain nearly equaled removal through the wetland cell during the 3 gpm test run and was exceeded by removal through the wetland cell during the 6 gpm test run, possibly indicating that iron

deposition within the rock drain diminished the capacity for zinc sorption to manganese sulfides over time or that retention time was insufficient for adsorption to manganese oxides.

As was observed for cadmium, normalized zinc removal rates in the wetland cell increased with each winter pilot test run and then decreased slightly during summer pilot testing (Table 14 and Figure 30). Peak dissolved zinc removal from the wetland cell was observed at the end of the 6 gpm test run (approximately 99.9% removal of dissolved zinc), when effluent flow rates had decreased from approximately 6 gpm at the start of the test run to approximately 4.6 gpm. Due to the hydraulic limitations of the constructed wetland, the effluent flow rate could not be maintained as high as 4.6 gpm, and no steady-state removal rate could be achieved. Therefore, the flow conditions associated with peak zinc removal were not determined during the pilot test.

5.0 MATRIX SAMPLING

Baseline and post-winter pilot testing matrix sampling were completed on December 6, 2012, and May 2 and 3, 2013, respectively. Matrix samples were collected from the rock drain and wetland cells and submitted to Pace for laboratory analysis of total metals in a matrix material acid extract. Baseline sampling coincided with wetland liner repair and re-plumbing activities. For both sampling events, power and water to the constructed wetland were shut off, and water levels in the rock drain and wetland cells were lowered by pumping and siphoning water from the constructed wetland into Pond 9.

On December 6, 2012, six samples were collected from the rock drain cell along two transects, and three samples were collected from each of three transects in the wetland cell (nine total samples). Approximately 500 grams of matrix material were collected from a depth of approximately six inches below the matrix surface at each location. Sampling locations and photograph documentation were described in the Baseline Matrix Sampling Technical Memorandum dated December 7, 2012 (Appendix E).

On May 2 and 3, 2013, rock drain matrix samples were collected from three locations at depths of approximately eight to 12 inches below the matrix surface. Twelve total samples were collected from the wetland cell; four samples were taken along each of three transects at depths approximately six inches below the matrix surface. Approximately 500 grams of matrix material were collected from each location. Sampling locations were approximated to the baseline sampling locations to the extent possible for comparison purposes; relative sample locations are indicated on Figures 31 and 32.

5.1 ROCK DRAIN MATRIX LABORATORY RESULTS

Matrix sampling laboratory analytical leachate results are provided in Table 10; the associated laboratory analytical report is provided in Appendix D. A comparison of rock drain matrix results for select analytes is provided on Figure 31. Metals concentrations in the rock drain matrix generally increased between the baseline and post-winter pilot test sampling events. Average rock drain matrix concentrations increased for beryllium, cadmium, chromium, cobalt, copper, iron, manganese, molybdenum, and zinc, all of which were contributed to the constructed wetland in the influent. Average arsenic concentrations decreased between the baseline and post-winter pilot test sampling events, further indicating that dissolution of manganese oxide from the rock drain matrix inoculum released previously sorbed arsenic at a rate exceeding arsenic loading from the influent.

Visual inspection of the matrix material in May 2013 indicated that rocks present at the northern end of the rock drain were colored black with manganese, those in the middle were less so, and those at the outlet were brown, indicating light manganese deposition (Appendix A). Manganese deposition generally was present on the underside of rocks and appeared uniform with depth, suggesting that the two-foot deep rock drain matrix had uniform contact with treatment water and that aeration was adequate throughout the water column. Most of the manganese deposited on rocks appeared to be black manganese dioxide. Occasionally, a green manganese deposit was observed.

5.2 WETLAND CELL MATRIX LABORATORY RESULTS

Matrix sampling laboratory analytical results are provided in Table 10; the associated laboratory analytical report is provided in Appendix D. A comparison of wetland cell matrix results for select analytes is provided on Figure 32. Metals concentrations in the wetland cell matrix generally increased between baseline and post-winter pilot testing. Average wetland cell matrix concentrations increased for aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, molybdenum, nickel, silver, vanadium, and zinc, while average manganese concentrations decreased.

Spatially, metals concentrations appeared to be fairly evenly distributed across the wetland cell in both December 2012 and May 2013 (Figure 32). Metals concentrations detected in the northwestern corner (influent end) of the wetland cell in May 2013 were generally significantly higher than concentrations detected elsewhere in the cell.

Visual inspection of the wetland cell matrix material in May 2013 found that a clearly demarcated "transition zone" extended approximately six feet into the wetland cell from the sheet pile divider wall between the rock drain and wetland cells (Figure 4 and Appendix A).

Within this transition zone, water was flowing over the surface of the wetland matrix, iron was deposited, and a considerable amount of algae growth was observed during the 3 gpm and 6 gpm test runs. Some of wetland cell matrix rocks collected within this zone during matrix sampling had a black coating that may have been iron sulfide.

In contrast, no algal growth was present on the wetland cell matrix surface downstream of the transition zone. Filamentous white biofilm was deposited on the wetland surface extending approximately 65 feet into the wetland cell, indicating that some of the sulfide generated in the wetland cell was oxidized to form elemental sulfur when it contacted an aerobic environment at the surface. White biofilm was not observed below the matrix surface. The subsurface matrix material within this zone, to within millimeters of the matrix surface, was black, typical of sulfide deposition. This distribution of black material within the wetland matrix indicated a strongly reducing environment except at the very surface of the matrix material. This strongly reducing environment likely prevented surficial algal growth. Some of the sulfide generated by SRB in the subsurface wetland matrix was likely released H_2S gas. Upon diffusion to the aerobic environment of the wetland matrix surface, the H_2S may have been intercepted by aerobic sulfide-oxidizing bacteria, resulting in a filamentous white biofilm typical of elemental sulfur. H_2S gas surveys (Section 8.0) did not detect H_2S gas near the matrix surface of the wetland cell.

6.0 WETLAND CELL TRACER STUDIES

Rhodamine WT dye (rhodamine) tracer studies were conducted during the 1.5 gpm and 3 gpm test runs in an attempt to estimate hydraulic residence times for the wetland cell. For each test, rhodamine was pumped into the Wetland MP-1 monitoring port standpipe (Figure 4). Sondes equipped with YSI 6130 rhodamine sensors were deployed in Wetland MP-1, Wetland MP-2, and Wetland Out. Prior to each tracer study, the YSI 6130 rhodamine sensors were calibrated with 0.0 µg/L and 125 µg/L rhodamine standards created using a 2.5% rhodamine solution. The instrument converted fluorescence measurements to dye concentrations with corrections for temperature and conductivity effects. The injection quantities, results, and conclusions for each tracer study are discussed below.

6.1 TRACER STUDY NUMBER 1

Prior to starting the Tracer Study Number 1, the YSI 6130 sondes were programmed to log water quality parameters and rhodamine concentrations every 30 minutes. At 16:15 on February 19, 2013, 45 milliliters (mL) of 2.5% rhodamine solution were injected into Wetland MP-1 over a period of approximately two seconds. Injection of rhodamine took approximately two seconds. Approximately 4.5 gallons of water from the flow control box were then added to distribute the injected rhodamine.

The results of Tracer Study Number 1 are shown on Figure 33. The maximum rhodamine concentrations detected at Wetland MP-1, Wetland MP-2, and Wetland Out were 342.7 µg/L (0.25 hour elapsed time), 2.3 µg/L (119.0 hours elapsed time), and 2.1 µg/L (52.25 hours elapsed time), respectively. The rhodamine concentrations at Wetland MP-1 decreased to essentially non-detectable levels within an elapsed time of approximately 35 hours. The detected tracer concentrations at Wetland MP-2 varied around approximately 0.9 µg/L, with many non-detected readings. Tracer concentrations at Wetland Out were similar to those at Wetland MP-2. No defined peaks in concentration were observed at the two downgradient monitoring locations.

The tracer study was terminated after approximately 188 hours. Calibration checks were performed on the YSI 6130 rhodamine sensors using 62.5 µg/L and 125 µg/L rhodamine standards created using a 2.5% rhodamine solution. All sensors were within acceptable ranges. The data from Tracer Study Number 1 showed no discernable concentration patterns; consequently, calculation of the wetland cell HRT was not possible. A potential cause for lack of discernable concentration patterns could be adsorptive losses of rhodamine through the wetland cell.

6.2 TRACER STUDY NUMBER 2

Prior to starting Tracer Study Number 2, sondes were programmed to log water quality parameters and rhodamine concentrations every 15 minutes. At 14:11 on March 14, 2013, 200 mL of 2.5% rhodamine (5.0 grams of rhodamine) were injected into Wetland MP-1 over a period of approximately two seconds. Approximately two gallons of water from the flow control box were then added to distribute the injected rhodamine.

The results of Tracer Study Number 2 are shown on Figure 34. The maximum rhodamine concentrations detected at Wetland MP-1, Wetland MP-2, and Wetland Out were 346.8 µg/L (0.25 hour elapsed time), 4.2 µg/L (108.5 hours elapsed time), and 18.1 µg/L (141.75 hours elapsed time), respectively. Rhodamine concentrations at Wetland MP-1 increased rapidly after injection and then decreased to near pre-injection concentrations within approximately 12 hours after injection, indicating that rhodamine dispersed from the injection point promptly.

Rhodamine was detected at Wetland MP-2 after approximately five hours elapsed time. Concentrations increased until approximately 29 hours elapsed time. Rhodamine concentrations were within a range of 2 µg/L to 4 µg/L at Wetland MP-2 between approximately 29 hours and 110 hours elapsed time and then gradually decreased until the conclusion of the tracer study. Rhodamine still was detected in Wetland MP-2 approximately 286 hours after tracer injection. No defined concentration peaks were observed in Wetland MP-2.

Rhodamine was detected at Wetland Out after approximately 3.25 hours elapsed time. Concentrations then increased until a peak concentration of 10.4 µg/L was detected at approximately 34.75 hours elapsed time. Rhodamine concentrations then decreased to less than approximately 4.0 µg/L. Three additional concentration peaks were observed, with each peak followed by a period of time in which concentrations at Wetland Out decreased to less than approximately 4.0 µg/L. Concentration peaks and elapsed times observed during the second tracer study were as follows.

- Peak 1: 34.75 hours, 10.4 µg/L
- Peak 2: 91.00 hours, 14.9 µg/L
- Peak 3: 141.75 hours, 18.1 µg/L
- Peak 4: 248.25 hours, 11.0 µg/L

After approximately 286 hours elapsed time, rhodamine was still detected at concentrations of approximately 3 µg/L at Wetland Out. Approximately 29% (1.5 grams) of the 5.0 grams injected at Wetland MP-1 had been detected at Wetland Out.

The gradual decrease of rhodamine concentrations detected at Wetland MP-2 (Figure 34) and the low mass recovery of rhodamine at Wetland Out suggested that rhodamine may have sorbed to wetland matrix material and then slowly desorbed and flushed through the wetland cell over time. Furthermore, the four rhodamine concentration peaks observed at Wetland Out indicated that four flow regimes potentially existed within the wetland cell, each with a particular HRT. Peak 1 was interpreted to be influenced by surface flow across the top of the matrix material and not solely from subsurface flow. Peak 4 was attributed to subsurface flow through the matrix material. It was inconclusive if Peaks 2 and 3 were substantially influenced by surface or subsurface flow. Therefore, an overall HRT for the wetland cell was not determined.

7.0 SLUG TESTING

Hydraulic testing (rising and falling head slug tests) was performed at Wetland MP-1 and Wetland MP-2 on March 12 and 14, 2013, respectively, to estimate the wetland cell hydraulic conductivity. Hydraulic conductivity could then be used to evaluate the wetland cell HRT, as described below. Additional hydraulic testing was performed on April 19, 2013. However, due to the overflow conditions and excessive standing water near the Wetland MP-1 monitoring port at that time, the results were inconclusive and therefore are not included in this Report.

7.1 FIELD TECHNIQUES

Prior to testing, the initial depth to water in each monitoring point was measured using a Solinst. A data-logging pressure transducer then was installed into the monitoring point several minutes prior to conducting the test to collect baseline water level measurements. The pressure transducer was suspended from the top of the casing on a direct-read cable, clamped into place to prevent slipping, and programmed to record water levels every 0.5 second.

Three falling and rising head slug tests were performed at Wetland MP-1 using 18-inch and 24-inch long slugs constructed of three-inch diameter HDPE pipe filled with sand and capped at both ends. Falling head tests were initiated by lowering the slugs into the monitoring port standpipes and measuring falling water levels (displacement) every 0.5 second. After the water levels subsided to a minimum of 90% of the initial static water levels, the slugs were removed, and the rising head slug tests began. The rising head slug tests were stopped after the water levels subsided to a minimum of 90% of the initial static water levels.

Falling head slug tests were performed at Wetland MP-1 and Wetland MP-2 by pouring 2.6 gallons (Wetland MP-1) and 1.4 gallons (Wetland MP-2) of water obtained from the flow control box into the monitoring port standpipes and measuring water levels every 0.5 second. The falling head slug tests continued until the water levels in the monitoring ports subsided to a minimum of 90% of the initial static water levels. It is worth noting that the Wetland MP-1 times required for a return to static water levels and the subsequent hydraulic conductivity calculations may have been affected by the presence of standing water outside of the Wetland MP-1 monitoring port.

7.2 DATA ANALYSIS

The slug testing displacement data was normalized by subtracting the initial pressure head and time from the measured pressure heads and times and dividing the data set by the expected displacement caused by the slug. Normalized data plots for Wetland MP-1 and Wetland MP-2 slug tests are presented on Figures 35 and 36. This data then was analyzed using HydroSOLVE, Inc. AQTESOLV Version 4.50 Professional, a software program capable of analyzing slug test data using straight line or type-curve methods for single or multi-well slug tests in confined, unconfined, and fractured aquifers.

The observed water level depths and depth of the monitoring port screened intervals were used to determine which aquifer analysis method was appropriate for analyzing the Wetland MP-1 and Wetland MP-2 slug test data. The wetland cell monitoring ports were installed in unconsolidated matrix material consisting of approximately 42% (by volume) two-inch rounded river rock, 46% (by volume) two-inch mini pine bark wood chips, and 12% (by volume) organic

amendment consisting of 30% manure and 70% aspen fines (Atlantic Richfield, 2012). Therefore, the methods used to calculate wetland matrix hydraulic parameters were based on unconfined aquifer solutions by Bouwer and Rice (1976) and Hyder, *et al.* (1994; conventionally referred to as the "KGS model"). Both models were used for comparison purposes. Resulting hydraulic conductivity ranged from approximately 160 ft/d to 240 ft/d for Wetland MP-1 and approximately 1,300 ft/d to 2,300 ft/d for Wetland MP-2. Table 15 provides AQTESOLV input data, assumptions, and hydraulic conductivity results.

Duplicate analyses were performed for both models using vertical-to-horizontal hydraulic conductivity anisotropy ratios of both 0.5 and 1.0. The KGS model results suggested that the more accurate anisotropy ratio was 1.0, which corresponded to isotropic mixed media. The responses of the water levels in Wetland MP-2 were nearly instantaneous (rapid return to static) after the start of each slug test. The fast response times (less than five seconds for each of five tests) at Wetland MP-2 indicated high hydraulic conductivities, similar to those of well-sorted gravel. The Wetland MP-2 hydraulic conductivity may have been affected by the nominal two-inch diameter river rock placed at the southernmost horizontal two feet of the wetland cell (AMEC, 2013).

8.0 HYDROGEN SULFIDE SURVEYS

Hydrogen sulfide gas surveys were conducted approximately monthly during the pilot test to quantify H_2S production from the constructed wetland and develop engineering and administrative controls to address any observed hazards. Ten surveys were performed to measure H_2S concentrations at specified locations around and within the constructed wetland exclusion zone. Two instruments were used during each survey: a multi-gas meter (RKI Eagle 2 or MSA Altair 5iR) equipped with an H_2S sensor and a personal H_2S gas badge (Industrial Science Gas Badge Plus or Pro model). Each of these devices was used to measure H_2S concentrations approximately one foot above the ground surface, within the breathing zone, and at the openings of constructed wetland monitoring locations. Meters and badges were bump checked prior to performing each survey and were set to alarm at the site action level of 5.0 parts per million (ppm).[15] Survey field sheets showing all monitoring locations and results are provided in Appendix G.

As summarized in Table 16, H_2S was detected in only two areas – Wetland MP-2 and Wetland Out. At Wetland MP-2, H_2S was detected twice at the top of the monitoring port standpipe at concentrations of 8 ppm and 3 ppm. At Wetland Out, the only breathing zone

[15] The site action level for H_2S was set below the acceptable ceiling concentration of 20 ppm (29 CFR 1910.1000); the Immediately Dangerous to Life and Health (IDLH) level is 100 ppm.

detection was 2.2 ppm on January 16, 2013. H_2S was detected approximately one foot above the ground surface near the Wetland Out outfall during three of the surveys at concentrations ranging from 0.9 ppm to 33 ppm. H_2S was detected at the Wetland Out monitoring port opening during all but one survey, with concentrations detected by the multi-gas meters ranging from 16 ppm to 53 ppm. No H_2S concentrations were detected within the breathing zone by personal gas badges in excess of the 5.0 ppm action level.

Based on these surveys, it was determined that H_2S gas is present in the constructed wetland effluent. The primary area of concern for H_2S exposure is the wetland cell discharge point (Wetland Out). To address this known hazard, an exclusion zone was established around the entire constructed wetland to restrict personnel access (Appendix A), and caution signs were posted on the exterior of the sheet pile sections (Appendix A). Personal protective equipment (PPE) requirements for any personnel entering the exclusion zone were increased to include a personal gas badge set to alarm at 5.0 ppm H_2S, a multi-gas meter set to alarm at 5.0 ppm H_2S, and an emergency escape respirator. Furthermore, all personnel entering the exclusion zone were required to maintain the buddy system. H_2S awareness training was provided to all personnel performing work at the constructed wetland.

9.0 DEVIATIONS FROM THE WORK PLAN AND SAP

Constructed wetland winter pilot testing was conducted in general accordance with the Work Plan (Atlantic Richfield, 2012) and SAP (Appendix A of Atlantic Richfield, 2012). A summary of deviations from these documents is provided below.

- The Implementation Schedule identified in Section 8 of the Work Plan anticipated that the first winter pilot test run would commence in mid-October, 2012. The baseline water sampling event conducted on January 4, 2013, marked the start of the first winter pilot test run.

- The Work Plan stated that winter pilot testing would be conducted in five three-week runs, with target flow rates of 1.0 gpm, 2.0 gpm, 4.0 gpm, 8.0 gpm, and 10 gpm. Winter pilot testing consisted of only three test runs, each ranging between four and six weeks in duration. Test runs were performed at effluent flow rates of 1.5 gpm, 3 gpm, and 6 gpm.

- The Work Plan stated that spring/summer pilot testing would be conducted in five three-week runs, with target flow rates of 1.0 gpm, 2.0 gpm, 4.0 gpm, 8.0 gpm, and 10 gpm. Due to the overflow conditions observed during the winter 6 gpm test run, a *"flow reduction and troubleshooting period"* was required to reduce standing water levels in the rock drain and wetland cell. Summer pilot testing then consisted of only one test run performed at an effluent flow rate averaging 2.2 gpm.

- The Work Plan stated that rhodamine dye tracer studies would be conducted through the entire constructed wetland during the 1.0 gpm and 4.0 gpm test runs. Tracer studies were only performed through the wetland cell to minimize anticipated dye losses through leaks in the rock drain geomembrane. The two tracer studies were performed during the 3 gpm and 6 gpm test runs. Due to the inconclusive results obtained from the winter pilot test tracer studies, no tracer studies were performed during summer pilot testing.

- The SAP stated that water samples would be collected during tracer studies and analyzed for rhodamine using a field fluorometer. Tracer concentrations were instead continuously measured in situ, using data logging YSI 6920 multi-parameter sondes equipped with YSI 6130 rhodamine sensors deployed to wetland monitoring points.

- The Work Plan and SAP stated that field monitoring would be performed three times per week to record flow rates and water quality parameters. During winter pilot testing, field monitoring and inspections were performed as weather and site access safely permitted, typically only once per week. Sondes were installed and programmed to continuously log water quality parameter data for the duration of the winter pilot test. During summer pilot testing, only one flow rate was assessed. Therefore, field monitoring and inspections were reduced to approximately every two weeks.

- The Work Plan and SAP stated that water samples would be collected weekly and submitted for laboratory analysis. Water sampling during winter pilot testing was performed weekly except during week four of the 1.5 gpm test run (week of January 28, 2013), when site access was not permitted due to weather and safety concerns. During summer pilot testing, only one flow rate was assessed. Therefore, water sampling was performed monthly.

- The SAP stated that mercury would be analyzed by laboratory analytical method EPA 245.1 for water samples collected from Rock Drain In, Rock Drain MP, and Wetland Out. Mercury was analyzed only on March 12, 2013, during the first 6 gpm test run sampling event.

- Neither the Work Plan nor the SAP stated that nitrogen or phosphorus laboratory analysis would be performed during pilot testing. Upon completion of winter pilot testing, water samples were collected and submitted to Pace for laboratory analysis by U.S. EPA methods 350.1 (ammonia nitrogen), 353.2 (nitrate-nitrite nitrogen), and 365.4 (phosphorus).

- Slug testing was not described in the Work Plan or SAP but was performed on March 12 and 14 and April 19, 2013, in an attempt to quantify the hydraulic conductivity of the wetland cell.

- The Work Plan and SAP stated that post-implementation matrix samples would be collected from the rock drain and wetland cells following the 2013 Spring/Summer Pilot Test. Due to the change in the pilot testing scheduling, matrix samples were

collected for laboratory analysis on May 2 and 3, 2013, upon completion of winter pilot testing.

- The SAP stated that metal removal rates would be calculated for the rock drain and wetland cells as a function of residence times. However, due to inconclusive tracer studies and slug testing, hydraulic residence times were not determined during pilot testing. Metal removal rates were calculated based on changes in metals concentrations, flow rates, and time.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The following sections provide conclusions regarding constructed wetland performance and efficacy for treatment of the St. Louis Tunnel discharge. Recommendations are given for additional pilot testing and design of a larger-scale system.

10.1 MANGANESE REMOVAL

The aerobic rock drain effectively removed manganese from the St. Louis Tunnel discharge and reduced effluent dissolved manganese concentrations to less than 1,000 µg/L. Therefore, this technology is recommended for additional demonstration scale testing. It is recommended that a larger-scale design include process treatment to remove iron from influent prior to treatment in the rock drain to minimize interferences with the colonization of manganese-oxidizing bacteria and to minimize the potential for ferrous iron to reduce manganese(IV) and dissolve manganese oxide.

10.2 CADMIUM AND ZINC REMOVAL

The anaerobic constructed wetland cell was observed to effectively remove cadmium and zinc from the St. Louis Tunnel discharge and reduce effluent dissolved cadmium and zinc concentrations to nearly 1 µg/L. Therefore, this technology is recommended for additional demonstration scale testing.

10.3 SONDES

In-situ data-logging sondes provided high quality water temperature, pH, DO, and SEC data at the constructed wetland while reducing required personnel field time. Decreasing personnel field time directly decreases exposure of field personnel to hazards associated with travel, site access, and field work, without compromising data quality or quantity objectives. Therefore, continued use of in situ data-logging sondes is recommended for continued pilot-scale and additional larger-scale testing.

10.4 THERMISTERS

Matrix temperature trends recorded by the thermisters were generally well correlated to water temperatures measured by the sondes. Additionally, the thermisters provided information regarding vertical temperature gradients in the rock drain and wetland cells that could be used to optimize hydraulics and microbial activity in a larger-scale wetland. Therefore, the use of thermisters is recommended for a larger-scale wetland.

10.5 WATER TEMPERATURE

Despite the low water temperatures observed in the rock drain and wetland cells, metal removal rates achieved during pilot testing indicated that the St. Louis Tunnel discharge could be effectively treated by manganese-oxidizing bacteria and SRB present in a constructed wetland. Manganese, cadmium, and zinc removal rates through the constructed wetland indicated that those metals could be removed via a constructed wetland at water temperatures lower than those measured at DR-3. Therefore, metals removal from the St. Louis Tunnel discharge may be achievable without the addition of an external heat source if heat loss from the St. Louis Tunnel discharge is minimized by decreasing the flow path distance between the St. Louis Tunnel portal and the constructed wetland.

10.6 BIOLOGICAL OXYGEN DEMAND

Permitted effluent requirements typically necessitate BOD concentrations to be less than 50 mg/L. BOD_5 concentrations for samples collected from Wetland Out ranged from 15.3 mg/L to 138 mg/L during the pilot test. To improve effluent BOD_5 concentrations for a larger-scale constructed wetland, it is recommended to modify the matrix material by decreasing the organic content, including the percentages of manure and wood chips incorporated into the matrix material. Furthermore, the use of hay bales to control surface flow in the wetland cell may have increased effluent BOD_5 concentrations above what otherwise would have been expected, given the wetland cell matrix organic content. Therefore, use of engineering controls to manage wetland hydraulics is recommended for a larger-scale wetland to mitigate the potential need for hay bales.

10.7 HYDRAULICS

To address the hydraulic concerns associated with the pilot test, the following design considerations are recommended for incorporation into a larger-scale wetland.

10.7.1 Sloped Subgrade

The rock drain and wetland cells were designed and constructed such that the system was gravity fed and driven by a hydraulic gradient between the flow control box water level and the

wetland outlet water level. Rock drain and wetland cell subgrades were not sloped and therefore did not provide hydraulic head to support water flow toward the wetland outlet. The hydraulic head between the flow control box and the wetland outlet was approximately 3.2 feet. To enhance the hydraulic gradient through the system, sloping the flowpath for both the top and bottom matrix surfaces is recommended for the design of a larger-scale wetland.

10.7.2 Improved Inlet Flow Structure

The constructed wetland inlet flow control structure consisted of a single pipe feeding one point near the center of the rock drain cell (Figure 4). Iron and manganese oxidizing bacteria deposition patterns within the rock drain indicated that treatment may not have been uniform across the width of the rock drain cell. To improve treatment efficacy, design improvements to the inlet flow control structure are recommended to distribute influent laterally across treatment cells.

10.7.3 Improved Outlet Flow Control Structure

The constructed wetland outlet flow control structure consisted of bulkhead fittings installed at the top of the wetland matrix material, connected via a manifold to a single discharge point. The water level in the pilot scale test wetland cell therefore was controlled by the height of those bulkhead fittings and could not be adjusted without drilling new holes in the sheet pile at the wetland cell outlet and installing new bulkhead fittings. Improved hydraulic controls are recommended for a larger-scale wetland to allow water level adjustments to be made quickly, easily, and independently of the water levels in adjacent upstream or downstream cells.

10.7.4 Adjusted Matrix Material

The wetland cell matrix experienced decomposition of material into fine sediments and loss of permeability, resulting in a reduction of hydraulic conductivity. To improve long-term permeability, recommended modifications to the matrix material include the following.

- Increased volume of inert rock to maintain structural support and minimize consolidation of the matrix, improve hydraulic conductivity, and increase surface area available for bacterial attachment.
- Use of 1.5-inch nominal diameter or larger wood chips to maintain structural support, minimize consolidation of the matrix, improve hydraulic conductivity, and increase surface area available for bacterial attachment.
- Reduce manure content to minimize the introduction of fine sediments and reduce the presence of salts, such as chloride and nitrate, present in the matrix.

11.0 POST-IMPLEMENTATION ACTIVITIES

The microorganisms that have colonized in the constructed wetland are already adapted to the water and environmental conditions at the site. Therefore, to reduce the colonization period required for the demonstration-scale wetland currently under construction, as described by the *St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study Work Plan Revision 1* (Atlantic Richfield, 2013), the pilot-scale constructed wetland will be decommissioned during the placement of matrix materials into the demonstration-scale rock drain and subsurface flow (SSF) wetland. Rock from the pilot-scale rock drain will be used as the source of inoculum (manganese-oxidizing microorganisms) for the demonstration-scale rock drain, and SRB from the pilot-scale wetland cell will be used as the source of inoculum for the demonstration-scale SSF wetland. Biofilm that is already affixed to the pilot-scale rock drain matrix is expected to be less prone to sloughing and releasing manganese-containing particulates. Dissolved metals already sorbed to the pilot-scale wetland cell matrix are expected to continue to be released slowly during demonstration-scale testing; however, concentrations are anticipated to be negligible once the inoculum is mixed into the much greater volume of new SSF wetland matrix material.

To facilitate the use of the pilot-scale constructed wetland matrices as inocula, flow to the constructed wetland will be maintained following the completion of summer pilot testing. Periodic inspections will be performed to confirm that flow rates and water levels are adequate to maintain the inocula. Heat trace may be turned on to minimize heat loss through the constructed wetland as ambient air temperatures and influent water temperatures decrease with the onset of winter. Additional water and matrix sampling may be performed during this time to further define water quality impacts, system operations, and maintenance requirements. The results of such sampling and analysis will be presented in an addendum to this Report, as will the results of sediment and biofilm samples collected for scanning electron microscope analysis on September 19, 2013.

12.0 REFERENCES

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TABLES

TABLE 1
SUMMARY OF FIELD ACTIVITIES
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Date	Phase[1]	Field Activity
12/6/2012	Colonization	Conducted pre-implementation rock drain and wetland cell matrix sampling
1/4/2013		Baseline water sampling event.
1/4/2013	Winter 1.5 gpm Test Run Average Influent Flow Rate: 3.1 gpm Average Effluent Flow Rate: 1.6 gpm	Decreased influent flow rate to target an effluent flow rate of 1.5 gpm.
1/8/2013		Completed wetland outlet piping construction. Deployed YSI 6920 multi-parameter sondes (sondes) to continuously monitor water quality parameters in Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out.
1/9/2013		Week one water sampling event. Temporarily removed sonde from Wetland MP-1 for calibration.
1/10/2013		Temporarily removed sonde from Rock Drain In and Wetland MP-1 for calibration.
1/11/2013		Temporarily removed sonde from Wetland MP-1 for calibration.
1/12/2013		Temporarily removed sonde from Wetland MP-1 for calibration.
1/13/2013		Temporarily removed sonde from Wetland MP-1 for calibration.
1/14/2013		Temporarily removed sonde from Wetland MP-1 for calibration.
1/15/2013		Temporarily removed sonde from Wetland MP-1 for calibration. Performed a H_2S gas survey.
1/16/2013		Week two water sampling event. Performed a H_2S gas survey.
1/17/2013		Temporarily removed sonde from Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out for calibration.
1/18/2013		Temporarily removed sondes from Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out for calibration.
1/22/2013		Week three water sampling event. Temporarily removed sonde from Rock Drain In, Rock Drain MP, Wetland MP-2, and Wetland Out for calibration.
1/24/2013		Temporarily removed sonde from Rock Drain In, Rock Drain MP, and Wetland MP-2 for calibration.
2/5/2013		Week five water sampling event.
2/5/2013	Winter 3 gpm Test Run Average Influent Flow Rate: 4.7 gpm Average Effluent Flow Rate: 2.9 gpm	Increased influent flow rate to target an effluent flow rate of 3 gpm. Temporarily removed sonde from Rock Drain MP for calibration.
2/6/2013		Adjusted influent flow rate to target an effluent flow rate of 3 gpm. Performed a H_2S gas survey. Removed sonde from Wetland MP-2 to install optical DO sensor.
2/13/2013		Week one water sampling event. Adjusted influent flow rate to target an effluent flow rate of 3 gpm. Removed sonde from Rock Drain MP, Wetland MP-1, and Wetland Out to install optical DO sensors.
2/14/2013		Performed rock drain matrix potholing to observe the extent of manganese oxidizing bacteria colonization and iron deposition.
2/19/2013		Week two water sampling event. Adjusted influent flow rate to target an effluent flow rate of 3 gpm. Replaced sondes at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out with optical DO sensors. Began calibrating DO using actual barometric pressure rather than corrected barometric pressure. Began first Rhodamine WT wetland cell tracer study.
2/27/2013		Week three water sampling event. Removed sondes from Rock Drain MP and Wetland MP-2 for maintenance. Data logger not restarted for Wetland MP-2 until 3/6/2013.
3/6/2013		Week four water sampling event.
3/6/2013	Winter 6 gpm Test Run Average Influent Flow Rate: 7.4 gpm Average Effluent Flow Rate: 5.5 gpm	Increased influent flow rate to target an effluent flow rate of 6 gpm. Replaced sonde at Wetland MP-2. Temporarily removed sondes from Rock Drain In, Wetland MP-1, and Wetland Out for calibration.
3/7/2013		Adjusted influent flow rate to target an effluent flow rate of 6 gpm.
3/12/2013		Week one water sampling event. Observed and stopped a small leak at effluent piping. Performed slug testing. Replaced sonde at Rock Drain MP. Placed hay bales across surface flow at north end of wetland cell.
3/13/2013		Adjusted influent flow rate to target an effluent flow rate of 6 gpm. Performed a H_2S gas survey.
3/14/2013		Performed slug testing. Temporarily removed sondes from Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out for calibration. Began second Rhodamine WT wetland cell tracer study.
3/19/2013		Week two water sampling event. Adjusted influent flow rate to target an effluent flow rate of 6 gpm. Temporarily removed sonde from Rock Drain MP for calibration.

TABLE 1
SUMMARY OF FIELD ACTIVITIES
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Date	Phase[1]	Field Activity
3/26/2013	Winter 6 gpm Test Run (continued)	Week three water sampling event. Adjusted influent flow rate to target an effluent flow rate of 6 gpm. Observed and stopped a small leak at effluent piping. Temporarily removed sonde from Rock Drain MP, Wetland MP-1, and Wetland Out for calibration.
4/1/2013		Week four water sampling event.
4/11/2013		Week five water sampling event. Observed a small leak at the inlet flow control box overflow pipe; mitigated by tightening drain fitting. Observed flow over the top of the rock drain geomembrane.
4/18/2013		Week six water sampling event. Observed flow over the top of the rock drain geomembrane. End of winter pilot testing.
4/18/2013	Flow Reduction and Trouble-Shooting	Decreased influent flow rate to 4.7 gpm to target an effluent flow rate of 3 gpm. Bailed sediment from the bottoms of Wetland MP-1 and MP-2.
4/19/2013		Observed flow over the top of the rock drain geomembrane. Performed slug testing. Temporarily removed sondes from Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out for calibration. Measured water levels and water quality parameters at all monitoring locations.
4/24/2013		Observed flow over the top of the rock drain geomembrane. Measured water levels and water quality parameters at all monitoring locations. Shut off heat trace to assess system performance.
4/25/2013		Performed a H_2S gas survey.
4/30/2013		Measured water levels and water quality parameters at all monitoring locations.
5/1/2013		Closed the inlet gate valve to turn off flow to the rock drain and wetland cells. Began a siphon to drain water from the rock drain into Pond 9 in preparation for matrix sampling. Retrieved sondes.
5/2/2013		Conducted rock drain and wetland cell matrix sampling. Pumped water from the wetland cell into Pond 9.
5/3/2013		Conducted wetland cell matrix sampling. Exposed the sheet pile divider wall bulkhead fittings; removed rock from within the fittings that may have been restricting flow into the wetland cell. Flow remained shut off to facilitate installation of screens over the fittings.
5/16/2013	Summer 2 gpm Test Run Average Influent Flow Rate: 2.7 gpm Average Effluent Flow Rate: 2.2 gpm	Installed 0.5-inch plastic mesh netting over the openings of the sheet pile divider wall bulkhead fittings in both the rock drain and wetland cell to mitigate potential blockages. Opened the inlet gate valve to turn on flow and refill the rock drain and wetland cells. Influent flow rate adjusted to 3.2 gpm to target an effluent flow rate of 1.5 gpm.
5/17/2013		Performed a wetland inspection. Confirmed that effluent flow rates had stabilized at 2.3 gpm as of 16:00. Effluent was observed to be black.
5/21/2013		Performed a wetland inspection. Effluent was observed to be black. Performed a H_2S gas survey.
5/29/2013		Performed a wetland inspection. Effluent no longer appeared black.
6/3/2013		Performed a wetland inspection. Measured water levels and water quality parameters at all monitoring locations.
6/18/2013		June water sampling event. Performed a H_2S gas survey.
7/8/2013		Cleaned and calibrated three sondes in anticipation of installation in the constructed wetland.
7/10/2013		July water sampling event. Performed a H_2S gas survey. Deployed sondes to continuously monitor water quality parameters in Rock Drain In, Rock Drain MP, and Wetland Out.
7/23/2013		Performed a site walk with U.S. EPA contractor personnel.
7/26/2013		Performed a wetland inspection. Measured water levels and water quality parameters at all monitoring locations.
8/14/2013		August water sampling event. Adjusted influent flow rate to target an effluent flow rate of 2 gpm.
8/15/2013		Performed a wetland inspection. Measured water levels and water quality parameters at all monitoring locations. Temporarily removed sondes from Rock Drain In, Wetland MP-1, and Wetland Out for calibration. Performed a H_2S gas survey.
8/27/2013		Performed a wetland inspection. Measured water levels and water quality parameters at all monitoring locations.
9/19/2013		September water sampling event. Temporarily removed sondes from Rock Drain In, Wetland MP-1, and Wetland Out for calibration. Performed a H_2S gas survey. Collected filtrate sediment samples from the Pond 9 mixing zone and elemental sulfur/biofilm samples near the wetland effluent for laboratory scanning electron microscopy analysis (results of this analysis will be presented under separate cover).

TABLE 1
SUMMARY OF FIELD ACTIVITIES
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Note:
1. Test run flow rates reflect target effluent flow rates.

Abbreviations:
gpm = gallon per minute
H_2S = hydrogen sulfide
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
sonde = YSI 6920 multi-parameter sonde
U.S. EPA = United States Environmental Protection Agency
Wetland MP-1 = wetland monitoring port number one
Wetland MP-2 = wetland monitoring port number two
Wetland Out = wetland outlet discharge point monitoring location

TABLE 2
FIELD AND LABORATORY ANALYTICAL METHODS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Parameter	Sampling / Monitoring Locations[1]	Method Reference / Equipment
Field Measurements		
Effluent Flow Rate	Wetland Out	Bucket Method: flow rate calculated from time to fill 5-gallon bucket; minimum of three measurements averaged
Influent Flow Rate & Cumulative Volume	Rock Drain In	LF620 Electromagnetic Flowmeter
Water Level	Rock Drain MP, Wetland MP-1, Wetland MP-2	Solinst Water Level Meter
Monitoring Port Total Depth	Rock Drain MP, Wetland MP-1, Wetland MP-2	Solinst Water Level Meter, corrected for sensor tip length of 3.25 inches
Water Quality Parameters[2]	Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland	YSI 556 Multi-Probe System / YSI 6920 Multi-Parameter Sonde
Rhodamine WT	Rock Drain MP, Wetland MP 1, Wetland MP 2, Wetland Out	YSI 6130 Rhodamine WT Sensor
Thermister Temperature Data	Rock Drain, Wetland North, Wetland South	Omega brand, model OM-CP-OctTemp2000
Total Dissolved Sulfide	Rock Drain In, Rock Drain MP, Wetland Out	YSI 9300 Photometer
Total Flow	Rock Drain In	LF620 Electromagnetic Flowmeter
Laboratory Analyses		
Five Day Biological Oxygen Demand	Rock Drain In, Wetland Out	SM 5210B
Nitrogen as Ammonia	Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland Out	EPA 350.1
Nitrogen as Nitrite/Nitrate	Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland Out	EPA 353.2
Total Phosphorus	Rock Drain In, Rock Drain MP, Wetland MP-1, Wetland Out	EPA 365.4
Total and Dissolved Metals[3]	Rock Drain In, Rock Drain MP, Wetland Out	EPA 200.7 / 200.8
Total Organic Carbon	Rock Drain In, Wetland Out	SM 5310C
Total Sulfate	Rock Drain In, Rock Drain MP, Wetland Out	EPA 300.0

Notes:

1. Sampling and monitoring locations are shown on Figure 4.
2. Water quality parameters included temperature, specific electrical conductance, dissolved oxygen, pH, and oxidation reduction potential.
3. Metals: Ca, Fe, Mg, K, Na (EPA 200.7); Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Mo, Ni, Se, Ag, Tl, V, Zn (EPA 200.8)

Abbreviations:

EPA = United States Environmental Protection Agency
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
SM = Standard Method
Wetland MP-1 = wetland monitoring port number one
Wetland MP-2 = wetland monitoring port number two
Wetland Out = wetland outlet discharge point monitoring location

TABLE 3
FLOW AND WATER LEVEL DATA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Test Run[1]	Date	Influent Flow Rate[2] (gpm)	Cumulative Influent Volume[2] (gallon)	Test Run Cumulative Influent Volume[2] (gallon)	Effluent Flow Rate[3] (gpm)	Rock Drain MP[4]			Wetland MP-1[4]			Wetland MP-2[4,5]	
						Water Elevation Inside MP (feet amsl)	Water Elevation Outside MP (feet amsl)	Bottom of MP Elevation (feet amsl)	Water Elevation Inside MP (feet amsl)	Water Elevation Outside MP (feet amsl)	Bottom of MP Elevation (feet amsl)	Water Elevation Inside MP (feet amsl)	Bottom of MP Elevation (feet amsl)
Winter 1.5 gpm	1/3/2013	3.3	249,634	0	1.7	--	--	--	--	--	--	--	--
	1/4/2013	3.0	252,992	3,358	2.2	8,796.37	--	8,794.42	8,796.37	--	8,793.83	8,796.35	8,794.26
	1/8/2013	3.1	270,717	21,083	1.6	--	--	--	--	--	--	--	--
	1/9/2013	3.1	274,619	24,985	1.5	8,796.37	--	--	8,796.37	--	--	8,796.35	--
	1/10/2013	3.1	279,251	29,617	1.5	--	--	--	--	--	--	--	--
	1/15/2013	3.1	302,471	52,837	1.6	8,796.37	--	--	8,796.37	--	--	8,796.54	--
	1/16/2013	3.1	306,597	56,963	1.6	8,796.39	--	--	8,796.38	--	--	8,796.34	--
	1/17/2013	3.1	310,525	60,891	1.6	--	--	--	--	--	--	--	--
	1/18/2013	3.1	315,570	65,936	1.5	--	--	--	--	--	--	--	--
	1/22/2013	3.1	332,965	83,331	1.5	8,796.40	--	--	8,796.39	--	--	8,796.35	--
	1/24/2013	3.1	341,560	91,926	1.4	--	--	--	--	--	--	--	--
	2/5/2013	3.0	395,053	145,419	1.5	8,796.42	--	--	8,796.43	--	--	8,796.35	--
Winter 3 gpm	2/5/2013	4.8	--	0	2.8	--	--	--	--	--	--	--	--
	2/6/2013	4.8	401,119	6,066	3.3	--	--	--	--	--	--	--	--
	2/6/2013[6]	4.6	--	--	2.9	--	--	--	--	--	--	--	--
	2/13/2013[6]	4.6	447,709	52,656	2.9	8,796.47	--	--	8,796.46	--	--	8,796.34	--
	2/14/2013	4.6	454,267	59,214	2.9	--	--	--	--	--	--	--	--
	2/19/2013	4.6	487,813	92,760	2.8	8,796.49	--	--	8,796.46	--	--	8,796.36	--
	2/19/2013[6]	4.8	488,351	93,298	--	--	--	--	--	--	--	--	--
	2/20/2013	4.8	493,496	98,443	3.0	--	--	--	--	--	--	--	--
	2/27/2013	4.7	542,062	147,009	3.0	8,796.55	--	--	8,796.51	--	--	8,796.36	--
	3/6/2013	4.7	589,589	194,536	2.9	8,796.55	8,796.61	8,794.39	8,796.53	8,796.59	8,794.04	--	--
Winter 6 gpm	3/6/2013	7.8	590,448	0	--	--	--	--	--	--	--	--	--
	3/7/2013	7.8	599,964	9,516	6.1	8,796.66	8,796.66	8,794.33	8,796.59	8,796.63	8,794.03	8,796.39	8,794.23
	3/7/2013[6]	7.7	600,759	10,311	6.0	--	--	--	--	--	--	--	--
	3/12/2013	7.7	656,476	66,028	6.1	8,796.70	8,796.70	8,794.33	8,796.64	8,796.67	8,794.16	8,796.39	8,794.19
	3/13/2013	7.7	666,806	76,358	6.2	--	--	--	--	--	--	--	--
	3/13/2013[6]	7.5	667,350	76,902	--	--	--	--	--	--	--	--	--
	3/14/2013	7.5	678,030	87,582	5.9	8,796.72	--	--	8,796.60	--	--	8,796.39	--
	3/19/2013[6]	7.4	732,903	142,455	5.9	8,796.76	8,796.75	8,794.38	8,796.65	8,796.73	8,794.01	8,796.38	8,794.21
	3/26/2013[6]	7.4	805,217	214,769	5.9	8,796.76	8,796.78	--	8,796.68	8,796.73	--	8,796.39	--
	4/1/2013	7.3	869,680	279,232	5.5	8,796.82	8,796.81	8,794.39	8,796.74	8,796.78	8,794.01	8,796.38	8,794.15
	4/11/2013	7.2	972,822	382,374	4.9	8,796.86	8,796.86	8,794.39	8,796.81	8,796.82	--	8,796.39	--
	4/17/2013	7.1	--	--	4.6	--	--	--	--	--	--	--	--
	4/18/2013	7.0	1,045,980	455,532	4.2	8,796.86	8,796.85	8,794.38	8,796.83	8,796.83	8,794.01	8,796.38	8,794.23
Flow Reduction and Trouble-shooting	4/18/2013	4.7	--	0	--	--	--	--	--	--	--	--	--
	4/19/2013	4.7	1,054,182	8,202	3.2	8,796.81	--	--	8,796.73	--	--	8,796.38	--
	4/24/2013	4.6	1,086,330	40,350	3.2	8,796.82	--	--	8,796.76	--	--	8,796.36	--
	4/30/2013	4.0	1,122,195	76,215	2.5	8,796.81	--	--	8,796.78	--	8,794.01	8,795.35	--
	5/1/2013[7]	0.0	1,128,431	82,451	0.0	--	--	--	--	--	--	--	--
	5/2/2013[7]	0.0	1,128,431	82,451	0.0	--	--	--	--	--	--	--	--
	5/3/2013[7]	0.0	1,128,431	82,451	0.0	--	--	--	--	--	--	--	--

TABLE 3
FLOW AND WATER LEVEL DATA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Test Run[1]	Date	Influent Flow Rate[2] (gpm)	Cumulative Influent Volume[2] (gallon)	Test Run Cumulative Influent Volume[2] (gallon)	Effluent Flow Rate[3] (gpm)	Rock Drain MP[4]			Wetland MP-1[4]			Wetland MP-2[4,5]	
						Water Elevation Inside MP (feet amsl)	Water Elevation Outside MP (feet amsl)	Bottom of MP Elevation (feet amsl)	Water Elevation Inside MP (feet amsl)	Water Elevation Outside MP (feet amsl)	Bottom of MP Elevation (feet amsl)	Water Elevation Inside MP (feet amsl)	Bottom of MP Elevation (feet amsl)
Summer 2 gpm	5/16/2013	3.2	1,128,431	0	--	--	--	--	--	--	--	--	--
	5/17/2013	3.0	1,132,040	3,609	1.1	--	--	--	--	--	--	--	--
	5/17/2013	2.9	1,133,029	4,598	2.3	8,796.40	--	--	8,796.41	--	--	8,796.37	--
	5/21/2013	3.2	1,150,640	22,209	2.8	8,796.45	--	--	8,796.46	--	--	8,796.39	--
	5/29/2013	3.3	1,189,213	60,782	2.9	--	--	--	--	--	--	--	--
	6/3/2013	2.9	1,210,680	82,249	2.5	8,796.54	--	8,794.32	8,795.54	--	8,794.01	8,796.38	8,794.21
	6/18/2013	2.6	1,271,403	142,972	2.2	8,796.48	--	--	8,796.49	--	--	8,796.38	--
	7/10/2013	2.4	1,350,086	221,655	2.1	8,796.50	--	--	8,796.53	--	--	8,796.38	--
	7/26/2013	2.5	--	--	--	--	--	--	--	--	--	--	--
	7/26/2013	2.6	1,407,222	278,791	2.0	8,796.56	--	--	8,796.57	--	--	8,796.37	--
	8/14/2013	2.5	--	--	1.9	--	--	--	--	--	--	--	--
	8/14/2013	2.6	1,477,043	348,612	1.9	8,796.59	--	8,794.31	8,796.60	--	8,794.03	8,796.38	8,794.23
	8/14/2013[6]	2.7	1,477,496	349,065	--	--	--	--	--	--	--	--	--
	8/15/2013	2.8	1,481,336	352,905	2.0	--	--	--	--	--	--	--	--
	8/27/2013	2.8	1,529,282	400,851	2.1	8,796.64	--	8,794.41	8,796.64	8,796.64	8,794.06	8,796.41	8,794.25
	8/27/2013	2.8	1,529,401	400,970	--	--	--	--	--	--	--	--	--
	9/19/2013	2.7	1,617,927	489,496	2.3	8,796.66	--	8,794.33	8,796.66	8,796.66	8,794.06	8,796.42	8,794.24

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Influent flow rate and total flow measured by Toshiba GF630 detector and LF620 electromagnetic flowmeter.
3. Effluent flow rate measured by bucket method.
4. Water elevations calculated based on Solinst water level meter measurements and as-built survey elevations.
5. Surface water was never observed around the base of Wetland MP-2. Therefore, water surface elevation measurements were never collected outside Wetland MP-2.
6. Influent flow rates were adjusted to maintain the target effluent flow rate.
7. Closed the inlet gate valve to turn off flow to the rock drain and wetland cells on 5/1/2013. Flow remained off until 5/16/2013 to facilitate installation of screens over the divider wall bulkhead fittings.

Abbreviations:
-- = not measured or measured value not considered reliable
amsl = above mean sea level
gpm = gallon per minute
Rock Drain MP = rock drain monitoring port
Wetland MP-1 = wetland monitoring port number one
Wetland MP-2 = wetland monitoring port number two

TABLE 4
WATER QUALITY PARAMETERS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Date	Sample ID	Instrument Used[2]	Temperature (°C)	SEC (uS/cm)	DO[3] (mg/L)	pH (su)	ORP (mV)	Comments
Rock Drain In	Baseline	1/4/2013	RockDrainIn130104	YSI 556	1.3	740	8.6	7.9	222	Recorded EC instead of SEC.
	Winter 1.5 gpm	1/8/2013	--	Sonde	3.0	1295	12.9	8.2	248	Sonde installed for continuous water quality monitoring.
		1/9/2013	RockDrainIn130109	Sonde	1.3	1305	13.2	8.2	254	
		1/10/2013	--	Sonde	1.9	1302	13.2	8.2	238	
		1/15/2013	--	Sonde	1.2	1323	13.9	8.2	251	
		1/16/2013	RockDrainIn130116	Sonde	1.8	1318	13.6	8.1	249	
		1/17/2013	--	Sonde	2.3	1295	13.2	8.2	245	
		1/18/2013	--	Sonde	3.2	1291	13.1	8.2	252	
		1/22/2013	RockDrainIn130122	Sonde	2.4	1303	12.6	8.2	250	
		1/24/2013	--	Sonde	2.7	1297	12.8	8.3	253	DO measured by YSI 556.
		2/5/2013	RockDrainIn130205	Sonde	1.4	1306	12.6	8.3	242	
	Winter 3 gpm	2/13/2013	RockDrainIn130213	Sonde	2.2	1337	12.3	8.2	244	
		2/14/2013	--	Sonde	2.0	1313	13.1	8.3	245	
		2/19/2013	RockDrainIn130219	Sonde	1.2	1334	13.2	8.3	244	
		2/27/2013	RockDrainIn130227	Sonde	0.6	1337	10.5	8.3	242	DO measured by YSI 556.
		3/6/2013	RockDrainIn130306	Sonde	2.7	1305	9.6	8.3	281	
	Winter 6 gpm	3/12/2013	RockDrainIn130312	Sonde	4.6	1305	9.4	8.3	271	
		3/19/2013	RockDrainIn130319	Sonde	4.6	1325	9.3	8.3	230	
		3/26/2013	RockDrainIn130326	Sonde	2.4	1322	9.7	8.3	230	
		4/1/2013	RockDrainIn130401	Sonde	9.4	1321	8.4	8.3	215	
		4/11/2013	RockDrainIn130411	Sonde	2.7	1333	9.7	8.3	222	
		4/18/2013	RockDrainIn130418	Sonde	1.1	1360	10.3	8.3	229	
	Flow Reduction	4/24/2013	--	YSI 556	6.0	1317	9.4	8.3	126	
		4/30/2013	--	YSI 556	13.8	1319	7.3	8.2	176	ORP slowly increasing with time.
	Summer 2 gpm	6/3/2013	--	YSI 556	12.3	1325	7.7	8.2	244	
		6/18/2013	RockDrainIn130618	YSI 556	14.7	1587	8.5	8.1	204	SEC value recorded is biased high and considered unreliable due to a calibration error.
		7/10/2013	RockDrainIn130710	YSI 556	16.7	1296	6.5	8.0	182	
		8/14/2013	RockDrainIn130814	YSI 556	13.4	1267	7.3	8.2	237	
		8/15/2013	--	YSI 556	16.7	1275	6.5	8.2	108	ORP unreliable.
		8/27/2013	--	YSI 556	18.8	1206	6.5	8.0	213	
		9/19/2013	RockDrainIn130919	YSI 556	13.3	1254	7.0	7.5	205	

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 meter during weekly inspections until January 8, 2013, at which time in situ YSI 6920 multi-parameter sondes were installed. Water quality parameters measured after January 8, 2013, were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 measurement recorded during weekly calibration checks was reported. These data are noted accordingly.
3. DO sensors were calibrated using corrected barometric pressure rather than actual barometric pressure for the following: YSI 556 measurements from 11/9/2012 to 2/19/2013; sonde measurements at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out from 1/8/2013 to 2/14/2013; sonde measurements at Rock Drain In from 1/8/2013 to 2/27/2013. These DO measurements are biased high. After these dates, DO sensors were calibrated using actual barometric pressure.

Abbreviations:
-- = not measured or measured value is not considered reliable
°C = degree Celsius
DO = dissolved oxygen
EC = electrical conductivity
gpm = gallon per minute
mg/L = milligram per liter
mV = millivolt
ORP = oxidation reduction potential
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
SEC = specific electrical conductance
sonde = YSI 6920 multi-parameter sonde
su = standard unit
uS/cm = microSiemen per centimeter
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Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Date	Sample ID	Instrument Used[2]	Temperature (°C)	SEC (uS/cm)	DO[3] (mg/L)	pH (su)	ORP (mV)	Comments
Rock Drain MP	Baseline	1/4/2013	RockDrainMP130104	YSI 556	4.9	783	6.9	7.8	168	Recorded EC instead of SEC; ORP measured by sonde.
	Winter 1.5 gpm	1/8/2013	--	Sonde	5.6	1306	8.8	7.6	155	Sonde installed for continuous water quality monitoring. ORP measured by YSI 556.
		1/9/2013	RockDrainMP130109	Sonde	5.7	1317	10.9	7.6	30	ORP measured by YSI 556.
		1/10/2013	--	Sonde	5.0	1295	11.6	7.7	100	ORP measured by YSI 556.
		1/15/2013	--	Sonde	4.9	1297	12.0	7.7	248	
		1/16/2013	RockDrainMP130116	Sonde	4.8	1311	12.0	7.7	263	
		1/17/2013	--	Sonde	5.0	1302	11.8	7.7	237	
		1/18/2013	--	Sonde	6.2	1293	11.2	7.7	152	
		1/22/2013	RockDrainMP130122	Sonde	5.0	1298	11.1	7.7	96	
		1/24/2013	--	Sonde	5.3	1298	12.7	7.7	26	
		2/5/2013	RockDrainMP130205	Sonde	5.5	1297	10.9	7.7	236	DO measured by YSI 556.
	Winter 3 gpm	2/13/2013	RockDrainMP130213	Sonde	4.5	1321	13.9	7.8	173	DO measured by YSI 556.
		2/14/2013	--	YSI 556	4.7	1286	8.0	7.9	195	Sonde temporarily removed; all measurements by YSI 556.
		2/19/2013	RockDrainMP130219	Sonde	4.8	1328	9.4	7.8	317	
		2/27/2013	RockDrainMP130227	Sonde	4.4	1332	9.3	7.8	335	
		3/6/2013	RockDrainMP130306	YSI 556	5.9	1279	9.5	7.6	225	Sonde temporarily removed; all measurements by YSI 556.
	Winter 6 gpm	3/12/2013	RockDrainMP130312	Sonde	6.2	1311	8.1	7.8	213	
		3/19/2013	RockDrainMP130319	Sonde	7.2	1351	7.5	7.8	369	
		3/26/2013	RockDrainMP130326	Sonde	5.2	1332	8.4	8.0	365	
		4/1/2013	RockDrainMP130401	Sonde	9.4	1328	7.3	7.9	390	
		4/11/2013	RockDrainMP130411	Sonde	6.2	1333	8.4	8.0	385	
		4/18/2013	RockDrainMP130418	Sonde	3.9	1370	9.4	8.2	362	
	Flow Reduction	4/24/2013	--	YSI 556	10.3	1311	6.9	7.8	131	
		4/30/2013	--	YSI 556	10.9	1328	5.9	8.0	182	
	Summer 2 gpm	6/3/2013	--	YSI 556	10.9	1335	6.2	7.8	193	
		6/18/2013	RockDrainMP130618	YSI 556	12.8	1594	6.5	7.6	195	SEC value recorded is biased high and considered unreliable due to a calibration error.
		7/10/2013	RockDrainMP130710	YSI 556	16.7	1301	5.4	7.7	206	
		8/14/2013	RockDrainMP130814	YSI 556	14.2	1255	6.3	7.7	181	
		8/15/2013	--	YSI 556	13.3	1273	4.8	7.7	125	
		8/27/2013	--	YSI 556	17.0	1157	5.2	7.9	212	
		9/19/2013	RockDrainMP130919	YSI 556	13.5	1237	7.3	7.5	165	

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 meter during weekly inspections until January 8, 2013, at which time in situ YSI 6920 multi-parameter sondes were installed. Water quality parameters measured after January 8, 2013, were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 measurement recorded during weekly calibration checks was reported. These data are noted accordingly.
3. DO sensors were calibrated using corrected barometric pressure rather than actual barometric pressure for the following: YSI 556 measurements from 11/9/2012 to 2/19/2013; sonde measurements at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out from 1/8/2013 to 2/14/2013; sonde measurements at Rock Drain In from 1/8/2013 to 2/27/2013. These DO measurements are biased high. After these dates, DO sensors were calibrated using actual barometric pressure.

Abbreviations:
-- = not measured or measured value is not considered reliable
°C = degree Celsius
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gpm = gallon per minute
mg/L = milligram per liter
mV = millivolt
ORP = oxidation reduction potential
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
SEC = specific electrical conductance
sonde = YSI 6920 multi-parameter sonde
su = standard unit
uS/cm = microSiemen per centimeter
Wetland MP-1 = wetland monitoring port number one
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ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Date	Sample ID	Instrument Used[2]	Temperature (°C)	SEC (uS/cm)	DO[3] (mg/L)	pH (su)	ORP (mV)	Comments
Wetland MP-1	Baseline	1/4/2013	--	YSI 556	4.2	778	6.4	7.6	156	Recorded EC instead of SEC; ORP measured by sonde.
	Winter 1.5 gpm	1/8/2013	--	Sonde	6.2	1295	8.1	7.6	144	Sonde installed for continuous water quality monitoring. DO measured by YSI 556.
		1/9/2013	--	Sonde	5.8	1292	9.2	7.5	85	DO measured by YSI 556.
		1/10/2013	--	Sonde	6.3	1296	9.5	7.6	176	DO measured by YSI 556.
		1/15/2013	--	Sonde	5.5	1300	9.9	7.6	275	DO measured by YSI 556.
		1/16/2013	--	Sonde	6.4	1311	8.9	7.6	303	DO measured by YSI 556.
		1/17/2013	--	Sonde	6.7	1299	7.7	7.6	198	DO measured by YSI 556.
		1/18/2013	--	Sonde	6.8	1287	7.7	7.6	244	DO measured by YSI 556.
		1/22/2013	--	Sonde	6.1	1301	9.3	7.6	195	DO measured by YSI 556.
		1/23/2013	--	Sonde	6.1	1300	9.7	7.6	84	
		2/5/2013	--	Sonde	6.8	1290	9.0	7.6	345	
	Winter 3 gpm	2/13/2013	--	Sonde	5.4	1325	6.4	7.8	345	
		2/14/2013	--	YSI 556	5.3	1278	7.7	7.8	184	Sonde temporarily removed; all measurements by YSI 556.
		2/19/2013	--	Sonde	5.4	1324	8.8	7.9	242	
		2/27/2013	--	Sonde	4.3	1322	9.1	7.9	273	
		3/6/2013	--	Sonde	6.9	1288	8.3	7.8	260	
	Winter 6 gpm	3/12/2013	--	Sonde	7.1	1306	8.9	8.0	288	
		3/19/2013	--	Sonde	7.7	1324	8.5	8.0	255	
		3/26/2013	--	Sonde	5.3	1318	9.2	8.0	329	
		4/1/2013	--	Sonde	11.6	1320	7.3	8.0	379	
		4/11/2013	--	Sonde	7.1	1325	8.7	8.0	368	
		4/18/2013	WetlandMP1130418	Sonde	3.9	1359	9.5	8.1	356	Sample collected for nitrite, nitrate, ammonia, and phosphorus only.
	Flow Reduction	4/24/2013	--	YSI 556	11.5	1312	6.6	7.8	126	
		4/30/2013	--	YSI 556	12.2	1321	5.7	7.9	178	
	Summer 2 gpm	6/3/2013	--	YSI 556	11.4	1333	4.1	7.4	-99	
		6/18/2013	--	YSI 556	13.1	1593	4.8	7.4	128	SEC value recorded is biased high and considered unreliable due to a calibration error.
		7/10/2013	--	YSI 556	17.0	1302	0.3	7.4	-228	
		8/14/2013	--	YSI 556	13.4	1262	2.6	7.3	-79	
		8/27/2013	--	YSI 556	15.1	1184	1.3	7.3	-24	ORP slowly decreasing with time.
		9/19/2013	--	YSI 556	13.4	1229	1.1	7.2	-185	

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 meter during weekly inspections until January 8, 2013, at which time in situ YSI 6920 multi-parameter sondes were installed. Water quality parameters measured after January 8, 2013, were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 measurement recorded during weekly calibration checks was reported. These data are noted accordingly.
3. DO sensors were calibrated using corrected barometric pressure rather than actual barometric pressure for the following: YSI 556 measurements from 11/9/2012 to 2/19/2013; sonde measurements at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out from 1/8/2013 to 2/14/2013; sonde measurements at Rock Drain In from 1/8/2013 to 2/27/2013. These DO measurements are biased high. After these dates, DO sensors were calibrated using actual barometric pressure.

Abbreviations:

-- = not measured or measured value is not considered reliable
°C = degree Celsius
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ORP = oxidation reduction potential
Rock Drain In = inlet flow control box monitoring location
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Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Date	Sample ID	Instrument Used[2]	Temperature (°C)	SEC (uS/cm)	DO[3] (mg/L)	pH (su)	ORP (mV)	Comments
Wetland MP-2	Baseline	1/4/2013	--	YSI 556	10.6	1062	2.1	6.5	-335	Recorded EC instead of SEC.
	Winter 1.5 gpm	1/8/2013	--	Sonde	10.2	1430	0.5	6.6	-341	Sonde installed for continuous water quality monitoring. DO measured by YSI 556.
		1/9/2013	--	Sonde	11.1	1439	0.2	6.6	-382	DO measured by YSI 556.
		1/10/2013	--	Sonde	11.0	1435	2.9	6.6	-409	DO measured by YSI 556.
		1/15/2013	--	Sonde	10.3	1444	3.2	6.5	-414	DO measured by YSI 556.
		1/16/2013	--	Sonde	11.0	1440	--	6.5	-431	DO measured by YSI 556 not considered reliable.
		1/17/2013	--	Sonde	10.7	1433	3.2	6.5	-416	DO measured by YSI 556.
		1/18/2013	--	Sonde	11.1	1449	1.5	6.5	-408	DO measured by YSI 556.
		1/22/2013	--	Sonde	11.7	1447	3.4	6.5	-420	DO measured by YSI 556.
		1/24/2013	--	Sonde	11.9	1455	1.2	6.5	-427	DO measured by YSI 556.
		2/5/2013	--	Sonde	12.2	1421	3.3	6.5	-428	DO measured by YSI 556.
	Winter 3 gpm	2/13/2013	--	YSI 556	8.8	1378	0.8	6.9	-275	Sonde temporarily removed; all measurements by YSI 556.
		2/14/2013	--	YSI 556	9.1	1378	0.9	6.9	-287	Sonde temporarily removed; all measurements by YSI 556.
		2/19/2013	--	Sonde	9.8	1370	2.1	6.8	-339	DO measured by YSI 556.
		2/27/2013	--	YSI 556	8.8	1387	1.1	6.8	-269	Sonde temporarily removed; all measurements by YSI 556. ORP steadily decreased.
		3/6/2013	--	Sonde	11.5	1345	0.4	6.7	-337	DO measured by YSI 556.
	Winter 6 gpm	3/12/2013	--	Sonde	8.3	1331	0.6	6.9	-428	DO measured by YSI 556.
		3/19/2013	--	Sonde	10.0	1357	0.8	6.8	-422	DO sensor removed from sonde. DO measured by YSI 556.
		3/26/2013	--	Sonde	7.8	1346	0.7	6.9	-429	DO measured by YSI 556.
		4/1/2013	--	Sonde	13.2	1353	0.9	6.8	-418	DO measured by YSI 556.
		4/11/2013	--	Sonde	10.7	1333	--	6.9	-435	DO measured by YSI 556 not considered reliable.
		4/18/2013	--	Sonde	11.1	1369	1.2	6.8	-421	DO measured by YSI 556.
	Flow Reduction	4/24/2013	--	YSI 556	14.7	1359	1.0	6.8	-327	
		4/30/2013	--	YSI 556	9.5	1360	0.2	6.9	-286	
	Summer 2 gpm	6/3/2013	--	YSI 556	10.9	1348	0.1	6.9	-310	
		6/18/2013	--	YSI 556	13.1	1622	0.1	6.9	-326	SEC value recorded is biased high and considered unreliable due to a calibration error.
		7/10/2013	--	YSI 556	16.4	1309	1.1	7.0	-370	ORP slowly decreasing with time.
		8/14/2013	--	YSI 556	13.5	1258	1.1	6.9	-349	
		8/27/2013	--	YSI 556	15.1	1199	2.0	7.0	-321	ORP slowly decreasing with time.
		9/19/2013	--	YSI 556	13.3	1204	1.5	7.0	-335	

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 meter during weekly inspections until January 8, 2013, at which time in situ YSI 6920 multi-parameter sondes were installed. Water quality parameters measured after January 8, 2013, were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 measurement recorded during weekly calibration checks was reported. These data are noted accordingly.
3. DO sensors were calibrated using corrected barometric pressure rather than actual barometric pressure for the following: YSI 556 measurements from 11/9/2012 to 2/19/2013; sonde measurements at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out from 1/8/2013 to 2/14/2013; sonde measurements at Rock Drain In from 1/8/2013 to 2/27/2013. These DO measurements are biased high. After these dates, DO sensors were calibrated using actual barometric pressure.

Abbreviations:

-- = not measured or measured value is not considered reliable
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Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Date	Sample ID	Instrument Used[2]	Temperature (°C)	SEC (uS/cm)	DO[3] (mg/L)	pH (su)	ORP (mV)	Comments
Wetland Out	Baseline	1/4/2013	WetlandOut130104	YSI 556	7.3	983	2.5	6.5	-331	Recorded EC instead of SEC.
	Winter 1.5 gpm	1/8/2013	--	Sonde	8.5	1464	2.6	6.6	-343	Sonde installed for continuous water quality monitoring. DO measured by YSI 556.
		1/9/2013	WetlandOut130109	Sonde	8.8	1460	1.4	6.6	-347	DO measured by YSI 556.
		1/10/2013	--	Sonde	8.6	1456	3.8	6.6	-340	DO measured by YSI 556.
		1/15/2013	--	Sonde	7.7	1466	--	6.6	-344	DO measured by YSI 556 not considered reliable.
		1/16/2013	WetlandOut130116	Sonde	8.3	1467	--	6.6	-347	DO measured by YSI 556 not considered reliable.
		1/17/2013	--	Sonde	8.3	1464	--	6.6	-352	DO measured by YSI 556 not considered reliable.
		1/18/2013	--	Sonde	8.9	1467	1.4	6.6	-305	DO measured by YSI 556.
		1/22/2013	WetlandOut130122	Sonde	9.2	1476	2.3	6.6	-348	DO measured by YSI 556.
		1/24/2013	--	Sonde	9.6	1476	1.1	6.6	-313	DO sensor removed from sonde. DO measured by YSI 556.
		2/5/2013	WetlandOut130205	Sonde	9.8	1427	4.0	6.6	-367	DO measured by YSI 556.
	Winter 3 gpm	2/13/2013	WetlandOut130213	Sonde	7.1	1398	1.1	6.7	-388	DO measured by YSI 556.
		2/14/2013	--	YSI 556	6.7	1379	2.0	6.8	-306	Sonde temporarily removed; all measurements by YSI 556. DO slowly decreased.
		2/19/2013	WetlandOut130219	YSI 556	7.1	1414	--	6.8	-303	Sonde temporarily removed; all measurements by YSI 556. DO not considered reliable.
		2/27/2013	WetlandOut130227	Sonde	6.7	1389	1.5	6.8	-377	DO measured by YSI 556.
		3/6/2013	WetlandOut130306	Sonde	8.6	1332	1.5	6.8	-382	DO measured by YSI 556.
	Winter 6 gpm	3/12/2013	WetlandOut130312	Sonde	7.5	1321	1.2	6.9	-369	DO measured by YSI 556.
		3/19/2013	WetlandOut130319	Sonde	9.0	1349	2.2	6.8	-380	DO sensor removed from sonde. DO measured by YSI 556.
		3/26/2013	WetlandOut130326	Sonde	6.2	1339	0.9	6.9	-401	DO measured by YSI 556.
		4/1/2013	WetlandOut130401	Sonde	12.0	1351	0.9	6.7	-373	DO measured by YSI 556.
		4/11/2013	WetlandOut130411	Sonde	9.6	1326	1.0	6.8	-371	DO measured by YSI 556.
		4/18/2013	WetlandOut130418	Sonde	9.8	1347	1.1	6.8	-373	DO measured by YSI 556.
	Flow Reduction	4/24/2013	--	YSI 556	13.4	1355	1.3	6.8	-318	
		4/30/2013	--	YSI 556	9.5	1366	1.5	6.9	-271	
	Summer 2 gpm	6/3/2013	--	YSI 556	10.7	1363	0.2	6.9	-310	
		6/18/2013	WetlandOut130618	YSI 556	13.0	1635	--	6.8	-316	SEC value recorded is biased high and considered unreliable due to a calibration error.
		7/10/2013	WetlandOut130710	YSI 556	16.5	1353	1.3	6.8	-365	
		8/14/2013	WetlandOut130814	YSI 556	13.2	1270	1.5	7.0	-316	
		8/15/2013	--	YSI 556	13.6	1280	4.6	6.9	-318	
		8/27/2013	--	YSI 556	14.8	1212	2.6	6.9	-321	
		9/19/2013	WetlandOut130919	YSI 556	12.7	1227	1.9	6.8	-316	

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 meter during weekly inspections until January 8, 2013, at which time in situ YSI 6920 multi-parameter sondes were installed. Water quality parameters measured after January 8, 2013, were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 measurement recorded during weekly calibration checks was reported. These data are noted accordingly.
3. DO sensors were calibrated using corrected barometric pressure rather than actual barometric pressure for the following: YSI 556 measurements from 11/9/2012 to 2/19/2013; sonde measurements at Rock Drain MP, Wetland MP-1, Wetland MP-2, and Wetland Out from 1/8/2013 to 2/14/2013; sonde measurements at Rock Drain In from 1/8/2013 to 2/27/2013. These DO measurements are biased high. After these dates, DO sensors were calibrated using actual barometric pressure.

Abbreviations:

-- = not measured or measured value is not considered reliable
°C = degree Celsius
DO = dissolved oxygen
EC = electrical conductivity
gpm = gallon per minute
mg/L = milligram per liter
mV = millivolt
ORP = oxidation reduction potential
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
SEC = specific electrical conductance
sonde = YSI 6920 multi-parameter sonde
su = standard unit
uS/cm = microSiemen per centimeter
Wetland MP-1 = wetland monitoring port number one
Wetland MP-2 = wetland monitoring port number two
Wetland Out = wetland outlet discharge point monitoring location
YSI 556 = YSI 556 multi-probe system

TABLE 5
WATER QUALITY PARAMETERS SUMMARY
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Statistic	Temperature (°C)	SEC (uS/cm)	DO[2] (mg/L)	pH (su)	ORP[3,4] (mV)
Rock Drain In	Winter 1.5 gpm	Minimum	0.3	1199	11.6	8.1	--
		Average	2.5	1287	12.9	8.2	246
		Maximum	6.0	1328	14.5	8.3	270
	Winter 3 gpm	Minimum	-0.1	1257	8.8	8.2	--
		Average	2.6	1304	11.7	8.3	251
		Maximum	6.2	1356	13.7	8.4	291
	Winter 6 gpm	Minimum	-0.1	1258	7.9	8.2	--
		Average	6.5	1320	8.9	8.3	231
		Maximum	13.0	1395	10.5	8.3	287
	Flow Reduction	Minimum	0.8	1311	7.2	8.2	--
		Average	9.6	1322	8.3	8.3	250
		Maximum	16.8	1356	10.2	8.4	267
	Summer 2 gpm	Minimum	12.9	1180	6.6	8.0	--
		Average	16.6	1257	7.3	8.2	252
		Maximum	21.8	1294	7.9	8.3	266
Rock Drain MP	Winter 1.5 gpm	Minimum	4.7	1203	8.8	7.6	--
		Average	5.5	1286	12.1	7.7	157
		Maximum	7.2	1317	14.8	7.8	263
	Winter 3 gpm	Minimum	4.0	1282	8.1	7.8	--
		Average	4.7	1312	8.7	7.8	245
		Maximum	5.5	1342	9.4	7.9	337
	Winter 6 gpm	Minimum	3.9	1236	6.9	7.7	--
		Average	7.9	1341	7.7	7.9	342
		Maximum	10.8	1387	9.4	8.2	401
	Flow Reduction	Minimum	4.0	1333	8.9	7.7	--
		Average	8.9	1341	9.1	7.8	284
		Maximum	11.5	1372	9.3	8.1	379
	Summer[2] 2 gpm	Minimum	12.7	1183	4.8	7.5	--
		Average	15.0	1275	5.9	7.7	239
		Maximum	17.1	1313	7.3	7.8	340
Wetland MP-1	Winter[2] 1.5 gpm	Minimum	4.9	1193	7.7	7.4	--
		Average	7.1	1282	8.8	7.6	227
		Maximum	9.8	1317	9.9	7.7	346
	Winter 3 gpm	Minimum	3.8	1251	6.2	7.6	--
		Average	5.9	1304	8.2	7.8	301
		Maximum	8.4	1337	9.6	7.9	350
	Winter 6 gpm	Minimum	2.2	1262	7.1	7.6	--
		Average	8.8	1322	8.1	7.9	321
		Maximum	12.9	1396	10.3	8.2	390
	Flow Reduction	Minimum	4.4	1320	6.0	7.7	--
		Average	10.4	1335	7.4	7.8	256
		Maximum	14.9	1353	9.0	8.0	382
	Summer[2] 2 gpm	Minimum	11.4	1184	0.3	7.2	--
		Average	14.4	1271	2.1	7.4	-86
		Maximum	17.0	1333	4.8	7.4	128

TABLE 5
WATER QUALITY PARAMETERS SUMMARY
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Statistic	Temperature (°C)	SEC (uS/cm)	DO[2] (mg/L)	pH (su)	ORP[3,4] (mV)
Wetland MP-2	Winter 1.5 gpm	Minimum	10.2	1352	0.2	6.5	-444
		Average	11.5	1423	2.3	6.5	-415
		Maximum	12.4	1457	3.4	6.6	--
	Winter 3 gpm	Minimum	8.2	1347	0.4	6.5	-429
		Average	10.1	1374	1.5	6.8	-396
		Maximum	12.4	1420	2.1	6.9	--
	Winter 6 gpm	Minimum	6.0	1303	0.6	6.7	-466
		Average	11.3	1352	0.8	6.9	-426
		Maximum	15.6	1392	1.2	7.0	--
	Flow Reduction	Minimum	8.1	1336	0.2	6.8	-463
		Average	11.0	1355	0.8	6.9	-410
		Maximum	15.6	1373	1.0	6.9	--
	Summer[2] 2 gpm	Minimum	10.9	1199	0.1	6.9	-370
		Average	14.3	1275	1.0	6.9	-342
		Maximum	16.4	1348	2.0	7.0	--
Wetland Out	Winter 1.5 gpm	Minimum	6.9	1373	1.1	6.5	-367
		Average	8.9	1443	2.4	6.6	-341
		Maximum	10.3	1478	4.0	6.6	--
	Winter 3 gpm	Minimum	6.3	1329	1.1	6.6	-389
		Average	7.4	1386	1.9	6.7	-349
		Maximum	9.8	1426	2.0	6.9	--
	Winter 6 gpm	Minimum	4.9	1297	0.9	6.7	-405
		Average	9.7	1343	1.2	6.8	-365
		Maximum	13.5	1375	2.2	6.9	--
	Flow Reduction	Minimum	7.9	1344	1.3	6.8	-376
		Average	10.0	1356	1.3	6.8	-338
		Maximum	13.6	1363	1.5	6.9	--
	Summer 2 gpm	Minimum	12.5	1153	0.2	6.7	-369
		Average	14.5	1267	1.6	6.8	-349
		Maximum	16.9	1360	4.6	6.9	--

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. Water quality parameter summaries were based on YSI 6920 multi-parameter sonde data with the exception of DO data at the Rock Drain MP (summer only), Wetland MP-1 (1.5 gpm test run), Wetland MP-2, and Wetland Out and all summer test run data at Wetland MP-1 and Wetland MP-2. For those locations, measurements from a calibrated YSI 556 multi-probe system collected during periodic inspections and sampling events were used (see Table 4 "Water Quality Parameters").
3. Minimum ORP values were not considered representative measurements at locations with positive ORP due to "ramping" behavior of the ORP sensors; these data were not included in calculations for Rock Drain In, Rock Drain MP, and Wetland MP-1.
4. Maximum ORP values were not considered representative measurements at locations with negative ORP due to the "ramping" behavior of the ORP sensors; these data were not included in calculations for Wetland MP-2 and Wetland Out.

Abbreviations:

-- = value is not considered reliable
°C = degree Celsius
DO = dissolved oxygen
gpm = gallon per minute
mg/L = milligram per liter
mV = millivolt
ORP = oxidation reduction potential
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
SEC = specific electrical conductance
su = standard unit
uS/cm = microsiemen per centimeter
Wetland MP-1 = wetland monitoring port number one
Wetland MP-2 = wetland monitoring port number two
Wetland Out = wetland outlet discharge point monitoring location

TABLE 6
THERMISTER TEMPERATURE DATA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Thermister	Test Run[1]	Thermocouple[2]	Average Matrix Temperature[3] (°C)	Average Temperature (°C)	Minimum Temperature (°C)	Maximum Temperature (°C)
Rock Drain	Winter 1.5 gpm	L1	5.4	3.9	3.0	5.9
		L2		5.6	2.2	7.6
		L3		7.0	1.8	9.6
		L4		7.5	4.2	10.5
		L5		2.8	-5.3	7.0
		L6		-0.2	-12.5	16.9
	Winter 3 gpm	L1	2.3	3.4	1.5	5.1
		L2		3.8	1.3	6.3
		L3		3.6	0.3	6.5
		L4		2.4	-0.7	5.9
		L5		-1.7	-8.7	7.8
		L6		-5.1	-19.3	22.2
	Winter 6 gpm	L1	6.6	6.3	2.1	10.5
		L2		6.7	0.8	11.5
		L3		6.8	0.1	11.9
		L4		6.7	-0.5	12.1
		L5		6.4	-3.6	12.0
		L6		1.9	-19.3	26.2
	Flow Reduction and Trouble-Shooting	L1	8.2	8.0	2.7	12.5
		L2		8.2	2.4	13.5
		L3		8.2	2.4	14.0
		L4		8.2	2.2	14.3
		L5		8.4	-4.4	29.2
		L6		6.7	-11.4	30.8
	Summer 2 gpm	L1	15.0	14.5	8.3	18.5
		L2		14.5	8.3	18.7
		L3		15.0	8.4	19.3
		L4		15.7	8.6	20.7
		L5		15.5	3.0	32.4
		L6		14.8	-3.1	42.2

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. The L1 thermocouples were located deepest in the matrix material and measured temperatures a distance of one inch above the bottom tip of the probe. Thermocouples L2, L3, L4, and L5 measured temperatures at distances of six inches, 12 inches, 18 inches, and 24 inches above the bottom tip of the probe, with L5 closest to the matrix material surface. The L6 thermocouples were located 30 inches above the tip of the probe.
3. All three of the L6 thermocouples were exposed above the matrix material surface; therefore, L6 thermister data was omitted from the analysis of overall average matrix temperatures.
4. The Northern Wetland Thermister L1 thermocouple lost calibration on February 8, 2013, and began logging erroneous data points. Therefore, data after the winter 1.5 gpm test run was omitted.
5. The Southern Wetland Thermister L3 thermocouple lost calibration on July 17, 2013, and began logging erroneous data points. Therefore, data after July 17, 2013, was omitted.

Abbreviations:

-- = data not reliable
°C = degree Celsius
gpm = gallon per minute

TABLE 6
THERMISTER TEMPERATURE DATA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Thermister	Test Run[1]	Thermocouple[2]	Average Matrix Temperature[3] (°C)	Average Temperature (°C)	Minimum Temperature (°C)	Maximum Temperature (°C)
Northern Wetland	Winter 1.5 gpm	L1	6.3	6.7	5.4	7.7
		L2		6.4	4.8	7.5
		L3		6.7	4.7	7.9
		L4		6.4	3.9	7.9
		L5		5.3	2.2	8.0
		L6		0.8	-4.8	4.7
	Winter 3 gpm	L1[4]	5.0	--	--	--
		L2		5.5	4.2	6.7
		L3		5.6	3.7	7.1
		L4		5.2	2.4	8.3
		L5		3.6	0.9	8.7
		L6		-0.3	-5.4	5.6
	Winter 6 gpm	L1[4]	7.7	--	--	--
		L2		8.3	3.5	11.5
		L3		8.3	2.9	12.2
		L4		7.3	1.7	13.4
		L5		6.8	0.5	15.9
		L6		2.0	-15.3	19.9
	Flow Reduction and Trouble-Shooting	L1[4]	9.3	--	--	--
		L2		9.1	7.5	11.3
		L3		9.4	7.6	12.5
		L4		9.4	6.3	14.7
		L5		9.2	4.0	16.9
		L6		6.5	-7.0	34.1
	Summer 2 gpm	L1[4]	13.7	--	--	--
		L2		13.4	8.9	16.4
		L3		13.4	7.9	16.8
		L4		13.6	6.4	18.1
		L5		14.5	5.2	20.8
		L6		14.1	-1.6	36.2

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. The L1 thermocouples were located deepest in the matrix material and measured temperatures a distance of one inch above the bottom tip of the probe. Thermocouples L2, L3, L4, and L5 measured temperatures at distances of six inches, 12 inches, 18 inches, and 24 inches above the bottom tip of the probe, with L5 closest to the matrix material surface. The L6 thermocouples were located 30 inches above the tip of the probe.
3. All three of the L6 thermocouples were exposed above the matrix material surface; therefore, L6 thermister data was omitted from the analysis of overall average matrix temperatures.
4. The Northern Wetland Thermister L1 thermocouple lost calibration on February 8, 2013, and began logging erroneous data points. Therefore, data after the winter 1.5 gpm test run was omitted.
5. The Southern Wetland Thermister L3 thermocouple lost calibration on July 17, 2013, and began logging erroneous data points. Therefore, data after July 17, 2013, was omitted.

Abbreviations:

-- = data not reliable
°C = degree Celsius
gpm = gallon per minute

TABLE 6
THERMISTER TEMPERATURE DATA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Thermister	Test Run[1]	Thermocouple[2]	Average Matrix Temperature[3] (°C)	Average Temperature (°C)	Minimum Temperature (°C)	Maximum Temperature (°C)
Southern Wetland	Winter 1.5 gpm	L1	10.8	8.8	7.9	9.5
		L2		9.9	8.8	10.7
		L3		11.6	10.7	12.5
		L4		11.9	10.8	13.1
		L5		11.9	10.6	13.0
		L6		3.2	-3.2	8.8
	Winter 3 gpm	L1	8.6	9.5	8.7	11.1
		L2		10.0	8.9	12.0
		L3		9.1	7.8	11.8
		L4		7.2	4.8	11.2
		L5		6.9	5.1	11.0
		L6		-0.1	-5.5	8.3
	Winter 6 gpm	L1	10.5	11.2	8.1	13.6
		L2		12.0	7.9	15.0
		L3		11.6	6.4	14.6
		L4		8.9	3.3	13.7
		L5		8.6	1.2	13.8
		L6		3.8	-8.3	21.4
	Flow Reduction and Trouble-Shooting	L1	9.4	9.1	7.5	12.0
		L2		9.4	7.2	13.1
		L3		9.6	7.0	14.3
		L4		9.3	5.8	14.1
		L5		9.4	5.8	14.1
		L6		7.8	-4.1	25.8
	Summer 2 gpm	L1	13.4	12.7	8.2	15.8
		L2		12.8	7.6	16.3
		L3[5]		--	--	--
		L4		13.6	6.0	17.5
		L5		14.6	6.5	20.5
		L6		15.2	1.5	39.6

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. The L1 thermocouples were located deepest in the matrix material and measured temperatures a distance of one inch above the bottom tip of the probe. Thermocouples L2, L3, L4, and L5 measured temperatures at distances of six inches, 12 inches, 18 inches, and 24 inches above the bottom tip of the probe, with L5 closest to the matrix material surface. The L6 thermocouples were located 30 inches above the tip of the probe.
3. All three of the L6 thermocouples were exposed above the matrix material surface; therefore, L6 thermister data was omitted from the analysis of overall average matrix temperatures.
4. The Northern Wetland Thermister L1 thermocouple lost calibration on February 8, 2013, and began logging erroneous data points. Therefore, data after the winter 1.5 gpm test run was omitted.
5. The Southern Wetland Thermister L3 thermocouple lost calibration on July 17, 2013, and began logging erroneous data points. Therefore, data after July 17, 2013, was omitted.

Abbreviations:

-- = data not reliable
°C = degree Celsius
gpm = gallon per minute

TABLE 7
LABORATORY ANALYTICAL DATA: GENERAL CHEMISTRY
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	BOD_5 (mg/L)	TOC (mg/L)	Ammonia Nitrogen (mg N/L)	NO_2/NO_3 Nitrogen (mg N/L)	Phosphorus (mg/L)	Sulfate[2] (mg/L)	Sulfide[3] (mg/L)
Rock Drain In	Baseline	1/4/2013 11:25	ROCK DRAIN IN 130104	<2.0	0.81 J Y	--	--	--	639	<0.01
	Winter 1.5 gpm	1/9/2013 11:05	ROCK DRAIN 130109	<2.0	0.98 J	--	--	--	632	0.04
		1/16/2013 11:30	ROCK DRAIN IN 130116	<2.0	0.33 J Y	--	--	--	632	0.01
		1/22/2013 10:05	ROCK DRAIN IN 130122	<2.0	0.33 J	--	--	--	626	<0.01
		2/5/2013 11:45	ROCK DRAIN IN 130205	<2.0	<0.50	--	--	--	648	0.02
	Winter 3 gpm	2/13/2013 12:00	ROCK DRAIN IN 130213	<2.0	0.094 J	--	--	--	647	0.06
		2/19/2013 11:30	ROCK DRAIN IN 130219	<2.0	0.16 J	--	--	--	642	0.09
		2/27/2013 11:10	ROCK DRAIN IN 130227	4.9 Y	0.10 J	--	--	--	628	0.17
		3/6/2013 9:55	ROCK DRAIN IN 130306	<2.0	0.15 J	--	--	--	613	0.09
	Winter 6 gpm	3/12/2013 11:42	ROCK DRAIN IN 130312	<2.0	0.18 J	--	--	--	605	<0.01
		3/19/2013 11:05	ROCK DRAIN IN 130319	<2.0	0.10 J	--	--	--	618	<0.01
		3/26/2013 10:30	ROCK DRAIN IN 130326	<2.0	0.63 J Y	--	--	--	623	0.10
		4/1/2013 12:45	ROCK DRAIN IN 130401	--	1.4 Y	--	--	--	599	0.02
		4/11/2013 10:35	ROCK DRAIN IN 130411	<2.0	2.1	--	--	--	610	<0.01
		4/18/2013 10:35	ROCK DRAIN IN 130418	<2.0	0.57 J Y	<0.10	<0.10	<0.10	700	<0.01
	Summer 2 gpm	6/18/2013 12:30	ROCK DRAIN IN 130618	<2.0	0.13 J	--	--	--	644	0.05
		7/10/2013 11:15	ROCK DRAIN IN 130710	<2.0	0.11 J	--	--	--	680	0.07
		8/14/2013 11:00	ROCK DRAIN IN 130814	<2.0	--	--	--	--	642	0.04
		9/19/2013 9:55	ROCK DRAIN IN 130919	<2.0	0.33 J	--	--	--	632	0.07

Notes:

1. Test run flow rates reflect target effluent flow rates.
2. Sulfate result for Rock Drain MP on April 11, 2013 was 75.1 mg/L. This result was attributed to laboratory dilution error and was omitted from trend analysis.
3. Sulfide was measured in the field using a YSI 9300 photometer.

Abbreviations:

-- = not measured or measured value is not considered reliable
< = analyzed but not detected above the method reporting limit shown
> = analyzed but was detected above the range of the instrument
BOD_5 = five day biochemical oxygen demand
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mg/L = milligram per liter
NO_2 = nitrite
NO_3 = nitrate
TOC = total organic carbon
Y = method quality control criteria were exceeded

TABLE 7
LABORATORY ANALYTICAL DATA: GENERAL CHEMISTRY
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	BOD_5 (mg/L)	TOC (mg/L)	Ammonia Nitrogen (mg N/L)	NO_2/NO_3 Nitrogen (mg N/L)	Phosphorus (mg/L)	Sulfate[2] (mg/L)	Sulfide[3] (mg/L)
Rock Drain MP	Baseline	1/4/2013 12:35	ROCK DRAIN MP 130104	–	–	–	–	–	640	0.12
	Winter 1.5 gpm	1/9/2013 12:45	ROCK DRAIN MP 130109	–	–	–	–	–	623	0.07
		1/16/2013 12:15	ROCK DRAIN MP 130116	–	–	–	–	–	611	0.23
		1/22/2013 11:20	ROCK DRAIN MP 130122	–	–	–	–	–	641	0.04
		2/5/2013 12:40	ROCK DRAIN MP 130205	–	–	–	–	–	640	0.02
	Winter 3 gpm	2/13/2013 13:00	ROCK DRAIN MP 130213	–	–	–	–	–	636	0.07
		2/19/2013 12:30	ROCK DRAIN MP 130219	–	–	–	–	–	630	0.14
		2/27/2013 12:05	ROCK DRAIN MP 130227	–	–	–	–	–	621	0.16
		3/6/2013 10:35	ROCK DRAIN MP 130306	–	–	–	–	–	607	0.11
	Winter 6 gpm	3/12/2013 12:55	ROCK DRAIN MP 130312	–	–	–	–	–	615	<0.01
		3/19/2013 12:20	ROCK DRAIN MP 130319	–	–	–	–	–	615	<0.01
		3/26/2013 11:40	ROCK DRAIN MP 130326	–	–	–	–	–	642	0.09
		4/1/2013 12:15	ROCK DRAIN MP 130401	–	–	–	–	–	609	0.01
		4/11/2013 12:08	ROCK DRAIN MP 130411	–	–	–	–	–	–	<0.01
		4/18/2013 11:25	ROCK DRAIN MP 130418	–	–	<0.10	0.050 J Y	<0.10	702	0.04
	Summer 2 gpm	6/18/2013 13:20	ROCK DRAIN MP 130618	–	–	–	–	–	625	0.07
		7/10/2013 12:50	ROCK DRAIN MP 130710	–	–	–	–	–	671	0.08
		8/14/2013 11:50	ROCK DRAIN MP 130814	–	–	–	–	–	637	0.07
		9/19/2013 11:06	ROCK DRAIN MP 130919	–	–	–	–	–	622	0.10
Wetland MP-1	6 gpm	04/18/2013 12:35	WETLAND MP 130418	–	–	<0.10	0.046 J Y	<0.10	–	–

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Sulfate result for Rock Drain MP on April 11, 2013 was 75.1 mg/L. This result was attributed to laboratory dilution error and was omitted from trend analysis.
3. Sulfide was measured in the field using a YSI 9300 photometer.

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J = estimated concentration detected below the laboratory reporting limit
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NO_2 = nitrite
NO_3 = nitrate
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TABLE 7
LABORATORY ANALYTICAL DATA: GENERAL CHEMISTRY
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	BOD_5 (mg/L)	TOC (mg/L)	Ammonia Nitrogen (mg N/L)	NO_2/NO_3 Nitrogen (mg N/L)	Phosphorus (mg/L)	Sulfate[2] (mg/L)	Sulfide[3] (mg/L)
Wetland Out	Baseline	1/4/2013 13:00	WETLAND OUT 130104	112	28.1	--	--	--	600	0.04
	Winter 1.5 gpm	1/9/2013 11:50	WETLAND OUT 130109	118	25.5	--	--	--	616	0.24
		1/9/2013 12:20	DUP130109	453	25.0	--	--	--	621	0.22
		1/16/2013 13:15	WETLAND OUT 130116	109	21.2	--	--	--	592	0.40
		1/22/2013 10:35	WETLAND OUT 130122	94.9	20.2	--	--	--	589	0.16
		2/5/2013 13:20	WETLAND OUT 130205	138	37.8	--	--	--	569	>0.5
	Winter 3 gpm	2/13/2013 13:20	WETLAND OUT 130213	15.3 Y	17.0	--	--	--	605	0.40
		2/19/2013 13:00	WETLAND OUT 130219	78.4	17.0	--	--	--	600	>0.5
		2/27/2013 13:00	WETLAND OUT 130227	74.7 Y	15.5	--	--	--	581	45
		3/6/2013 11:05	WETLAND OUT 130306	78.2	1.7	--	--	--	531	160
	Winter 6 gpm	3/12/2013 13:30	WETLAND OUT 130312	32.8	10.0	--	--	--	574	15
		3/19/2013 13:05	WETLAND OUT 130319	50.5	10.9	--	--	--	540	--
		3/26/2013 10:50	WETLAND OUT 130326	22.5	8.4 Y	--	--	--	603	27
		4/1/2013 13:30	WETLAND OUT 130401	--	14.6	--	--	--	543	24
		4/11/2013 12:35	WETLAND OUT 130411	54.9	13.3	--	--	--	681	21
		4/18/2013 11:50	WETLAND OUT 130418	60.3	12.8	0.15	0.041 J Y	0.29	565	24
	Summer 2 gpm	6/18/2013 13:45	WETLAND OUT 130618	39.8	40.6	--	--	--	423	45
		7/10/2013 12:50	WETLAND OUT 130710	129	17.6	--	--	--	353	70
		8/14/2013 12:35	WETLAND OUT 130814	94.3	9.7	--	--	--	412	55
		9/19/2013 11:47	WETLAND OUT 130919	47.3	3.5	--	--	--	433	65

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Sulfate result for Rock Drain MP on April 11, 2013 was 75.1 mg/L. This result was attributed to laboratory dilution error and was omitted from trend analysis.
3. Sulfide was measured in the field using a YSI 9300 photometer.

Abbreviations:
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< = analyzed but not detected above the method reporting limit shown
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BOD_5 = five day biochemical oxygen demand
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mg/L = milligram per liter
NO_2 = nitrite
NO_3 = nitrate
TOC = total organic carbon
Y = method quality control criteria were exceeded

TABLE 8
LABORATORY ANALYTICAL DATA: TOTAL METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Aluminum (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Calcium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)
Rock Drain In	Baseline	1/4/2013 11:25	ROCK DRAIN IN 130104	7.9	222	270	0.28 J	0.62 J	22.5	0.30 J	12.5	239000 Y	1.2	2.5	46.0	2760	5.6
	Winter 1.5 gpm	1/9/2013 11:05	ROCK DRAIN 130109	8.2	254	189	0.28 J	0.48 J	19.7	0.26 J	11.6	231000	2.0	2.4	37.4	2230	4.2
		1/16/2013 11:30	ROCK DRAIN IN 130116	8.1	249	218	0.26 J	0.58 J	19.6	0.32 J	11.7	256000	0.41 J	2.4	46.2	2820	5.1
		1/22/2013 10:05	ROCK DRAIN IN 130122	8.2	250	181	0.23 J	0.48 J	19.2	0.25 J	10.6	243000	0.44 J	2.3	39.8	2260	4.2
		2/5/2013 11:45	ROCK DRAIN IN 130205	8.3	242	170	0.22 J	0.63 J	19.5	0.20 J	10.2	258000	0.28 J	2.2	37.7	2150	3.9
	Winter 3 gpm	2/13/2013 12:00	ROCK DRAIN IN 130213	8.2	244	155	0.35 J Y	0.41 J	19.8	0.22 J	10.7	258000	0.32 J Y	2.3	36.8	2320	4.0
		2/19/2013 11:30	ROCK DRAIN IN 130219	8.3	244	163	0.28 J	0.49 J	20.0	0.25 J	10.5	260000 Y	0.45 J	2.2	32.1	2100	3.5
		2/27/2013 11:10	ROCK DRAIN IN 130227	8.3	242	185	0.24 J	0.48 J	19.7	0.21 J	10.9	265000	0.31 J	2.3	40.9	2230	4.1
		3/6/2013 9:55	ROCK DRAIN IN 130306	8.3	281	137	0.23 J	0.29 J	18.8	0.15 J	10.0	247000	0.84 J	2.0	27.4	1720	2.9
	Winter 6 gpm	03/12/2013 11:42	ROCK DRAIN IN 130312	8.3	271	135	0.23 J	0.29 J	19.3	0.15 J	9.4	252000	0.47 J	2.1	27.5	1760	3.0
		03/19/2013 11:05	ROCK DRAIN IN 130319	8.3	230	151	<1.0	0.29 J	20.0	0.19 J	10.5	257000 Y	0.23 J	2.0	27.1	1750	3.1
		03/26/2013 10:30	ROCK DRAIN IN 130326	8.3	230	123	0.35 J Y	0.36 J	20.8	0.20 J	11.1	240000 Y	0.65 J	2.4	27.7	1850	4.1
		04/01/2013 12:45	ROCK DRAIN IN 130401	8.3	215	126	0.22 J	0.36 J	19.9	0.18 J	11.0	261000 Y	0.40 J	2.1	23.5	1590	3.2
		04/11/2013 10:35	ROCK DRAIN IN 130411	8.3	222	202	0.21 J	0.49 J	20.6	0.28 J	15.0	238000 Y	0.48 J	2.2	36.2	2580	5.1
		04/18/2013 10:35	ROCK DRAIN IN 130418	8.3	228	207	0.23 J	0.49 J	21.0	0.27 J	15.0	254000	0.54 J	2.1	36.0	2610	6.1
	Summer 2 gpm	06/18/2013 12:30	ROCK DRAIN IN 130618	8.1	204	90.0	0.23 J	0.18 J	20.2	0.14 J	15.3	246000	0.71 JY	2.5	20.8	843	1.6
		07/10/2013 11:15	ROCK DRAIN IN 130710	8.0	182	82.6	0.077 J	<1.0	18.4	0.20 J	14.7	235000	<1.0	2.1	25.3	1270	2.2
		08/14/2013 11:00	ROCK DRAIN IN 130814	8.2	237	114	0.26 JY	0.24 J	18.8	0.17 J	14.2	253000	0.18 J	2.2	26.7	1450Y	2.5Y
		09/19/2013 09:55	ROCK DRAIN IN 130919	7.5	205	78.0	0.50 JY	0.30 J	21.6	0.28 JY	18.5	247000Y	0.39 JY	2.6	16.1	936	2.3
Rock Drain MP	Baseline	1/4/2013 12:35	ROCK DRAIN MP 130104	7.8	168	44.8 J	0.26 J	0.59 J	35.2	<0.50	1.3	252000	0.45 J	0.51 J	2.7	285	0.54 J
	Winter 1.5 gpm	1/9/2013 12:45	ROCK DRAIN MP 130109	7.6	30	144	0.32 J	0.83 J	36.4	<0.50	2.8	247000	0.42 J	0.64 J	5.8	643	1.4
		1/16/2013 12:15	ROCK DRAIN MP 130116	7.7	263	468	0.41 J	1.6	65.6	<0.50	3.0	253000	0.79 J	1.1	7.4	945	2.8
		1/22/2013 11:20	ROCK DRAIN MP 130122	7.7	96	63.2	0.26 J	0.44 J	26.3	<0.50	3.6	238000	0.24 J	0.34 J	4.3	389	0.79 J
		2/5/2013 12:40	ROCK DRAIN MP 130205	7.7	236	25.4 J Y	0.21 J	0.43 J	21.3	<0.50	3.8	256000	0.22 J	0.16 J	3.5	289	0.49 J Y
	Winter 3 gpm	2/13/2013 13:00	ROCK DRAIN MP 130213	7.8	173	31.8 J	0.28 J Y	0.16 J	19.0	0.062 J	5.3	254000	0.23 J Y	0.090 J	5.8	429	1.1 Y
		2/19/2013 12:30	ROCK DRAIN MP 130219	7.8	317	30.1 J	0.25 J	0.23 J	18.8	0.070 J	5.0	265000	0.27 J	0.15 J	6.0	429	0.66 J
		2/27/2013 12:05	ROCK DRAIN MP 130227	7.8	336	35.6 J	0.19 J	0.20 J	18.3	0.054 J	6.0	257000 Y	0.31 J	0.20 J	8.3	482	0.86 J
		3/6/2013 10:35	ROCK DRAIN MP 130306	7.6	225	32.2 J	0.18 J	0.079 J	17.6	<0.50	4.9	245000	0.29 J	<1.0	4.0	295	0.47 J
	Winter 6 gpm	03/12/2013 12:55	ROCK DRAIN MP 130312	7.8	213	27.9 J	0.21 J	0.13 J	18.2	<0.50	5.8	246000	0.24 J	0.24 J	5.9	387	0.73 J
		03/19/2013 12:20	ROCK DRAIN MP 130319	7.8	369	47.6 J	<1.0	0.11 J	19.2	0.060 J	6.1	252000	0.21 J	<1.0	7.7	485	1.1
		03/26/2013 11:40	ROCK DRAIN MP 130326	8.0	365	40.5 J	0.32 J Y	0.20 J	18.4	0.094 J	7.1	243000	0.87 J	0.68 J Y	9.9	685	1.4
		04/01/2013 12:15	ROCK DRAIN MP 130401	7.9	390	38.9 J	0.20 J	0.051 J	19.2	0.054 J	5.6	274000	0.48 J	0.15 J	5.8	398	0.90 J
		04/11/2013 12:08	ROCK DRAIN MP 130411	8.0	385	66.3	0.18 J	0.19 J	19.1	0.095 J	9.3	252000	0.84 J	0.36 J	11.8	872	1.7
		04/18/2013 11:25	ROCK DRAIN MP 130418	8.2	362	77.8	0.20 J	0.21 J	18.4	0.12 J	9.0	253000	0.70 J	0.53 J	13.6	969	2.2
	Summer 2 gpm	06/18/2013 13:20	ROCK DRAIN MP 130618	7.6	195	13.6 J	0.18 J	0.12 J	17.7	<0.50	3.7	246000	0.55 JY	0.12 J	2.2Y	87.8	0.32 J
		07/10/2013 12:50	ROCK DRAIN MP 130710	7.7	206	<50.0	0.047 J	<1.0	18.5	<0.50	3.6	238000	<1.0	<1.0	1.6	44.0 J	0.29 JY
		08/14/2013 11:50	ROCK DRAIN MP 130814	7.7	181	16.4 J	0.26 JY	<1.0	17.2	<0.50	5.9	252000	0.20 J	<1.0	10.3	96.3	0.49 JY
		09/19/2013 11:06	ROCK DRAIN MP 130919	7.5	165	14.0 J	0.47 JY	0.20 J	20.1	0.12 JY	7.5	251000	0.15 JY	0.32 JY	3.6	102	0.28 J

TABLE 8
LABORATORY ANALYTICAL DATA: TOTAL METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Magnesium (ug/L)	Manganese (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Potassium (ug/L)	Selenium (ug/L)	Silver (ug/L)	Sodium (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Rock Drain In	Baseline	1/4/2013 11:25	ROCK DRAIN IN 130104	7.9	222	18800	1820 Y	--	20.7	3.0	21300	<1.0	0.19 J Y	12700	0.12 J	0.38 J	2390 Y
	Winter 1.5 gpm	1/9/2013 11:05	ROCK DRAIN 130109	8.2	254	19500	1720	--	20.4	2.8	19000	<1.0	0.22 J Y	12000	0.12 J	<1.0	2220
		1/16/2013 11:30	ROCK DRAIN IN 130116	8.1	249	21400	1710 Y	--	18.9	2.0	16200	<1.0	0.12 J	12300	0.14 J	<1.0	2240 Y
		1/22/2013 10:05	ROCK DRAIN IN 130122	8.2	250	20600	1660 Y	--	18.2	1.8	14000	<1.0	0.15 J	12000	0.14 J Y	<1.0	1930 Y
		2/5/2013 11:45	ROCK DRAIN IN 130205	8.3	242	20700	1630	--	17.0	2.2	8910	<1.0	<0.50	11600	0.072 J	<1.0	1900
	Winter 3 gpm	2/13/2013 12:00	ROCK DRAIN IN 130213	8.2	244	19900	1680 Y	--	17.4	3.5	8460	0.15 J	<0.50	12800	0.15 J Y	<1.0	2090
		2/19/2013 11:30	ROCK DRAIN IN 130219	8.3	244	19500	1620	--	17.4	1.7	7480	0.20 J	0.030 J	12100	0.13 J	0.13 J Y	2020
		2/27/2013 11:10	ROCK DRAIN IN 130227	8.3	242	21100	1690 Y	--	16.5	2.3	7350	<1.0	0.041 J	13400	0.14 J	<1.0	2060 Y
		3/6/2013 9:55	ROCK DRAIN IN 130306	8.3	281	20600	1560 Y	--	15.5	2.4	6170	<1.0	0.033 J	12000	0.14 J	<1.0	1680
	Winter 6 gpm	03/12/2013 11:42	ROCK DRAIN IN 130312	8.3	271	20400	1540 Y	<0.20	15.6	1.7	5860	0.15 J	0.033 J	12100	0.14 J	<1.0	1610 Y
		03/19/2013 11:05	ROCK DRAIN IN 130319	8.3	230	20900	1620	--	15.8	3.5	5960	<1.0	0.036 J	12800	0.22 J Y	<1.0	1840
		03/26/2013 10:30	ROCK DRAIN IN 130326	8.3	230	19900	1560	--	16.0	3.6	5230	<1.0	0.019 J	12000	0.10 J	<1.0	2120
		04/01/2013 12:45	ROCK DRAIN IN 130401	8.3	215	23400	1500	--	15.5	3.6	5600	0.16 J	0.029 J	12800	0.12 J	<1.0	1920
		04/11/2013 10:35	ROCK DRAIN IN 130411	8.3	222	20700	1650	--	14.9	3.9	5050	0.16 J	0.030 J	11500	0.11 J	<1.0	2900
		04/18/2013 10:35	ROCK DRAIN IN 130418	8.3	228	21400	1560	--	15.4	3.7	6460	<1.0	0.040 J	13800	0.026 J	<1.0	2730
	Summer 2 gpm	06/18/2013 12:30	ROCK DRAIN IN 130618	8.1	204	21600	1770	--	15.3	2.7	4240	0.15 J	0.029 J	12900	0.12 J	<1.0	2450
		07/10/2013 11:15	ROCK DRAIN IN 130710	8.0	182	19800	1580	--	22.6	3.6	4920	<1.0	<0.50	35700	<1.0	<1.0	2580
		08/14/2013 11:00	ROCK DRAIN IN 130814	8.2	237	20900	1640Y	--	16.5	3.8Y	3670	<1.0	0.056 JY	17000	0.18 JY	<1.0	2270Y
		09/19/2013 09:55	ROCK DRAIN IN 130919	7.5	205	22200	1780	--	19.7	3.1	3890	0.42 JY	0.19 JY	14800	0.072 JY	<1.0	3050
Rock Drain MP	Baseline	1/4/2013 12:35	ROCK DRAIN MP 130104	7.8	168	21800	3230	--	15.5	2.4	23000	<1.0	0.19 J Y	13800	0.078 J	0.87 J	1230
	Winter 1.5 gpm	1/9/2013 12:45	ROCK DRAIN MP 130109	7.6	30	22400	4560 Y	--	16.2	2.6	21300	<1.0	0.12 J Y	13900	0.053 J	1.2	1140 Y
		1/16/2013 12:15	ROCK DRAIN MP 130116	7.7	263	25500	12800	--	12.8	3.0	19800	<1.0	0.14 J	15100	0.11 J	3.4	934
		1/22/2013 11:20	ROCK DRAIN MP 130122	7.7	96	21200	2170	--	13.9	1.2	15800	<1.0	<0.50	12500	0.054 J Y	0.72 J	1010
		2/5/2013 12:40	ROCK DRAIN MP 130205	7.7	236	20900	675 Y	--	13.3	1.3	10200	<1.0	<0.50	11600	0.037 J	0.36 J	971
	Winter 3 gpm	2/13/2013 13:00	ROCK DRAIN MP 130213	7.8	173	20000	118	--	13.5	2.7	8910	<1.0	<0.50	12600	0.12 J Y	<1.0	1180
		2/19/2013 12:30	ROCK DRAIN MP 130219	7.8	317	19600	112	--	14.4	0.71 J	8310	<1.0	<0.50	12800	0.044 J	0.40 J Y	1130 Y
		2/27/2013 12:05	ROCK DRAIN MP 130227	7.8	336	20900	170	--	13.7	1.3	7280	<1.0	0.027 J	13000	0.10 J	<1.0	1240
		3/6/2013 10:35	ROCK DRAIN MP 130306	7.6	225	20600	48.2	--	12.2	1.3 Y	6590	<1.0	0.034 J	12100	0.10 J	0.39 J	886
	Winter 6 gpm	03/12/2013 12:55	ROCK DRAIN MP 130312	7.8	213	20100	177	<0.20	13.7	1.3	6230	<1.0	0.026 J	11900	0.11 J	<1.0	1020
		03/19/2013 12:20	ROCK DRAIN MP 130319	7.8	369	20800	188	--	14.4	2.4	6030	<1.0	<0.50	12600	0.14 J Y	0.23 J	957
		03/26/2013 11:40	ROCK DRAIN MP 130326	8.0	365	20000	338	--	13.4	3.0	5320	<1.0	<0.50	12100	0.042 J	0.28 J	1310 Y
		04/01/2013 12:15	ROCK DRAIN MP 130401	7.9	390	23000	105	--	13.9	2.2	6320	0.17 J	<0.50	13400	0.053 J	<1.0	912 Y
		04/11/2013 12:08	ROCK DRAIN MP 130411	8.0	385	21700	258	--	12.8	3.1	5500	0.17 J	<0.50	12500	0.043 J	<1.0	1690
		04/18/2013 11:25	ROCK DRAIN MP 130418	8.2	362	21000	376	--	13.8	3.0	6090	<1.0	<0.50	13400	<1.0	0.17 J	1600
	Summer 2 gpm	06/18/2013 13:20	ROCK DRAIN MP 130618	7.6	195	21600	76.5	--	12.9	<1.0	4500	<1.0	<0.50	13000	0.035 J	<1.0	688
		07/10/2013 12:50	ROCK DRAIN MP 130710	7.7	206	19800	16.5	--	20.2	0.58 J	5300	<1.0	<0.50	34500	<1.0	0.25 J	485
		08/14/2013 11:50	ROCK DRAIN MP 130814	7.7	181	20900	5.7	--	14.3	1.6Y	3740	<1.0	0.050 JY	17200	0.14 JY	0.17 J	871Y
		09/19/2013 11:06	ROCK DRAIN MP 130919	7.5	165	21900	10.0	--	14.2	2.0Y	3680	0.19 JY	<0.50	15100	0.036 JY	<1.0	1150

TABLE 8
LABORATORY ANALYTICAL DATA: TOTAL METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Aluminum (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Calcium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)
Wetland Out	Baseline	1/4/2013 13:00	WETLAND OUT 130104	6.5	-331	76.4	0.62 J	10.8	114	<0.50	0.81	281000	0.71 J	0.30 J	<1.0	89.9 J	0.15 J
	Winter 1.5 gpm	1/9/2013 11:50	WETLAND OUT 130109	6.6	-347	50.8	0.67 J	11.2	116	<0.50	0.69	275000	0.58 J	0.28 J	<1.0	68.1 J	0.16 J
		1/9/2013 12:20	DUP130109	6.6	-347	44.5 J	0.72 J	11.1	114	<0.50	0.64	274000	0.55 J	0.29 J	0.80 J	61.1 J	0.15 J
		1/16/2013 13:15	WETLAND OUT 130116	6.6	-347	34.3 J	0.56 J	8.6	115	<0.50	0.57	273000	0.57 J	0.23 J	0.45 J	62.4	0.18 J
		1/22/2013 10:35	WETLAND OUT 130122	6.6	-348	46.0 J	0.80 J	8.8	118	<0.50	0.48 J	278000 Y	0.69 J	0.24 J	<1.0	67.9	0.14 J
		2/5/2013 13:20	WETLAND OUT 130205	6.6	-367	37.3 J Y	0.59 J	6.4	113	<0.50	0.22 J	276000 Y	0.44 J	0.17 J	<1.0	42.6 J	0.25 J Y
	Winter 3 gpm	2/13/2013 13:20	WETLAND OUT 130213	6.7	-388	16.0 J	0.40 J Y	3.2	95.3	<0.50	0.80	268000	0.18 J Y	<1.0	0.19 J	60.1	0.27 J Y
		2/19/2013 13:00	WETLAND OUT 130219	6.8	-303	16.9 J	0.36 J	2.9	93.5	<0.50	1.1	278000	0.34 J	0.13 J	0.39 J Y	29.7 J	0.12 J Y
		2/27/2013 13:00	WETLAND OUT 130227	6.8	-377	16.7 J	0.24 J	2.5	88.3	<0.50	0.44 J	276000	0.30 J	0.11 J	0.28 J	48.4 J	0.090 J
		3/6/2013 11:05	WETLAND OUT 130306	6.8	-382	18.1 J	0.27 J	2.4	87.3	<0.50	0.45 J	256000	0.29 J	0.12 J	0.26 J	41.9 J	0.42 J
	Winter 6 gpm	03/12/2013 13:30	WETLAND OUT 130312	6.9	-369	12.6 J	0.20 J	1.1	81.9	<0.50	0.87	265000	0.23 J	0.11 J	0.52 J	75.3	0.11 J
		03/19/2013 13:05	WETLAND OUT 130319	6.8	-380	13.1 J	<1.0	1.2	87.0	<0.50	0.72	264000	0.72 J	<1.0	1.1	38.6 J	0.033 J
		03/26/2013 10:50	WETLAND OUT 130326	6.9	-401	<50.0	0.29 J Y	0.64 J	73.4	<0.50	1.2	259000	0.48 J	0.32 J Y	0.48 J Y	42.6 J	0.18 J Y
		04/01/2013 13:30	WETLAND OUT 130401	6.7	-373	13.3 J	0.16 J	1.2	82.0	<0.50	0.75	275000	1.3	0.13 J	0.44 J Y	53.4	0.16 J Y
		04/11/2013 12:35	WETLAND OUT 130411	6.8	-371	14.0 J	0.12 J	1.2	77.4	<0.50	0.95	248000	0.37 J	0.11 J	0.50 J Y	45.8 J	0.11 J Y
		04/18/2013 11:50	WETLAND OUT 130418	6.8	-373	13.3 J	0.14 J	1.5	81.0	<0.50	0.74	251000	0.65 J	0.12 J	0.53 J	43.2 J	0.15 J Y
	Summer 2 gpm	06/18/2013 13:45	WETLAND OUT 130618	6.8	-316	21.1 J	0.16 J	3.4	106	<0.50	0.15 J	241000	0.46 JY	0.13 J	<1.0	26.7 JY	0.12 J
		07/10/2013 12:50	WETLAND OUT 130710	6.8	-365	19.1 J	0.059 J	5.4	112	<0.50	0.12 J	244000	<1.0	0.14 J	1.1	85.3	0.56 JY
		08/14/2013 12:35	WETLAND OUT 130814	7.0	-316	12.4 J	0.13 J	2.2	99.2	<0.50	<0.50	253000Y	0.24 J	0.16 J	0.15 JY	17.8 J	0.35 JY
		09/19/2013 11:47	WETLAND OUT 130919	6.8	-316	7.5 J	0.37 J	1.7	89.9	0.15 JY	0.26 JY	244000	0.47 JY	0.33 JY	0.44 JY	20.2 JY	0.067 J

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 multi-probe system during weekly inspections prior to January 8 and after April 18, 2013. Between January 8 and April 18, 2013, in situ YSI 6920 multi-parameter sondes (sondes) were installed, and water quality parameters were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 multi-probe system measurement recorded during weekly calibration checks was reported; such data is noted on Table 4, Water Quality Parameters.

Abbreviations:
< = analyzed but not detected above the method reporting limit shown
-- = not analyzed
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mV = millivolt
ORP = oxidation reduction potential
su = standard unit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 8
LABORATORY ANALYTICAL DATA: TOTAL METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Magnesium (ug/L)	Manganese (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Potassium (ug/L)	Selenium (ug/L)	Silver (ug/L)	Sodium (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Wetland Out	Baseline	1/4/2013 13:00	WETLAND OUT 130104	6.5	-331	26800	4800	--	0.21 J Y	<1.0	30300	<1.0	0.098 J Y	13300	<1.0	2.3	271
	Winter 1.5 gpm	1/9/2013 11:50	WETLAND OUT 130109	6.6	-347	27100	4650	--	0.41 J Y	<1.0	30100	<1.0 Y	0.19 J Y	13800	0.049 J	1.9	242
		1/9/2013 12:20	DUP130109	6.6	-347	27000	5000	--	0.33 J Y	<1.0	30200	7.2	0.10 J Y	13700	<1.0	1.8	241
		1/16/2013 13:15	WETLAND OUT 130116	6.6	-347	24600	4010	--	<1.0	<1.0	24300	<1.0	<0.50	12400	<1.0	1.5	219
		1/22/2013 10:35	WETLAND OUT 130122	6.6	-348	24400	3710	--	0.49 J Y	<1.0	24400	<1.0	0.15 J	12800	0.073 J Y	1.6	181
		2/5/2013 13:20	WETLAND OUT 130205	6.6	-367	22000	2960	--	<1.0	<1.0	17900	<1.0	<0.50	12200	<1.0	1.3	112
	Winter 3 gpm	2/13/2013 13:20	WETLAND OUT 130213	6.7	-388	20200	2040	--	0.12 J	0.32 J	11400	<1.0	<0.50	12100	0.051 J Y	0.33 J	281
		2/19/2013 13:00	WETLAND OUT 130219	6.8	-303	19100	1620	--	0.36 J	<1.0	10000	<1.0	0.028 J	11900	0.068 J	0.62 J Y	295
		2/27/2013 13:00	WETLAND OUT 130227	6.8	-377	20900	1320	--	0.23 J	<2.0 Y	9160	<1.0	<0.50	12800	<1.0	0.36 J	249
		3/6/2013 11:05	WETLAND OUT 130306	6.8	-382	20800	1110	--	0.16 J	<1.0	9120	<1.0	<0.50	12500	<1.0	0.50 J	186
	Winter 6 gpm	03/12/2013 13:30	WETLAND OUT 130312	6.9	-369	20800	815	<0.20	0.42 J	0.23 J	7240	<1.0	<0.50	12300	<1.0	0.22 J	268
		03/19/2013 13:05	WETLAND OUT 130319	6.8	-380	21100	810	--	0.21 J	0.12 J	7120	<1.0	<0.50	12800	0.16 J Y	0.53 J	192
		03/26/2013 10:50	WETLAND OUT 130326	6.9	-401	20700	697	--	0.76 J Y	0.14 J Y	6010	<1.0	0.017 J	12400	0.054 J	0.57 J	316
		04/01/2013 13:30	WETLAND OUT 130401	6.7	-373	21200	668	--	0.46 J	0.85 J	6800	<1.0	0.031 J	12600	0.066 J	0.35 J	174
		04/11/2013 12:35	WETLAND OUT 130411	6.8	-371	22200	627	--	0.45 J	0.18 J	6040	<1.0	0.026 J	11900	0.059 J	<1.0	226
		04/18/2013 11:50	WETLAND OUT 130418	6.8	-373	22300	610	--	0.41 J	0.15 J	6800	<1.0	0.030 J	13200	<1.0	0.41 J	182
	Summer 2 gpm	06/18/2013 13:45	WETLAND OUT 130618	6.8	-316	21700	542	--	0.57 J	<1.0	6380	<1.0	0.029 J	14200	0.060 J	0.42 J	50.2
		07/10/2013 12:50	WETLAND OUT 130710	6.8	-365	20900	461	--	0.26 J	0.90 J	7140	<1.0	<0.50	31000	<1.0	0.83 J	36.7
		08/14/2013 12:35	WETLAND OUT 130814	7.0	-316	20900	398	--	0.34 JY	0.57 JY	5360	<1.0	0.049 JY	17400	0.11 JY	0.46 J	22.5Y
		09/19/2013 11:47	WETLAND OUT 130919	6.8	-316	20500	320	--	0.22 J	<1.0	5210	0.26 JY	0.20 JY	13100	0.056 JY	<1.0	43.2

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 multi-probe system during weekly inspections prior to January 8 and after April 18, 2013. Between January 8 and April 18, 2013, in situ YSI 6920 multi-parameter sondes (sondes) were installed, and water quality parameters were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 multi-probe system measurement recorded during weekly calibration checks was reported; such data is noted on Table 4, Water Quality Parameters.

Abbreviations:
< = analyzed but not detected above the method reporting limit shown
-- = not analyzed
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mV = millivolt
ORP = oxidation reduction potential
su = standard unit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 9
LABORATORY ANALYTICAL DATA: DISSOLVED METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Aluminum (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Calcium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)
Rock Drain In	Baseline	1/4/2013 11:25	ROCK DRAIN IN 130104	7.9	222	10.7 J	0.26 J	<1.0	19.4	<0.50	10.4	242000 Y	0.54 J	2.3	2.2	<50.0	<1.0
	Winter 1.5 gpm	1/9/2013 11:05	ROCK DRAIN 130109	8.2	254	8.8 J	0.26 J	0.15 J	19.0	<0.50	9.6	229000 Y	1.1	2.2	2.3	<50.0	<1.0
		1/16/2013 11:30	ROCK DRAIN IN 130116	8.1	249	6.7 J	0.23 J	0.21 J	19.5	<0.50	10.2	245000	1.3 Y	2.4	2.3	<50.0	<1.0
		1/22/2013 10:05	ROCK DRAIN IN 130122	8.2	250	7.2 J	0.26 J	0.25 J	19.8 Y	<0.50	9.4	238000	0.28 J	2.3	2.3	<50.0	<1.0
		2/5/2013 11:45	ROCK DRAIN IN 130205	8.3	242	12.4 J Y	0.19 J	0.19 J	18.7	<0.50	8.9	254000	0.18 J	2.1	1.9	<50.0	0.098 J Y
	Winter 3 gpm	2/13/2013 12:00	ROCK DRAIN IN 130213	8.2	244	10.4 J	0.28 J Y	<1.0	20.3 Y	<0.50	9.6	260000 Y	0.18 J Y	2.2	4.8	22.1 J	0.25 J Y
		2/19/2013 11:30	ROCK DRAIN IN 130219	8.3	244	<50.0	0.23 J Y	0.14 J	19.7	<0.50	9.3	266000 Y	0.27 J	2.2 Y	1.7	7.7 J	<1.0
		2/27/2013 11:10	ROCK DRAIN IN 130227	8.3	242	<50.0	0.21 J	0.16 J	18.8	<0.50	9.4	255000	0.27 J	2.3	2.0	6.3 J	<1.0
		3/6/2013 9:55	ROCK DRAIN IN 130306	8.3	281	<50.0	0.22 J Y	0.064 J	18.3	<0.50	8.7	248000 Y	0.25 J	2.1 Y	2.0	5.9 J	0.037 J
	Winter 6 gpm	03/12/2013 11:42	ROCK DRAIN IN 130312	8.3	271	7.7 J	0.52 J Y	<1.0	19.6 Y	<0.50	8.5	252000 Y	0.24 J	2.2 Y	2.3 Y	10.5 J Y	<1.0
		03/19/2013 11:05	ROCK DRAIN IN 130319	8.3	230	<50.0	0.24 J Y	<1.0	20.8 Y	<0.50	9.4	253000 Y	0.58 J	2.3 Y	2.7	12.6 J Y	0.60 J Y
		03/26/2013 10:30	ROCK DRAIN IN 130326	8.3	230	<50.0	0.34 J Y	<1.0	19.8	0.050 J	9.9	250000 Y	0.32 J Y	2.4	1.7 Y	<50.0	0.088 J Y
		04/01/2013 12:45	ROCK DRAIN IN 130401	8.3	215	7.4 J	0.21 J	0.053 J	19.8	<0.50	9.6	245000 Y	0.38 J	2.1	1.7	9.0 J	0.043 J
		04/11/2013 10:35	ROCK DRAIN IN 130411	8.3	222	6.8 J	0.19 J	0.080 J	20.5	<0.50	13.0	248000 Y	0.47 J	2.2	1.6	7.0 J Y	0.073 J
		04/18/2013 10:35	ROCK DRAIN IN 130418	8.3	228	<50.0	0.22 J	<1.0	20.2	<0.50	12.5	257000 Y	0.33 J	2.0	1.6	7.8 J	0.047 J
	Summer 2 gpm	06/18/2013 12:30	ROCK DRAIN IN 130618	8.1	204	12.5 J	0.21 J	0.094 J	19.3	<0.50	13.8	256000Y	0.79 J	2.3	2.7	6.0 J	0.037 J
		07/10/2013 11:15	ROCK DRAIN IN 130710	8.0	182	<50.0	0.11 J	<1.0	18.1	<0.50	12.8	234000	<1.0	2.1	2.8	<50.0	0.22 JY
		08/14/2013 11:00	ROCK DRAIN IN 130814	8.2	237	<50.0	0.26 J	<1.0	19.1Y	<0.50	13.3	253000	<1.0	3.5Y	2.6	<50.0	0.088 JY
		09/19/2013 09:55	ROCK DRAIN IN 130919	7.5	205	9.3 J	0.55 JY	0.14 J	21.6	0.19 JY	17.5	253000Y	0.36 JY	3.0Y	3.6	102	0.28 J
Rock Drain MP	Baseline	1/4/2013 12:35	ROCK DRAIN MP 130104	7.8	168	16.2 J	0.29 J	0.46 J	37.3 Y	<0.50	0.57	238000	1.4 Y	0.49 J	1.3	134	0.20 J Y
	Winter 1.5 gpm	1/9/2013 12:45	ROCK DRAIN MP 130109	7.6	30	6.2 J	0.29 J	0.42 J	32.3	<0.50	0.68	239000	0.21 J	0.51 J	0.58 J	122	<1.0
		1/16/2013 12:15	ROCK DRAIN MP 130116	7.7	263	7.4 J	0.26 J	0.61 J	47.0	<0.50	<0.50	242000	0.74 J	0.60 J	<1.0	282	<1.0
		1/22/2013 11:20	ROCK DRAIN MP 130122	7.7	96	5.4 J	0.26 J	0.34 J	25.4	<0.50	1.7	238000 Y	0.11 J	0.27 J	1.7	57.3	<1.0
		2/5/2013 12:40	ROCK DRAIN MP 130205	7.7	236	10.5 J Y	0.21 J	0.29 J	21.1	<0.50	2.9	255000 Y	2.9	0.18 J	0.53 J	32.6 J	0.15 J Y
	Winter 3 gpm	2/13/2013 13:00	ROCK DRAIN MP 130213	7.8	173	<50.0	0.31 J Y	0.11 J	19.1 Y	<0.50	4.9	255000 Y	0.50 J Y	0.085 J	0.55 J	<50.0	0.26 J Y
		2/19/2013 12:30	ROCK DRAIN MP 130219	7.8	317	<50.0	0.18 J Y	0.16 J	19.2 Y	<0.50	4.9	270000 Y	0.30 J	0.13 J	0.73 J	3.6 J	0.034 J
		2/27/2013 12:05	ROCK DRAIN MP 130227	7.8	336	<50.0	0.19 J	0.13 J	18.5 Y	<0.50	5.6	259000 Y	0.24 J	0.21 J	0.83 J	4.3 J	<1.0
		3/6/2013 10:35	ROCK DRAIN MP 130306	7.6	225	<50.0	0.21 J Y	0.072 J	17.4	<0.50	4.9	246000 Y	0.33 J	<1.0	0.94 J	3.6 J	0.073 J
	Winter 6 gpm	03/12/2013 12:55	ROCK DRAIN MP 130312	7.8	213	<50.0	0.47 J Y	<1.0	18.2	<0.50	5.6	247000 Y	0.24 J	0.29 J	0.93 J Y	9.7 J Y	0.034 J
		03/19/2013 12:20	ROCK DRAIN MP 130319	7.8	369	<50.0	0.21 J Y	<1.0	18.6	<0.50	5.5	245000	0.68 J	0.26 J	1.9	11.4 J Y	0.19 J Y
		03/26/2013 11:40	ROCK DRAIN MP 130326	8.0	365	<50.0	0.31 J Y	<1.0	18.3	<0.50	6.7	255000 Y	0.71 J	0.70 J Y	6.1 Y	<50.0	0.30 J Y
		04/01/2013 12:15	ROCK DRAIN MP 130401	7.9	390	<50.0	0.20 J	<1.0	19.1	<0.50	5.3	261000	0.29 J	0.17 J	0.80 J	5.8 J	0.35 J Y
		04/11/2013 12:08	ROCK DRAIN MP 130411	8.0	385	7.3 J	0.17 J	<1.0	18.7	<0.50	8.3	251000	0.51 J	0.34 J	1.2	9.9 J Y	0.042 J
		04/18/2013 11:25	ROCK DRAIN MP 130418	8.2	362	<50.0	0.18 J	<1.0	18.8 Y	<0.50	8.3	254000 Y	0.67 J	0.46 J	1.1	7.6 J	0.073 J
	Summer 2 gpm	06/18/2013 13:20	ROCK DRAIN MP 130618	7.6	195	<50.0	0.20 J	<1.0	17.7	<0.50	3.7	247000Y	0.35 J	0.11 J	0.97 J	5.7 J	0.080 J
		07/10/2013 12:50	ROCK DRAIN MP 130710	7.7	206	<50.0	0.072 J	<1.0	18.0	<0.50	3.6	236000	<1.0	<1.0	1.4	<50.0	0.22 JY
		08/14/2013 11:50	ROCK DRAIN MP 130814	7.7	181	<50.0	0.22 J	<1.0	16.8	<0.50	5.6	248000	<1.0	0.92 J	6.2	<50.0	0.087 JY
		09/19/2013 11:06	ROCK DRAIN MP 130919	7.5	165	<50.0	0.52 JY	0.11 J	20.3Y	0.15 JY	7.4	246000	0.41 JY	0.53 JY	1.6Y	6.0 JY	0.037 J

TABLE 9
LABORATORY ANALYTICAL DATA: DISSOLVED METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Magnesium (ug/L)	Manganese (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Potassium (ug/L)	Selenium (ug/L)	Silver (ug/L)	Sodium (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Rock Drain In	Baseline	1/4/2013 11:25	ROCK DRAIN IN 130104	7.9	222	20700 Y	1710 Y	--	19.7	2.6	21600 Y	<1.0	0.18 J Y	12300	0.14 J Y	<1.0	1970
	Winter 1.5 gpm	1/9/2013 11:05	ROCK DRAIN 130109	8.2	254	19000	1640 Y	--	19.2	2.4	19300 Y	<1.0	0.21 J Y	12200 Y	0.38 J Y	<1.0	1810
		1/16/2013 11:30	ROCK DRAIN IN 130116	8.1	249	20700	1720 Y	--	18.6	2.3 Y	17000 Y	<1.0	0.14 J	12200	0.18 J Y	<1.0	1940
		1/22/2013 10:05	ROCK DRAIN IN 130122	8.2	250	19900	1660 Y	--	18.0	1.7	14000	<1.0	0.12 J	12000 Y	0.15 J	<1.0	1660 Y
		2/5/2013 11:45	ROCK DRAIN IN 130205	8.3	242	20600	1600	--	16.5	2.2	9610 Y	<1.0	<0.50	12700 Y	0.11 J	<1.0	1590
	Winter 3 gpm	2/13/2013 12:00	ROCK DRAIN IN 130213	8.2	244	20400 Y	1700 Y	--	17.0	4.0	8470 Y	<1.0	<0.50	12800 Y	0.15 J Y	<1.0	1820
		2/19/2013 11:30	ROCK DRAIN IN 130219	8.3	244	20200 Y	1640 Y	--	17.4	1.8 Y	7740 Y	<1.0	0.028 J	12600 Y	0.13 J	<1.0	1720
		2/27/2013 11:10	ROCK DRAIN IN 130227	8.3	242	20400	1630	--	15.7	2.1	7100	<1.0	0.030 J	12800	0.14 J	<1.0	1740
		3/6/2013 9:55	ROCK DRAIN IN 130306	8.3	281	20600 Y	1580 Y	--	15.4	2.4	6250 Y	<1.0	0.038 J	12200 Y	0.13 J	<1.0	1520 Y
	Winter 6 gpm	03/12/2013 11:42	ROCK DRAIN IN 130312	8.3	271	20500 Y	1560 Y	<0.20	16.1 Y	3.5 Y	5970 Y	<1.0	<0.50	12300 Y	0.47 J Y	<1.0	1390
		03/19/2013 11:05	ROCK DRAIN IN 130319	8.3	230	20800	1720 Y	--	16.8 Y	3.4	5730	<1.0	0.040 J Y	12600	0.43 J Y	<1.0	1620
		03/26/2013 10:30	ROCK DRAIN IN 130326	8.3	230	20600 Y	1550	--	15.3	3.7 Y	5340 Y	<1.0	0.017 J	12400 Y	0.12 J	<1.0	1830
		04/01/2013 12:45	ROCK DRAIN IN 130401	8.3	215	21600	1510 Y	--	15.3	3.6	5210	<1.0	0.027 J	12000	0.12 J	<1.0	1620
		04/11/2013 10:35	ROCK DRAIN IN 130411	8.3	222	21100 Y	1660 Y	--	14.9	3.8	5220 Y	0.15 J	0.027 J	12000 Y	0.12 J	<1.0	2450
		04/18/2013 10:35	ROCK DRAIN IN 130418	8.3	228	21500 Y	1550	--	15.3	3.5	6340	<1.0	0.024 J	13500	<1.0	<1.0	2240
	Summer 2 gpm	06/18/2013 12:30	ROCK DRAIN IN 130618	8.1	204	21800Y	1720	--	14.0	2.9Y	4050	<1.0	0.025 J	12400	0.12 J	<1.0	2070
		07/10/2013 11:15	ROCK DRAIN IN 130710	8.0	182	19800	1560	--	22.5	3.5	4880	<1.0	<0.50	35400	0.023 J	<1.0	2070
		08/14/2013 11:00	ROCK DRAIN IN 130814	8.2	237	20800	1650Y	--	16.5	2.6	3450	<1.0	<0.50	16700	0.27 JY	0.33 JY	1990
		09/19/2013 09:55	ROCK DRAIN IN 130919	7.5	205	22200	1810Y	--	20.2Y	3.3Y	4060Y	0.46 JY	0.20 JY	15200Y	0.12 J	<1.0	2840
Rock Drain MP	Baseline	1/4/2013 12:35	ROCK DRAIN MP 130104	7.8	168	22400 Y	3950 Y	--	15.7 Y	2.5 Y	22600	<1.0	0.20 J Y	13400	0.063 J Y	0.86 J	1030
	Winter 1.5 gpm	1/9/2013 12:45	ROCK DRAIN MP 130109	7.6	30	21500	4550	--	16.1	2.2	21400 Y	<1.0	0.20 J Y	14000 Y	0.12 J Y	0.84 J	970
		1/16/2013 12:15	ROCK DRAIN MP 130116	7.7	263	24100	10400 Y	--	11.8	2.2	20700 Y	<1.0	0.13 J	15200 Y	0.063 J Y	1.7	516
		1/22/2013 11:20	ROCK DRAIN MP 130122	7.7	96	21000	2080	--	13.8	1.0	16100 Y	<1.0	<0.50	13000 Y	0.041 J	0.66 J	950
		2/5/2013 12:40	ROCK DRAIN MP 130205	7.7	236	21100 Y	662	--	13.2	2.9 Y	10900 Y	<1.0	0.059 J	12600 Y	0.075 J	0.38 J	918
	Winter 3 gpm	2/13/2013 13:00	ROCK DRAIN MP 130213	7.8	173	19900	122 Y	--	13.4	3.0	8930 Y	<1.0	<0.50	12600 Y	0.12 J Y	<1.0	1120
		2/19/2013 12:30	ROCK DRAIN MP 130219	7.8	317	20100 Y	114 Y	--	14.1	0.76 J	8300	<1.0	<0.50	12700	0.046 J	0.35 J	1070
		2/27/2013 12:05	ROCK DRAIN MP 130227	7.8	336	21500 Y	168	--	14.0 Y	1.6 Y	7560 Y	<1.0	0.026 J	13300 Y	0.10 J	<1.0	1200
		3/6/2013 10:35	ROCK DRAIN MP 130306	7.6	225	20500	49.0 Y	--	12.5 Y	1.2	6630 Y	<1.0	0.035 J	12000	0.10 J	0.12 J	898 Y
	Winter 6 gpm	03/12/2013 12:55	ROCK DRAIN MP 130312	7.8	213	20300 Y	182 Y	<0.20	13.6	2.6 Y	6230 Y	<1.0	<0.50	12100 Y	0.39 J Y	0.23 J	881 Y
		03/19/2013 12:20	ROCK DRAIN MP 130319	7.8	369	20200	175	--	14.4	2.4	5860	<1.0	0.028 J Y	12100	0.39 J Y	0.26 J	870 Y
		03/26/2013 11:40	ROCK DRAIN MP 130326	8.0	365	20400 Y	368 Y	--	13.4 Y	3.2 Y	5560 Y	<1.0	<0.50	12700 Y	0.044 J	0.23 J Y	1260 Y
		04/01/2013 12:15	ROCK DRAIN MP 130401	7.9	390	21700	100	--	14.2 Y	2.1	6070	<1.0	<0.50	13000	0.054 J	0.13 J	854 Y
		04/11/2013 12:08	ROCK DRAIN MP 130411	8.0	385	22200 Y	248	--	12.4	2.9	5360	<1.0	<0.50	12200	0.042 J	<1.0	1480 Y
		04/18/2013 11:25	ROCK DRAIN MP 130418	8.2	362	21400 Y	352	--	13.8	2.8	6200 Y	<1.0	<0.50	13600 Y	<1.0	<1.0	1420
	Summer 2 gpm	06/18/2013 13:20	ROCK DRAIN MP 130618	7.6	195	21800Y	69.0	--	12.7	<1.0	4290	<1.0	<0.50	12500	0.038 J	0.50 J	682Y
		07/10/2013 12:50	ROCK DRAIN MP 130710	7.7	206	19900	10.3	--	20.0	0.40 J	5280	<1.0	<0.50	34300	<1.0	0.28 J	488Y
		08/14/2013 11:50	ROCK DRAIN MP 130814	7.7	181	20300	6.8Y	--	14.1	0.34 J	3500	<1.0	<0.50	16700	0.24 JY	0.60 JY	842
		09/19/2013 11:06	ROCK DRAIN MP 130919	7.5	165	21600Y	10.1Y	--	13.8	0.52 JY	3640	0.33 JY	0.18 JY	14900	0.044 J	<1.0	1110

TABLE 9
LABORATORY ANALYTICAL DATA: DISSOLVED METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Aluminum (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Calcium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)
Wetland Out	Baseline	1/4/2013 13:00	WETLAND OUT 130104	6.5	-331	46.6 J	0.86 J	8.2	117 Y	<0.50	<0.50	306000 Y	0.85 J	0.10 J	0.55 J	17.2 J	<1.0
	Winter 1.5 gpm	1/9/2013 11:50	WETLAND OUT 130109	6.6	-347	40.8 J	0.54 J	7.4	115	<0.50	<0.50	271000	1.6 Y	0.11 J	<1.0	28.8 J	<1.0
		1/9/2013 12:20	DUP130109	6.6	-347	42.6 J	0.49 J	7.7	113	<0.50	<0.50	268000	0.78 J	0.12 J	<1.0	28.7 J	<1.0
		1/16/2013 13:15	WETLAND OUT 130116	6.6	-347	30.3 J	0.58 J	6.2	116 Y	<0.50	<0.50	270000	0.57 J	0.083 J	<1.0	25.9 J	<1.0
		1/22/2013 10:35	WETLAND OUT 130122	6.6	-348	30.8 J	0.58 J	6.1	116	<0.50	<0.50	265000	0.90 J	0.084 J	0.46 J	33.7 J	<1.0
		2/5/2013 13:20	WETLAND OUT 130205	6.6	-367	31.1 J Y	0.49 J	5.0	112	<0.50	<0.50	279000 Y	0.72 J	0.072 J	<1.0	<50.0	0.18 J Y
	Winter 3 gpm	2/13/2013 13:20	WETLAND OUT 130213	6.7	-388	14.6 J	0.34 J Y	1.7	94.0	<0.50	<0.50	282000 Y	0.98 J Y	<1.0	<1.0	27.3 J Y	0.20 J Y
		2/19/2013 13:00	WETLAND OUT 130219	6.8	-303	15.1 J	0.28 J Y	1.3	95.5 Y	<0.50	<0.50	286000 Y	0.71 J	<1.0	0.28 J	21.8 J	<1.0
		2/27/2013 13:00	WETLAND OUT 130227	6.8	-377	13.8 J	0.18 J	1.2	89.6 Y	<0.50	<0.50	280000 Y	0.34 J	<1.0	0.13 J	20.4 J	<1.0
		3/6/2013 11:05	WETLAND OUT 130306	6.8	-382	13.8 J	0.18 J Y	1.1	85.5	<0.50	<0.50	262000 Y	0.26 J	<1.0	0.16 J	14.3 J	<1.0
	Winter 6 gpm	03/12/2013 13:30	WETLAND OUT 130312	6.9	-369	8.5 J	0.46 J Y	0.26 J	78.5	<0.50	0.18 J Y	259000	0.32 J	<1.0	0.34 J Y	30.7 J Y	<1.0
		03/19/2013 13:05	WETLAND OUT 130319	6.8	-380	50.1 Y	0.17 J Y	0.35 J	87.1 Y	<0.50	<0.50	262000	0.97 J	<1.0	2.3 Y	31.1 J Y	0.20 J Y
		03/26/2013 10:50	WETLAND OUT 130326	6.9	-401	<50.0	0.25 J Y	0.13 J	70.3	<0.50	0.11 J Y	267000 Y	0.51 J Y	0.24 J Y	1.2 Y	17.5 J Y	0.14 J Y
		04/01/2013 13:30	WETLAND OUT 130401	6.7	-373	10.7 J	0.13 J	0.47 J	80.9	<0.50	<0.50	272000	0.39 J	<1.0	0.28 J	17.6 J	0.075 J
		04/11/2013 12:35	WETLAND OUT 130411	6.8	-371	10.2 J	0.078 J	0.42 J	77.4	<0.50	<0.50	262000 Y	0.46 J	<1.0	0.16 J	15.1 J Y	0.033 J
		04/18/2013 11:50	WETLAND OUT 130418	6.8	-373	10.6 J	0.11 J	0.47 J	80.7	<0.50	<0.50	249000	0.36 J	<1.0	0.22 J	12.5 J	<1.0
	Summer 2 gpm	06/18/2013 13:45	WETLAND OUT 130618	6.8	-316	13.5 J	0.15 J	3.0	110Y	<0.50	<0.50	251000Y	1.1Y	0.11 J	0.30 J	11.6 J	<1.0
		07/10/2013 12:50	WETLAND OUT 130710	6.8	-365	7.4 J	0.068 J	5.2	110	<0.50	<0.50	238000	<1.0	<1.0	0.16 J	6.8 J	0.22 JY
		08/14/2013 12:35	WETLAND OUT 130814	7.0	-316	<50.0	0.12 J	1.9	95.6	<0.50	<0.50	238000	0.11 J	0.53 J	0.23 J	<50.0	0.12 JY
		09/19/2013 11:47	WETLAND OUT 130919	6.8	-316	10.0 J	0.42 JY	1.3	89.1	0.17 JY	0.19 JY	242000	0.42 JY	0.43 JY	0.51 JY	16.0 JY	0.030 J

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 multi-probe system during weekly inspections prior to January 8 and after April 18, 2013. Between January 8 and April 18, 2013, in situ YSI 6920 multi-parameter sondes (sondes) were installed, and water quality parameters were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 multi-probe system measurement recorded during weekly calibration checks was reported; such data is noted on Table 4, Water Quality Parameters.

Abbreviations:
< = analyzed but not detected above the method reporting limit shown
-- = not analyzed
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mV = millivolt
ORP = oxidation reduction potential
su = standard unit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 9
LABORATORY ANALYTICAL DATA: DISSOLVED METALS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Test Run[1]	Collection Date Time	Sample ID	pH[2] (su)	ORP[2] (mV)	Magnesium (ug/L)	Manganese (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Potassium (ug/L)	Selenium (ug/L)	Silver (ug/L)	Sodium (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Wetland Out	Baseline	1/4/2013 13:00	WETLAND OUT 130104	6.5	-331	29000 Y	4990 Y	--	0.17 J	<1.0	34000 Y	<1.0	0.082 J Y	14400 Y	<1.0	1.6	3.5 J Y
	Winter 1.5 gpm	1/9/2013 11:50	WETLAND OUT 130109	6.6	-347	26500	4600	--	0.31 J Y	<1.0	30500 Y	<1.0 Y	0.11 J Y	13900 Y	0.20 J Y	1.4	2.4 J Y
		1/9/2013 12:20	DUP130109	6.6	-347	26200	4970	--	0.27 J Y	<1.0	30100	5.5	0.091 J Y	13700	0.066 J Y	1.5	3.7 J Y
		1/16/2013 13:15	WETLAND OUT 130116	6.6	-347	24800 Y	4050 Y	--	<1.0	<2.0 Y	26600 Y	<1.0	<0.50	13100 Y	<1.0	1.1	4.5 J Y
		1/22/2013 10:35	WETLAND OUT 130122	6.6	-348	23300	3630	--	0.42 J	<2.0 Y	24200	<1.0	0.14 J	12900 Y	0.068 J	1.1	6.0 J
		2/5/2013 13:20	WETLAND OUT 130205	6.6	-367	22400 Y	2900	--	<1.0	<1.0	18000 Y	<1.0	<0.50	12200 Y	<1.0	1.1	3.5 J
	Winter 3 gpm	2/13/2013 13:20	WETLAND OUT 130213	6.7	-388	20900	2040 Y	--	<1.0	0.25 J	11700 Y	<1.0	<0.50	12300 Y	0.050 J Y	0.18 J	1.6 J Y
		2/19/2013 13:00	WETLAND OUT 130219	6.8	-303	20400 Y	1640 Y	--	0.35 J	<1.0	10400 Y	<1.0	0.028 J	12400 Y	0.068 J	0.55 J	2.6 J Y
		2/27/2013 13:00	WETLAND OUT 130227	6.8	-377	21100 Y	1320 Y	--	<1.0	<2.0 Y	9460 Y	<1.0	<0.50	13000 Y	<1.0	0.28 J	1.9 J
		3/6/2013 11:05	WETLAND OUT 130306	6.8	-382	20700	1100	--	<1.0	<1.0	8460	<1.0	<0.50	11900	0.079 J	0.27 J	2.2 J
	Winter 6 gpm	03/12/2013 13:30	WETLAND OUT 130312	6.9	-369	20400	807	<0.20	0.33 J	0.28 J Y	7000	<1.0	<0.50	12100	0.41 J Y	0.19 J	1.3 J
		03/19/2013 13:05	WETLAND OUT 130319	6.8	-380	20600	802	--	0.29 J Y	<1.0	6930	<1.0	0.035 J Y	12400	0.37 J Y	0.68 J	2.0 J
		03/26/2013 10:50	WETLAND OUT 130326	6.9	-401	21000 Y	664	--	0.62 J Y	0.074 J Y	6120 Y	<1.0	0.014 J	12800 Y	0.043 J	0.38 J Y	1.2 J
		04/01/2013 13:30	WETLAND OUT 130401	6.7	-373	21000	660	--	0.31 J	0.28 J	6720	<1.0	0.034 J	12700 Y	0.063 J	0.32 J	1.6 J
		04/11/2013 12:35	WETLAND OUT 130411	6.8	-371	24000 Y	632 Y	--	0.33 J	<1.0	6150 Y	<1.0	0.021 J	12200 Y	0.057 J	<1.0	1.2 J
		04/18/2013 11:50	WETLAND OUT 130418	6.8	-373	22500 Y	599	--	0.30 J	<1.0	6900 Y	<1.0	0.027 J	13400 Y	0.021 J	0.31 J	1.8 J
	Summer 2 gpm	06/18/2013 13:45	WETLAND OUT 130618	6.8	-316	22400Y	560Y	--	0.33 J	<1.0	6090	<1.0	0.028 J	13500	0.070 J	0.77 J	1.4 J
		07/10/2013 12:50	WETLAND OUT 130710	6.8	-365	20500	452	--	0.13 J	0.72 J	6950	<1.0	<0.50	30200	<1.0	0.61 J	2.2 J
		08/14/2013 12:35	WETLAND OUT 130814	7.0	-316	19100	397	--	<1.0	<1.0	4870	<1.0	<0.50	16300	0.23 JY	0.61 JY	11.2
		09/19/2013 11:47	WETLAND OUT 130919	6.8	-316	20100	319	--	0.29 J	<1.0	5200	0.22 JY	0.20 JY	13100	0.056 J	<1.0	5.1 JY

Notes:
1. Test run flow rates reflect target effluent flow rates.
2. Field water quality parameters were measured using a calibrated YSI 556 multi-probe system during weekly inspections prior to January 8 and after April 18, 2013. Between January 8 and April 18, 2013, in situ YSI 6920 multi-parameter sondes (sondes) were installed, and water quality parameters were recorded by sondes. If the data recorded by a sonde was considered unreliable, the YSI 556 multi-probe system measurement recorded during weekly calibration checks was reported; such data is noted on Table 4, Water Quality Parameters.

Abbreviations:
< = analyzed but not detected above the method reporting limit shown
-- = not analyzed
gpm = gallon per minute
J = estimated concentration detected below the laboratory reporting limit
mV = millivolt
ORP = oxidation reduction potential
su = standard unit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 10
LABORATORY ANALYTICAL DATA: MATRIX MATERIAL
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Phase	Collection Date & Time	Sample_ID	Aluminum (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)
Rock Drain	Baseline	12/06/2012 13:45	P9RD1A121206 LEACHATE	20700 Y	<20.0 Y	36.1	1780	6.8	114	20.4 Y	94.2	851	45100	3060
		12/06/2012 14:00	P9RD2A121206 LEACHATE	27600	<20.0 Y	38.3	2760	7.4 J	147	30.6 J Y	260	797	59500	579 Y
		12/06/2012 14:15	P9RD1B121206 LEACHATE	28700	<20.0 Y	30.7	3640	6.8	126	30.2 J Y	232	648	56800	426 Y
		12/06/2012 14:25	P9RD2B121206 LEACHATE	11100	<50.0 Y	71.6	3000	<2.0 Y	171	18.2 J Y	85.7	623	20800	224 Y
		12/06/2012 14:30	P9RD1C121206 LEACHATE	14000	<20.0 Y	58.7	3510	1.3 J	138	20.9 J Y	146	441	23300	302 Y
		12/06/2012 14:40	P9RD2C121206 LEACHATE	15600	<200 Y	69.4	4350	2.6	239	23.8 J Y	312	1260	32700	883 Y
	Post-Winter Pilot Testing	05/02/2013 13:15	SWRD1C130502 LEACHATE	11500	<100 Y	18.9 J	1030	3.9 J	176	20.2 J Y	139	456	28900	211
		05/02/2013 13:15	MIDRD130502 LEACHATE	13400	<100 Y	14.0 J	1510	17.8	538	16.6 J Y	424	3000	157000	1630
		05/02/2013 13:20	NERD2A130502 LEACHATE	18300 Y	<20.0 Y	54.0	4840	7.0	602	60.0 J Y	478	1940 Y	80800 Y	1480
Wetland Cell	Baseline	12/06/2012 15:40	P9W1A121206 LEACHATE	62500	<20.0 Y	50.0	3860	7.5	54.9	66.5 Y	101	773	206000	1930
		12/06/2012 15:50	P9W1B121206 LEACHATE	62400	<20.0 Y	55.6	5020	14.4	239	71.3 Y	172	1350	216000	1600
		12/06/2012 16:00	P9W1C121206 LEACHATE	58900	<20.0 Y	52.8	4440	8.9	77.0	81.8 Y	121	879	197000	1720
		12/06/2012 16:10	P9W2A121206 LEACHATE	54700	<20.0 Y	69.7	2810	<10.0 Y	44.8 J	74.8 Y	83.6	895	150000	1370
		12/06/2012 16:15	P9W2B121206 LEACHATE	71500	<20.0 Y	48.3	5450	10.6	112	78.5 Y	135	945	223000	1660
		12/06/2012 16:25	P9W2C121206 LEACHATE	54600	8.9 J	46.9	3620	8.7	99.4	66.0 Y	113	909	170000	1300
		12/06/2012 16:40	P9W3A121206 LEACHATE	46300	<20.0	33.6	3070	5.7	37.9 J	55.0	70.0	548	127000	894
		12/06/2012 16:35	P9W3B121206 LEACHATE	44100	<20.0	38.0	2930	8.7	62.7	55.9	72.8	673	149000	994
		12/06/2012 16:30	P9W3C121206 LEACHATE	82800	<20.0	54.9	5520	10.7	92.2	100	151	1100	340000	2160
	Post-Winter Pilot Testing	05/03/2013 10:30	P9W1A130503 LEACHATE	255000 Y	66.7	90.4	7080	52.3	449	300	414	4170	1440000 Y	23700
		05/03/2013 11:20	P9W1B130503 LEACHATE	170000	20.5	76.3	5410	23.6	154	269	239	1890	725000	2570
		05/03/2013 11:35	P9W1C130503 LEACHATE	159000	30.5	54.3	6240	21.2	121	293	233	1920	813000	2800
		05/03/2013 11:55	P9W1D130503 LEACHATE	216000	40.0	45.3	7210	27.2	137	304	268	1980	1170000	3810
		05/03/2013 11:00	P9W2A130503 LEACHATE	151000	25.1	41.0	5680	20.7	132	194	226	1840	668000	3010
		05/03/2013 11:25	P9W2B130503 LEACHATE	176000	37.6	57.2	6220	25.1	162	234	248	2070	740000	2340
		05/03/2013 11:40	P9W2C130503 LEACHATE	177000	20.8	51.6	6890	27.8	131	208	251	1610	882000	3490
		05/03/2013 12:00	P9W2D130503 LEACHATE	208000	28.1	71.1	8820	27.2	136	250	294	2280	963000	3610
		05/03/2013 11:10	P9W3A130503 LEACHATE	147000	25.6	53.7	6220	19.4	102	313	203	1710	611000	2100
		05/03/2013 11:30	P9W3B130503 LEACHATE	161000	16.9 J	37.1	6110	23.6	192	199	247	1520	657000	2290
		05/03/2013 11:45	P9W3C130503 LEACHATE	182000	12.9 J	67.4	6340	24.0	148	288	256	2220	809000	3350
		05/03/2013 12:05	P9W3D130503 LEACHATE	159000	27.3	44.8	6280	24.5	134	396	286	1890	966000	3000

Abbreviations:
< = analyte was analyzed but not detected above the associated method reporting limit shown
J = estimated concentration detected below the laboratory reporting limit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 10
LABORATORY ANALYTICAL DATA: MATRIX MATERIAL
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Location ID	Phase	Collection Date & Time	Sample_ID	Manganese (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Rock Drain	Baseline	12/06/2012 13:45	P9RD1A121206 LEACHATE	50400 Y	23.8 J Y	139	<30.0 Y	8.9 J	<40.0 Y	157	28300 Y
		12/06/2012 14:00	P9RD2A121206 LEACHATE	153000	48.2	263	<150 Y	22.1	<200 Y	264	38800
		12/06/2012 14:15	P9RD1B121206 LEACHATE	104000	29.6 J Y	208	<150 Y	17.0	<200 Y	259	33200
		12/06/2012 14:25	P9RD2B121206 LEACHATE	61000	41.8	155	<75.0 Y	8.0 J	<100 Y	293	24600
		12/06/2012 14:30	P9RD1C121206 LEACHATE	65800	19.0 J Y	258	<75.0 Y	8.4 J	<100 Y	272	12200
		12/06/2012 14:40	P9RD2C121206 LEACHATE	218000	100	755	<300 Y	<140 Y	<400 Y	1050	21200
	Post-Winter Pilot Testing	05/02/2013 13:15	SWRD1C130502 LEACHATE	60800	68.8	131	<150 Y	7.0 J	<40.0 Y	76.9 J	31100
		05/02/2013 13:15	MIDRD130502 LEACHATE	182000	148	181	<150 Y	36.4	32.2 J	170	106000
		05/02/2013 13:20	NERD2A130502 LEACHATE	276000 Y	165	567	<300 Y	35.1	298	789	95300 Y
Wetland Cell	Baseline	12/06/2012 15:40	P9W1A121206 LEACHATE	18400	15.5 J	216	<30.0 Y	25.6	<40.0 Y	356	7500
		12/06/2012 15:50	P9W1B121206 LEACHATE	40600	14.9 J	297	<30.0 Y	23.7	<40.0 Y	372	36800
		12/06/2012 16:00	P9W1C121206 LEACHATE	24500	10.9 J	241	<30.0 Y	22.6	<40.0 Y	383	10400
		12/06/2012 16:10	P9W2A121206 LEACHATE	23700	11.7 J	158	<30.0 Y	<70.0 Y	<40.0 Y	319	4670
		12/06/2012 16:15	P9W2B121206 LEACHATE	38800	7.4 J	274	<30.0 Y	22.7	<40.0 Y	424	15700
		12/06/2012 16:25	P9W2C121206 LEACHATE	22900	15.0 J	212	<30.0 Y	21.1	<40.0 Y	325	14200
		12/06/2012 16:40	P9W3A121206 LEACHATE	16000	3.9 J	168	<30.0	13.5 J	<40.0	259	5350
		12/06/2012 16:35	P9W3B121206 LEACHATE	19200	5.0 J	164	<30.0	15.1	<40.0	288	8820
		12/06/2012 16:30	P9W3C121206 LEACHATE	32900	6.8 J	341	<30.0	29.2	<40.0	501	11500
	Post-Winter Pilot Testing	05/03/2013 10:30	P9W1A130503 LEACHATE	42900 Y	49.7 J Y	775	<45.0 Y	151	22.1 J Y	935	58100 Y
		05/03/2013 11:20	P9W1B130503 LEACHATE	13400	302	546	<30.0 Y	27.3	20.2 J	834	27500
		05/03/2013 11:35	P9W1C130503 LEACHATE	15600	79.5	509	<30.0 Y	32.7	23.3 J	842	21600
		05/03/2013 11:55	P9W1D130503 LEACHATE	19100	25.0 J	568	<30.0 Y	31.9	31.7 J	1150	22200
		05/03/2013 11:00	P9W2A130503 LEACHATE	13600	148	510	<30.0 Y	24.4	17.2 J	892	22000
		05/03/2013 11:25	P9W2B130503 LEACHATE	14400	189	571	<30.0 Y	18.3	22.7 J	868	26500
		05/03/2013 11:40	P9W2C130503 LEACHATE	14800	54.5	563	<30.0 Y	31.9	26.8 J	919	23600
		05/03/2013 12:00	P9W2D130503 LEACHATE	25000	49.1	641	<30.0 Y	32.4	23.5 J	1090	19100
		05/03/2013 11:10	P9W3A130503 LEACHATE	12000	69.8	487	<30.0 Y	18.3	15.0 J	864	15400
		05/03/2013 11:30	P9W3B130503 LEACHATE	11300	182	557	<30.0 Y	13.5 J	19.4 J	813	35100
		05/03/2013 11:45	P9W3C130503 LEACHATE	13800	242	589	<30.0 Y	24.0	17.5 J	914	27000
		05/03/2013 12:05	P9W3D130503 LEACHATE	15600	42.0	546	<30.0 Y	30.1	30.8 J	1020	21600

Abbreviations:
< = analyte was analyzed but not detected above the associated method reporting
J = estimated concentration detected below the laboratory reporting limit
ug/L = microgram per liter
Y = method quality control criteria were exceeded

TABLE 11
MASS REMOVAL RATES: IRON
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Unit Process	Test Run[1]	Duration	Total			Dissolved		
			Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed	Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed
Rock Drain	Winter 1.5 gpm	1/4/2013 - 2/5/2013	31	10	78%	-1.51	-0.49	-132%
	Winter 3 gpm	2/5/2013 - 3/6/2013	43	9.7	81%	-0.55	-0.01	-15%
	Winter 6 gpm	3/6/2013 - 4/18/2013	53	7.4	70%	0.03	0.00	3%
	Summer 2 gpm	6/18/2013 - 9/19/2013	16	6.5	93%	0.18	0.07	35%
Wetland Cell	Winter 1.5 gpm	1/4/2013 - 2/5/2013	4.4	2.8	94%	0.92	0.59	86%
	Winter 3 gpm	2/5/2013 - 3/6/2013	5.3	1.9	93%	-0.07	-0.02	16%
	Winter 6 gpm	3/6/2013 - 4/18/2013	14	2.7	94%	-0.17	-0.03	-7%
	Summer 2 gpm	6/18/2013 - 9/19/2013	0.4	0.2	60%	0.16	0.08	42%
System Overall	Winter 1.5 gpm	1/4/2013 - 2/5/2013	36	12	99%	-0.59	-0.19	67%
	Winter 3 gpm	2/5/2013 - 3/6/2013	48	11	99%	-0.62	-0.03	4%
	Winter 6 gpm	3/6/2013 - 4/18/2013	68	9.4	98%	-0.14	-0.02	-3%
	Summer 2 gpm	6/18/2013 - 9/19/2013	17	6.7	97%	0.34	0.13	62%

Notes:

1. Test run flow rates reflect target effluent flow rates. Summer test run mass removal rates were calculated using data collected between 6/18/13 and 9/19/13.
2. Rock drain mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Rock Drain MP from Rock Drain In and multiplying the difference against the corresponding average influent flow rates measured for those two sampling events.
3. Wetland cell mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Wetland Out from Rock Drain MP and multiplying the difference against the corresponding average effluent flow rates measured for those two sampling events.
4. Mass removal rates were normalized by dividing the mass removal rate by the average influent (rock drain) or effluent (wetland cell) flow rates corresponding to the sampling events.
5. Overall removal rates were normalized conservatively by dividing the sum of rock drain and wetland mass removal rates (g/d) by the average influent rate.

Abbreviations:

gpm = gallon per minute
g/d = gram per day
g/d/gpm = gram per day per gallon per minute
% = percent
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
Wetland Out = wetland outlet discharge point monitoring location

TABLE 12
MASS REMOVAL RATES: MANGANESE
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Unit Process	Test Run[1]	Duration	Total			Dissolved		
			Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed	Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed
Rock Drain	Winter 1.5 gpm	1/4/2013 - 2/5/2013	-68	-22	-170%	-56	-18	-146%
	Winter 3 gpm	2/5/2013 - 3/6/2013	32	7.0	88%	5.7	7.0	88%
	Winter 6 gpm	3/6/2013 - 4/18/2013	54	7.5	87%	55	7.6	87%
	Summer 2 gpm	6/18/2013 - 9/19/2013	23	9.1	99%	23	9.1	99%
Wetland Cell	Winter 1.5 gpm	1/4/2013 - 2/5/2013	15	9.7	57%	9.3	5.9	53%
	Winter 3 gpm	2/5/2013 - 3/6/2013	-24	-9.1	-446%	-24	-9.0	-447%
	Winter 6 gpm	3/6/2013 - 4/18/2013	-17	-3.2	-163%	-17	-3.1	-162%
	Summer 2 gpm	6/18/2013 - 9/19/2013	-4.6	-2.2	-1800%	-4.6	-2.2	-2071%
Overall	Winter 1.5 gpm	1/4/2013 - 2/5/2013	-53	-17	-15%	-47	-15	-16%
	Winter 3 gpm	2/5/2013 - 3/6/2013	8.4	1.6	34%	-18	1.6	34%
	Winter 6 gpm	3/6/2013 - 4/18/2013	37	5.1	65%	38	5.3	66%
	Summer 2 gpm	6/18/2013 - 9/19/2013	18	7.3	79%	18	7.3	79%

Notes:

1. Test run flow rates reflect target effluent flow rates. Summer test run mass removal rates were calculated using data collected between 6/18/13 and 9/19/13.
2. Rock drain mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Rock Drain MP from Rock Drain In and multiplying the difference against the corresponding average influent flow rates measured for those two sampling events.
3. Wetland cell mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Wetland Out from Rock Drain MP and multiplying the difference against the corresponding average effluent flow rates measured for those two sampling events.
4. Mass removal rates were normalized by dividing the mass removal rate by the average influent (rock drain) or effluent (wetland cell) flow rates corresponding to the sampling events.
5. Overall removal rates were normalized conservatively by dividing the sum of rock drain and wetland mass removal rates (g/d) by the average influent rate.

Abbreviations:

gpm = gallon per minute
g/d = gram per day
g/d/gpm = gram per day per gallon per minute
% = percent
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
Wetland Out = wetland outlet discharge point monitoring location

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TABLE 13
MASS REMOVAL RATES: CADMIUM
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Unit Process	Test Run[1]	Duration	Total			Dissolved		
			Mass Removal Rate[2,3] (mg/d)	Normalized Removal Rate[4,5] (mg/d/gpm)	Percent Removed	Mass Removal Rate[2,3] (mg/d)	Normalized Removal Rate[4,5] (mg/d/gpm)	Percent Removed
Rock Drain	Winter 1.5 gpm	1/4/2013 - 2/5/2013	135	44	71%	142	46	85%
	Winter 3 gpm	2/5/2013 - 3/6/2013	135	31	51%	154	26	48%
	Winter 6 gpm	3/6/2013 - 4/18/2013	186	26	41%	150	21	38%
	Summer 2 gpm	6/18/2013 - 9/19/2013	142	56	66%	125	49	63%
Wetland Cell	Winter 1.5 gpm	1/4/2013 - 2/5/2013	22	14	92%	6.0	4.0	83%
	Winter 3 gpm	2/5/2013 - 3/6/2013	64	23	92%	60	21	94%
	Winter 6 gpm	3/6/2013 - 4/18/2013	169	31	91%	170	31	95%
	Summer 2 gpm	6/18/2013 - 9/19/2013	53	26	95%	49	24	93%
Overall	Winter 1.5 gpm	1/4/2013 - 2/5/2013	157	51	98%	148	48	97%
	Winter 3 gpm	2/5/2013 - 3/6/2013	199	45	96%	214	39	97%
	Winter 6 gpm	3/6/2013 - 4/18/2013	355	49	95%	320	44	97%
	Summer 2 gpm	6/18/2013 - 9/19/2013	194	77	98%	174	69	97%

Notes:

1. Test run flow rates reflect target effluent flow rates. Summer test run mass removal rates were calculated using data collected between 6/18/13 and 9/19/13.
2. Rock drain mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Rock Drain MP from Rock Drain In and multiplying the difference against the corresponding average influent flow rates measured for those two sampling events.
3. Wetland cell mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Wetland Out from Rock Drain MP and multiplying the difference against the corresponding average effluent flow rates measured for those two sampling events.
4. Mass removal rates were normalized by dividing the mass removal rate by the average influent (rock drain) or effluent (wetland cell) flow rates corresponding to the sampling events.
5. Overall removal rates were normalized conservatively by dividing the sum of rock drain and wetland mass removal rates (g/d) by the average influent rate.

Abbreviations:

gpm = gallon per minute
g/d = gram per day
g/d/gpm = gram per day per gallon per minute
% = percent
Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
Wetland Out = wetland outlet discharge point monitoring location

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TABLE 14
MASS REMOVAL RATES: ZINC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Unit Process	Test Run[1]	Duration	Total			Dissolved		
			Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed	Mass Removal Rate[2,3] (g/d)	Normalized Removal Rate[4,5] (g/d/gpm)	Percent Removed
Rock Drain	Winter 1.5 gpm	1/4/2013 - 2/5/2013	18	5.9	51%	16	5.2	51%
	Winter 3 gpm	2/5/2013 - 3/6/2013	21	4.8	44%	19	3.5	37%
	Winter 6 gpm	3/6/2013 - 4/18/2013	35	4.9	44%	26	3.6	36%
	Summer 2 gpm	6/18/2013 - 9/19/2013	25	9.9	69%	20	7.9	65%
Wetland Cell	Winter 1.5 gpm	1/4/2013 - 2/5/2013	6.9	4.5	91%	6.8	4.4	99.5%
	Winter 3 gpm	2/5/2013 - 3/6/2013	13	4.8	87%	16	5.8	99.8%
	Winter 6 gpm	3/6/2013 - 4/18/2013	27	5.0	86%	32	5.9	99.9%
	Summer 2 gpm	6/18/2013 - 9/19/2013	7.9	3.8	96%	8.1	3.9	99.4%
Overall	Winter 1.5 gpm	1/4/2013 - 2/5/2013	25	8.2	95%	23	7.5	99.7%
	Winter 3 gpm	2/5/2013 - 3/6/2013	34	7.7	93%	35	7.0	99.9%
	Winter 6 gpm	3/6/2013 - 4/18/2013	62	8.6	92%	58	8.0	99.9%
	Summer 2 gpm	6/18/2013 - 9/19/2013	33	13.0	98.9%	28	11.1	99.8%

Notes:

1. Test run flow rates reflect target effluent flow rates. Summer test run mass removal rates were calculated using data collected between 6/18/13 and 9/19/13.
2. Rock drain mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Rock Drain MP from Rock Drain In and multiplying the difference against the corresponding average influent flow rates measured for those two sampling events.
3. Wetland cell mass removal rates were determined by subtracting the average metals concentrations for two subsequent sampling events at Wetland Out from Rock Drain MP and multiplying the difference against the corresponding average effluent flow rates measured for those two sampling events.
4. Mass removal rates were normalized by dividing the mass removal rate by the average influent (rock drain) or effluent (wetland cell) flow rates corresponding to the sampling events.
5. Overall removal rates were normalized conservatively by dividing the sum of rock drain and wetland mass removal rates (g/d) by the average influent rate.

Abbreviations:

gpm = gallon per minute
g/d = gram per day
g/d/gpm = gram per day per gallon per minute
% = percent

Rock Drain In = inlet flow control box monitoring location
Rock Drain MP = rock drain monitoring port
Wetland Out = wetland outlet discharge point monitoring location

TABLE 15
WETLAND CELL SLUG TEST RESULTS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

Well Specifications							----- AQTESOLV Parameters Applied -----												Model			Results[2,3]	
							General		Aquifer		Screen			Radius									
Location ID	Test Date	Borehole Diameter	Well Diameter (ID)	Screen Interval	Screen Length	Screen Interval Lithology	H(0)	H	b	Kv/Kh	d	L	Trans depth	r(c)	r(eq)	r(p)	r(w)	r(sk)	Aquifer Model	Test Phase	Solution	K	T
		(inches)	(inches)	(ft bgs)	(feet)	---	(feet)	(feet)	(feet)	---	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	---	---	---	(f/d)	(f^2/d)
Wetland MP-1	03/12/13	4.5	4.026	0 - 2.5	2.5	Wetland Matrix	1.26	2.5	2.5	1.0	0	2.5	0	0.168	0	0	0.16775	0.16775	unconfined	slug out, test one	Bouwer-Rice (1976)	161	402
																					KGS - Hyder et al. (1994)[1]	166	415
										0.5											Bouwer-Rice (1976)	161	402
																					KGS - Hyder et al. (1994)[1]	190	475
							0.89	2.5	2.5	1.0	0	2.5	0	0.168	0	0	0.16775	0.16775	unconfined	slug out, test two	Bouwer-Rice (1976)	190	475
																					KGS - Hyder et al. (1994)[1]	206	515
										0.5											Bouwer-Rice (1976)	190	475
																					KGS - Hyder et al. (1994)[1]	236	589
							0.85	2.5	2.5	1.0	0	2.5	0	0.168	0	0	0.16775	0.16775	unconfined	slug out, test three	Bouwer-Rice (1976)	197	493
																					KGS - Hyder et al. (1994)[1]	198	496
										0.5											Bouwer-Rice (1976)	197	493
																					KGS - Hyder et al. (1994)[1]	227	567
Wetland MP-2	03/14/13	4.5	4.026	0 - 2.5	2.5	Wetland Matrix	0.41	2.5	2.5	0.5	0	2.5	0	0.168	0	0	0.16775	0.16775	unconfined	slug out, test one	Bouwer-Rice (1976)	1,874	4,685
																					KGS - Hyder et al. (1994)[1]	2,286	5,715
							0.23													slug out, test two	Bouwer-Rice (1976)	1,253	3,133
																					KGS - Hyder et al. (1994)[1]	1,449	3,623
							0.33													slug out, test three	Bouwer-Rice (1976)	1,322	3,305
																					KGS - Hyder et al. (1994)[1]	1,557	3,893

Notes:

1. KGS Model, in which solution calculates radial hydraulic conductivity (Kr).
2. Assumptions include the following.
   - Well screen is fully penetrating.
   - Screen length is 2.5 feet.
   - Aquifer thickness is 2.5 feet.
   - Entire thickness of wetland matrix is saturated.
   - H(0) is maximum displacement measured after slug is removed.
   - The slug is removed instantaneously.
   - Some consolidation of wetland matrix has occurred.
   - Wetland matrix is a uniform mixture of 50 percent 2" river rock and 50 percent wood and bark chips.
3. The very rapid response to slugs calculated on 3/14/13 indicated high K. Data were sparse, so results from analyses are approximations only.

Reference Values of K:

Gravel:	85 to 8501 f/d	Domenico and Schwartz, 1990
Gravel:	283 to 283,392 f/d	Freeze & Cherry, 1979

Abbreviations:

b	saturated thickness of aquifer
d	depth to top of well screen
ft bgs	feet below ground surface
f/d	feet per day
f^2/d	square feet per day
H	Pre-test static water column height
H(0)	observed maximum displacement (change in water level from static)
ID	inner diameter
K	hydraulic conductivity
Kr	radial hydraulic conductivity
Kv/Kh	vertical-to-horizontal hydraulic conductivity anisotropy ratic
L	saturated length of well screen
r(c)	inside radius of well casing
r(eq)	radius of downhole equipment
r(p)	inside radius of packer
r(sk)	outer radius of well skin (disturbed zone enveloping filter pack)
r(w)	radius of well (open or perforated interval)
T	transmissivity
Trans depth	Transducer depth

TABLE 16
HYDROGEN SULFIDE SURVEY RESULTS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

		Wetland MP-2						Wetland Out					
		Breathing Zone		1 ft above Ground		Monitoring Port		Breathing Zone		1 ft above Ground		Monitoring Port	
Date	Survey Start Time	Meter (ppm)	Badge (ppm)	Meter (ppm)	Badge (ppm)	Meter (ppm)	Badge (ppm)	Meter (ppm)	Badge (ppm)	Meter (ppm)	Badge (ppm)	Meter (ppm)	Badge (ppm)
1/15/2013	15:00	0	0	0	0	0	0	0	0	4	0	20	0
1/16/2013	10:56	0	0	0	0	8	0	0	2.2	33	3.2	33	3.1
2/6/2013	12:15	0	0	0	0	3	0	0	0	19.5	0.9	26	0
3/13/2013	12:20	0	0	0	0	0	0	0	0	0	0	20	0.28
4/25/2013	9:30	0	0	0	0	0	0	0	0	0	0	53	2.6
5/21/2013	10:04	0	0	0	0	0	0	0	0	0	0	0	0
6/18/2013	14:30	0	0	0	0	0	0	0	0	0	0	44	0
7/10/2013	15:50	0	0	0	0	0	0	0	0	0	0	16	0
8/15/2013	14:35	0	0	0	0	0	0	0	0	0	0	24	0.9
9/19/2019	15:15	0	0	0	0	0	0	0	0	0	0	20	0

Notes:

1. Hydrogen sulfide (H_2S) surveys were completed using a calibrated RKI Eagle 2 or MSA Altair 5iR multi-gas meter and Industrial Science Gas Badge Plus or Pro badges. Meters and badges were bump checked prior to performing each survey and set to alarm at five parts per million (ppm) H_2S.
2. H_2S measurements were recorded at various locations around the constructed wetland (see survey field sheets in Appendix E). At each location, measurements were recorded in the breathing zone, at a height of one foot above the ground surface, within the rock drain and wetland cells, and at monitoring port openings.
3. H_2S was only detected at monitoring locations Wetland MP-2 and Wetland Out. Therefore, only that data is presented here. Complete survey data is available in Appendix G.

Abbreviations:

Badge = Industrial Science Gas Badge Plus or Pro
ft = foot
H_2S = hydrogen sulfide
Meter = RKI Eagle 2 or MSA Altair 5iR
ppm = part per million
Wetland MP-2 = wetland monitoring port number two
Wetland Out = wetland outlet discharge point monitoring location

FIGURES

0 2.5 5 10 15 20 Miles

N

SITE LOCATION MAP
Rico-Argentine Mine Site
Dolores County, Colorado

By: dpv	Date: 09/12/2013	Project No. SA11161300
amec		Figure 1

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\14000_CAD\Injection Test WP\SiteLocMap.mxd

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\14000_CAD\Injection Test WP\2_Rico Mine Site.mxd

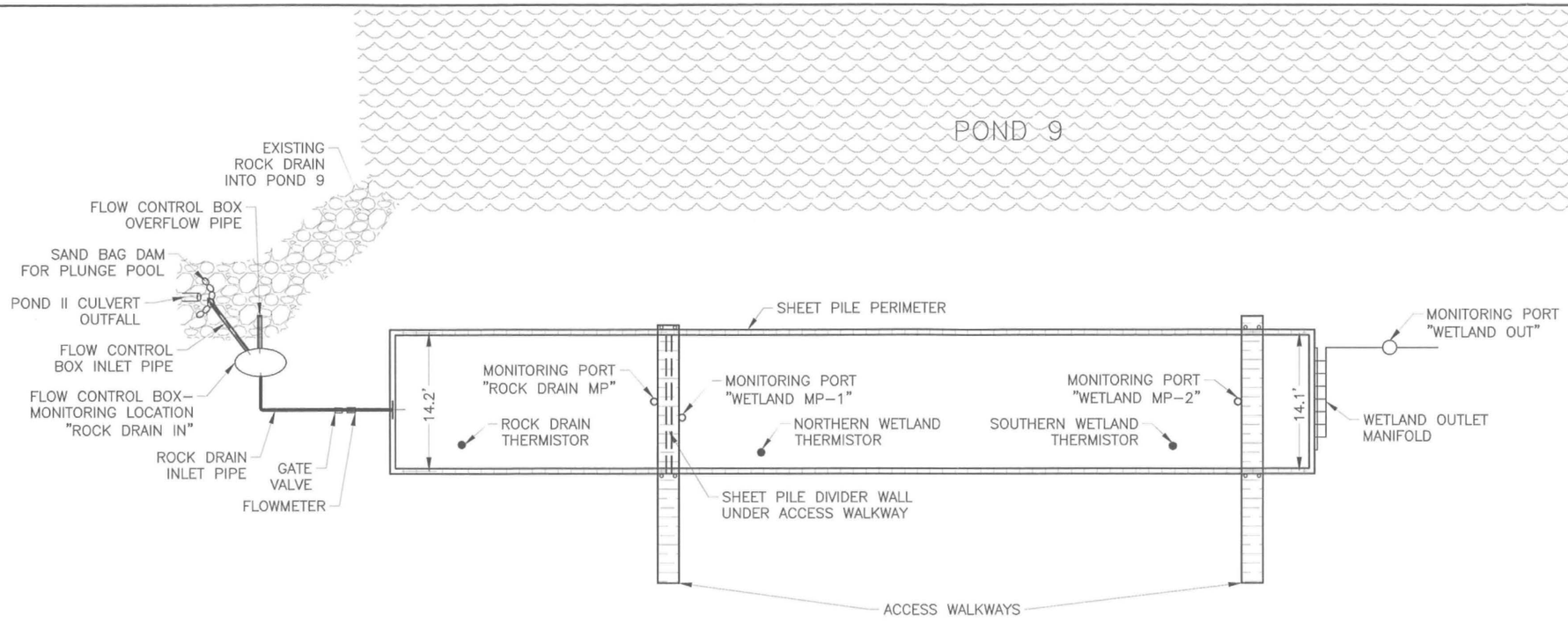
SITE LAYOUT
Rico-Argentine Mine Site
Dolores County, Colorado

By: dpv	Date: 09/11/2013	SA11161300
amec		Figure 2

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\14000_CAD\Ponds\PondLayout_WetlandSystem.mxd

POND LAYOUT AND PILOT-SCALE CONSTRUCTED WETLAND
Rico-Argentine Mine Site
Dolores County, Colorado

By: dpv	Date: 10/22/2013	Project No. SA11161300
amec		Figure 3



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CLIENT	RICO–ARGENTINE MINE SITE
PROJECT	CONSTRUCTED WETLAND PILOT SCALE TEST
TITLE	CONSTRUCTED WETLAND GENERAL DETAILS

amec

DESIGNED BY	RJB	CHECKED BY	HBS	DATE
DRAWN BY	CWM	APPROVED BY	STA	9–12–13

FILENAME	FIGURE No.	REV
WINTER12–13_F4	4	0

FIGURE 5
FLOW RATES and CUMULATIVE INFLUENT VOLUME
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

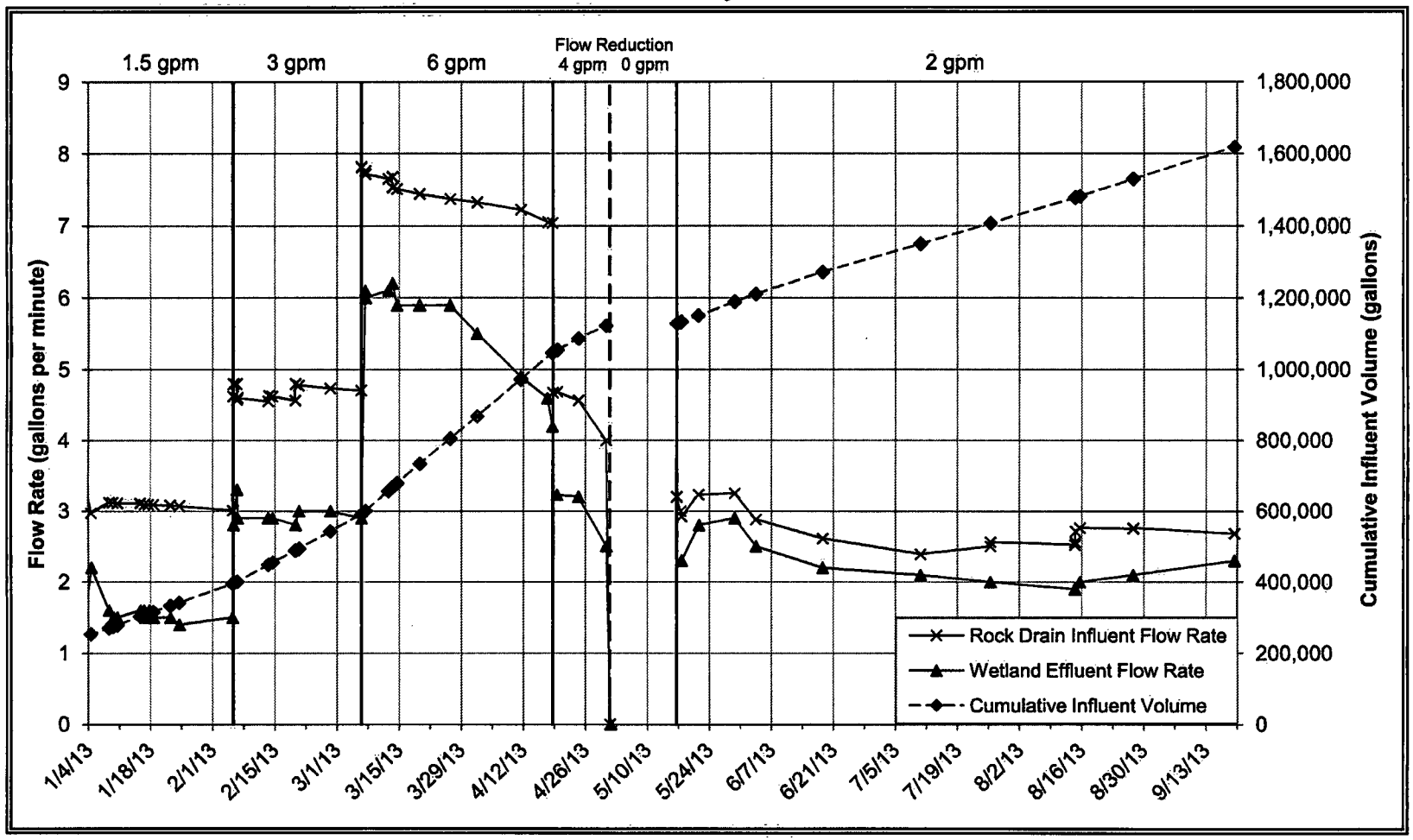

FIGURE 6
MONITORING PORT WATER ELEVATIONS
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

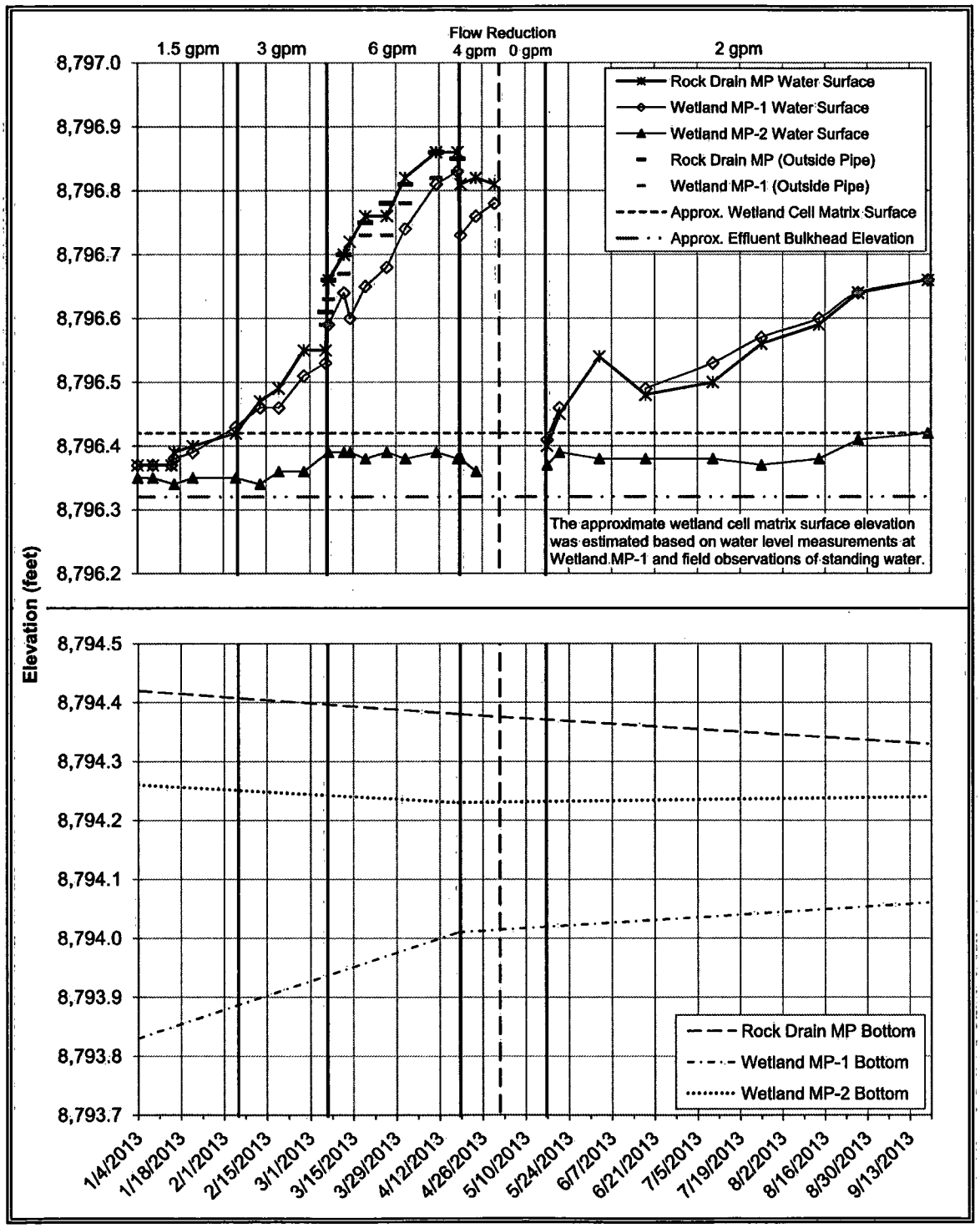

FIGURE 7
APPARENT HYDRAULIC CONDUCTIVITY OF WETLAND CELL MEDIA
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

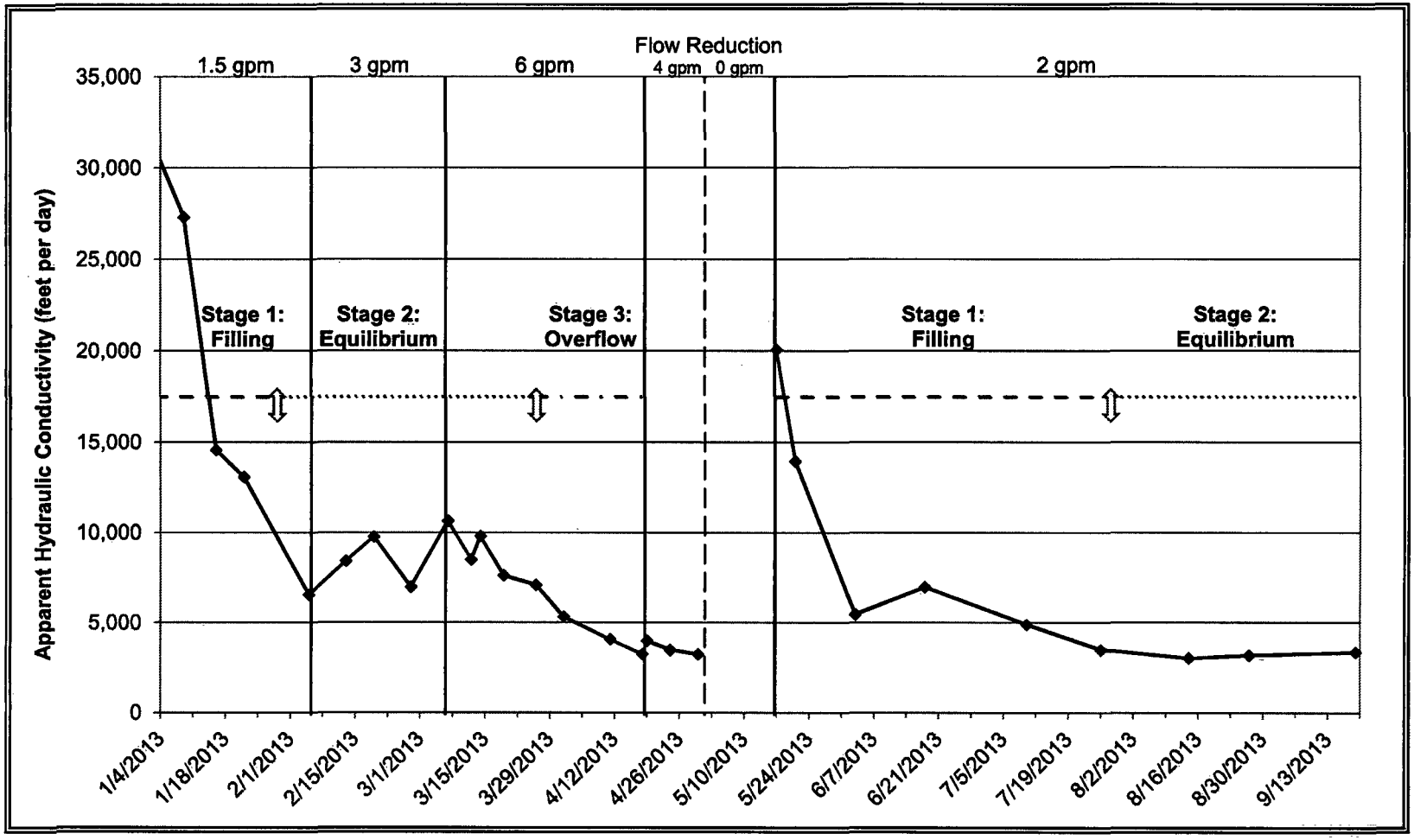

FIGURE 8
WATER QUALITY PARAMETERS: ROCK DRAIN INLET FLOW CONTROL BOX
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT-SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

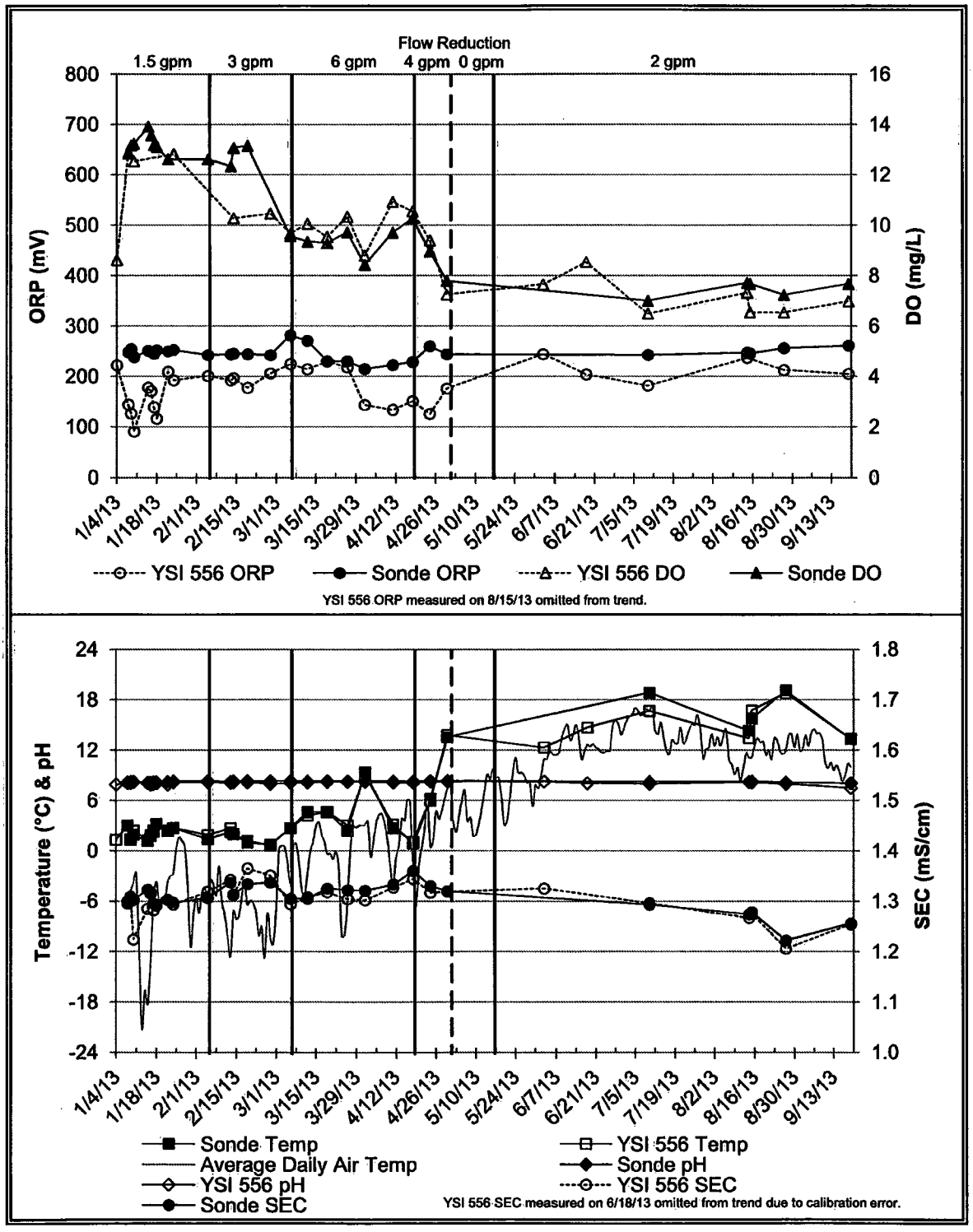

FIGURE 9
WATER QUALITY PARAMETERS: ROCK DRAIN MONITORING PORT
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT-SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

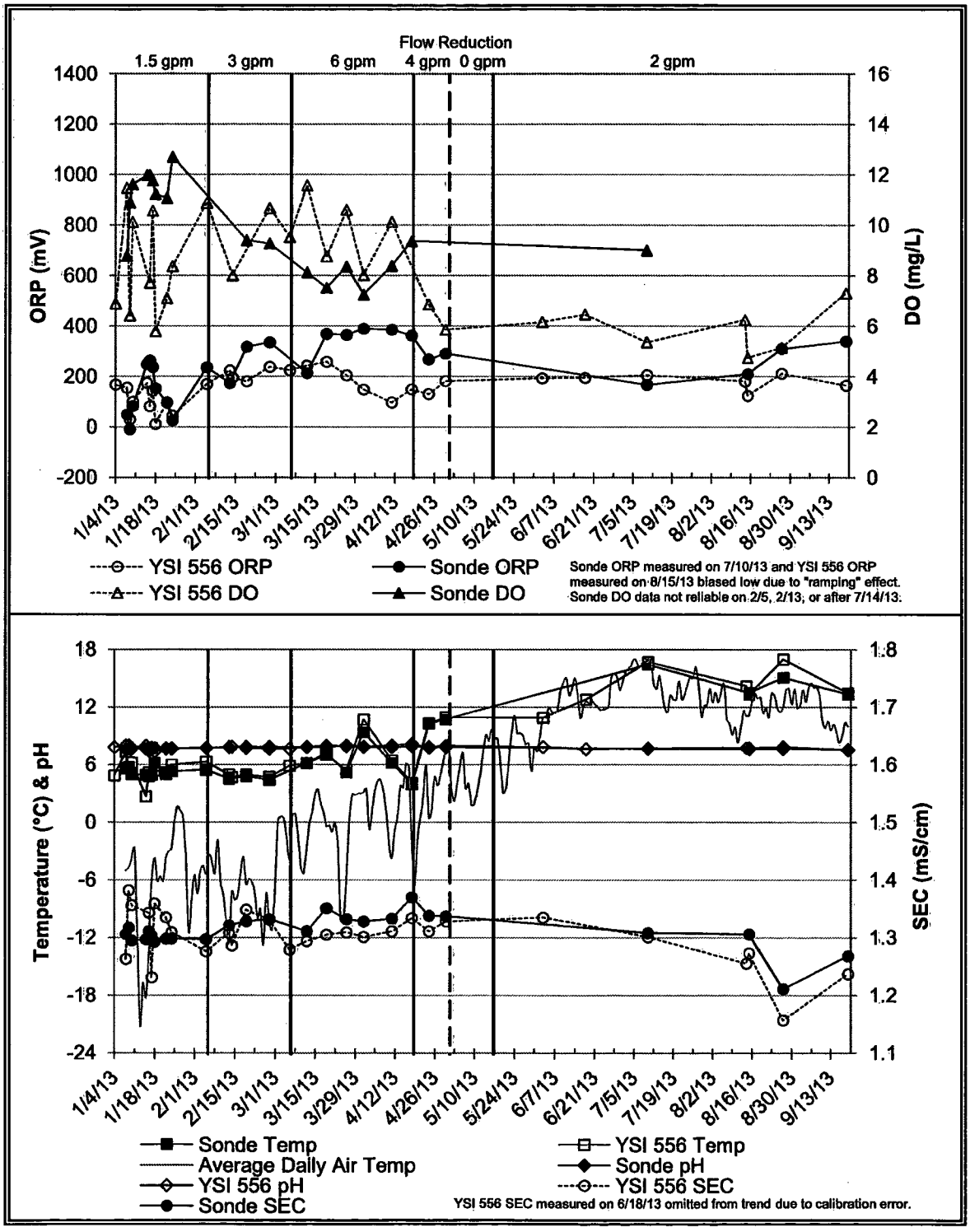

FIGURE 10
WATER QUALITY PARAMETERS: WETLAND MONITORING PORT 1
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT-SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

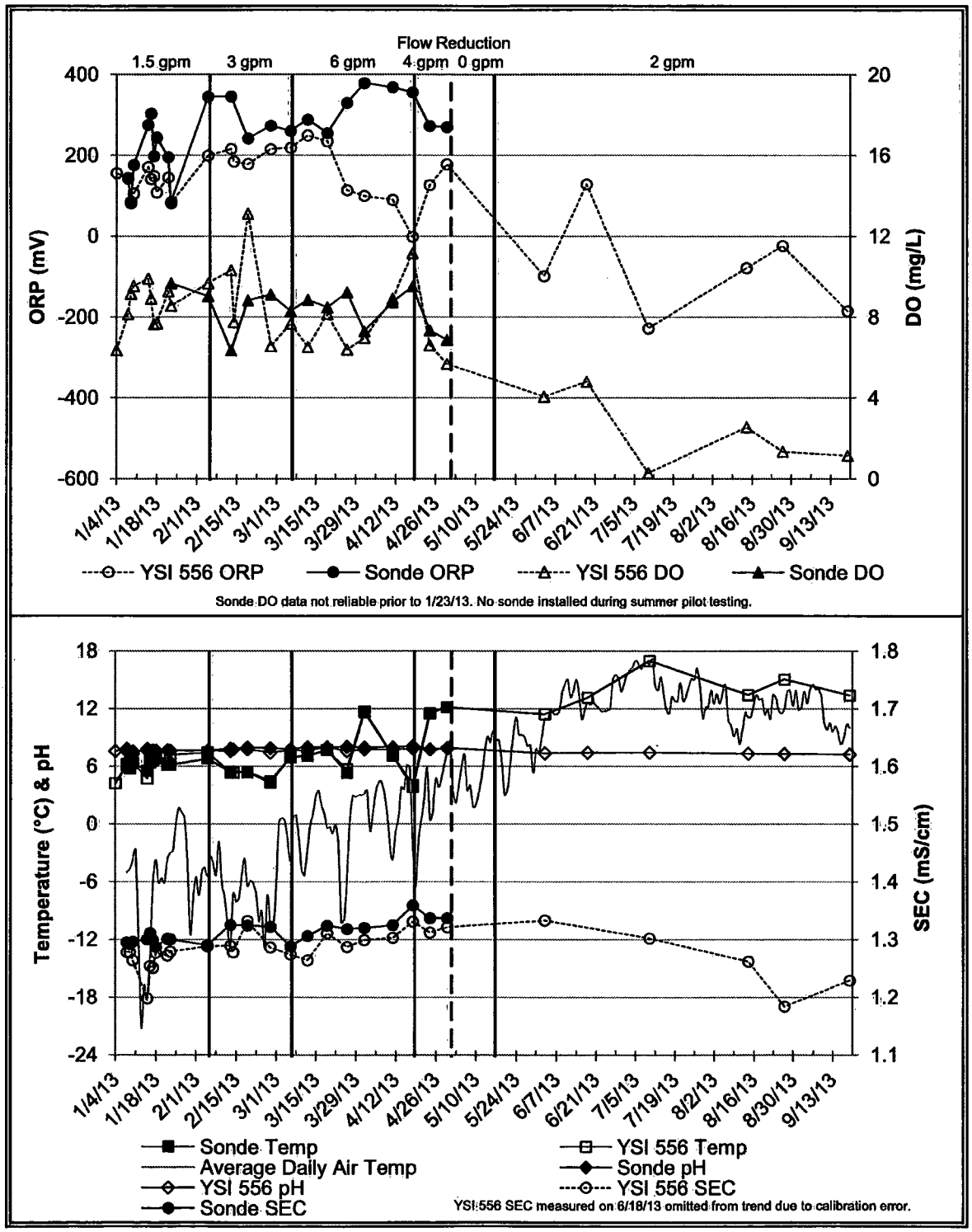

FIGURE 11
WATER QUALITY PARAMETERS: WETLAND MONITORING PORT 2
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT-SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

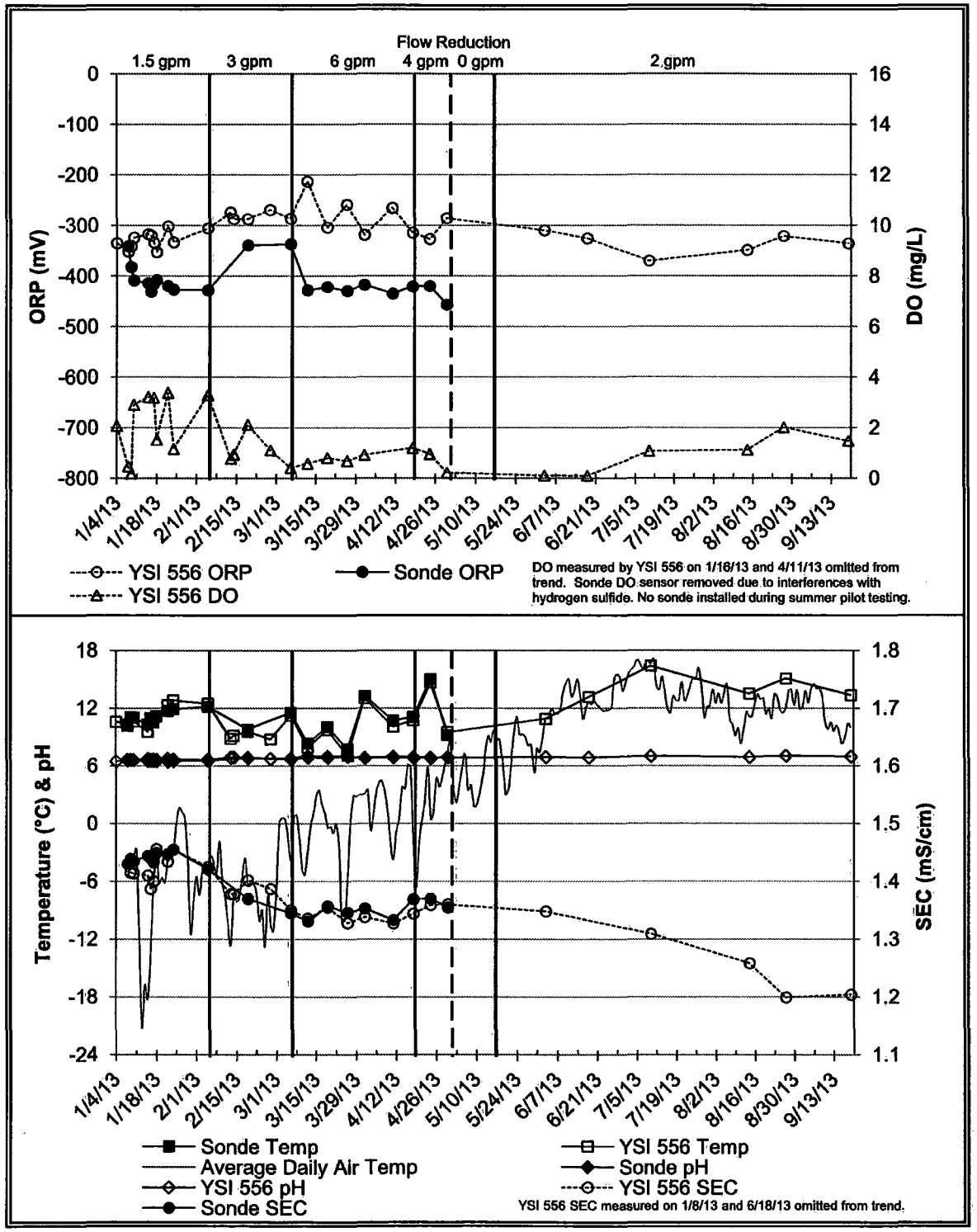

FIGURE 12
WATER QUALITY PARAMETERS: WETLAND OUTLET
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT-SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

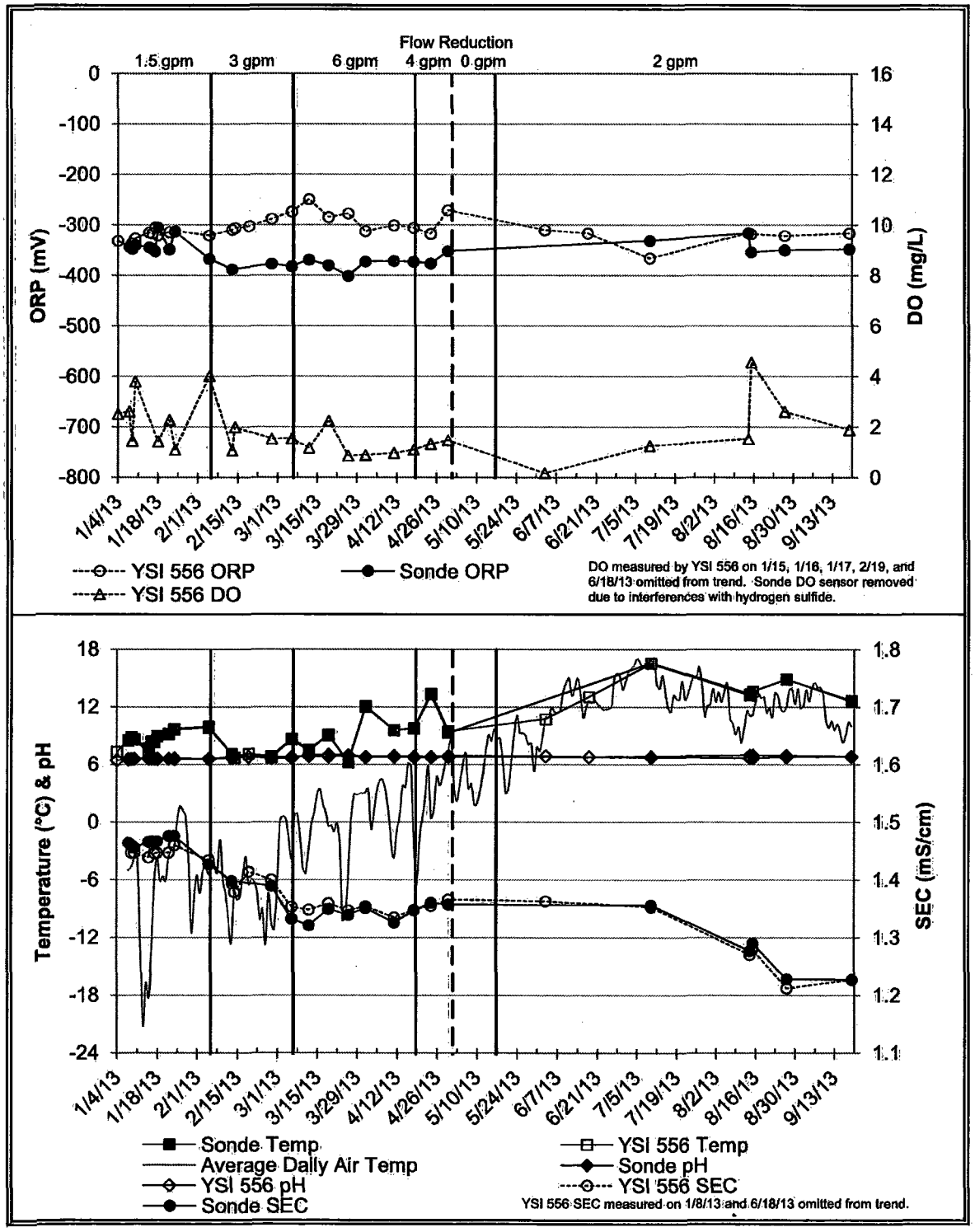

FIGURE 13
WATER QUALITY PARAMETERS: AVERAGE TEMPERATURE and SEC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

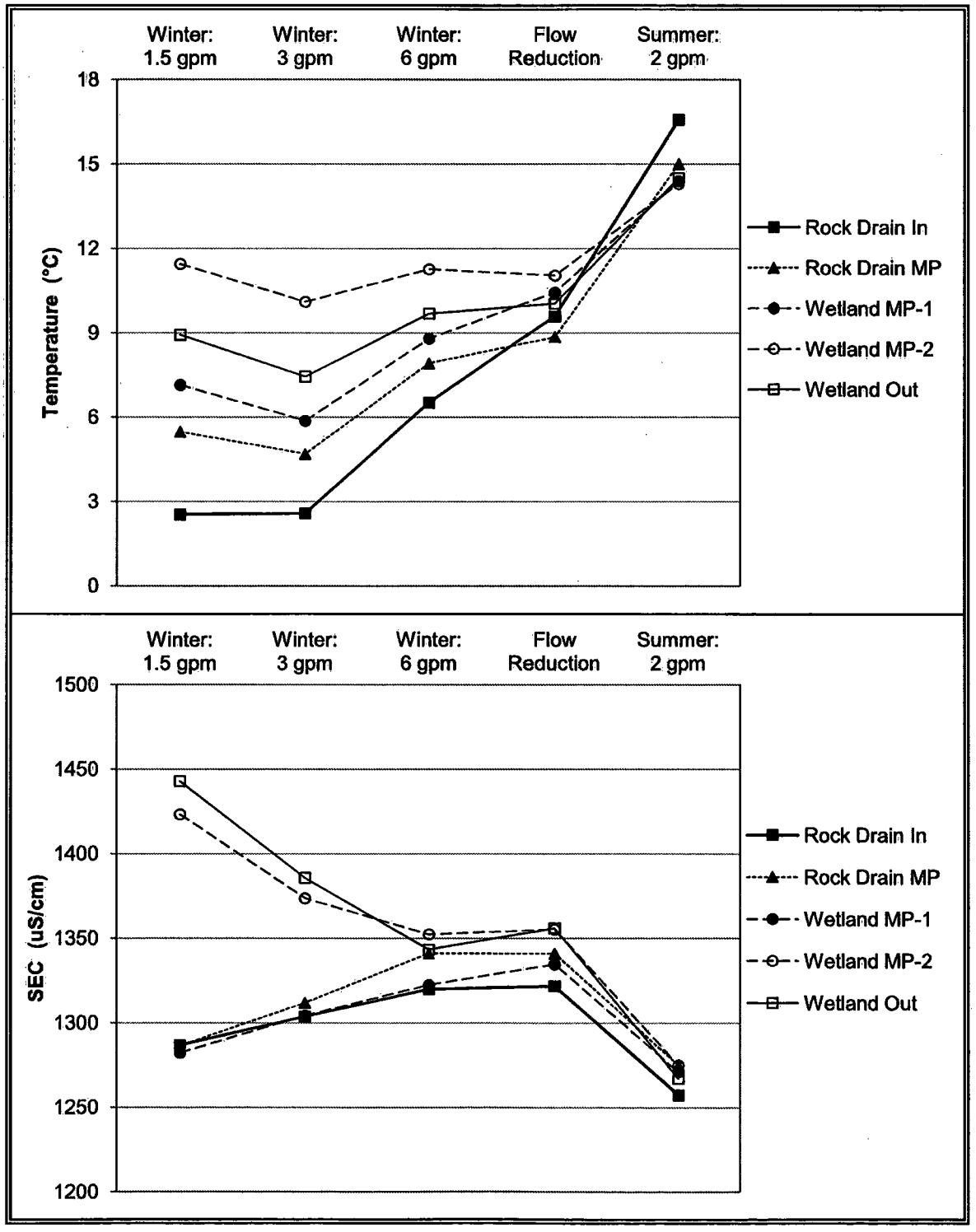

FIGURE 14
WATER QUALITY PARAMETERS: AVERAGE DO and ORP
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

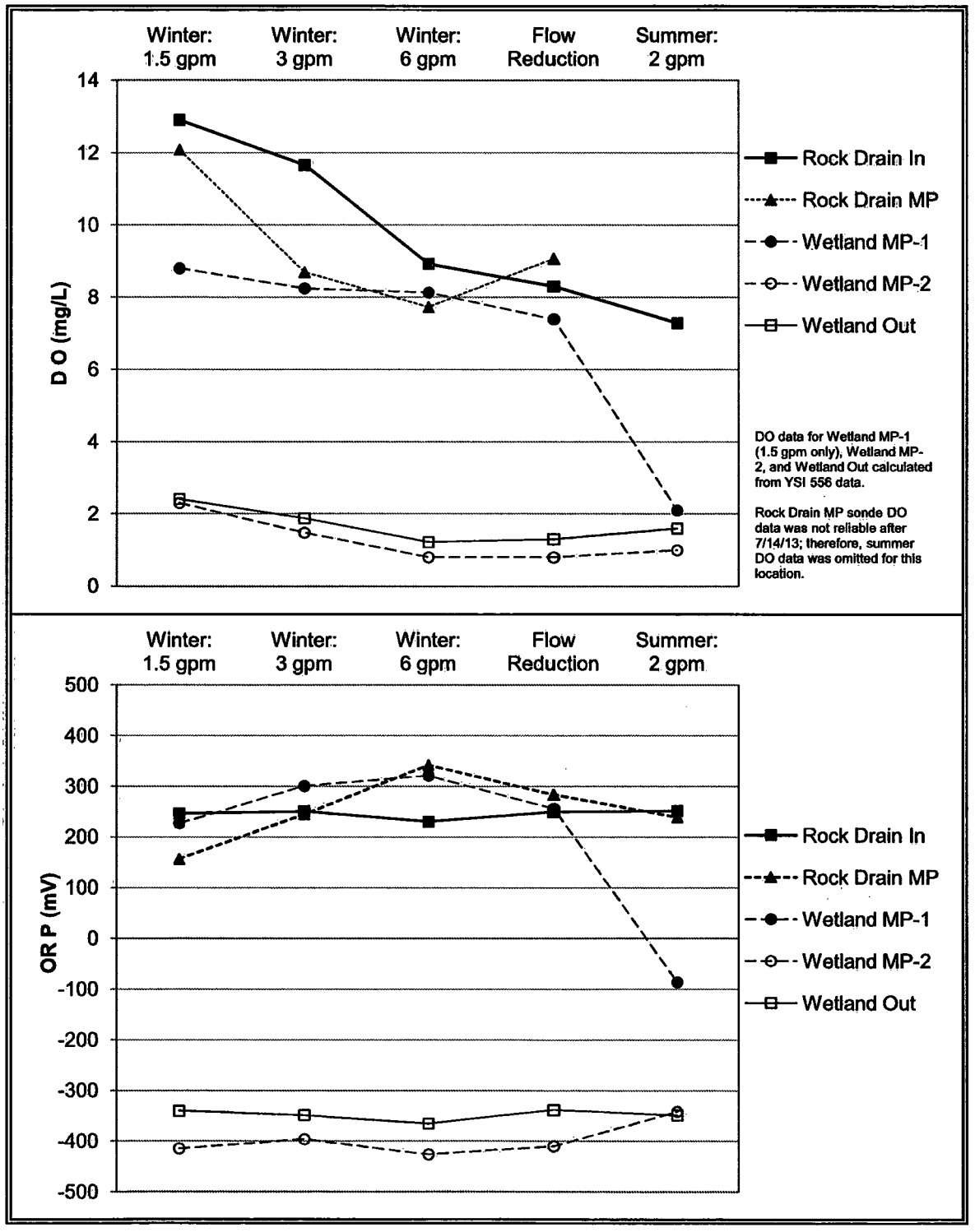

FIGURE 15
WATER QUALITY PARAMETERS: AVERAGE pH
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

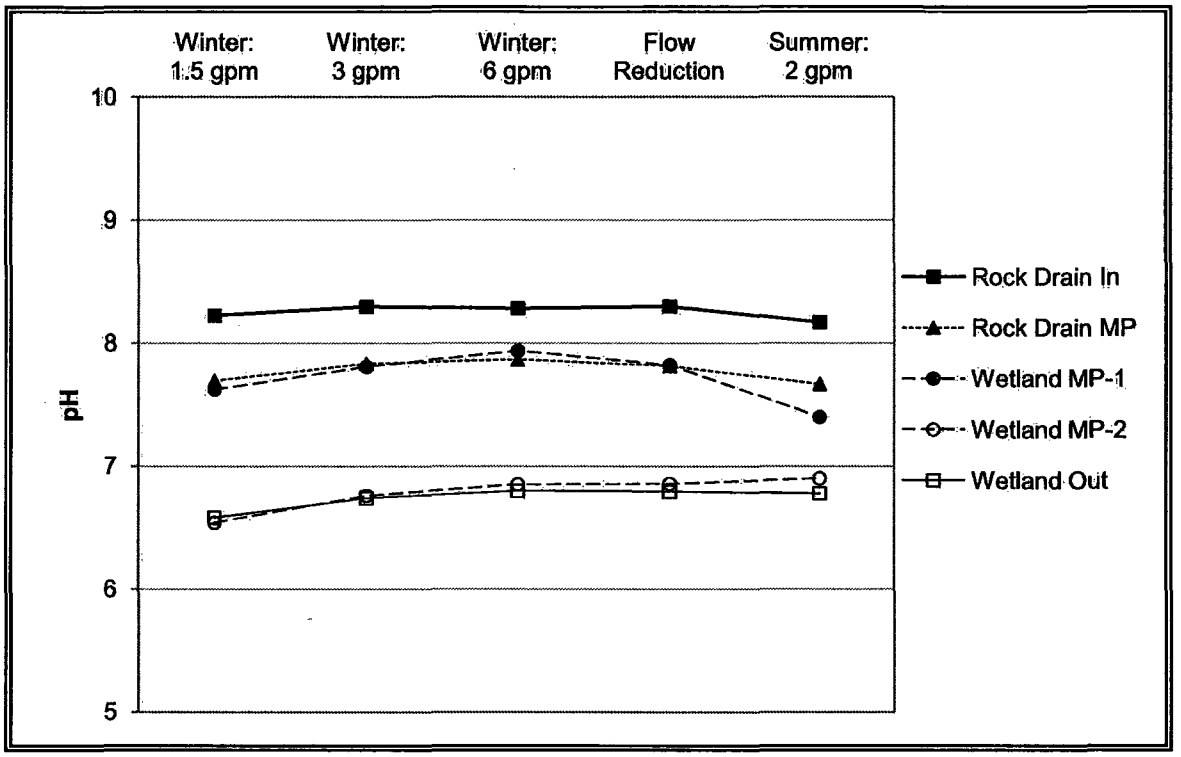

FIGURE 16
ST. LOUIS POND SYSTEM pH: 2010-2013
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

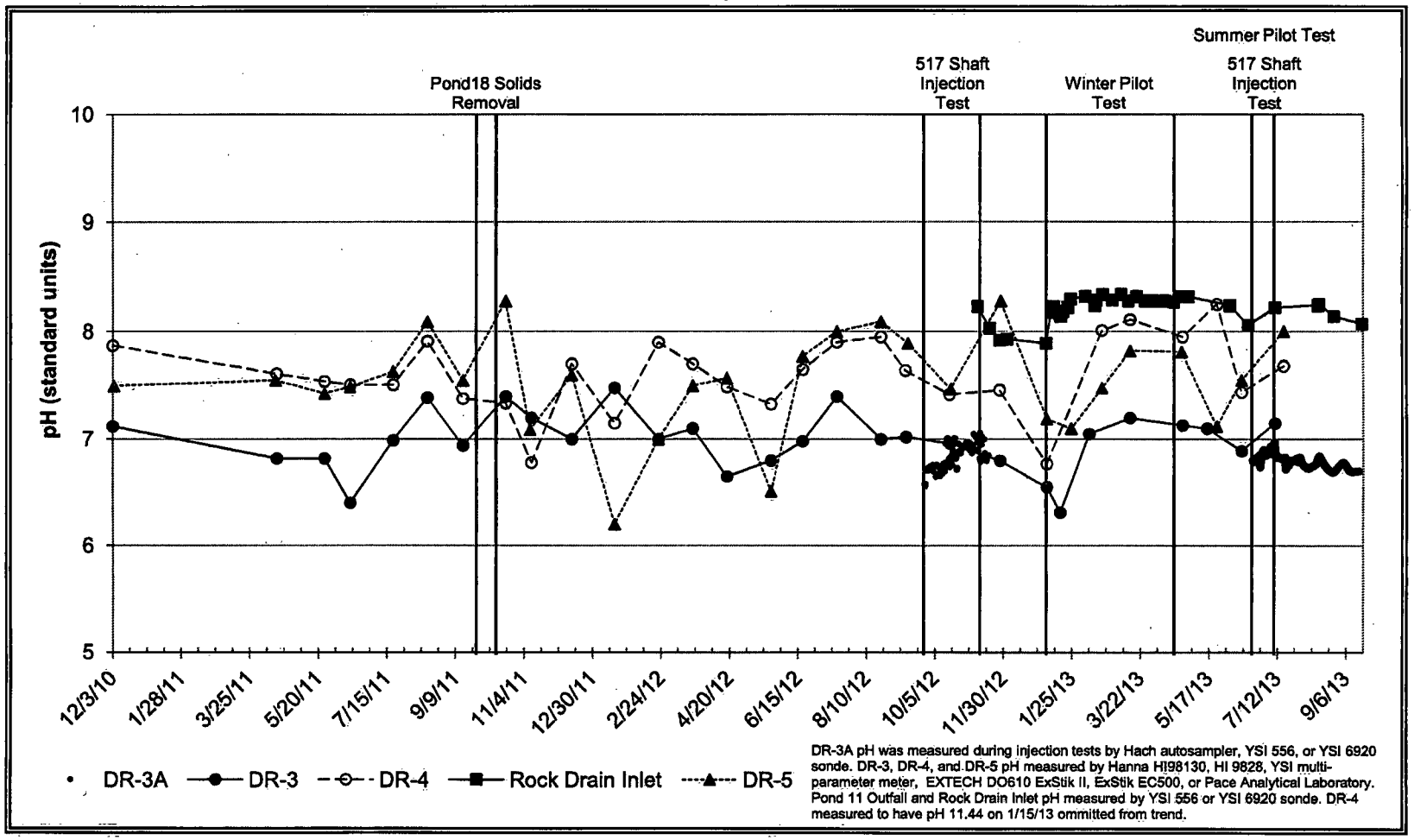

FIGURE 17
MATRIX TEMPERATURE DATA: ROCK DRAIN THERMISTER
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

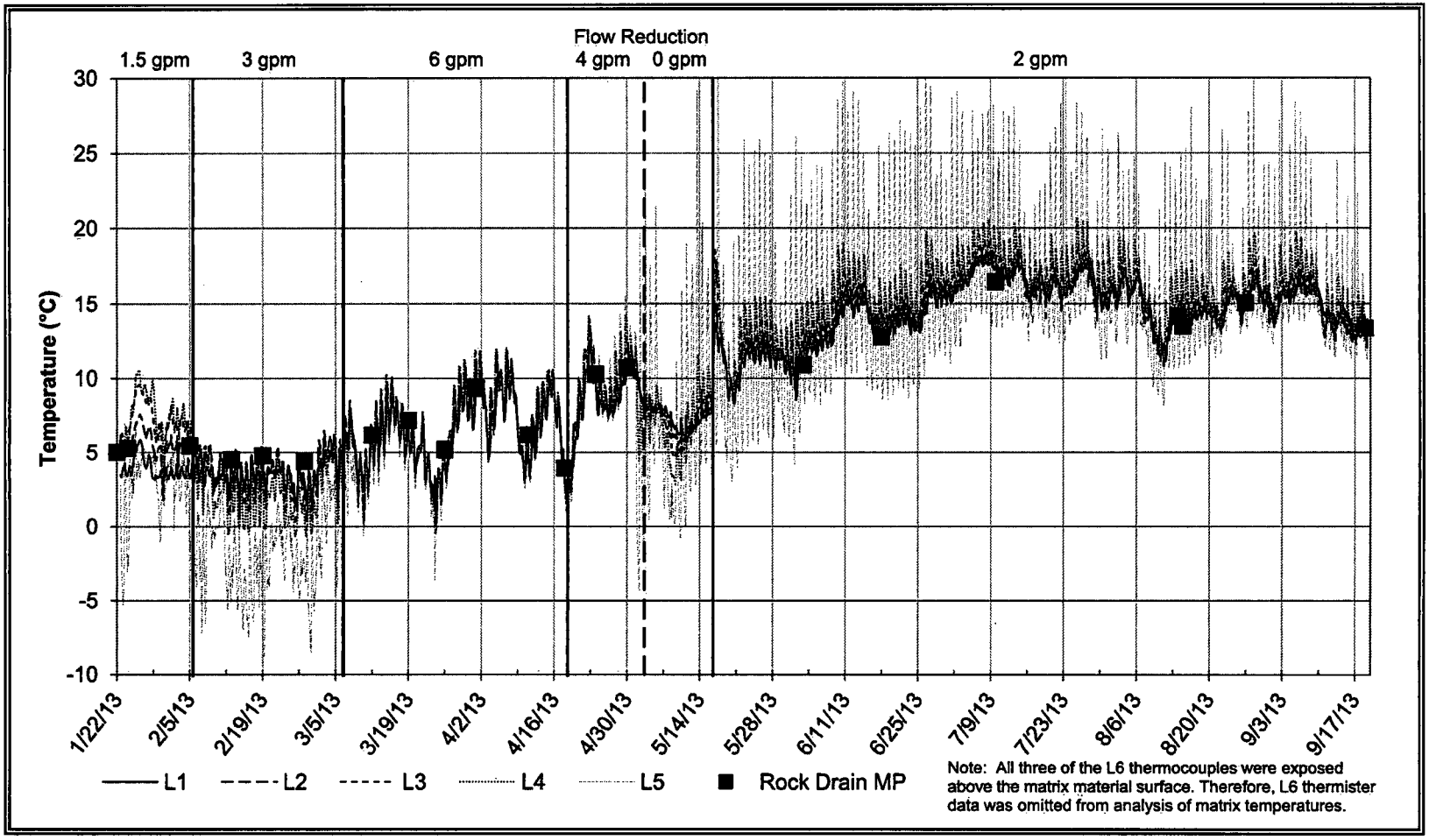

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FIGURE 18
MATRIX TEMPERATURE DATA: WETLAND NORTHERN THERMISTER
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

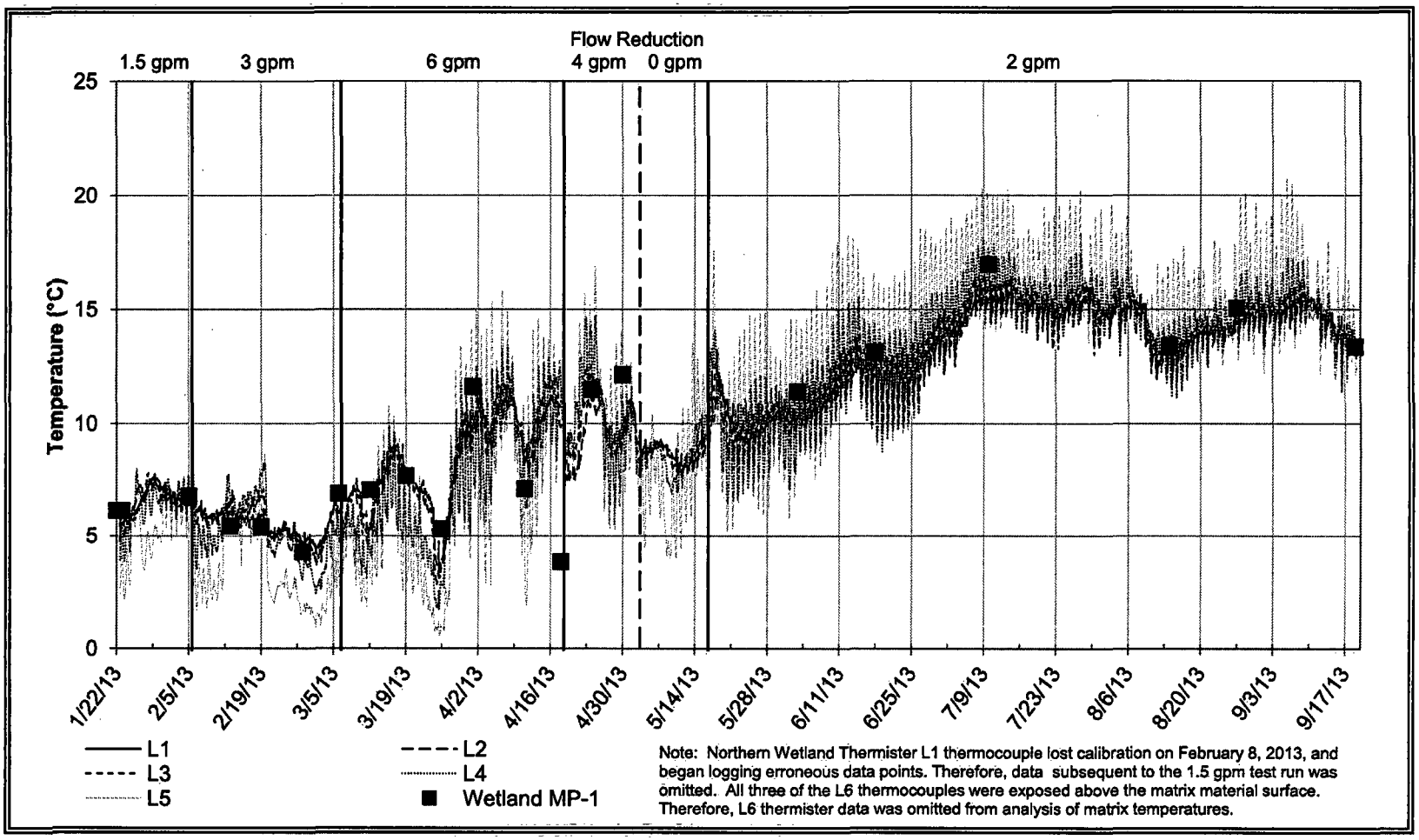

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FIGURE 19
MATRIX TEMPERATURE DATA: WETLAND SOUTHERN THERMISTER
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

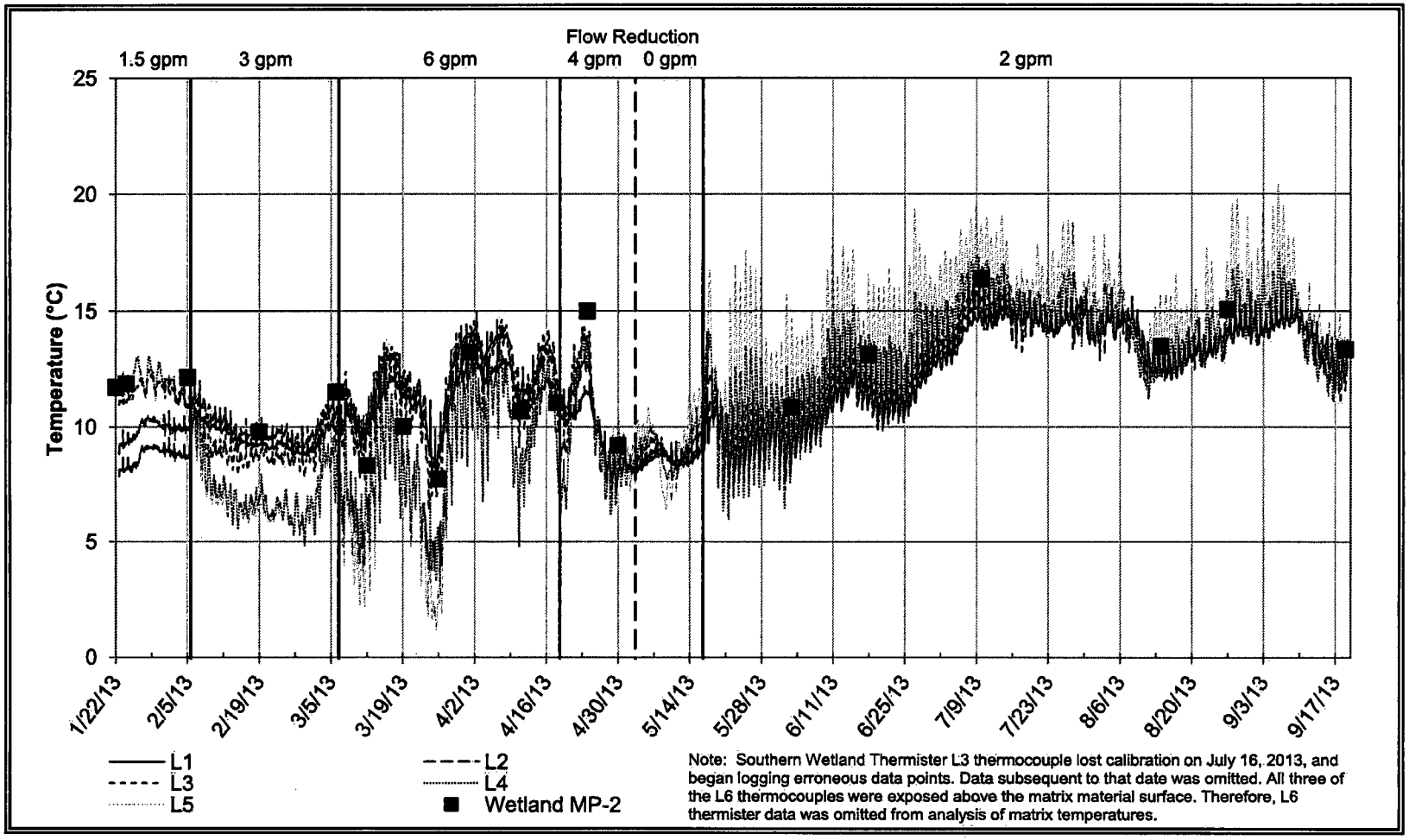

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FIGURE 20
LABORATORY ANALYTICAL RESULTS: 5-DAY BOD and TOC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

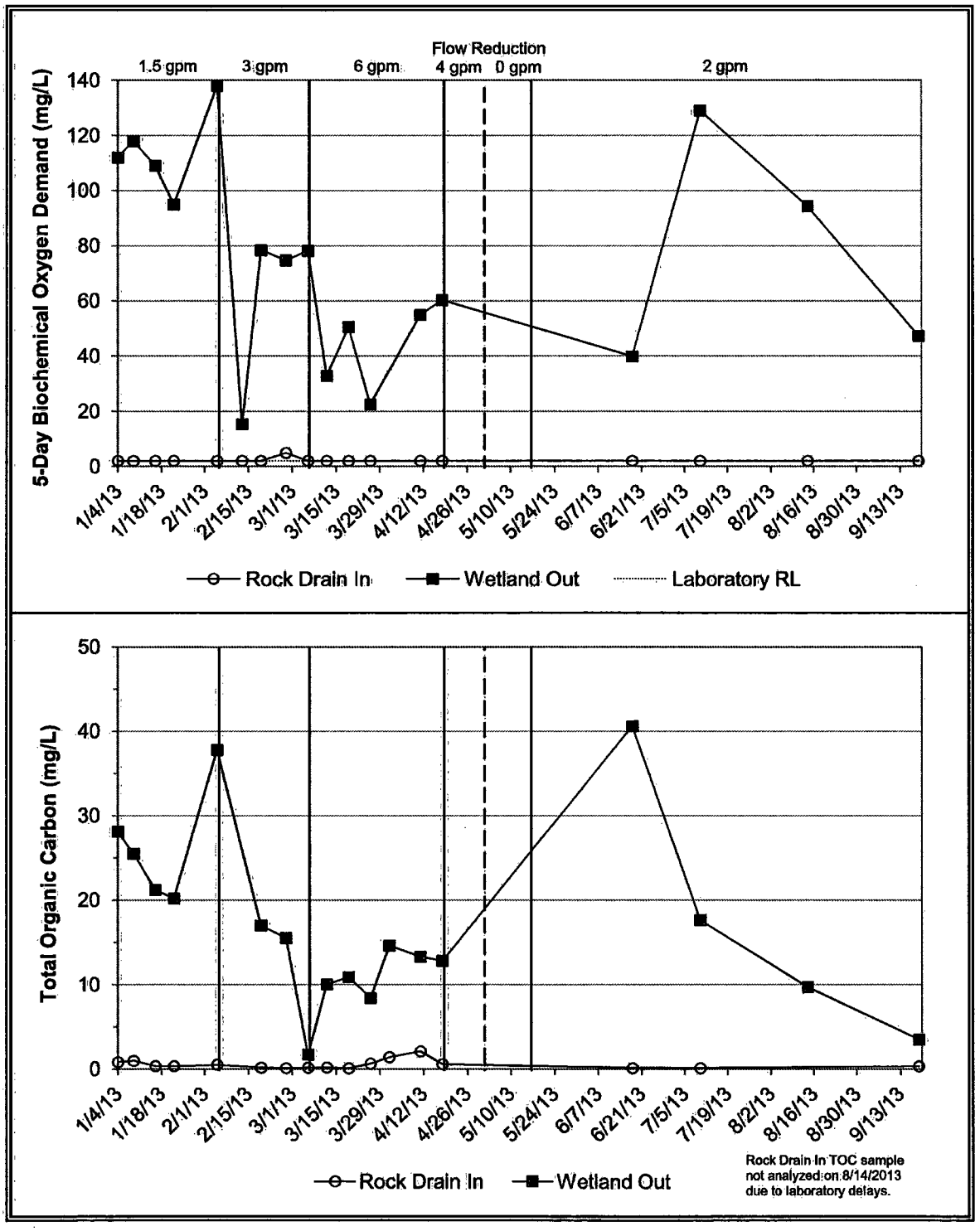


FIGURE 21
LABORATORY ANALYTICAL RESULTS: SULFATE and SULFIDE
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

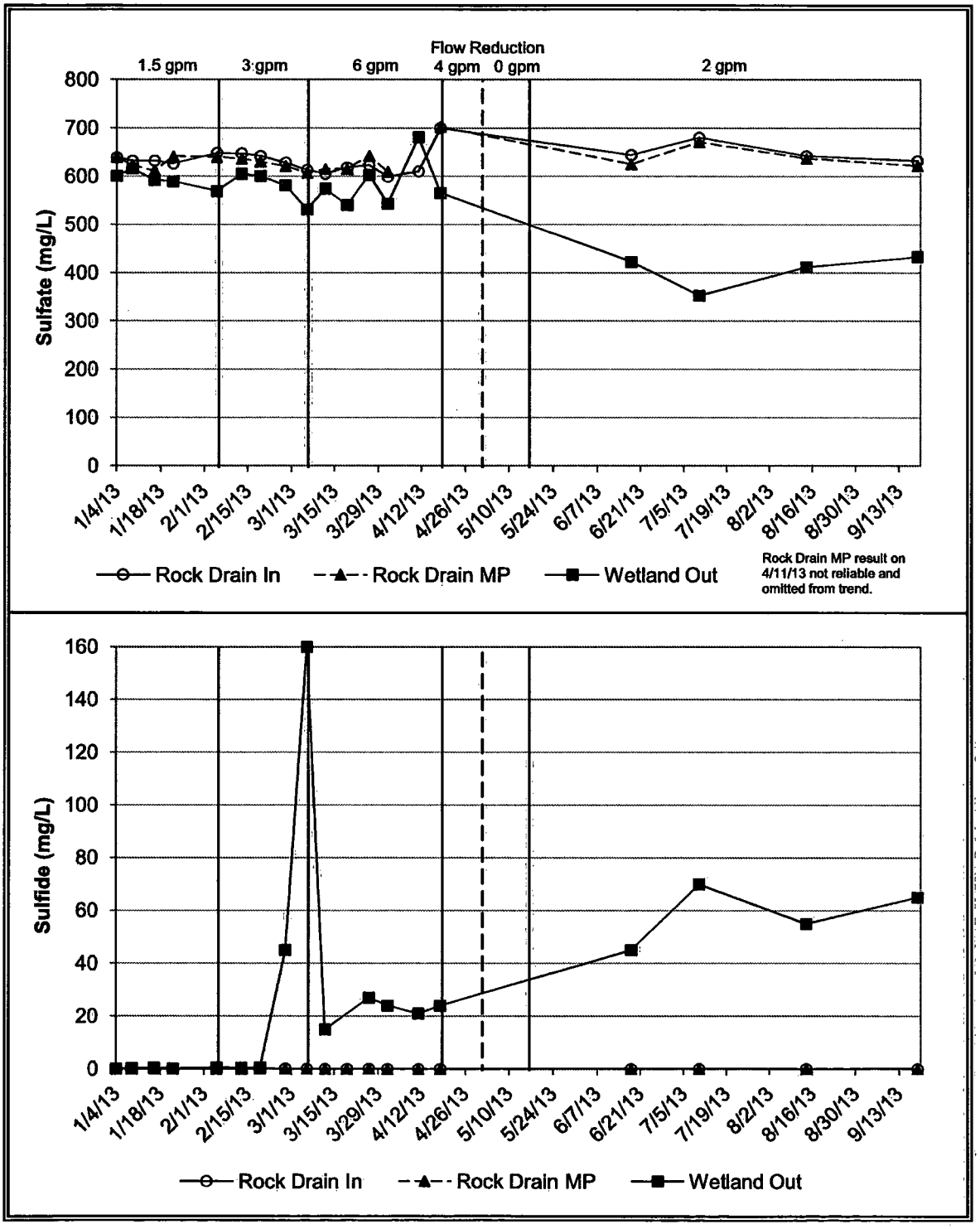


FIGURE 22
LABORATORY ANALYTICAL RESULTS: ARSENIC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

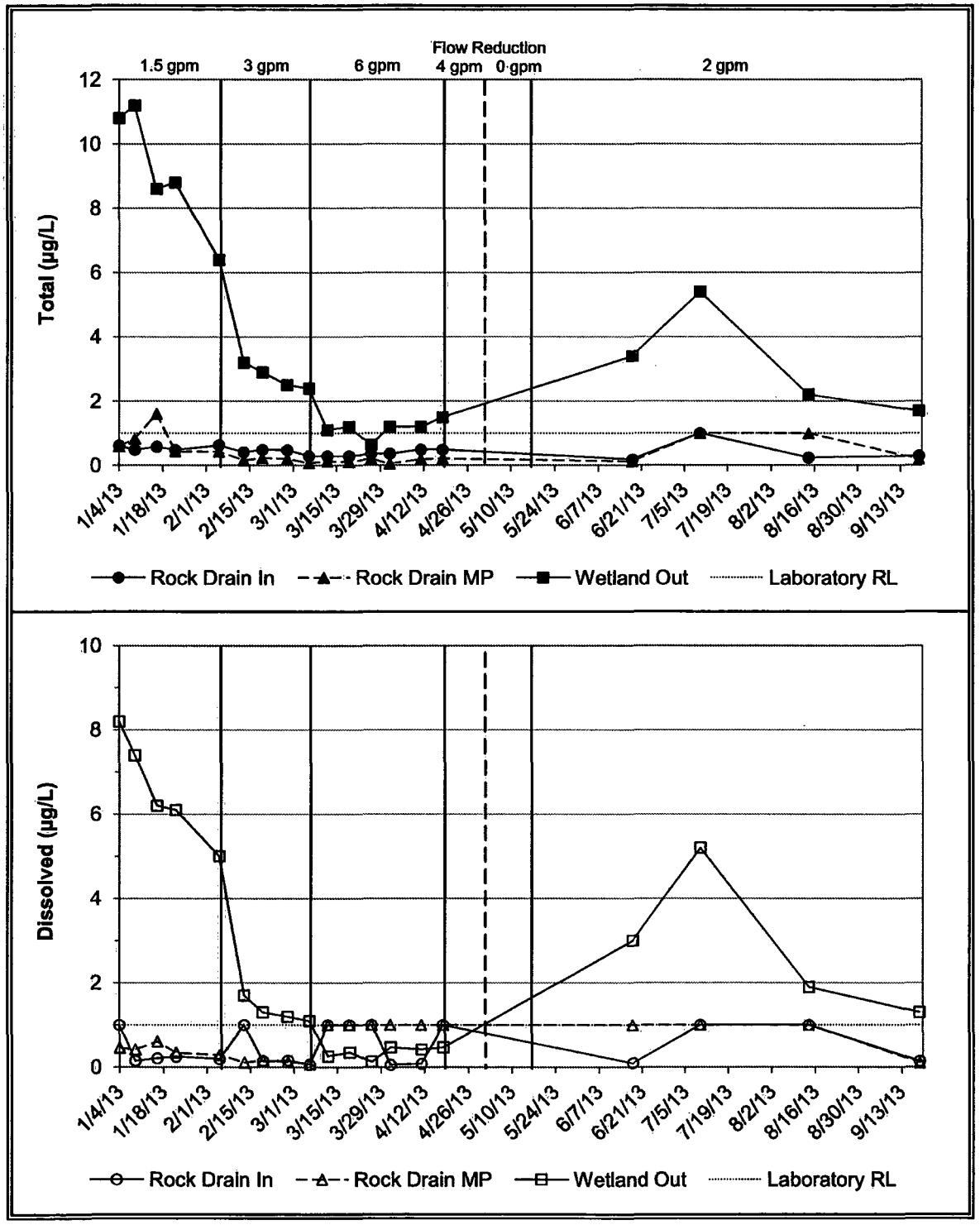


FIGURE 23
LABORATORY ANALYTICAL RESULTS: IRON
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

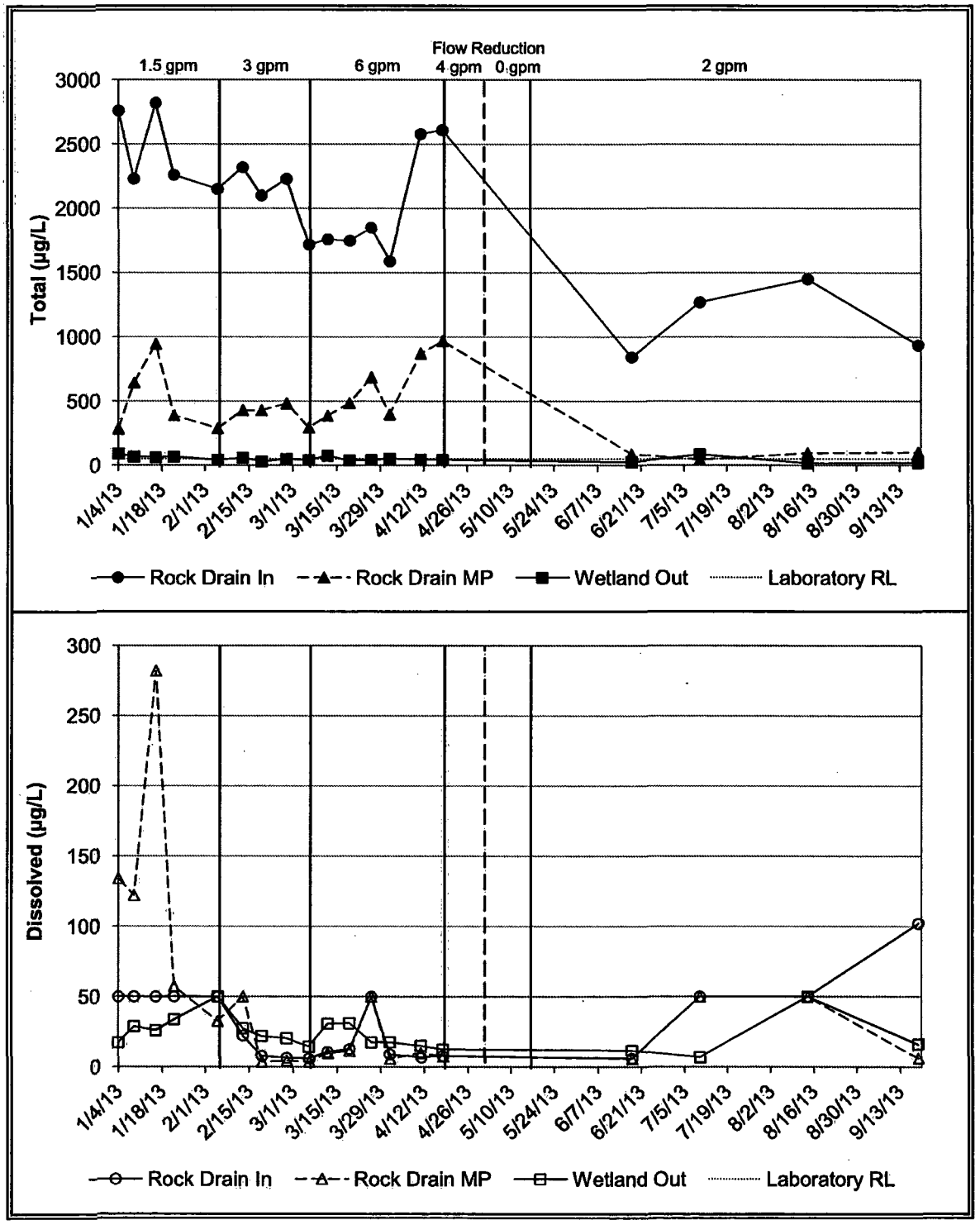


FIGURE 24
LABORATORY ANALYTICAL RESULTS: MANGANESE
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

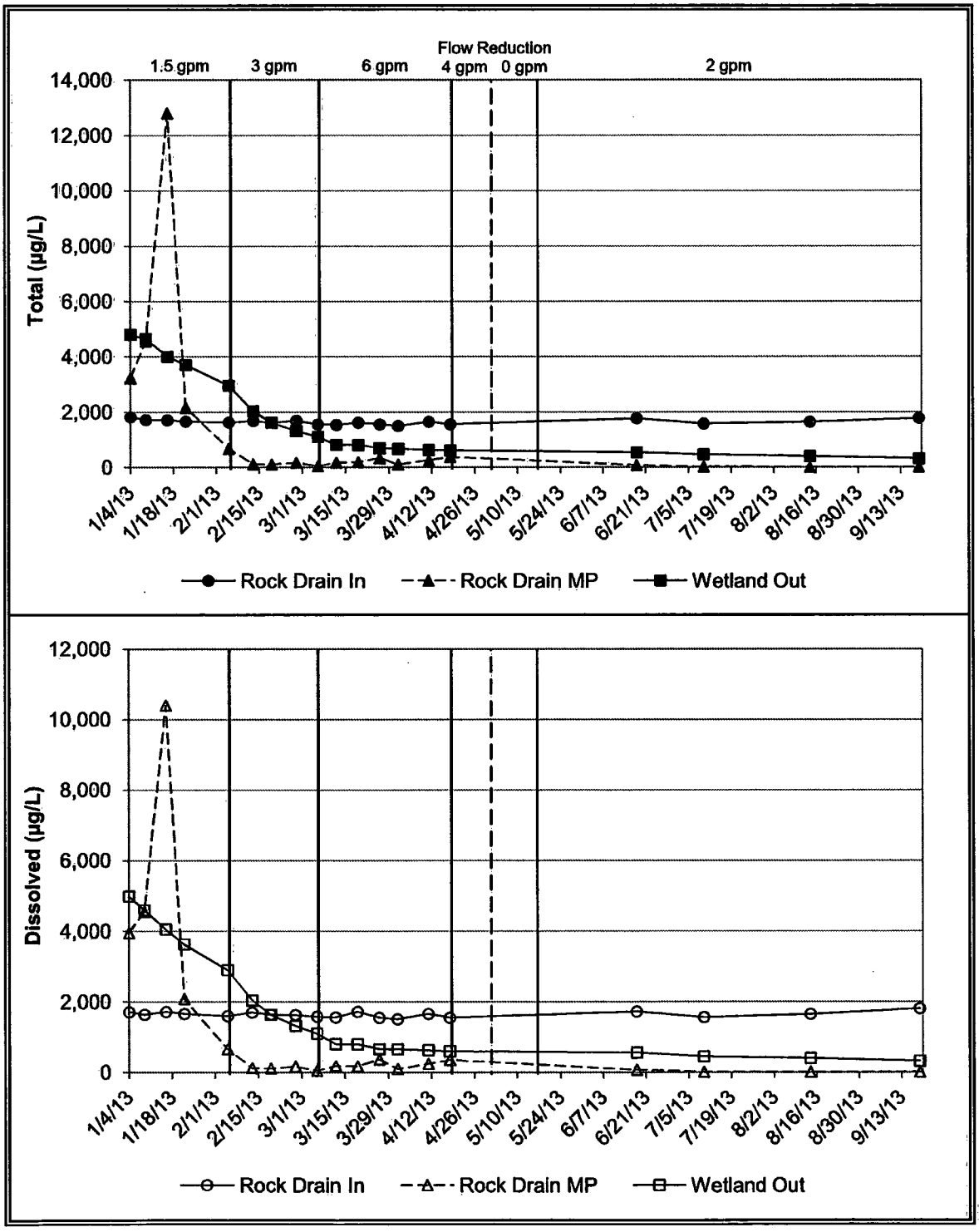


FIGURE 25
LABORATORY ANALYTICAL RESULTS: CADMIUM
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

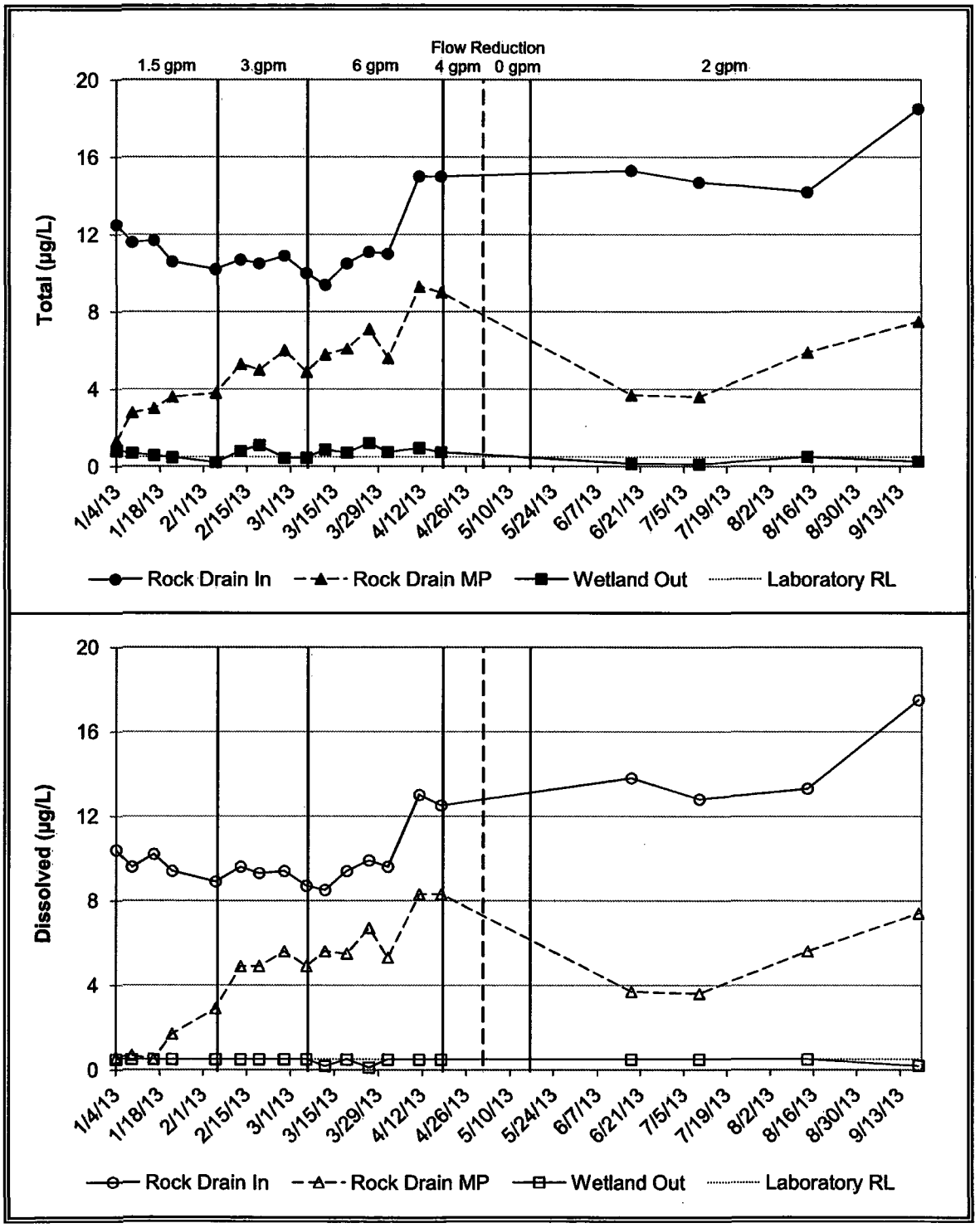


FIGURE 26
LABORATORY ANALYTICAL RESULTS: ZINC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

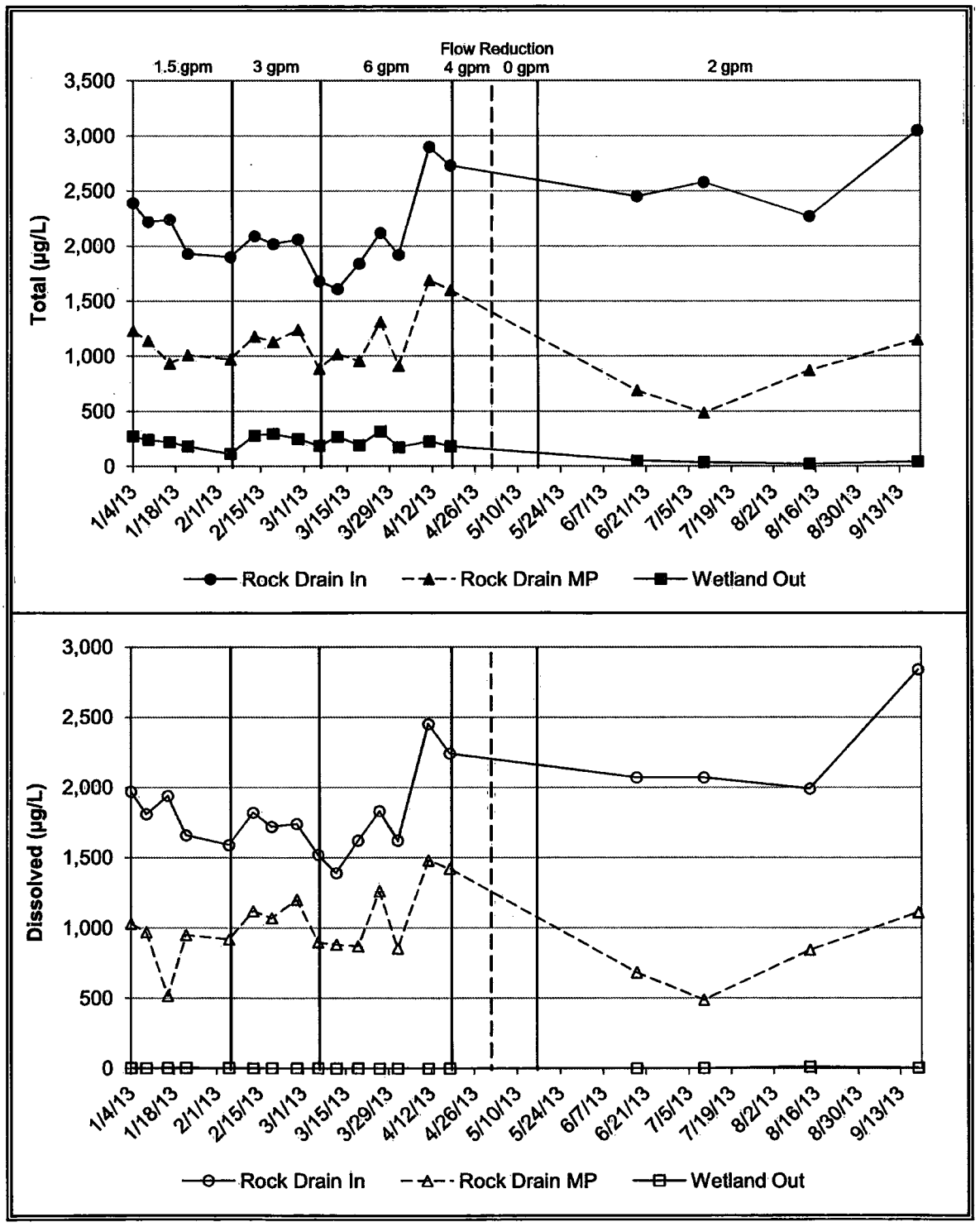


FIGURE 27
MASS REMOVAL RATES: IRON
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

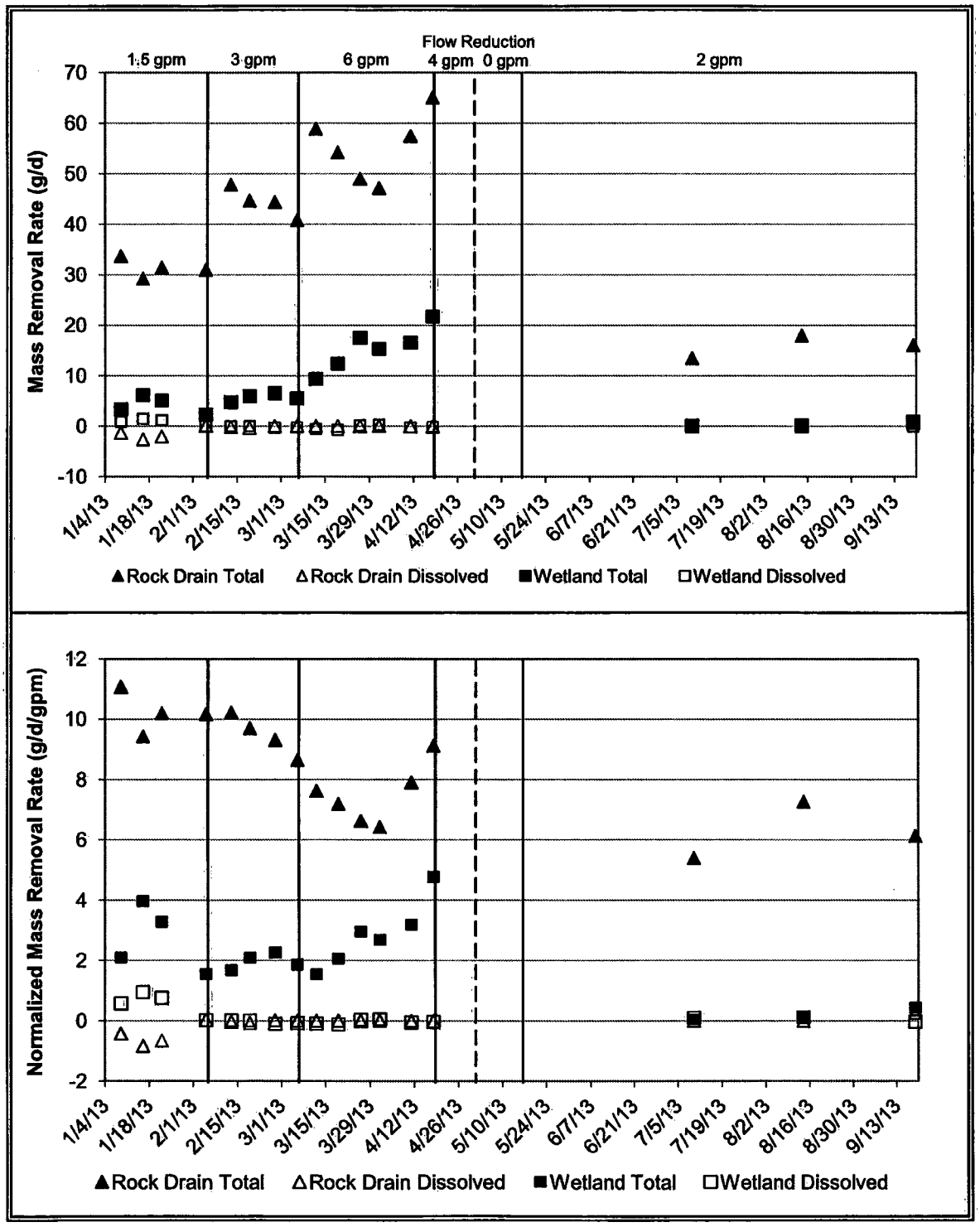


FIGURE 28
MASS REMOVAL RATES: MANGANESE
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

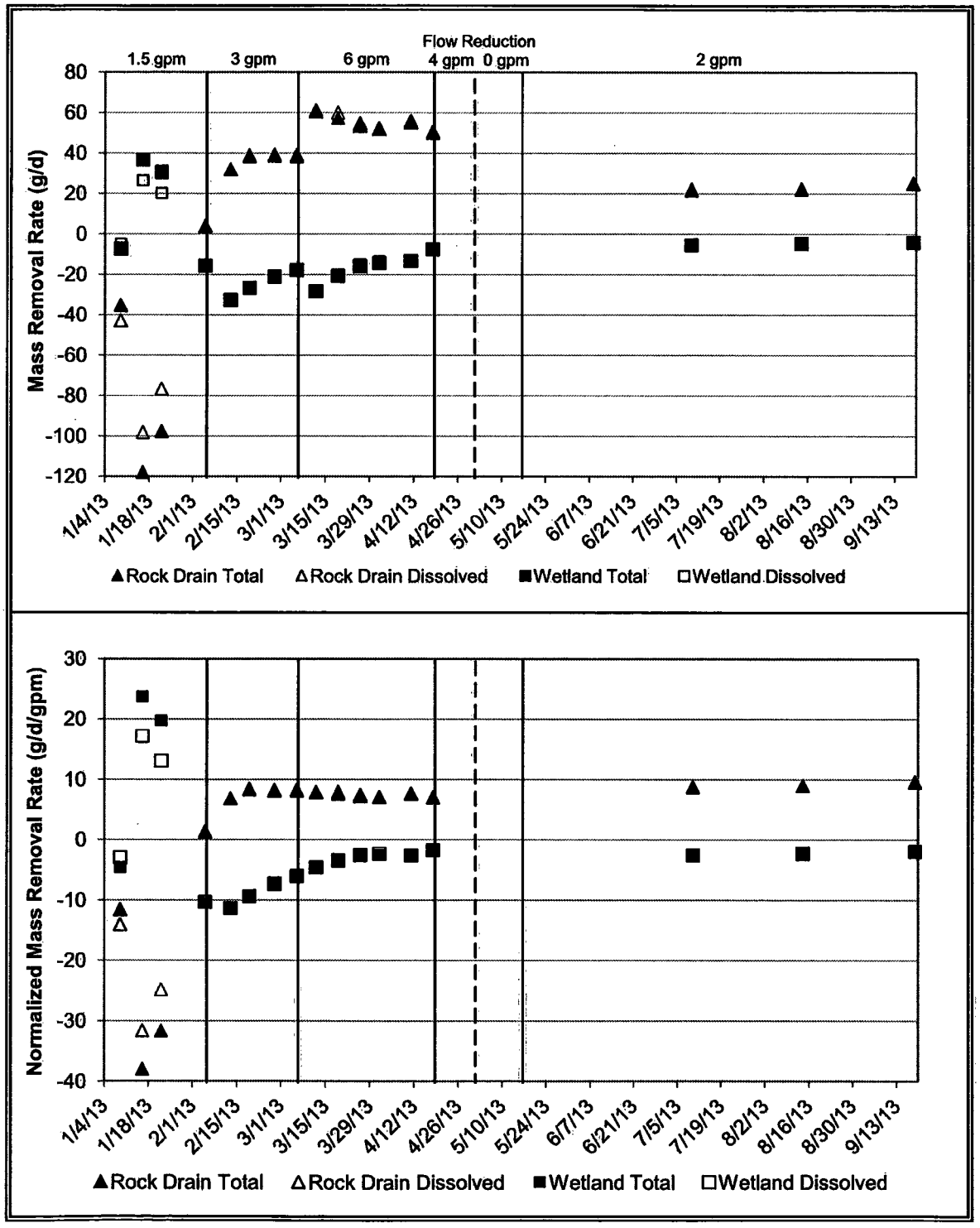


FIGURE 29
MASS REMOVAL RATES: CADMIUM
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

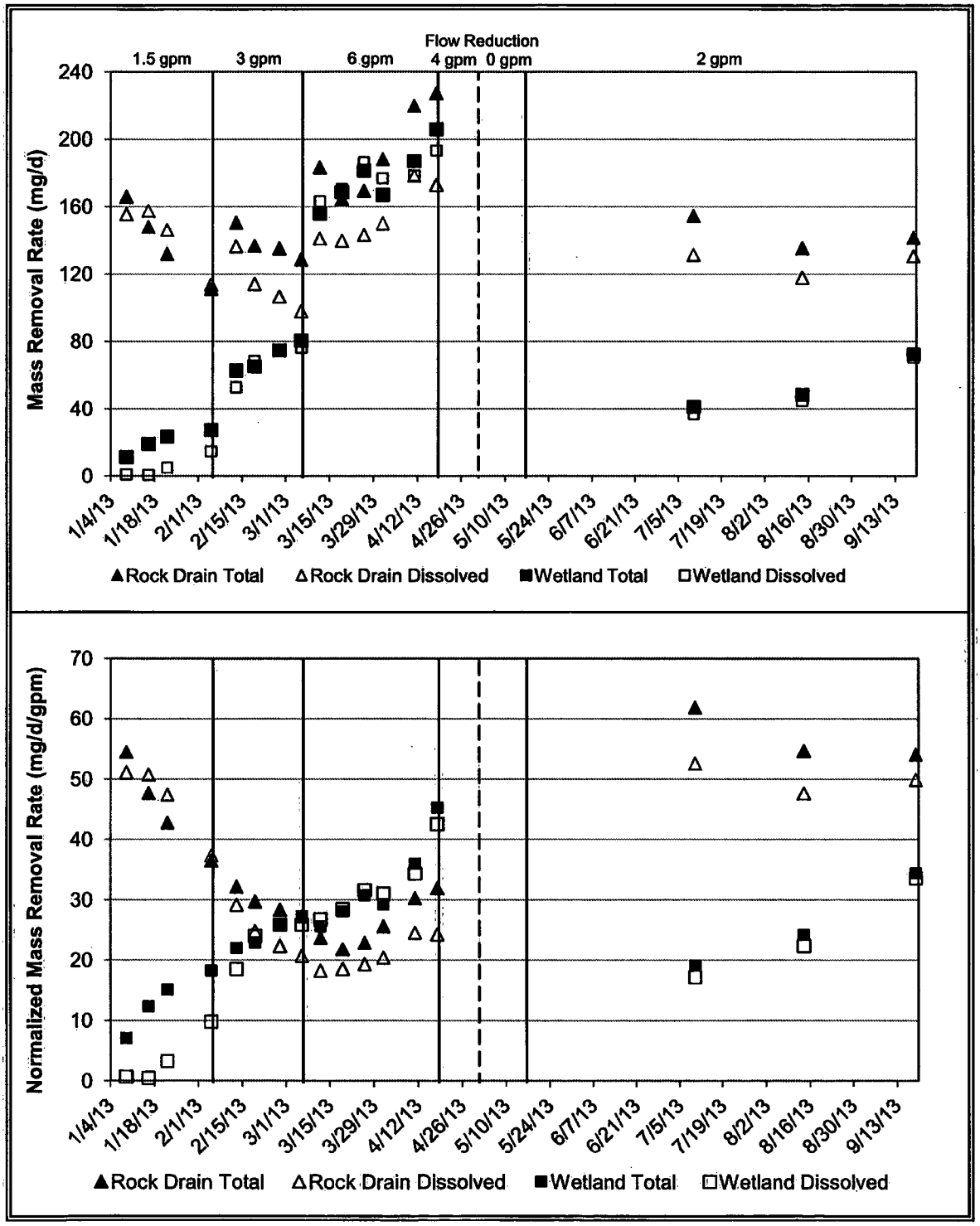


FIGURE 30
MASS REMOVAL RATES: ZINC
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

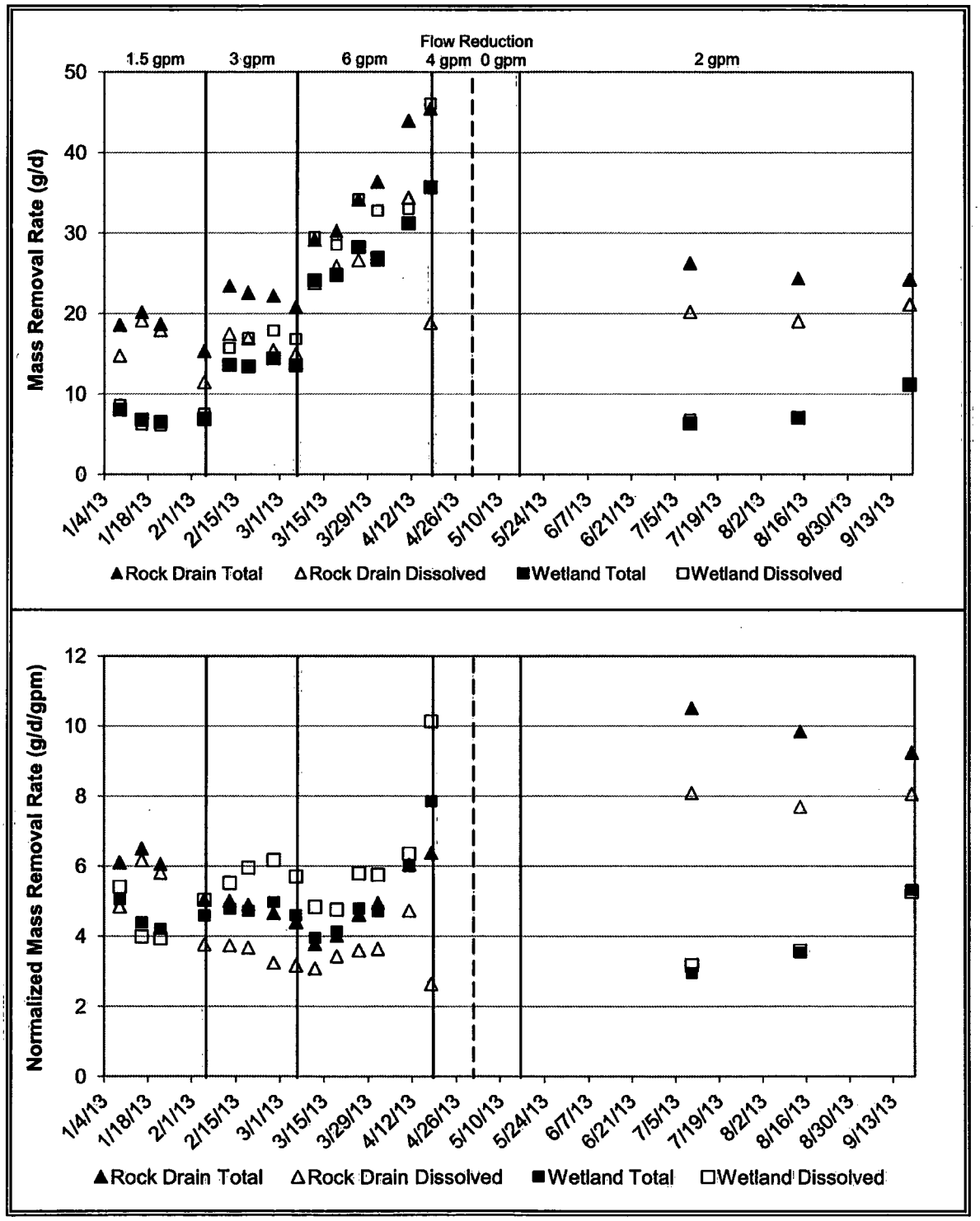
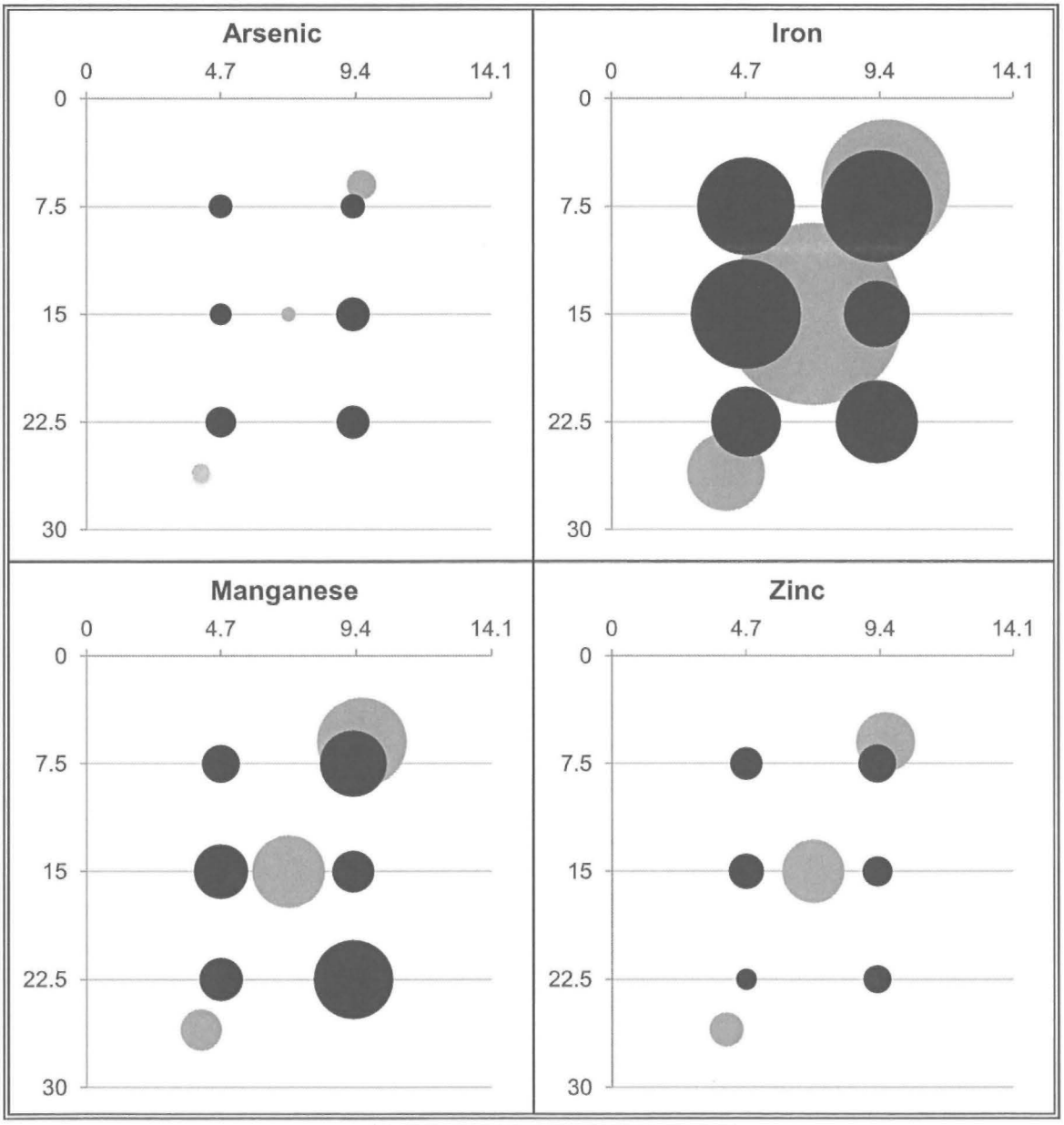


FIGURE 31
LABORATORY ANALYTICAL RESULTS: ROCK DRAIN MATRIX
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT

Rico-Argentine Mine Site
Dolores County, Colorado

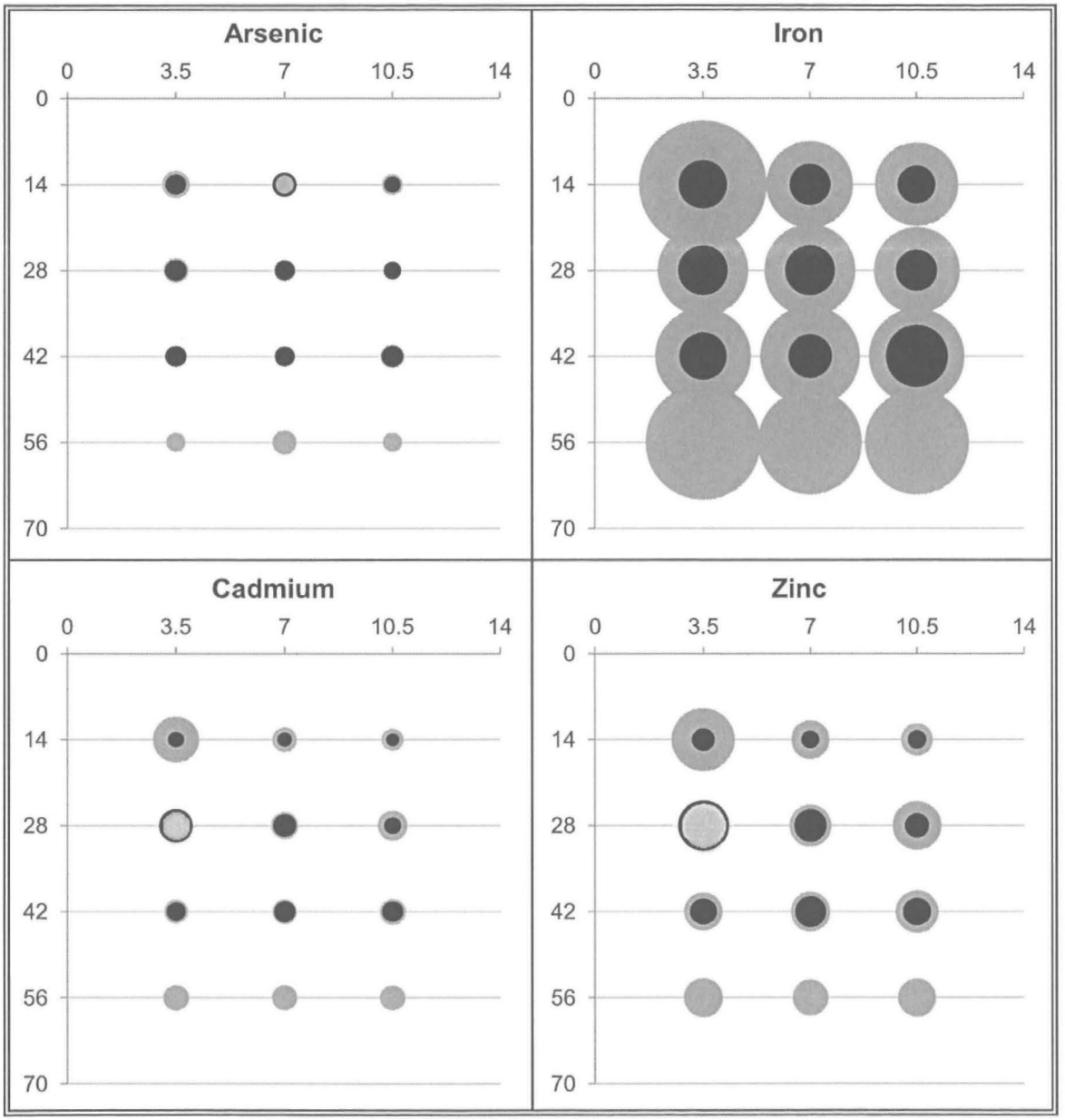


Notes:

1. Plots indicate metals concentrations across the rock drain, with axes indicating feet from the northwest corner of the cell.
2. Larger circles indicate higher concentrations; smaller circles indicate lower concentrations.
3. Relative circle sizes compare relative concentrations between sampling events (December 2012 and May 2013) for each metal but not between different metals. Scaling between different metals is for conceptual purposes only.
4. May 2013 samples were collected from only three rock drain locations: northeast corner, center, and southwest corner.
5. All distances and sample locations are approximate.

FIGURE 32
LABORATORY ANALYTICAL RESULTS: WETLAND CELL MATRIX
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT

Rico-Argentine Mine Site
Dolores County, Colorado



Notes:

1. Plots indicate metals concentrations across the wetland cell, with axes indicating feet from the northwest corner of the cell.
2. Larger circles indicate higher concentrations; smaller circles indicate lower concentrations.
3. Relative circle sizes compare relative concentrations between sampling events (December 2012 and May 2013) for each metal but not between different metals. Scaling between different metals is for conceptual purposes only.
4. No samples were collected from the southernmost end of the wetland cell in December 2012.
5. All distances and sample locations are approximate.

FIGURE 33
TRACER STUDY NUMBER 1: FEBRUARY 2013
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

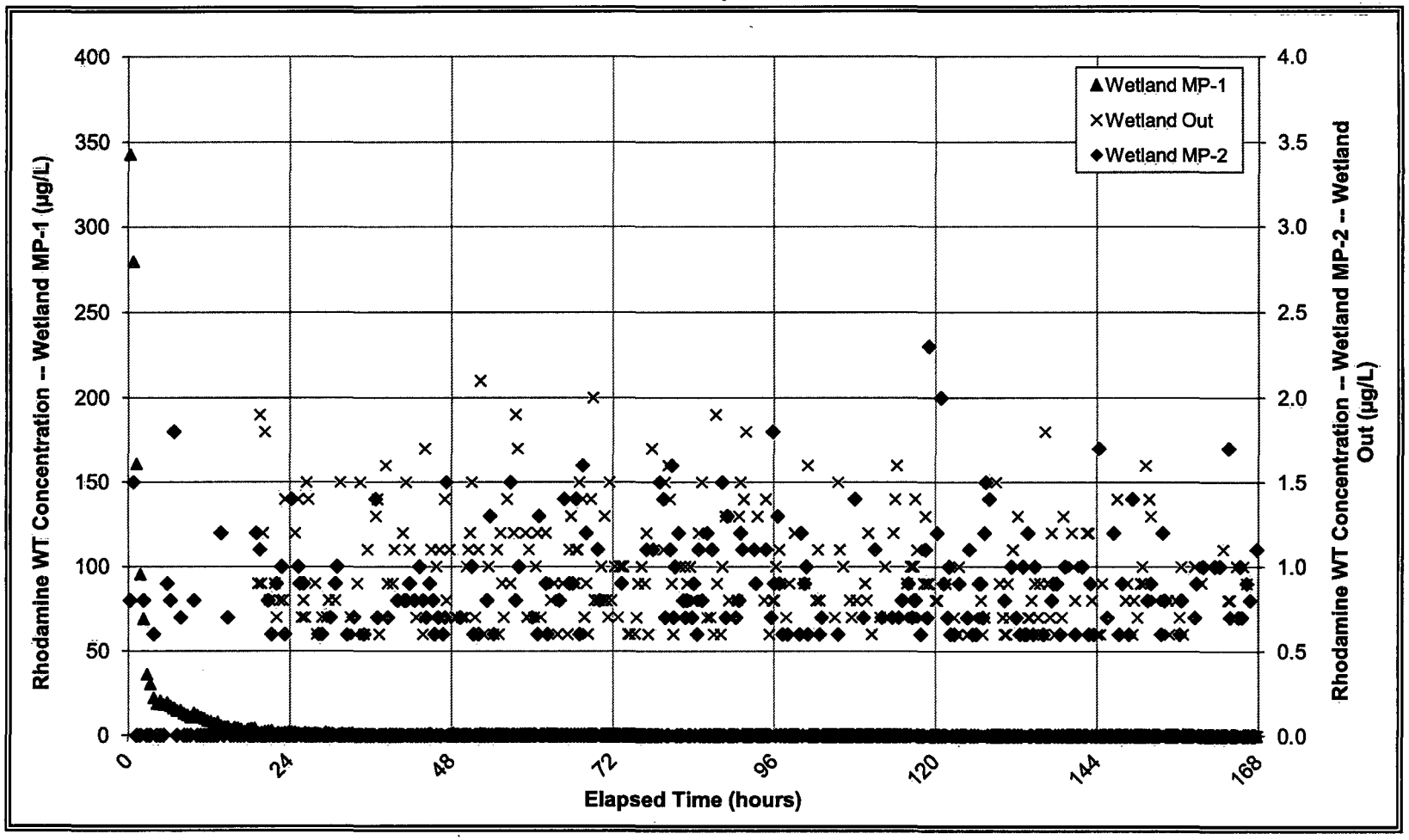


FIGURE 34
TRACER STUDY NUMBER 2: MARCH 2013
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

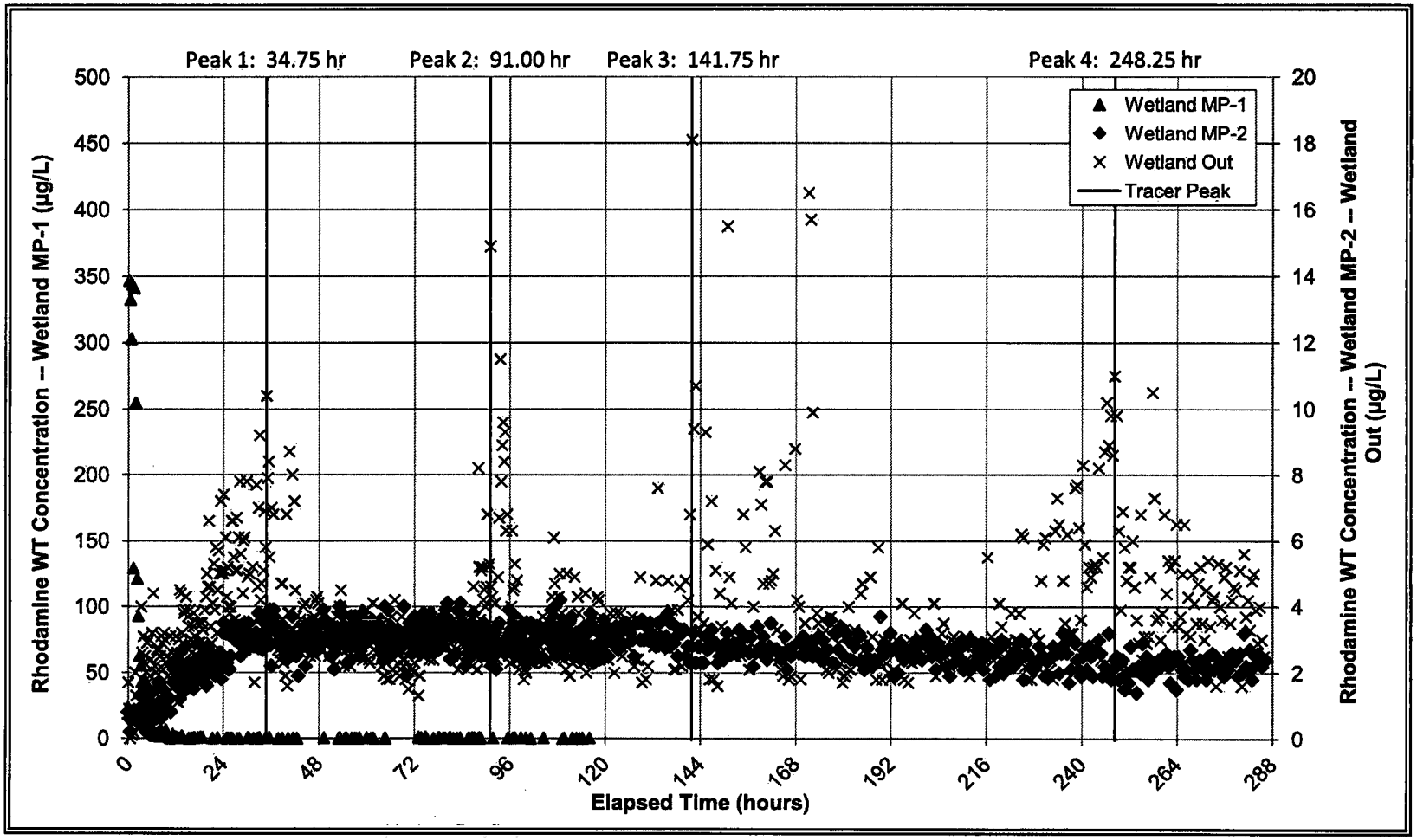


FIGURE 35
SLUG TEST NORMALIZED PRESSURE HEAD: WETLAND MP-1
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado

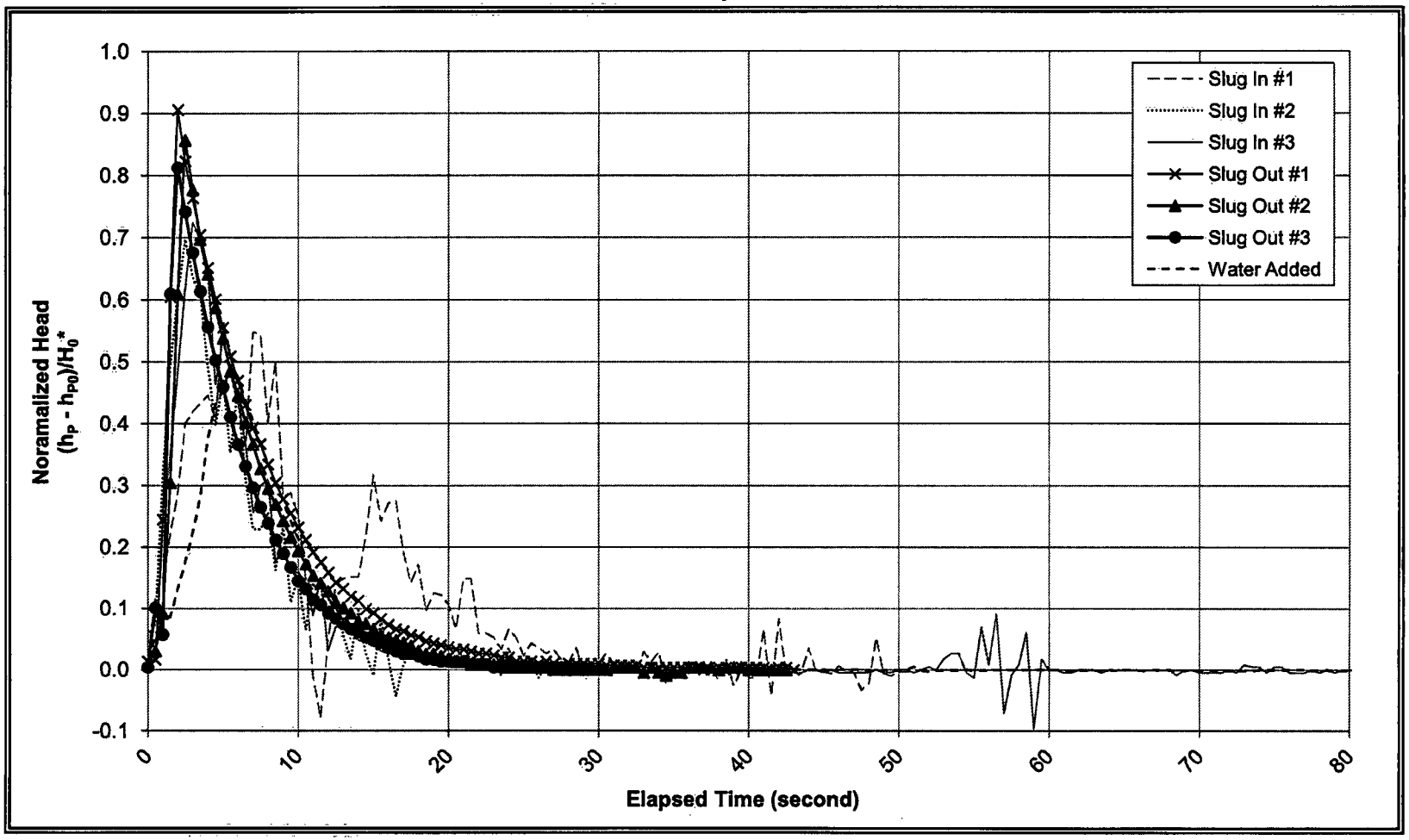
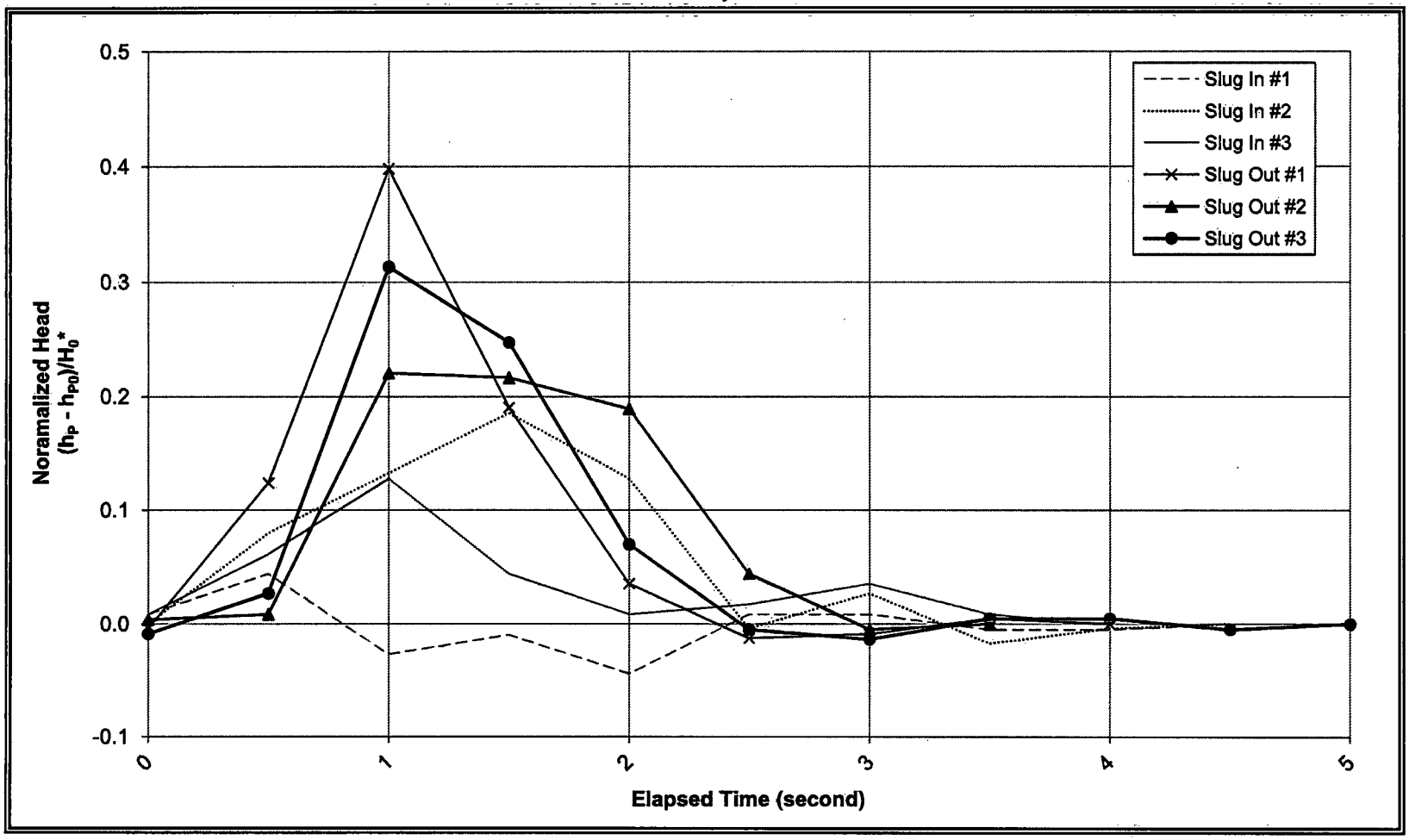


FIGURE 36
SLUG TEST NORMALIZED PRESSURE HEAD: WETLAND MP-2
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado



APPENDIX A

Photographs

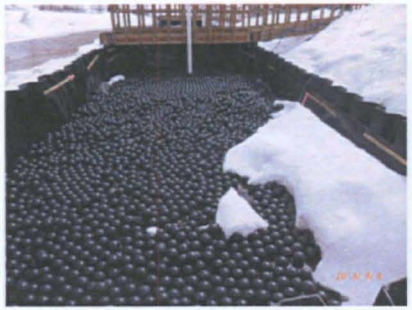
Rock Drain – View South from Inlet

January 3, 2013

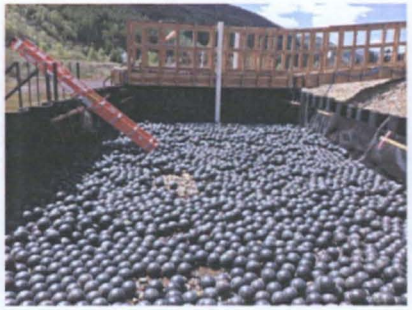
January 4, 2013

January 24, 2013

February 27, 2013



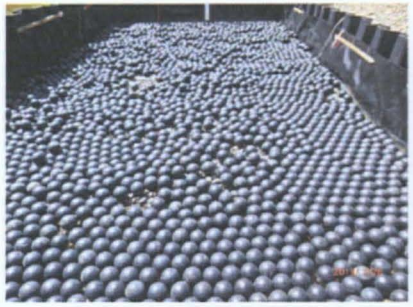
March 6, 2013



June 6, 2013

June 18, 2013

July 10, 2013



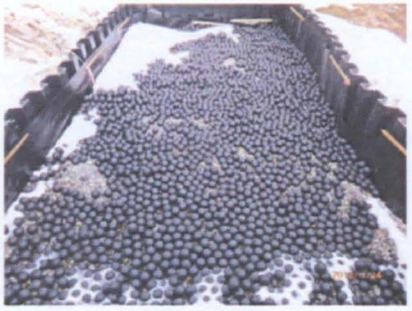
July 26, 2013

August 14, 2013

Rock Drain – View North from Rock Drain MP

January 4, 2013

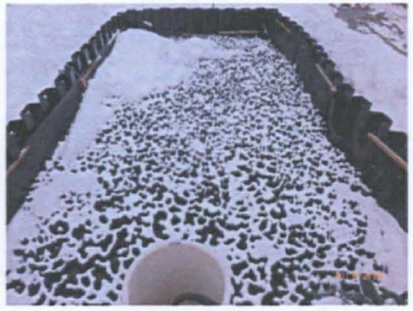
January 22, 2013



January 24, 2013

February 6, 2013

February 14, 2013



February 20, 2013

February 27, 2013

March 6, 2013

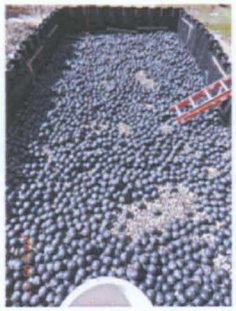
March 12, 2013

March 13, 2013

March 19, 2013

April 11, 2013

Rock Drain – View North (continued)



May 17, 2013

May 29, 2013

June 18, 2013

July 10, 2013

July 26, 2013

August 14, 2013

August 27, 2013

September 19, 2013

Rock Drain – Iron Deposition and Water Levels

January 4, 2013 – Rock Drain MP

February 14, 2013 – Iron and Standing Water

February 14, 2013 – Suspended Solids – North End of Rock Drain during Matrix Potholing

February 14, 2013 – Suspended Solids – North End of Rock Drain during Matrix Potholing

February 14, 2013 – Manganese Deposition during Rock Drain Matrix Potholing

February 14, 2013 – Iron Deposition during Rock Drain Matrix Potholing

March 6, 2013 – Floating Balls Northern End of Rock Drain

March 6, 2013 – Floating Balls and Iron Northern End of Rock Drain

March 19, 2013 – Floating Balls

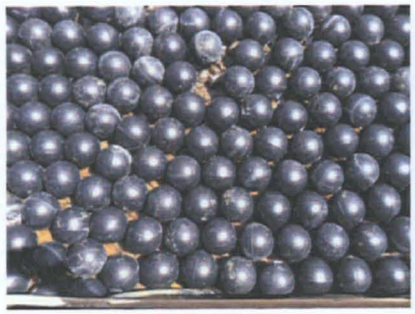
April 1, 2013 – Floating Balls and Iron

April 11, 2013 – Overflow near

May 2, 2013 – Matrix Sampling

Rock Drain – Iron Deposition and Water Levels (continued)

Northern End of Rock Drain



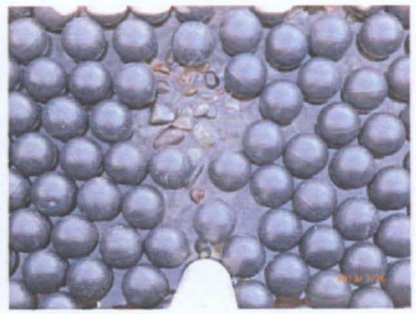
July 10, 2013 – Floating Balls
Northern End of Rock Drain

July 10, 2013 – Water at Surface
of Rock Matrix near Rock Drain MP

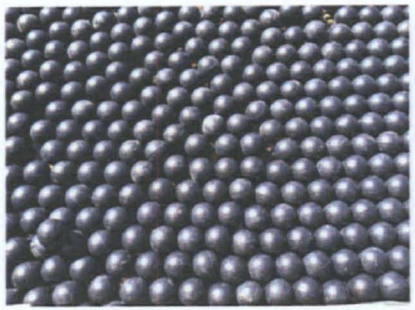
Northeastern Corner of Rock Drain

July 26, 2013 – Floating Balls
Northern End of Rock Drain

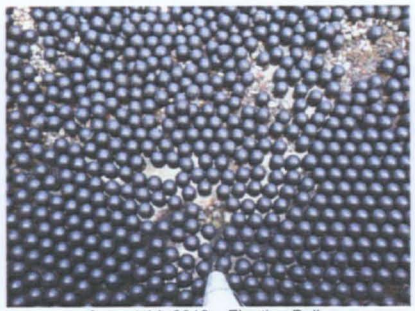
Iron and Manganese Deposition



July 26, 2013 – Floating Balls
Rock Drain MP



August 14, 2013 – Floating Balls
Northern End of Rock Drain



August 14, 2013 – Floating Balls
Rock Drain MP

September 19, 2013 – Floating Balls
Rock Drain MP

Wetland Cell – View South from Wetland MP-1

January 3, 2013

January 4, 2013

January 22, 2013

January 24, 2013

February 6, 2013

February 14, 2013

February 20, 2013

February 27, 2013

March 6, 2013

March 7, 2013

March 12, 2013

March 13, 2013

Wetland Cell – View South (continued)

March 19, 2013

April 11, 2013

May 17, 2013

May 29, 2013

June 3, 2013

June 18, 2013

July 10, 2013

July 26, 2013

August 14, 2013

August 27, 2013

September 19, 2013

Wetland Cell – View North from Wetland MP-2

January 4, 2013

January 22, 2013

January 24, 2013

February 6, 2013

February 14, 2013

February 20, 2013

February 27, 2013

March 6, 2013

March 12, 2013

March 13, 2013

March 19, 2013

April 11, 2013

Wetland Cell – View North (continued)

May 29, 2013

June 3, 2013

June 18, 2013

July 10, 2013

July 26, 2013

August 14, 2013

August 27, 2013

September 19, 2013

Wetland Cell – Transition Zone – Iron Precipitation, Surface Flow, Algal Growth

February 6, 2013 – Northeastern Corner

February 14, 2013 – Northeastern Corner

February 14, 2013 – Northeastern Corner

February 20, 2013 – Northeastern Corner

February 20, 2013 – Northeastern Corner

February 27, 2013 – Northeastern Corner

February 27, 2013 – Wetland MP-1

March 6, 2013 – Northeastern Corner

March 7, 2013 – Northeastern Corner

March 12, 2013 – Northeastern Corner

March 12, 2013 – Northern End

March 12, 2013 – Hay Bale Placement

Wetland Cell – Transition Zone (continued)

March 13, 2013 – Wetland MP-1

March 13, 2013 – Northwestern Corner

March 19, 2013 – Northeastern Corner

March 19, 2013 – Northwestern Corner

April 11, 2013 – Northeastern Corner

April 11, 2013 – Northwestern Corner

April 11, 2013 – South of Hay Bales

April 11, 2013 – Wetland MP-1

May 17, 2013 – Northeastern Corner

May 17, 2013 – Northwestern Corner

May 29, 2013 – Northeastern Corner

May 29, 2013 – Northwestern Corner

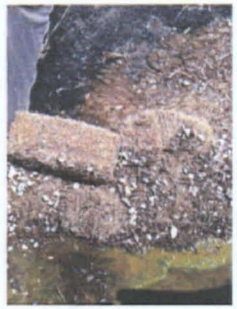
Wetland Cell – Transition Zone (continued)

June 3, 2013 – Wetland MP-1

June 18, 2013 – Northeastern Corner

June 18, 2013 – Northwestern Corner

July 10, 2013 – Wetland MP-1



July 10, 2013 – Northeastern Corner

July 10, 2013 – Northwestern Corner

July 10, 2013 – Wetland MP-1

July 26, 2013 – Wetland MP-1

July 26, 2013 – Northeastern Corner

July 26, 2013 – Northwestern Corner

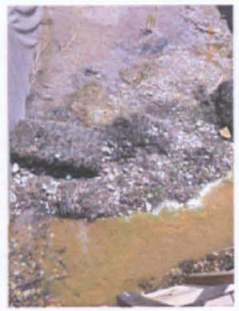
August 14, 2013 – Northeastern Corner

August 14, 2013 – Northwestern Corner

Wetland Cell – Transition Zone (continued)

August 14, 2013 – Wetland MP-1

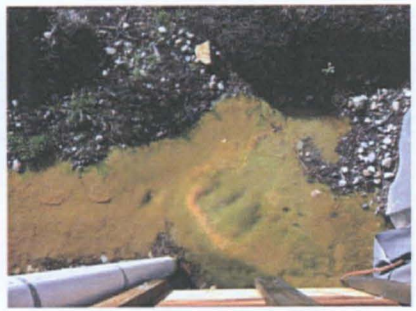
August 27, 2013 – Wetland MP-1



August 27, 2013 – Northeastern Corner

August 27, 2013 – Northwestern Corner

September 19, 2013 – Northeastern Corner



September 19, 2013 – Northwestern Corner

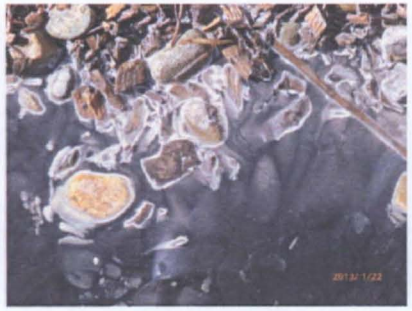
September 19, 2013 – Wetland MP-1

September 19, 2013 – Wetland MP-1

Wetland Cell – Matrix Surface Deposits

January 3, 2013

January 22, 2013



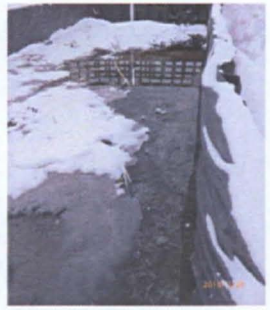
January 22, 2013

January 24, 2013

February 6, 2013

February 14, 2013

February 14, 2013



February 20, 2013

February 20, 2013

March 6, 2013

March 6, 2013

March 12, 2013

Wetland Cell – Matrix Surface Deposits (continued)

May 2, 2013 – Water Drained from Constructed Wetland

May 29, 2013

June 3, 2013

July 10, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

July 26, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

July 26, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

August 14, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

August 14, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

August 27, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

August 27, 2013 – Pink Color May Indicate Presence of Purple Sulfur Bacteria

September 19, 2013 – Pink and Green Colors May Indicate Presence of Sulfur Bacteria

September 19, 2013 – Pink and Green Colors May Indicate Presence of Sulfur Bacteria

Wetland Outlet

January 3, 2013 – Metal Sulfide Deposit

January 3, 2013 – Sulfur Biofilm

January 3, 2013 – Metal Sulfide & Sulfur Deposit

January 22, 2013

January 22, 2013

March 6, 2013

March 7, 2013

March 12, 2013

March 19, 2013

April 1, 2013

May 17, 2013

May 29, 2013

Wetland Outlet (continued)

June 3, 2013

June 18, 2013

July 10, 2013

July 26, 2013

August 14, 2013

August 14, 2013

August 27, 2013

September 19, 2013

Wetland Outlet – Pond 9 Mixing Zone

January 24, 2013

February 6, 2013

February 14, 2013

February 20, 2013

February 27, 2013

March 6, 2013

March 7, 2013

March 12, 2013

March 13, 2013

March 13, 2013 – Algae in Pond 9 Outfall

March 19, 2013

April 1, 2013 – View Northwest

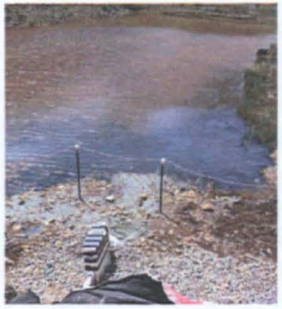
Wetland Outlet – Pond 9 Mixing Zone (continued)

April 11, 2013

May 17, 2013

May 21, 2013

May 29, 2013



June 3, 2013

July 10, 2013

July 26, 2013

August 27, 2013

September 19, 2013

September 19, 2013

September 19, 2013

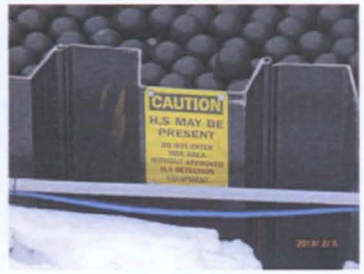
September 19, 2013

Constructed Wetland Exclusion Zone – February 2013

Rock Drain View South

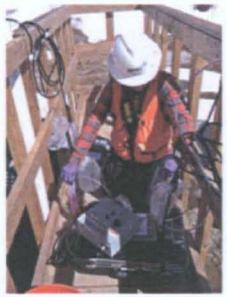
Wetland Outlet

Exclusion Zone Signage



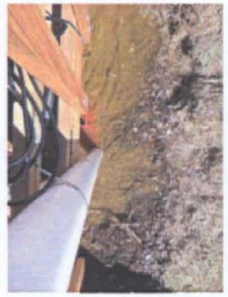
H_2S Signage

Tracer Study Number 2 – March 14, 2013



Northern Access Walkway

Wetland MP-1



Wetland MP-1

Wetland MP-1

Divider Wall Bulkhead Fitting Screen Installation – May 16, 2013

Rock in Divider Wall Bulkhead Fitting

Rock in Divider Wall Bulkhead Fitting

Screen Installed Over Bulkhead Fitting in Rock Drain

Screen Installed Over Bulkhead Fitting in Wetland Cell

Rock Drain Matrix Sampling – May 2, 2013

Near Rock Drain Inlet Pipe
Top Surface of Rock – Iron Deposition

Near Rock Drain Inlet Pipe
Bottom Surface of Rock – Manganese Oxide

Northeastern Test Pit
Top Surface of Rock – Iron Deposition

Northeastern Test Pit
Bottom Surface of Rock – Manganese Oxide

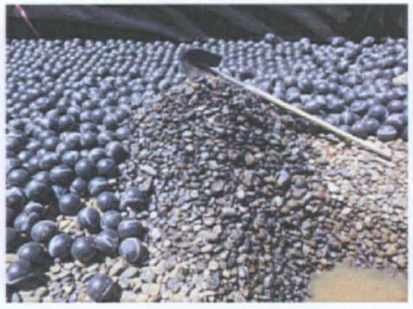
Northeastern Test Pit
Near Surface

Northeastern Test Pit
Six Inches Deep

Northeastern Test Pit
15 Inches Deep

Northeastern Test Pit
20 Inches Deep

Northeastern Test Pit
Four Inches Deep – Inoculum

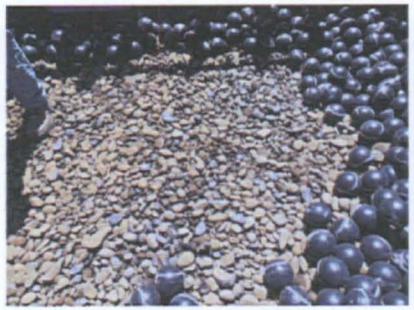


Northeastern Test Pit
Rock Pile from Test Pit

Northeastern Test Pit
Six Inches Deep – Suspended Iron

Northeastern Test Pit
20 Inches Deep – Suspended Iron

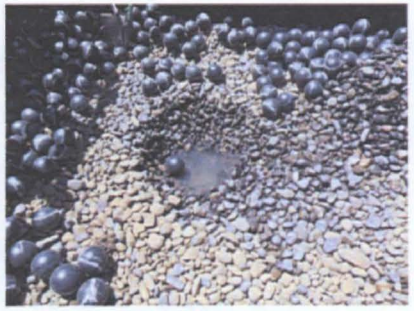
Rock Drain Matrix Sampling – May 2, 2013 (continued)



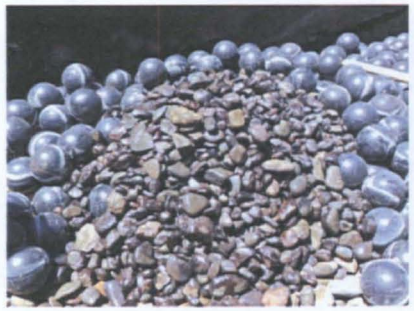
Southwestern Test Pit
Near Surface

Southwestern Test Pit
Three Inches Deep

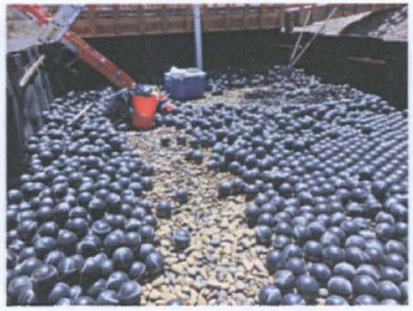
Southwestern Test Pit
12 Inches Deep



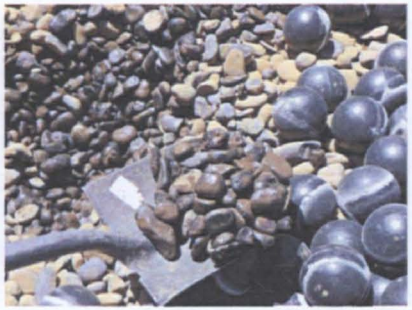
Southwestern Test Pit
12 Inches Deep



Southwestern Test Pit
Rock Pile from Test Pit



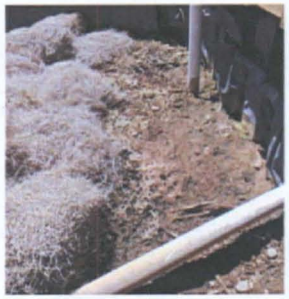
Rock Drain Surface near Center of Cell
Iron Deposited on Surface



Center Test Pit

Center Test Pit

Wetland Cell Matrix Sampling – May 2 and 3, 2013



Transition Zone

Transition Zone
Surface Iron Deposit – Metal Sulfides Below Surface

Hay Bales and Lower Extent
of Transition Zone

Hay Bales and Lower Extent
of Transition Zone

Elemental Sulfur Crystals
on Matrix Surface

Elemental Sulfur Crystals
on Matrix Surface

Sulfur Biofilm on Matrix Surface
Metal Sulfides Below Surface

Rock near Wetland Outlet
Elemental Sulfur Biofilm

Wetland Outlet Effluent Piping
Elemental Sulfur Biofilm

Wetland Outlet Effluent Piping
Elemental Sulfur Biofilm

Matrix Sampling Locations
1A through 3C

Matrix Sampling Locations
1D through 3D in Foreground

Wetland Cell Matrix Sampling – May 2 and 3, 2013 – Potholes

3A – Northeastern Corner

3B – Eastern Side

3C – Eastern Side

3D – Southeastern Corner

2A – Northern End

2B – North Central

2C – South Central

2D – Southern End

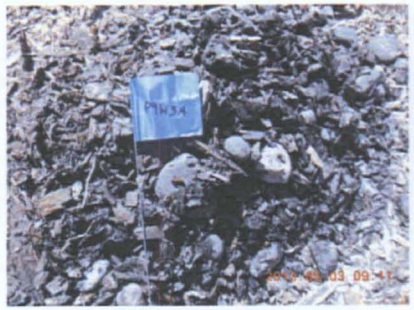
1A – Northwestern Corner

1B – Western Side

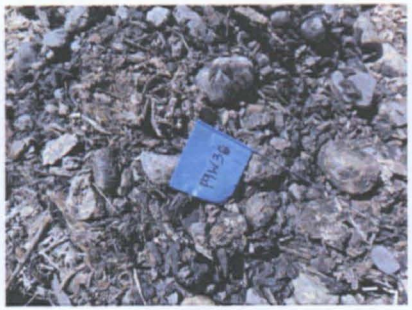
1C – Western Side

1D – Southwestern Corner

Wetland Cell Matrix Sampling – May 2 and 3, 2013 – Excavated Material



3A – Northeastern Corner



3B – Eastern Side

3C – Eastern Side

3D – Southeastern Corner

2A – Northern End

2B – North Central

2C – South Central

2D – Southern End

1A – Northwestern Corner

1B – Western Side

1C – Western Side

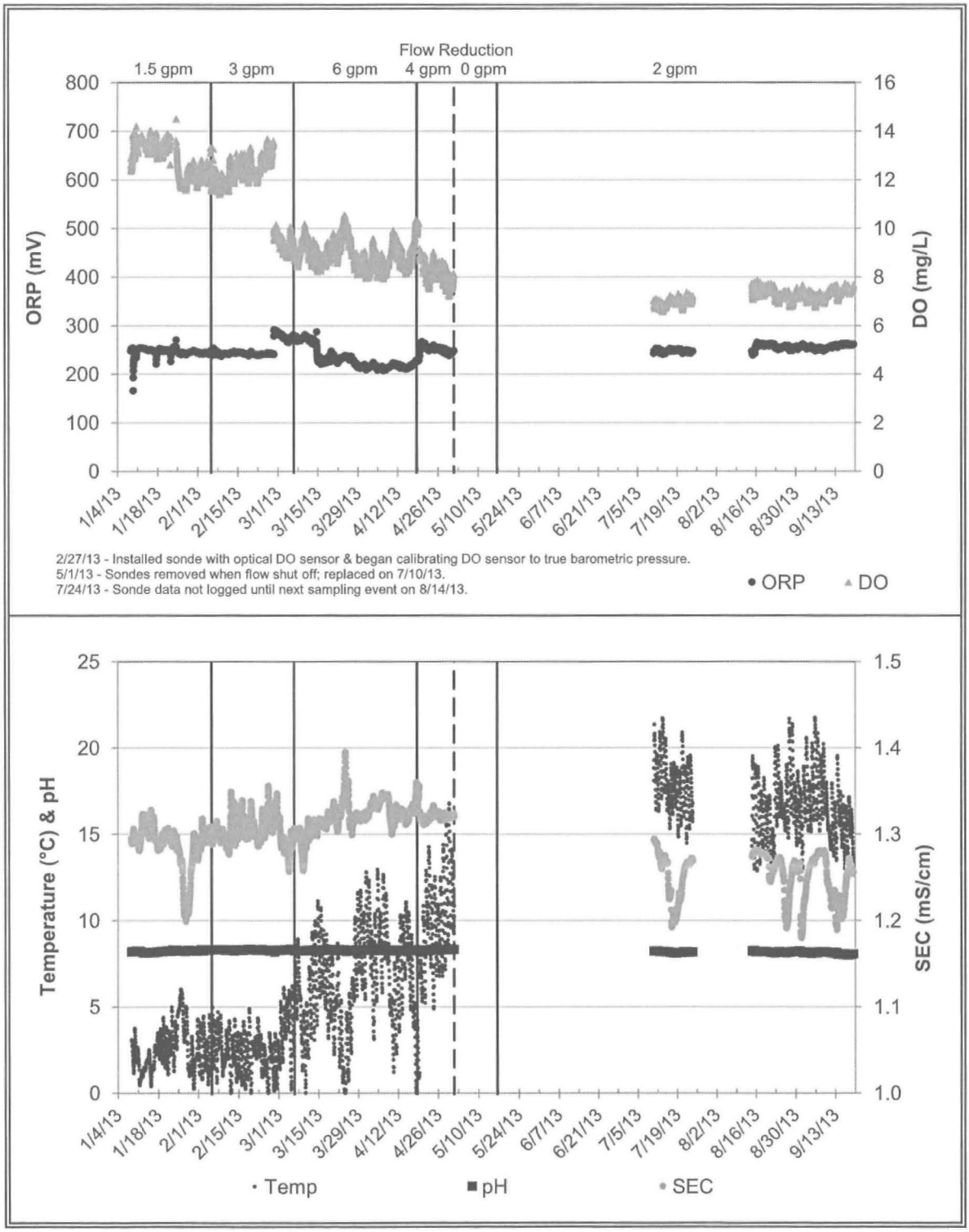
1D – Southwestern Corner

APPENDIX B

YSI 6920 Sonde Continuously Logged Water Quality Data

FIGURE B-1
SONDE WATER QUALITY PARAMETERS: ROCK DRAIN INLET FLOW CONTROL BOX
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT

Rico-Argentine Mine Site
Dolores County, Colorado



AMEC Environment & Infrastructure, Inc.

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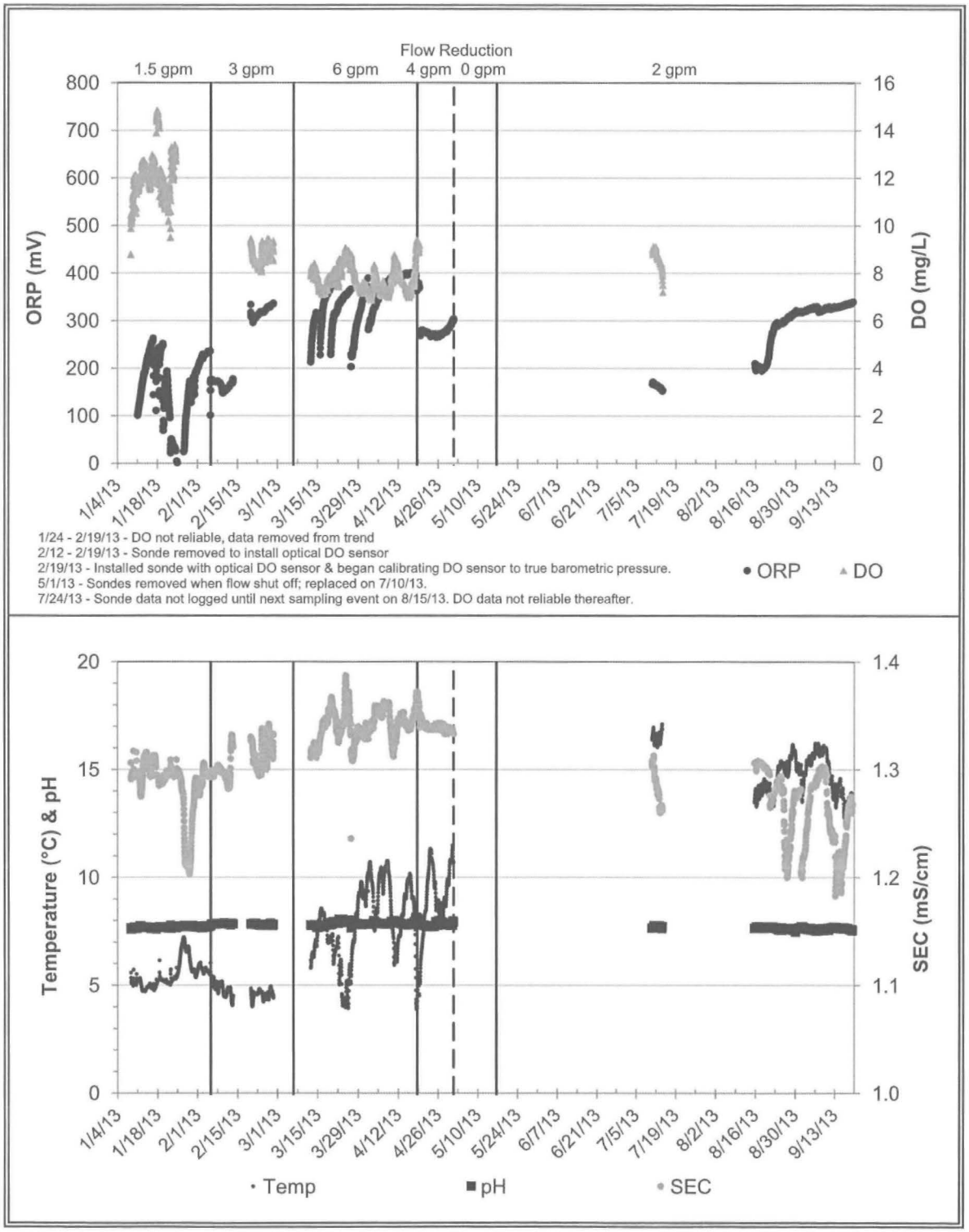
FIGURE B-2
SONDE WATER QUALITY PARAMETERS: ROCK DRAIN MONITORING PORT
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT

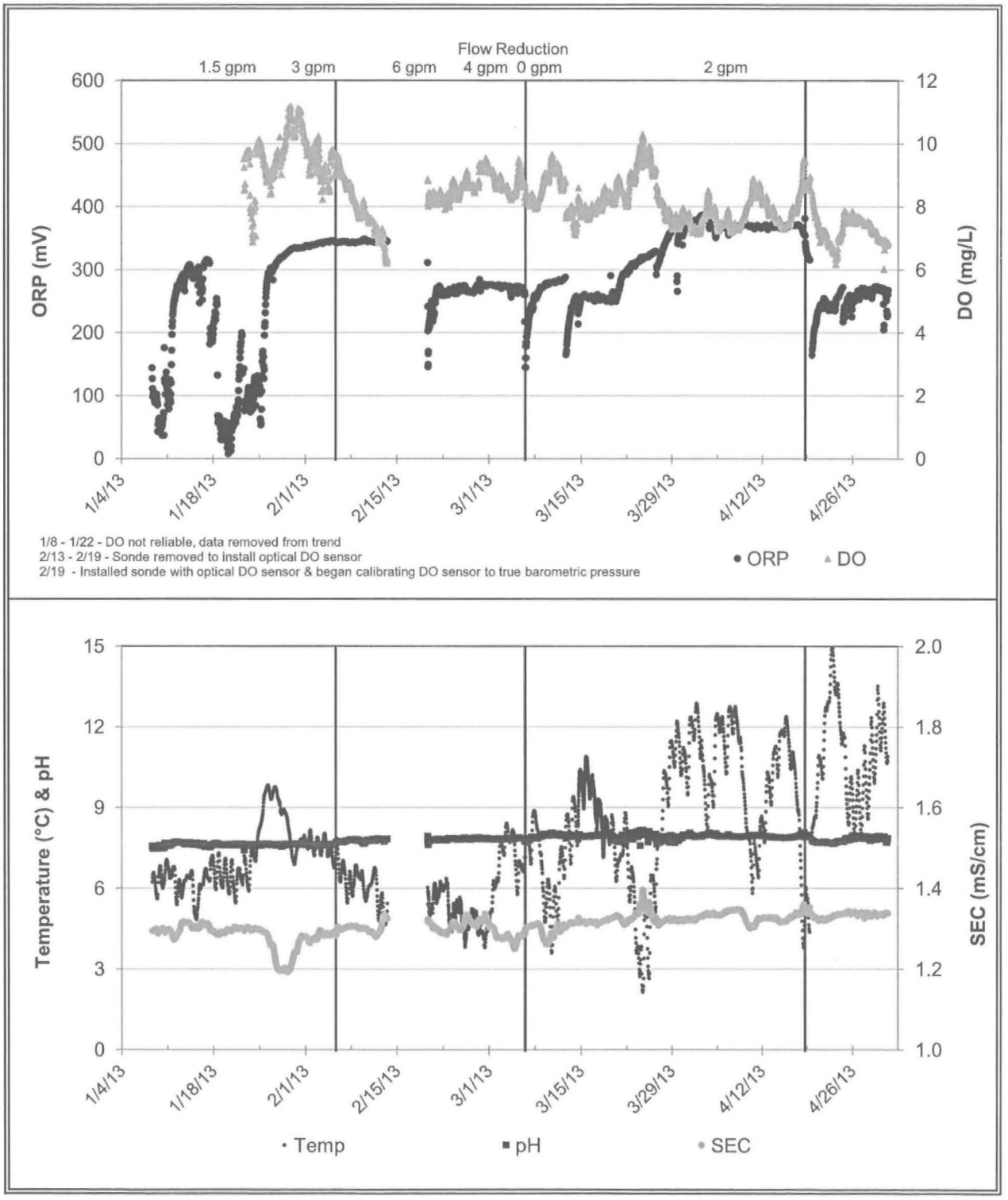
Rico-Argentine Mine Site
Dolores County, Colorado



AMEC Environment & Infrastructure, Inc.

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\4000_REG ISSUES\4040 TreatStudyRpts\2013\WetlandPS\Completion\Fig_Tbl\Rico_WetlandPS_Rpt_F13-15_T5_AppB_Sonde_131031.xlsx

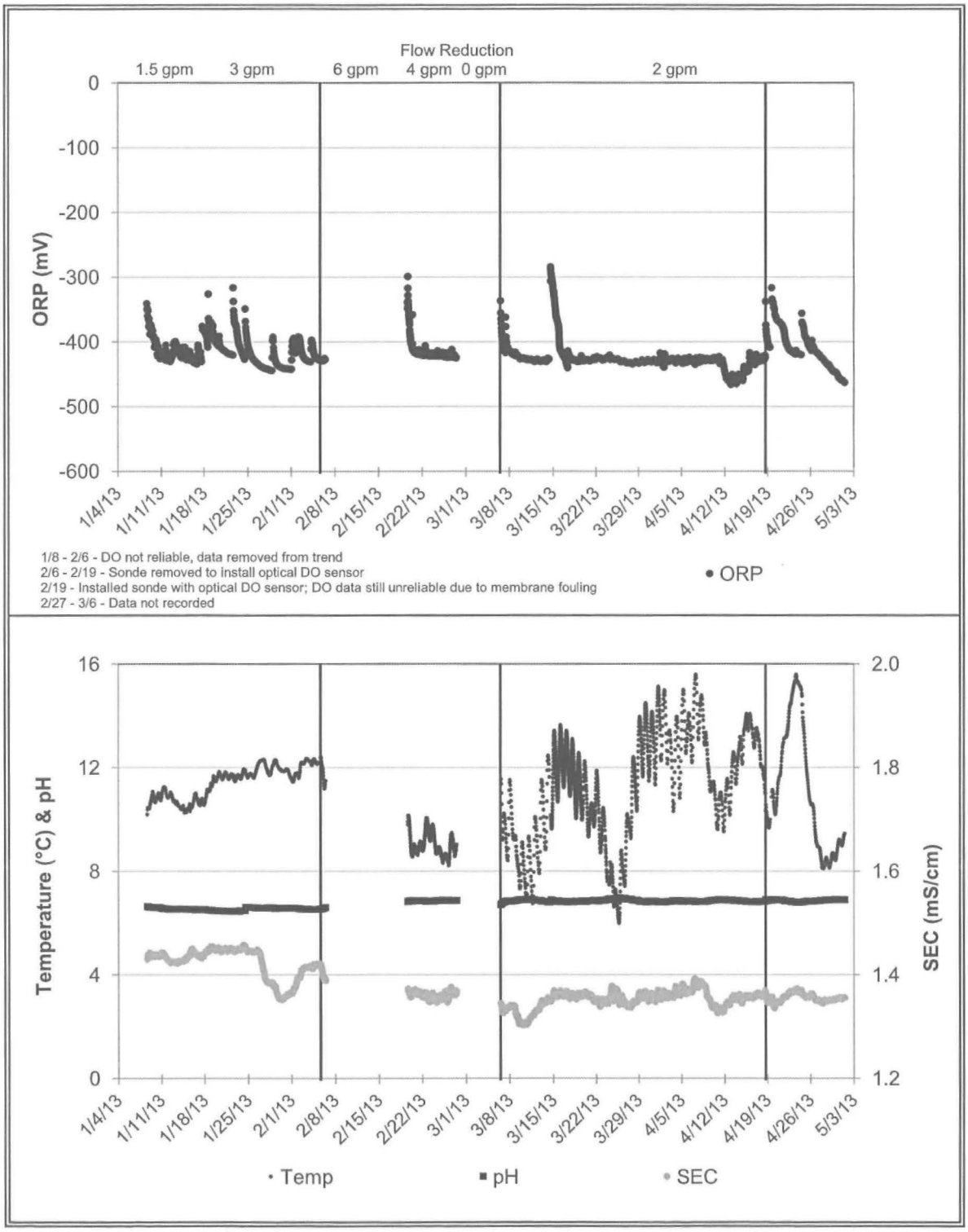
FIGURE B-3
SONDE WATER QUALITY PARAMETERS: WETLAND MONITORING PORT 1
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado



AMEC Environment & Infrastructure, Inc.

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\4000_REG ISSUES\4040 TreatStudyRpts\2013\WetlandPS\Completion\Fig_Tbl\Rico_WetlandPS_Rpt_F13-15_T5_AppB_Sonde_131031.xlsx

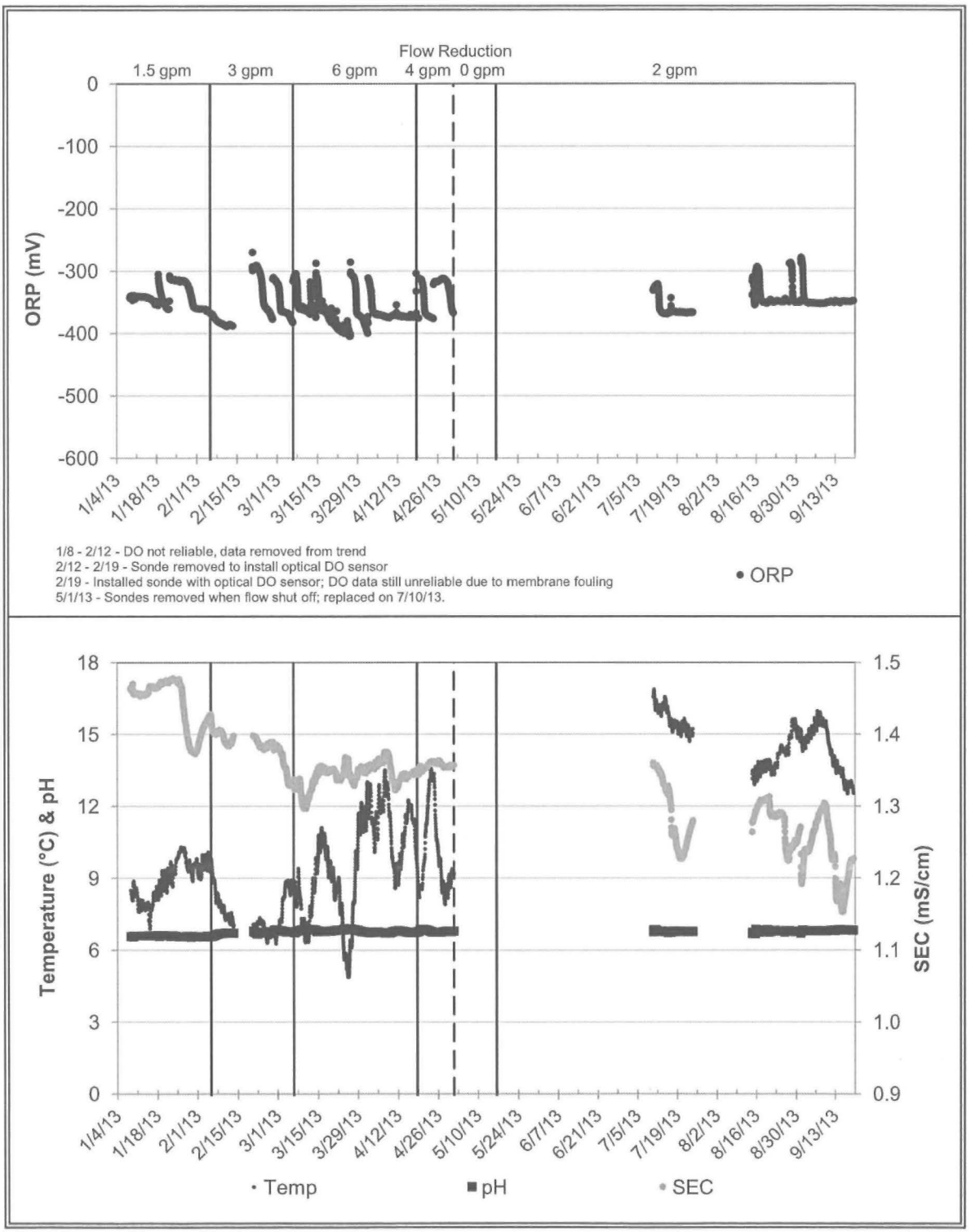
FIGURE B-4
SONDE WATER QUALITY PARAMETERS: WETLAND MONITORING PORT 2
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado



AMEC Environment & Infrastructure, Inc.

P:\Project\16000s\SA11161300 - Rico-Argentine Mine Site\4000_REG ISSUES\4040 TreatStudyRpts\2013\WetlandPS\Completion\Fig_Tbl\Rico_WetlandPS_Rpt_F13-15_T5_AppB_Sonde_131031.xlsx

FIGURE B-5
SONDE WATER QUALITY PARAMETERS: WETLAND OUTLET
ST. LOUIS TUNNEL DISCHARGE CONSTRUCTED WETLAND
PILOT SCALE TEST COMPLETION REPORT
Rico-Argentine Mine Site
Dolores County, Colorado



AMEC Environment & Infrastructure, Inc.

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APPENDIX C

Scotch Creek SNOTEL Site Air Temperature Data

Colorado SNOTEL Site SCOTCH CREEK - NRCS National Water and Climate Center

Date	Observed Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Temperature (°C)
1/1/2013	-19.7	-1.3	-19.7	-8.0
1/2/2013	-21.0	-3.2	-21.5	-16.1
1/3/2013	-20.5	1.2	-21.1	-14.1
1/4/2013	-17.3	-0.2	-22.6	-14.8
1/5/2013	-15.0	2.8	-17.8	-10.9
1/6/2013	-11.1	7.3	-15.2	-8.2
1/7/2013	-8.2	4.3	-11.7	-4.1
1/8/2013	-11.7	8.1	-11.7	-5.0
1/9/2013	-8.2	9.2	-12.4	-4.7
1/10/2013	-8.5	9.4	-10.0	-3.8
1/11/2013	-3.9	5.2	-8.7	-2.7
1/12/2013	-21.5	-2.6	-21.5	-12.0
1/13/2013	-23.9	-8.1	-27.4	-21.2
1/14/2013	-20.5	-11.7	-23.9	-16.7
1/15/2013	-26.7	-10.4	-26.9	-18.2
1/16/2013	-12.8	-1.7	-27.1	-13.5
1/17/2013	-7.8	7.4	-13.4	-6.0
1/18/2013	-9.5	6.2	-9.6	-3.7
1/19/2013	-11.6	8.0	-12.7	-6.1
1/20/2013	-10.6	10.2	-13.1	-5.6
1/21/2013	-9.8	9.2	-13.5	-6.1
1/22/2013	-7.8	10.5	-10.6	-3.7
1/23/2013	-9.1	12.3	-9.2	-3.0
1/24/2013	-5.0	10.9	-10.9	-2.7
1/25/2013	-0.2	7.4	-5.4	0.1
1/26/2013	0.7	6.2	-0.5	1.6
1/27/2013	0.5	2.1	0.1	1.2
1/28/2013	-0.3	4.5	-1.0	0.6
1/29/2013	-8.2	-0.1	-8.2	-3.7
1/30/2013	-12.4	-6.1	-17.7	-11.4
1/31/2013	-6.4	-2.0	-15.3	-8.1
2/1/2013	-13.1	5.1	-13.1	-5.5
2/2/2013	-12.3	4.9	-14.4	-7.4
2/3/2013	-8.5	8.3	-13.5	-5.1
2/4/2013	-9.8	2.4	-10.7	-4.5
2/5/2013	-10.5	7.3	-13.1	-5.4
2/6/2013	-7.8	10.3	-11.5	-3.4
2/7/2013	-9.2	5.8	-9.5	-4.0
2/8/2013	-8.7	7.1	-14.9	-5.3
2/9/2013	-2.3	2.6	-8.8	-1.8
2/10/2013	-9.8	-1.8	-9.8	-6.1
2/11/2013	-8.1	-3.1	-9.8	-7.6
2/12/2013	-20.5	-2.1	-20.5	-10.4
2/13/2013	-16.2	2.2	-22.3	-12.6
2/14/2013	-12.4	7.4	-16.5	-7.2
2/15/2013	-14.2	3.6	-15.2	-8.1
2/16/2013	-12.5	1.6	-15.5	-7.7
2/17/2013	-11.6	8.7	-14.2	-5.4
2/18/2013	-5.5	6.4	-12.7	-3.6
2/19/2013	-13.4	4.9	-16.1	-6.4
2/20/2013	-5.9	4.7	-16.3	-5.9
2/21/2013	-11.5	-2.3	-11.6	-6.2
2/22/2013	-9.3	0.5	-12.9	-7.2

Colorado SNOTEL Site SCOTCH CREEK - NRCS National Water and Climate Center

Date	Observed Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Temperature (°C)
2/23/2013	-19.3	-2.3	-19.3	-10.1
2/24/2013	-10.7	2.2	-20.1	-9.0
2/25/2013	-17.0	-2.1	-22.7	-12.8
2/26/2013	-13.1	6.2	-17.6	-7.4
2/27/2013	-18.3	-3.0	-18.3	-10.5
2/28/2013	-16.5	1.8	-21.3	-11.1
3/1/2013	-3.9	4.3	-18.7	-7.0
3/2/2013	-4.7	9.4	-7.7	0.1
3/3/2013	-3.7	13.4	-8.0	0.6
3/4/2013	-0.3	7.5	-5.7	0.4
3/5/2013	-12.4	5.2	-12.4	-1.5
3/6/2013	-4.1	9.9	-15.5	-3.8
3/7/2013	-3.1	10.5	-6.7	0.6
3/8/2013	-3.6	10.7	-5.9	0.9
3/9/2013	-3.6	3.0	-3.7	-1.4
3/10/2013	-10.7	-0.3	-10.8	-4.8
3/11/2013	-10.9	6.4	-14.5	-5.3
3/12/2013	-7.3	9.2	-12.3	-2.7
3/13/2013	-5.8	11.4	-8.4	-0.1
3/14/2013	-2.7	13.1	-7.9	1.1
3/15/2013	-2.4	16.0	-5.9	2.9
3/16/2013	-1.5	14.7	-3.9	3.4
3/17/2013	-4.2	10.0	-4.2	2.0
3/18/2013	-1.8	7.9	-5.1	1.1
3/19/2013	-5.4	6.2	-5.8	-0.4
3/20/2013	-7.9	7.4	-7.9	-0.3
3/21/2013	-0.3	6.0	-8.8	-1.0
3/22/2013	-9.8	6.6	-9.8	-0.1
3/23/2013	-6.2	7.2	-10.5	-2.0
3/24/2013	-17.8	-5.2	-17.8	-10.2
3/25/2013	-15.7	0.4	-19.9	-9.9
3/26/2013	-5.7	5.2	-18.5	-5.8
3/27/2013	0.7	7.9	-8.1	0.3
3/28/2013	-2.4	11.4	-2.8	2.9
3/29/2013	-1.7	11.9	-3.2	2.8
3/30/2013	-2.5	12.2	-2.9	3.0
3/31/2013	-2.2	13.0	-4.0	3.0
4/1/2013	-0.6	13.6	-4.8	3.1
4/2/2013	-1.9	12.0	-2.3	3.5
4/3/2013	-6.1	7.2	-6.1	-0.7
4/4/2013	-3.9	11.4	-7.2	1.0
4/5/2013	-1.1	13.7	-5.1	3.3
4/6/2013	0.6	11.5	-1.2	4.3
4/7/2013	0.2	12.8	-2.8	4.4
4/8/2013	-1.3	11.4	-2.5	3.3
4/9/2013	-2.6	7.5	-2.7	1.2
4/10/2013	-7.0	3.4	-7.4	-2.1
4/11/2013	-7.0	4.7	-10.1	-3.7
4/12/2013	-5.7	7.0	-8.0	-0.7
4/13/2013	-4.5	10.7	-7.8	0.5
4/14/2013	6.0	10.6	-6.2	3.8
4/15/2013	4.7	9.0	-1.0	3.6
4/16/2013	2.3	12.1	1.5	6.1

Colorado SNOTEL Site SCOTCH CREEK - NRCS National Water and Climate Center

Date	Observed Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Temperature (°C)
4/17/2013	2.6	11.7	-0.2	5.8
4/18/2013	-8.8	2.8	-8.8	-2.3
4/19/2013	-10.6	-1.0	-10.7	-6.6
4/20/2013	-0.7	7.4	-12.1	-1.7
4/21/2013	-4.1	7.6	-4.2	0.5
4/22/2013	2.1	11.2	-6.5	2.5
4/23/2013	-1.4	12.9	-1.4	5.9
4/24/2013	-5.9	5.8	-6.6	0.5
4/25/2013	-1.2	10.1	-7.8	1.3
4/26/2013	-0.8	12.4	-1.7	4.7
4/27/2013	-1.8	13.0	-3.3	3.8
4/28/2013	-1.5	15.5	-3.8	4.7
4/29/2013	-0.1	17.7	-3.1	6.2
4/30/2013	0.9	17.7	-1.2	7.5
5/1/2013	3.0	17.3	0.0	8.5
5/2/2013	-3.4	11.0	-3.4	3.6
5/3/2013	-4.0	12.1	-5.8	2.2
5/4/2013	-2.1	15.1	-5.9	4.0
5/5/2013	7.0	15.7	-4.1	5.8
5/6/2013	4.5	13.1	2.8	7.2
5/7/2013	1.3	6.6	1.3	3.5
5/8/2013	1.5	10.2	-0.2	4.0
5/9/2013	-0.3	6.7	-0.4	1.8
5/10/2013	-1.2	6.2	-1.3	1.9
5/11/2013	-0.9	12.8	-2.7	3.2
5/12/2013	0.1	13.9	-2.2	4.9
5/13/2013	1.1	17.7	-0.6	7.2
5/14/2013	2.8	19.3	-0.4	9.1
5/15/2013	4.0	18.2	1.1	8.5
5/16/2013	1.5	19.6	1.5	9.7
5/17/2013	2.2	19.0	-0.3	8.7
5/18/2013	3.4	18.4	0.0	8.7
5/19/2013	0.8	14.4	-0.1	6.4
5/20/2013	-0.8	10.8	-2.2	3.1
5/21/2013	0.2	12.6	-2.7	3.6
5/22/2013	0.3	15.6	-2.1	6.3
5/23/2013	3.4	18.4	-1.0	9.2
5/24/2013	3.4	20.5	1.5	11.1
5/25/2013	1.5	19.4	0.9	9.3
5/26/2013	1.9	19.6	-0.6	9.3
5/27/2013	0.9	18.9	0.3	9.0
5/28/2013	0.3	17.9	-0.5	8.1
5/29/2013	3.5	16.1	-0.7	8.2
5/30/2013	1.9	12.5	0.0	5.3
5/31/2013	0.6	15.9	0.6	7.8
6/1/2013	-0.4	15.3	-1.0	7.4
6/2/2013	0.9	21.5	-1.9	9.0
6/3/2013	5.3	21.1	-0.4	10.9
6/4/2013	3.6	20.6	2.9	10.9
6/5/2013	4.2	21.8	3.2	11.9
6/6/2013	3.0	21.5	2.4	11.5
6/7/2013	4.1	22.5	1.2	11.4
6/8/2013	4.3	21.7	2.4	11.7

Colorado SNOTEL Site SCOTCH CREEK - NRCS National Water and Climate Center

Date	Observed Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Temperature (°C)
6/9/2013	5.5	25.1	2.7	13.5
6/10/2013	6.0	27.0	3.4	14.5
6/11/2013	7.0	26.4	4.5	15.0
6/12/2013	4.6	23.2	4.6	13.2
6/13/2013	7.4	25.3	4.0	13.8
6/14/2013	10.1	24.2	6.1	15.0
6/15/2013	3.5	23.0	3.5	13.5
6/16/2013	4.5	21.4	1.9	10.9
6/17/2013	5.5	21.8	3.7	11.9
6/18/2013	4.0	22.7	3.3	12.6
6/19/2013	4.3	23.6	2.6	12.4
6/20/2013	5.0	23.4	2.6	12.7
6/21/2013	4.3	22.8	2.5	12.3
6/22/2013	4.6	22.7	3.0	12.1
6/23/2013	3.5	22.2	2.1	11.7
6/24/2013	4.4	22.8	1.8	11.7
6/25/2013	6.8	20.4	3.4	11.8
6/26/2013	5.0	22.6	3.0	12.0
6/27/2013	7.6	27.1	3.6	15.0
6/28/2013	8.5	27.2	6.2	15.5
6/29/2013	9.7	27.3	7.4	15.1
6/30/2013	8.8	25.4	6.8	13.8
7/1/2013	7.7	24.9	5.8	14.6
7/2/2013	10.2	25.9	6.8	15.6
7/3/2013	12.4	26.6	8.3	16.0
7/4/2013	11.6	25.5	6.3	16.3
7/5/2013	13.8	25.2	10.3	17.0
7/6/2013	10.8	24.5	10.7	16.7
7/7/2013	11.9	25.0	8.6	16.1
7/8/2013	12.1	26.3	8.2	16.6
7/9/2013	11.0	27.0	8.5	16.9
7/10/2013	10.2	27.5	8.5	16.6
7/11/2013	8.9	27.9	8.9	17.1
7/12/2013	10.1	-99.9	-99.9	14.4
7/13/2013	9.8	23.2	8.2	13.9
7/14/2013	10.0	24.0	7.6	15.3
7/15/2013	9.4	24.0	8.8	13.6
7/16/2013	9.4	19.2	8.8	11.9
7/17/2013	10.2	16.9	8.1	11.5
7/18/2013	11.4	19.3	8.9	13.2
7/19/2013	9.4	20.7	8.1	12.8
7/20/2013	9.8	21.7	7.2	12.8
7/21/2013	9.3	25.4	7.4	14.7
7/22/2013	6.7	23.5	6.6	12.8
7/23/2013	8.5	24.3	5.7	13.3
7/24/2013	9.9	25.2	6.5	14.3
7/25/2013	9.7	24.6	9.1	15.1
7/26/2013	8.5	25.1	7.7	15.0
7/27/2013	11.0	25.3	7.9	16.2
7/28/2013	11.3	22.6	8.7	14.4
7/29/2013	8.6	15.1	8.6	11.0
7/30/2013	6.1	19.9	6.1	12.1
7/31/2013	6.5	22.3	5.4	12.3

Colorado SNOTEL Site SCOTCH CREEK - NRCS National Water and Climate Center

Date	Observed Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Temperature (°C)
8/1/2013	10.6	24.9	5.1	13.9
8/2/2013	9.8	19.4	9.8	12.5
8/3/2013	10.5	22.1	6.2	13.5
8/4/2013	6.7	21.2	6.7	12.5
8/5/2013	10.8	22.2	5.6	13.5
8/6/2013	9.5	22.3	8.4	14.4
8/7/2013	9.2	19.9	6.9	10.8
8/8/2013	8.5	15.9	8.5	10.3
8/9/2013	4.1	15.5	4.0	9.1
8/10/2013	5.6	19.1	3.2	9.9
8/11/2013	3.7	17.7	3.7	8.3
8/12/2013	7.3	20.2	2.8	9.8
8/13/2013	5.7	21.0	5.1	11.6
8/14/2013	5.1	21.2	4.1	11.1
8/15/2013	5.0	21.2	3.7	11.2
8/16/2013	5.7	23.8	3.8	12.5
8/17/2013	7.8	24.6	4.4	13.4
8/18/2013	7.2	23.4	5.4	12.9
8/19/2013	9.2	22.6	5.8	13.0
8/20/2013	8.5	23.4	6.7	11.4
8/21/2013	6.7	20.4	6.7	11.9
8/22/2013	9.8	20.2	5.9	10.9
8/23/2013	8.0	22.3	6.8	13.4
8/24/2013	9.3	22.3	7.3	13.1
8/25/2013	9.9	18.1	8.9	11.8
8/26/2013	10.6	15.4	9.8	11.5
8/27/2013	8.1	18.8	8.1	12.0
8/28/2013	9.9	22.6	7.9	13.8
8/29/2013	8.1	22.7	7.0	13.9
8/30/2013	10.0	22.3	7.6	12.3
8/31/2013	11.3	23.6	8.3	13.9
9/1/2013	6.7	21.7	6.7	11.9
9/2/2013	10.3	20.9	6.6	12.2
9/3/2013	8.3	23.1	7.8	13.8
9/4/2013	10.0	20.8	7.2	12.5
9/5/2013	11.0	22.2	8.3	14.0
9/6/2013	8.3	24.3	7.3	14.5
9/7/2013	10.5	23.9	5.8	14.0
9/8/2013	10.7	23.9	6.6	14.0
9/9/2013	8.0	21.8	7.2	13.2
9/10/2013	9.3	16.4	7.5	10.5
9/11/2013	9.3	12.5	8.6	9.8
9/12/2013	5.3	17.3	5.2	10.5
9/13/2013	7.1	16.9	4.4	9.6
9/14/2013	9.6	16.6	4.3	10.2
9/15/2013	6.3	15.0	6.3	9.4
9/16/2013	5.1	15.6	4.8	8.3
9/17/2013	6.5	16.7	4.9	9.0
9/18/2013	9.3	17.5	5.9	10.4
9/19/2013	6.0	17.4	5.8	10.0

APPENDIX D

Laboratory Analytical Reports
(On CD)

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

August 20, 2012

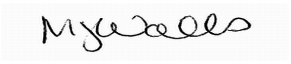
Mark DeFriez
Anderson Engineering Company I
977 W 2100 S.
Salt Lake City, UT 84119

RE: Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Dear Mark DeFriez:
Enclosed are the analytical results for sample(s) received by the laboratory on August 15, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Mary Jane Walls for
Heather Wilson
heather.wilson@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60127152001	**ARS-20120807**	Solid	08/07/12 16:50	08/15/12 10:15

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SAMPLE ANALYTE COUNT

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60127152001	**ARS-20120807**	EPA 6010	TJG	23
		EPA 7471	SMW	1
		ASTM D2974	TMD	1

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PROJECT NARRATIVE

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP Anderson Engineering Company Inc.
Date: August 20, 2012

General Information:
1 sample was analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/19130

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60127130001

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- MSD (Lab ID: 1045998)
  - Manganese

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1045997)
  - Aluminum
  - Calcium
  - Iron
  - Magnesium
  - Manganese
- MSD (Lab ID: 1045998)
  - Aluminum
  - Antimony
  - Calcium
  - Iron
  - Magnesium
  - Manganese

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PROJECT NARRATIVE

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP Anderson Engineering Company Inc.
Date: August 20, 2012

Additional Comments:

Analyte Comments:

QC Batch: MPRP/19130

1e: A post digestion spike was performed. recovery was 66%.
- MS (Lab ID: 1045997)
  - Manganese

2e: A post digestion spike was performed. recovery was 81%.
- MSD (Lab ID: 1045998)
  - Antimony

3e: A post digestion spike was performed. recovery was 91%.
- MS (Lab ID: 1045997)
  - Aluminum
  - Magnesium

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
- ARS-20120807 (Lab ID: 60127152001)
  - Beryllium
  - Chromium

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PROJECT NARRATIVE

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Method: **EPA 7471**
Description: 7471 Mercury
Client: BP Anderson Engineering Company Inc.
Date: August 20, 2012

General Information:
1 sample was analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Sample: ARS-20120807 **Lab ID: 60127152001** Collected: 08/07/12 16:50 Received: 08/15/12 10:15 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050							
Aluminum	**2940**	mg/kg	27.0	1	08/16/12 17:10	08/20/12 10:32	7429-90-5	
Antimony	ND	mg/kg	3.6	1	08/16/12 17:10	08/20/12 10:32	7440-36-0	
Arsenic	**12.2**	mg/kg	3.6	1	08/16/12 17:10	08/20/12 10:32	7440-38-2	
Barium	**702**	mg/kg	3.6	1	08/16/12 17:10	08/20/12 10:32	7440-39-3	
Beryllium	ND	mg/kg	7.2	20	08/16/12 17:10	08/20/12 14:25	7440-41-7	D3
Cadmium	**129**	mg/kg	1.8	1	08/16/12 17:10	08/20/12 10:32	7440-43-9	
Calcium	**18600**	mg/kg	36.0	1	08/16/12 17:10	08/20/12 10:32	7440-70-2	
Chromium	ND	mg/kg	360	200	08/16/12 17:10	08/20/12 15:29	7440-47-3	D3
Cobalt	**37.5**	mg/kg	1.8	1	08/16/12 17:10	08/20/12 10:32	7440-48-4	
Copper	**35.3**	mg/kg	3.6	1	08/16/12 17:10	08/20/12 10:32	7440-50-8	
Iron	**1410**	mg/kg	18.0	1	08/16/12 17:10	08/20/12 10:32	7439-89-6	
Lead	**111**	mg/kg	1.8	1	08/16/12 17:10	08/20/12 10:32	7439-92-1	
Magnesium	ND	mg/kg	3600	200	08/16/12 17:10	08/20/12 15:29	7439-95-4	
Manganese	**396000**	mg/kg	360	200	08/16/12 17:10	08/20/12 15:29	7439-96-5	
Molybdenum	**72.4**	mg/kg	7.2	1	08/16/12 17:10	08/20/12 10:32	7439-98-7	
Nickel	**134**	mg/kg	1.8	1	08/16/12 17:10	08/20/12 10:32	7440-02-0	
Potassium	**829**	mg/kg	180	1	08/16/12 17:10	08/20/12 10:32	7440-09-7	
Selenium	ND	mg/kg	1080	200	08/16/12 17:10	08/20/12 15:29	7782-49-2	
Silver	ND	mg/kg	252	100	08/16/12 17:10	08/20/12 14:30	7440-22-4	
Sodium	ND	mg/kg	180	1	08/16/12 17:10	08/20/12 10:32	7440-23-5	
Thallium	ND	mg/kg	1440	200	08/16/12 17:10	08/20/12 15:29	7440-28-0	
Vanadium	ND	mg/kg	720	200	08/16/12 17:10	08/20/12 15:29	7440-62-2	
Zinc	**73000**	mg/kg	3600	100	08/16/12 17:10	08/20/12 14:30	7440-66-6	
7471 Mercury	Analytical Method: EPA 7471 Preparation Method: EPA 7471							
Mercury	ND	mg/kg	0.14	1	08/17/12 10:51	08/17/12 15:17	7439-97-6	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**75.2**	%	0.50	1		08/16/12 00:00		

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QUALITY CONTROL DATA

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

QC Batch: MERP/6527
QC Batch Method: EPA 7471
Analysis Method: EPA 7471
Analysis Description: 7471 Mercury
Associated Lab Samples: 60127152001

METHOD BLANK: 1045899 Matrix: Solid
Associated Lab Samples: 60127152001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.050	08/17/12 14:37	

LABORATORY CONTROL SAMPLE: 1045900

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.5	0.49	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1045901 1045902

Parameter	Units	60126927001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.093	.51	.45	0.62	0.59	103	108	75-125	5	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

QC Batch: MPRP/19130
QC Batch Method: EPA 3050
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Associated Lab Samples: 60127152001

METHOD BLANK: 1045995
Matrix: Solid
Associated Lab Samples: 60127152001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	ND	7.5	08/20/12 10:12	
Antimony	mg/kg	ND	1.0	08/20/12 10:12	
Arsenic	mg/kg	ND	1.0	08/20/12 10:12	
Barium	mg/kg	ND	1.0	08/20/12 10:12	
Beryllium	mg/kg	ND	0.10	08/20/12 10:12	
Cadmium	mg/kg	ND	0.50	08/20/12 10:12	
Calcium	mg/kg	ND	10.0	08/20/12 10:12	
Chromium	mg/kg	ND	0.50	08/20/12 10:12	
Cobalt	mg/kg	ND	0.50	08/20/12 10:12	
Copper	mg/kg	ND	1.0	08/20/12 10:12	
Iron	mg/kg	ND	5.0	08/20/12 10:12	
Lead	mg/kg	ND	0.50	08/20/12 10:12	
Magnesium	mg/kg	ND	5.0	08/20/12 10:12	
Manganese	mg/kg	ND	0.50	08/20/12 10:12	
Molybdenum	mg/kg	ND	2.0	08/20/12 10:12	
Nickel	mg/kg	ND	0.50	08/20/12 10:12	
Potassium	mg/kg	ND	50.0	08/20/12 10:12	
Selenium	mg/kg	ND	1.5	08/20/12 10:12	
Silver	mg/kg	ND	0.70	08/20/12 10:12	
Sodium	mg/kg	ND	50.0	08/20/12 10:12	
Thallium	mg/kg	ND	2.0	08/20/12 10:12	
Vanadium	mg/kg	ND	1.0	08/20/12 10:12	
Zinc	mg/kg	ND	10.0	08/20/12 10:12	

LABORATORY CONTROL SAMPLE: 1045996

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	500	417	83	80-120	
Antimony	mg/kg	50	43.5	87	80-120	
Arsenic	mg/kg	50	44.1	88	80-120	
Barium	mg/kg	50	41.8	84	80-120	
Beryllium	mg/kg	50	42.4	85	80-120	
Cadmium	mg/kg	50	43.9	88	80-120	
Calcium	mg/kg	500	425	85	80-120	
Chromium	mg/kg	50	46.3	93	80-120	
Cobalt	mg/kg	50	45.6	91	80-120	
Copper	mg/kg	50	44.1	88	80-120	
Iron	mg/kg	500	427	85	80-120	
Lead	mg/kg	50	46.0	92	80-120	
Magnesium	mg/kg	500	454	91	80-120	
Manganese	mg/kg	50	45.8	92	80-120	

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QUALITY CONTROL DATA

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

LABORATORY CONTROL SAMPLE: 1045996

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Molybdenum	mg/kg	50	46.2	92	80-120	
Nickel	mg/kg	50	45.9	92	80-120	
Potassium	mg/kg	500	420	84	80-120	
Selenium	mg/kg	50	43.7	87	80-120	
Silver	mg/kg	25	21.7	87	80-120	
Sodium	mg/kg	500	428	86	80-120	
Thallium	mg/kg	50	44.2	88	80-120	
Vanadium	mg/kg	50	44.9	90	80-120	
Zinc	mg/kg	50	46.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1045997 1045998

Parameter	Units	60127130001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/kg	860	493	480	1800	1860	191	209	75-125	3	20	3e,M1
Antimony	mg/kg	ND	49.3	48	38.6	35.9	78	74	75-125	7	20	2e,M1
Arsenic	mg/kg	1.9	49.3	48	45.5	42.5	88	85	75-125	7	20	
Barium	mg/kg	16.7	49.3	48	59.3	58.5	86	87	75-125	1	20	
Beryllium	mg/kg	0.11	49.3	48	42.3	39.6	85	82	75-125	6	20	
Cadmium	mg/kg	ND	49.3	48	43.9	40.9	89	85	75-125	7	20	
Calcium	mg/kg	2190	493	480	1350	1440	-171	-156	75-125	7	20	M1
Chromium	mg/kg	1.3	49.3	48	47.8	44.2	94	90	75-125	8	20	
Cobalt	mg/kg	1.1	49.3	48	45.9	42.6	91	87	75-125	8	20	
Copper	mg/kg	3.5	49.3	48	46.5	43.3	87	83	75-125	7	20	
Iron	mg/kg	5060	493	480	3130	2930	-391	-444	75-125	7	20	M1
Lead	mg/kg	2.3	49.3	48	47.3	45.2	91	89	75-125	5	20	
Magnesium	mg/kg	688	493	480	857	912	34	47	75-125	6	20	3e,M1
Manganese	mg/kg	343	49.3	48	192	137	-304	-428	75-125	34	20	1e,D6, M1
Molybdenum	mg/kg	ND	49.3	48	45.9	42.7	92	88	75-125	7	20	
Nickel	mg/kg	2.5	49.3	48	47.2	44.0	91	87	75-125	7	20	
Potassium	mg/kg	203	493	480	675	628	96	89	75-125	7	20	
Selenium	mg/kg	ND	49.3	48	43.9	40.8	89	85	75-125	7	20	
Silver	mg/kg	ND	24.7	24	22.0	20.5	89	85	75-125	7	20	
Sodium	mg/kg	ND	493	480	482	457	92	89	75-125	5	20	
Thallium	mg/kg	ND	49.3	48	43.4	40.3	88	84	75-125	7	20	
Vanadium	mg/kg	7.1	49.3	48	49.8	46.3	86	82	75-125	7	20	
Zinc	mg/kg	9.8	49.3	48	50.4	47.2	82	78	75-125	7	20	

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QUALITY CONTROL DATA

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

QC Batch: PMST/7598
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 60127152001

METHOD BLANK: 1046289
Matrix: Solid
Associated Lab Samples: 60127152001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	08/16/12 00:00	

SAMPLE DUPLICATE: 1046290

Parameter	Units	60126927001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.3	13.5	1	20	

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QUALIFIERS

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	A post digestion spike was performed. recovery was 66%.
2e	A post digestion spike was performed. recovery was 81%.
3e	A post digestion spike was performed. recovery was 91%.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 60127152

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60127152001	**ARS-20120807**	EPA 3050	MPRP/19130	EPA 6010	ICP/15864
60127152001	**ARS-20120807**	EPA 7471	MERP/6527	EPA 7471	MERC/6489
60127152001	**ARS-20120807**	ASTM D2974	PMST/7598		

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Pace Analytical Services, Inc., M&E Lab
206 2nd Avenue West
Virginia, MN 55792
218-735-6740

August 18, 2012

Heather Wilson
Pace Analytical Kansas
9608 Loiret Blvd
Lenexa, KS 66219

RE: Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

Dear Heather Wilson:
Enclosed are the analytical results for sample(s) received by the laboratory on August 17, 2012. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Gina Koski

Gina M Koski

gina.koski@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc., M&E Lab
206 2nd Avenue West
Virginia, MN 55792
218-735-6740

SAMPLE SUMMARY

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60127152001	**ARS-20120807**	Mine, Non	08/07/12 16:50	08/17/12 14:05

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SAMPLE ANALYTE COUNT

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60127152001	**ARS-20120807**	ASTM D7348	KAH	1	PASI-MNG

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ANALYTICAL RESULTS

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

Sample: ARS-20120807 **Lab ID: 60127152001** Collected: 08/07/12 16:50 Received: 08/17/12 14:05 Matrix: Mine, Non Aqueous

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
ASTM D7348 Loss on Ignition	Analytical Method: ASTM D7348							
Loss on Ignition, (550 C)	**81.8**	%	0.10	1		08/17/12 15:57		

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QUALITY CONTROL DATA

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

QC Batch: MING/1212
QC Batch Method: ASTM D7348
Analysis Method: ASTM D7348
Analysis Description: ASTM D7348 Loss on Ignition
Associated Lab Samples: 60127152001

SAMPLE DUPLICATE: 27301

Parameter	Units	60127152001 Result	Dup Result	RPD	Max RPD	Qualifiers
Loss on Ignition, (550 C)	%	81.8	78.6	4	10	

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206 2nd Avenue West
Virginia, MN 55792
218-735-6740

QUALIFIERS

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-MNG Pace Analytical Services - Virginia Mining

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Virginia, MN 55792
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ARGENTINE SEEP SAMPLE
Pace Project No.: 1211479

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60127152001	**ARS-20120807**	ASTM D7348	MING/1212		

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Chain of Custody

WO#: 1211479
PM: GMK Due Date: 08/28/12
CLIENT: 14Pace Kans

Workorder: 60127152 **Workorder Name:** ARGENTINE SEEP SAMPLE **Owner Received Date:** 8/16/2012 **Results Requested By:** 8/21/2012

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Virginia 315 Chestnut Street Virginia, MN 55792 Phone (218)741-1010

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: none	Requested Analysis: Loss on ignition	LAB USE ONLY
1	ARS-20120807	PS	8/7/2012 16:50	60127152001	Solid	1	X	
2								
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] Pace	8/16/12 1700	[signature] KOSKI	8-17-12 14:00
2				
3				

Comments:

Cooler Temperature on Receipt 5.0 °C Custody Seal (Y) or N Received on Ice (Y) or N Samples Intact (Y) or N

ANDERSON ENGINEERING COMPANY INC.

977 West 2100 South
Salt Lake City, UT 84119
(801) 972-6222
FAX (801) 972-6235

CHAIN OF CUSTODY RECORD

COC#
Page 1 of 1

Receiving lab: Pace Labs
Lab Contact: Heather Wilson (303) 563-1401

Project: Argentine Seep Sample
Contact: Mark Petrie (801) 224-9583

Field Location	Field Sample ID Number	Date	Time	Matrix	No. of Containers	Analysis Requested: TOTAL metals	Analysis Requested: LOI	Analysis Requested: (1 BPSU)	COMMENTS
AR SEEP	ARS-20120807	8/7/12	1650	S	1	X	X	(1 BPSU)	LOI = Loss ON Ignition (C)

Matrix Codes
(W) Water
(S) Soil
(L) Liquid

QC: (circle one)
I II III IV

6612752

Relinquished By: *signature*	Date	Time	Received By: *signature*	Date	Time	Special Instructions
	8/7/12	1740		8/07/12	17:40	
	8/8/12	4:00 pm		8/15/12	1015	21.1 °C

FLD-002

Sample Condition Upon Receipt

Pace Analytical
www.pacelabs.com

Client Name: Anderson Eng. Project # 61127152

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other _____

Tracking #: 1Z F90 7X5 03 9901 8307 Pace Shipping Label Used? ☐ Yes ☒ No

Optional	
Proj. Due Date:	8/24
Proj. Name:	

Custody Seal on Cooler/Box Present: ☒ Yes ☐ ~~No~~ Seals intact: ☒ Yes ☐ No

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other _____

Thermometer Used: (T-191) T-194 **Type of Ice:** Wet Blue (None) ☐ Samples on ice, cooling process has begun

Cooler Temperature: 21.1

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: MS 8/15/12 1050

Comments:

Chain of Custody present:	☑ Yes ☐ No ☐ N/A	1.
Chain of Custody filled out:	☑ Yes ☐ No ☐ N/A	2.
Chain of Custody relinquished:	☑ Yes ☐ No ☐ N/A	3.
Sampler name & signature on COC:	☑ Yes ☐ No ☐ N/A	4.
Samples arrived within holding time:	☑ Yes ☐ No ☐ N/A	5.
Short Hold Time analyses (<72hr):	☐ Yes ☑ No ☐ N/A	6.
Rush Turn Around Time requested:	☐ Yes ☑ No ☐ N/A	7.
Sufficient volume:	☑ Yes ☐ No ☐ N/A	8.
Correct containers used:	☑ Yes ☐ No ☐ N/A	9.
-Pace containers used:	☑ Yes ☐ No ☐ N/A	
Containers intact:	☑ Yes ☐ No ☐ N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐ Yes ☐ No ☑ N/A	11.
Filtered volume received for dissolved tests	☐ Yes ☐ No ☑ N/A	12.
Sample labels match COC:	☑ Yes ☐ No ☐ N/A	13.
-Includes date/time/ID/analyses Matrix: ~~water~~ Rush: Soil		
All containers needing preservation have been checked.	☐ Yes ☐ No ☒ N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐ Yes ☐ No ☑ N/A	
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑ Yes ☐ No	Initial when completed: n/a Lot # of added preservative:
Trip Blank present:	☐ Yes ☐ No ☑ N/A	15.
Pace Trip Blank lot # (if purchased): n/a		
Headspace in VOA vials (>6mm):	☐ Yes ☐ No ☑ N/A	16.
Project sampled in USDA Regulated Area:	☐ Yes ☐ No ☑ N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 8/16/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

December 21, 2012

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on December 10, 2012. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60135088001	P9RD1A121206	Solid	12/06/12 13:45	12/10/12 08:15
60135088002	P9RD1B121206	Solid	12/06/12 14:15	12/10/12 08:15
60135088003	P9RD1C121206	Solid	12/06/12 14:30	12/10/12 08:15
60135088004	P9RD2A121206	Solid	12/06/12 14:00	12/10/12 08:15
60135088005	P9RD2B121206	Solid	12/06/12 14:25	12/10/12 08:15
60135088006	P9RD2C121206	Solid	12/06/12 14:40	12/10/12 08:15
60135088007	P9W1A121206	Solid	12/06/12 15:40	12/10/12 08:15
60135088008	P9W1B121207	Solid	12/06/12 15:50	12/10/12 08:15
60135088009	P9W1C121206	Solid	12/06/12 16:00	12/10/12 08:15
60135088010	P9W2A121206	Solid	12/06/12 16:10	12/10/12 08:15
60135088011	P9W2B121206	Solid	12/06/12 16:15	12/10/12 08:15
60135088012	P9W2C121206	Solid	12/06/12 16:25	12/10/12 08:15
60135088013	P9W3A121206	Solid	12/06/12 16:40	12/10/12 08:15
60135088014	P9W3B121206	Solid	12/06/12 16:35	12/10/12 08:15
60135088015	P9W3C121206	Solid	12/06/12 16:30	12/10/12 08:15
60135088016	P9RD1A121206 LEACHATE	Water	12/06/12 13:45	12/10/12 08:15
60135088017	P9RD1B121206 LEACHATE	Water	12/06/12 14:15	12/10/12 08:15
60135088018	P9RD1C121206 LEACHATE	Water	12/06/12 14:30	12/10/12 08:15
60135088019	P9RD2A121206 LEACHATE	Water	12/06/12 14:00	12/10/12 08:15
60135088020	P9RD2B121206 LEACHATE	Water	12/06/12 14:25	12/10/12 08:15
60135088021	P9RD2C121206 LEACHATE	Water	12/06/12 14:40	12/10/12 08:15
60135088022	P9W1A121206 LEACHATE	Water	12/06/12 15:40	12/10/12 08:15
60135088023	P9W1B121206 LEACHATE	Water	12/06/12 15:50	12/10/12 08:15
60135088024	P9W1C121206 LEACHATE	Water	12/06/12 16:00	12/10/12 08:15
60135088025	P9W2A121206 LEACHATE	Water	12/06/12 16:10	12/10/12 08:15
60135088026	P9W2B121206 LEACHATE	Water	12/06/12 16:15	12/10/12 08:15
60135088027	P9W2C121206 LEACHATE	Water	12/06/12 16:25	12/10/12 08:15
60135088028	P9W3A121206 LEACHATE	Water	12/06/12 16:40	12/10/12 08:15
60135088029	P9W3B121206 LEACHATE	Water	12/06/12 16:35	12/10/12 08:15
60135088030	P9W3C121206 LEACHATE	Water	12/06/12 16:30	12/10/12 08:15

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SAMPLE ANALYTE COUNT

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60135088016	**P9RD1A121206 LEACHATE**	EPA 6010	JGP	19
60135088017	**P9RD1B121206 LEACHATE**	EPA 6010	JGP	19
60135088018	**P9RD1C121206 LEACHATE**	EPA 6010	JGP	19
60135088019	**P9RD2A121206 LEACHATE**	EPA 6010	JGP	19
60135088020	**P9RD2B121206 LEACHATE**	EPA 6010	JGP	19
60135088021	**P9RD2C121206 LEACHATE**	EPA 6010	JGP	19
60135088022	**P9W1A121206 LEACHATE**	EPA 6010	JGP	19
60135088023	**P9W1B121206 LEACHATE**	EPA 6010	JGP	19
60135088024	**P9W1C121206 LEACHATE**	EPA 6010	JGP	19
60135088025	**P9W2A121206 LEACHATE**	EPA 6010	JGP	19
60135088026	**P9W2B121206 LEACHATE**	EPA 6010	JGP	19
60135088027	**P9W2C121206 LEACHATE**	EPA 6010	JGP	19
60135088028	**P9W3A121206 LEACHATE**	EPA 6010	JGP	19
60135088029	**P9W3B121206 LEACHATE**	EPA 6010	JGP	19
60135088030	**P9W3C121206 LEACHATE**	EPA 6010	JGP	19

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: December 21, 2012

General Information:
15 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/20844

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60135088016

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- MSD (Lab ID: 1113782)
  - Manganese

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1113781)
  - Manganese
  - Selenium
  - Zinc
- MSD (Lab ID: 1113782)
  - Aluminum
  - Selenium
  - Zinc

QC Batch: MPRP/20842

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60135088030

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1113783)
  - Thallium

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: December 21, 2012

QC Batch: MPRP/20842

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60135088030

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1113784)
  - Thallium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/20842

2e: Post Digestion Spike Performed - 72.7% Recovery

- MS (Lab ID: 1113783)
  - Thallium
- MSD (Lab ID: 1113784)
  - Thallium

B: Analyte was detected in the associated method blank.

- P9W1A121206 LEACHATE (Lab ID: 60135088022)
  - Chromium
- P9W1B121206 LEACHATE (Lab ID: 60135088023)
  - Chromium
- P9W1C121206 LEACHATE (Lab ID: 60135088024)
  - Chromium
- P9W2A121206 LEACHATE (Lab ID: 60135088025)
  - Chromium
- P9W2B121206 LEACHATE (Lab ID: 60135088026)
  - Chromium
- P9W2C121206 LEACHATE (Lab ID: 60135088027)
  - Chromium
- P9W3A121206 LEACHATE (Lab ID: 60135088028)
  - Chromium
- P9W3B121206 LEACHATE (Lab ID: 60135088029)
  - Chromium
- P9W3C121206 LEACHATE (Lab ID: 60135088030)
  - Chromium

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- P9W1A121206 LEACHATE (Lab ID: 60135088022)
  - Antimony
  - Selenium
  - Thallium
- P9W1B121206 LEACHATE (Lab ID: 60135088023)
  - Antimony
  - Selenium
  - Thallium
- P9W1C121206 LEACHATE (Lab ID: 60135088024)
  - Antimony

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: December 21, 2012

Analyte Comments:

QC Batch: MPRP/20842

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- P9W1C121206 LEACHATE (Lab ID: 60135088024)
  - Selenium
  - Thallium
- P9W2A121206 LEACHATE (Lab ID: 60135088025)
  - Silver
  - Beryllium
  - Antimony
  - Selenium
  - Thallium
- P9W2B121206 LEACHATE (Lab ID: 60135088026)
  - Antimony
  - Selenium
  - Thallium
- P9W2C121206 LEACHATE (Lab ID: 60135088027)
  - Selenium
  - Thallium
- P9W3A121206 LEACHATE (Lab ID: 60135088028)
  - Antimony
  - Selenium
  - Thallium
- P9W3B121206 LEACHATE (Lab ID: 60135088029)
  - Antimony
  - Selenium
  - Thallium
- P9W3C121206 LEACHATE (Lab ID: 60135088030)
  - Antimony
  - Selenium
  - Thallium

QC Batch: MPRP/20844

1e: Post Digestion Spike Performed - 141% Recovery

- MSD (Lab ID: 1113782)
  - Aluminum

3e: Post Digestion Spike Performed - 95.8% Recovery

- MS (Lab ID: 1113781)
  - Selenium
- MSD (Lab ID: 1113782)
  - Selenium

B: Analyte was detected in the associated method blank.

- P9RD1A121206 LEACHATE (Lab ID: 60135088016)
  - Chromium
  - Molybdenum

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: December 21, 2012

Analyte Comments:

QC Batch: MPRP/20844

B: Analyte was detected in the associated method blank.

- P9RD1B121206 LEACHATE (Lab ID: 60135088017)
  - Chromium
  - Lead
  - Molybdenum
- P9RD1C121206 LEACHATE (Lab ID: 60135088018)
  - Chromium
  - Lead
  - Molybdenum
- P9RD2A121206 LEACHATE (Lab ID: 60135088019)
  - Chromium
  - Lead
- P9RD2B121206 LEACHATE (Lab ID: 60135088020)
  - Chromium
  - Lead
- P9RD2C121206 LEACHATE (Lab ID: 60135088021)
  - Chromium
  - Lead

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- P9RD1A121206 LEACHATE (Lab ID: 60135088016)
  - Antimony
  - Selenium
  - Thallium
- P9RD1B121206 LEACHATE (Lab ID: 60135088017)
  - Antimony
  - Selenium
  - Thallium
- P9RD1C121206 LEACHATE (Lab ID: 60135088018)
  - Antimony
  - Selenium
  - Thallium
- P9RD2A121206 LEACHATE (Lab ID: 60135088019)
  - Antimony
  - Selenium
  - Thallium
- P9RD2B121206 LEACHATE (Lab ID: 60135088020)
  - Beryllium
  - Antimony
  - Selenium
  - Thallium
- P9RD2C121206 LEACHATE (Lab ID: 60135088021)
  - Silver
  - Antimony

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: December 21, 2012

Analyte Comments:

QC Batch: MPRP/20844

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- P9RD2C121206 LEACHATE (Lab ID: 60135088021)
  - Selenium
  - Thallium

This data package has been reviewed for quality and completeness and is approved for release.

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Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
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Lenexa, KS 66219

Phone: 913.599.5665
Fax: 913.599.1759

AMEC Leaching Log

Analyst: TDS ☑ AMEC SOP 7.0, Revision 0: Rock Drain Matrix

Date: 12/13/12 ☐ AMEC SOP 8.0, Revision 0: Wetland Organic Matrix

Batch: 20844

Hydroxylamine ID: 6604 Acetic acid ID: 6681

6M HCl ID: NA Filter Paper ID: NA

Theremometer ID: T- 175 Correction Factor: 0 °C

Temp. As-Read: 85 °C Corrected Temp. 85 °C

Time On: 13:30 Time Off: 17:30

Sample ID	Weight of beaker	Weight of sample +beaker	Weight of sample	Final Volume
60135088-001	171.80g	371.33g	199.55g	TDS 12/14/12 ~~475 ml~~ 100ml
60135088-002	182.50g	383.04g	200.55g	TDS 12/14/12 ~~100ml~~ 75ml
60135088-003	172.88g	372.99g	200.10g	TDS 12/14/12 ~~75ml~~ 100ml
60135088-004	175.52g	374.98g	199.47g	100ml
60135088-005	169.60g	369.18g	199.69g	100ml
60135088-006	172.21g	373.04g	200.92g	75ml
MB	169.83g	169.83g	N/A	175ml

Pace Analytical
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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219

Phone: 913.599.5665
Fax: 913.599.1759

AMEC Leaching Log

Analyst NDJ.

Date: 12/17/12

Batch: 20842

☐ AMEC SOP 7.0, Revision 0: Rock Drain Matrix

☑ AMEC SOP 8.0, Revision 0: Wetland Organic Matrix

Hydroxylamine ID: NA

6M HCl ID: 16e27

Theremometer ID: T- NA

Temp. As-Read: NA °C

Time On: 9:00

Acetic acid ID: NA

Filter Paper ID: 1441-125

Correction Factor: NA °C

Corrected Temp. NA °C

Time Off: 10:00

	Sample ID	Weight of beaker	Weight of sample +beaker	Weight of sample	Final Volume
7	60135088-022	178.94g	280.27g	101.34g	~~150mL~~ ~~50mL~~ 200mL
8	60135088-023	185.51g	285.75g	100.25g	~~150mL~~
9	60135088-024	181.90g	291.28g	109.39g	~~150mL~~
10	60135088-25	165.80g	268.53g	102.74g	~~150mL~~
11	60135088-26	171.30g	276.59g	105.30g	~~150mL~~
12	60135088-27	180.96g	287.80g	106.85g	~~150mL~~
13	60135088-28	169.85g	277.22g	107.38g	~~150mL~~
14	60135088-29	169.70g	261.63g	91.95g	~~150mL~~
15	60135088-30	174.11g	285.43g	111.31g	~~150mL~~ ~~150mL~~
	MB	184.08g	184.08g	NA	~~150mL~~ ~~50mL~~

NJ 12/17/12

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD1A121206 LEACHATE **Lab ID: 60135088016** Collected: 12/06/12 13:45 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**20700**	ug/L	150	50.0	2	12/13/12 10:00	12/20/12 10:58	7429-90-5	M1
Antimony	ND	ug/L	20.0	6.2	2	12/13/12 10:00	12/20/12 10:58	7440-36-0	D3
Arsenic	**36.1**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 10:58	7440-38-2	
Barium	**1780**	ug/L	20.0	1.5	2	12/13/12 10:00	12/20/12 10:58	7440-39-3	
Beryllium	**6.8**	ug/L	2.0	1.0	2	12/13/12 10:00	12/20/12 10:58	7440-41-7	
Cadmium	**114**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 10:58	7440-43-9	
Chromium	**20.4**	ug/L	10.0	1.4	2	12/13/12 10:00	12/20/12 10:58	7440-47-3	B
Cobalt	**94.2**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 10:58	7440-48-4	
Copper	**851**	ug/L	50.0	5.0	5	12/13/12 10:00	12/20/12 13:48	7440-50-8	
Iron	**45100**	ug/L	100	34.4	2	12/13/12 10:00	12/20/12 10:58	7439-89-6	
Lead	**3060**	ug/L	25.0	12.0	5	12/13/12 10:00	12/20/12 13:48	7439-92-1	
Manganese	**50400**	ug/L	25.0	3.0	5	12/13/12 10:00	12/20/12 13:48	7439-96-5	M1
Molybdenum	**23.8J**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 10:58	7439-98-7	B
Nickel	**139**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 10:58	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/13/12 10:00	12/20/12 10:58	7782-49-2	D3,M1
Silver	**8.9J**	ug/L	14.0	2.6	2	12/13/12 10:00	12/20/12 10:58	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/13/12 10:00	12/20/12 10:58	7440-28-0	D3
Vanadium	**157**	ug/L	20.0	2.4	2	12/13/12 10:00	12/20/12 10:58	7440-62-2	
Zinc	**28300**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 10:58	7440-66-6	M1

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD1B121206 LEACHATE **Lab ID: 60135088017** Collected: 12/06/12 14:15 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**28700**	ug/L	150	50.0	2	12/13/12 10:00	12/20/12 11:15	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/13/12 10:00	12/20/12 11:15	7440-36-0	D3
Arsenic	**30.7**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 11:15	7440-38-2	
Barium	**3640**	ug/L	20.0	1.5	2	12/13/12 10:00	12/20/12 11:15	7440-39-3	
Beryllium	**6.8**	ug/L	2.0	1.0	2	12/13/12 10:00	12/20/12 11:15	7440-41-7	
Cadmium	**126**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 11:15	7440-43-9	
Chromium	**30.2J**	ug/L	50.0	6.9	10	12/13/12 10:00	12/20/12 14:12	7440-47-3	B
Cobalt	**232**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 11:15	7440-48-4	
Copper	**648**	ug/L	100	9.9	10	12/13/12 10:00	12/20/12 14:12	7440-50-8	
Iron	**56800**	ug/L	100	34.4	2	12/13/12 10:00	12/20/12 11:15	7439-89-6	
Lead	**426**	ug/L	50.0	24.0	10	12/13/12 10:00	12/20/12 14:12	7439-92-1	B
Manganese	**104000**	ug/L	50.0	6.0	10	12/13/12 10:00	12/20/12 14:12	7439-96-5	
Molybdenum	**29.6J**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 11:15	7439-98-7	B
Nickel	**208**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 11:15	7440-02-0	
Selenium	ND	ug/L	150	27.0	10	12/13/12 10:00	12/20/12 14:12	7782-49-2	D3
Silver	**17.0**	ug/L	14.0	2.6	2	12/13/12 10:00	12/20/12 11:15	7440-22-4	
Thallium	ND	ug/L	200	43.0	10	12/13/12 10:00	12/20/12 14:12	7440-28-0	D3
Vanadium	**259**	ug/L	100	12.0	10	12/13/12 10:00	12/20/12 14:12	7440-62-2	
Zinc	**33200**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 11:15	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD1C121206 LEACHATE **Lab ID: 60135088018** Collected: 12/06/12 14:30 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**14000**	ug/L	150	50.0	2	12/13/12 10:00	12/20/12 11:18	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/13/12 10:00	12/20/12 11:18	7440-36-0	D3
Arsenic	**58.7**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 11:18	7440-38-2	
Barium	**3510**	ug/L	20.0	1.5	2	12/13/12 10:00	12/20/12 11:18	7440-39-3	
Beryllium	**1.3J**	ug/L	2.0	1.0	2	12/13/12 10:00	12/20/12 11:18	7440-41-7	
Cadmium	**138**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 11:18	7440-43-9	
Chromium	**20.9J**	ug/L	25.0	3.4	5	12/13/12 10:00	12/20/12 14:05	7440-47-3	B
Cobalt	**146**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 11:18	7440-48-4	
Copper	**441**	ug/L	50.0	5.0	5	12/13/12 10:00	12/20/12 14:05	7440-50-8	
Iron	**23300**	ug/L	100	34.4	2	12/13/12 10:00	12/20/12 11:18	7439-89-6	
Lead	**302**	ug/L	25.0	12.0	5	12/13/12 10:00	12/20/12 14:05	7439-92-1	B
Manganese	**65800**	ug/L	25.0	3.0	5	12/13/12 10:00	12/20/12 14:05	7439-96-5	
Molybdenum	**19.0J**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 11:18	7439-98-7	B
Nickel	**258**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 11:18	7440-02-0	
Selenium	ND	ug/L	75.0	13.5	5	12/13/12 10:00	12/20/12 14:05	7782-49-2	D3
Silver	**8.4J**	ug/L	14.0	2.6	2	12/13/12 10:00	12/20/12 11:18	7440-22-4	
Thallium	ND	ug/L	100	21.5	5	12/13/12 10:00	12/20/12 14:05	7440-28-0	D3
Vanadium	**272**	ug/L	50.0	6.0	5	12/13/12 10:00	12/20/12 14:05	7440-62-2	
Zinc	**12200**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 11:18	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD2A121206 LEACHATE **Lab ID: 60135088019** Collected: 12/06/12 14:00 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**27600**	ug/L	750	250	10	12/13/12 10:00	12/20/12 14:22	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/13/12 10:00	12/20/12 11:22	7440-36-0	D3
Arsenic	**38.3**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 11:22	7440-38-2	
Barium	**2760**	ug/L	100	7.7	10	12/13/12 10:00	12/20/12 14:22	7440-39-3	
Beryllium	**7.4J**	ug/L	10.0	5.0	10	12/13/12 10:00	12/20/12 14:22	7440-41-7	
Cadmium	**147**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 11:22	7440-43-9	
Chromium	**30.6J**	ug/L	50.0	6.9	10	12/13/12 10:00	12/20/12 14:22	7440-47-3	B
Cobalt	**260**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 11:22	7440-48-4	
Copper	**797**	ug/L	100	9.9	10	12/13/12 10:00	12/20/12 14:22	7440-50-8	
Iron	**59500**	ug/L	500	172	10	12/13/12 10:00	12/20/12 14:22	7439-89-6	
Lead	**579**	ug/L	50.0	24.0	10	12/13/12 10:00	12/20/12 14:22	7439-92-1	B
Manganese	**153000**	ug/L	50.0	6.0	10	12/13/12 10:00	12/20/12 14:22	7439-96-5	
Molybdenum	**48.2**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 11:22	7439-98-7	
Nickel	**263**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 11:22	7440-02-0	
Selenium	ND	ug/L	150	27.0	10	12/13/12 10:00	12/20/12 14:22	7782-49-2	D3
Silver	**22.1**	ug/L	14.0	2.6	2	12/13/12 10:00	12/20/12 11:22	7440-22-4	
Thallium	ND	ug/L	200	43.0	10	12/13/12 10:00	12/20/12 14:22	7440-28-0	D3
Vanadium	**264**	ug/L	100	12.0	10	12/13/12 10:00	12/20/12 14:22	7440-62-2	
Zinc	**38800**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 11:22	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD2B121206 LEACHATE **Lab ID: 60135088020** Collected: 12/06/12 14:25 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**11100**	ug/L	150	50.0	2	12/13/12 10:00	12/20/12 11:40	7429-90-5	
Antimony	ND	ug/L	50.0	15.5	5	12/13/12 10:00	12/20/12 14:08	7440-36-0	D3
Arsenic	**71.6**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 11:40	7440-38-2	
Barium	**3000**	ug/L	20.0	1.5	2	12/13/12 10:00	12/20/12 11:40	7440-39-3	
Beryllium	ND	ug/L	2.0	1.0	2	12/13/12 10:00	12/20/12 11:40	7440-41-7	D3
Cadmium	**171**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 11:40	7440-43-9	
Chromium	**18.2J**	ug/L	25.0	3.4	5	12/13/12 10:00	12/20/12 14:08	7440-47-3	B
Cobalt	**85.7**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 11:40	7440-48-4	
Copper	**623**	ug/L	50.0	5.0	5	12/13/12 10:00	12/20/12 14:08	7440-50-8	
Iron	**20800**	ug/L	100	34.4	2	12/13/12 10:00	12/20/12 11:40	7439-89-6	
Lead	**224**	ug/L	25.0	12.0	5	12/13/12 10:00	12/20/12 14:08	7439-92-1	B
Manganese	**61000**	ug/L	25.0	3.0	5	12/13/12 10:00	12/20/12 14:08	7439-96-5	
Molybdenum	**41.8**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 11:40	7439-98-7	
Nickel	**155**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 11:40	7440-02-0	
Selenium	ND	ug/L	75.0	13.5	5	12/13/12 10:00	12/20/12 14:08	7782-49-2	D3
Silver	**8.0J**	ug/L	35.0	6.5	5	12/13/12 10:00	12/20/12 14:08	7440-22-4	
Thallium	ND	ug/L	100	21.5	5	12/13/12 10:00	12/20/12 14:08	7440-28-0	D3
Vanadium	**293**	ug/L	50.0	6.0	5	12/13/12 10:00	12/20/12 14:08	7440-62-2	
Zinc	**24600**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 11:40	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9RD2C121206 LEACHATE **Lab ID: 60135088021** Collected: 12/06/12 14:40 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**15600**	ug/L	150	50.0	2	12/13/12 10:00	12/20/12 11:44	7429-90-5	
Antimony	ND	ug/L	200	62.0	20	12/13/12 10:00	12/20/12 14:26	7440-36-0	D3
Arsenic	**69.4**	ug/L	20.0	9.2	2	12/13/12 10:00	12/20/12 11:44	7440-38-2	
Barium	**4350**	ug/L	20.0	1.5	2	12/13/12 10:00	12/20/12 11:44	7440-39-3	
Beryllium	**2.6**	ug/L	2.0	1.0	2	12/13/12 10:00	12/20/12 11:44	7440-41-7	
Cadmium	**239**	ug/L	10.0	0.78	2	12/13/12 10:00	12/20/12 11:44	7440-43-9	
Chromium	**23.8J**	ug/L	100	13.8	20	12/13/12 10:00	12/20/12 14:26	7440-47-3	B
Cobalt	**312**	ug/L	10.0	1.5	2	12/13/12 10:00	12/20/12 11:44	7440-48-4	
Copper	**1260**	ug/L	200	19.8	20	12/13/12 10:00	12/20/12 14:26	7440-50-8	
Iron	**32700**	ug/L	100	34.4	2	12/13/12 10:00	12/20/12 11:44	7439-89-6	
Lead	**883**	ug/L	100	48.0	20	12/13/12 10:00	12/20/12 14:26	7439-92-1	B
Manganese	**218000**	ug/L	100	12.0	20	12/13/12 10:00	12/20/12 14:26	7439-96-5	
Molybdenum	**100**	ug/L	40.0	3.0	2	12/13/12 10:00	12/20/12 11:44	7439-98-7	
Nickel	**755**	ug/L	10.0	1.6	2	12/13/12 10:00	12/20/12 11:44	7440-02-0	
Selenium	ND	ug/L	300	54.0	20	12/13/12 10:00	12/20/12 14:26	7782-49-2	D3
Silver	ND	ug/L	140	26.0	20	12/13/12 10:00	12/20/12 14:26	7440-22-4	D3
Thallium	ND	ug/L	400	86.0	20	12/13/12 10:00	12/20/12 14:26	7440-28-0	D3
Vanadium	**1050**	ug/L	200	24.0	20	12/13/12 10:00	12/20/12 14:26	7440-62-2	
Zinc	**21200**	ug/L	100	14.6	2	12/13/12 10:00	12/20/12 11:44	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W1A121206 LEACHATE **Lab ID: 60135088022** Collected: 12/06/12 15:40 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**62500**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:30	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:30	7440-36-0	D3
Arsenic	**50.0**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:30	7440-38-2	
Barium	**3860**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 10:50	7440-39-3	
Beryllium	**7.5**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:30	7440-41-7	
Cadmium	**54.9**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 10:50	7440-43-9	
Chromium	**66.5**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 10:50	7440-47-3	B
Cobalt	**101**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 10:50	7440-48-4	
Copper	**773**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 10:50	7440-50-8	
Iron	**206000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:30	7439-89-6	
Lead	**1930**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 10:50	7439-92-1	
Manganese	**18400**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 10:50	7439-96-5	
Molybdenum	**15.5J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:30	7439-98-7	
Nickel	**216**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 10:50	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:30	7782-49-2	D3
Silver	**25.6**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:30	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:30	7440-28-0	D3
Vanadium	**356**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 10:50	7440-62-2	
Zinc	**7500**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 10:50	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W1B121206 LEACHATE **Lab ID: 60135088023** Collected: 12/06/12 15:50 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**62400**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:34	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:34	7440-36-0	D3
Arsenic	**55.6**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:34	7440-38-2	
Barium	**5020**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 10:53	7440-39-3	
Beryllium	**14.4**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:34	7440-41-7	
Cadmium	**239**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 10:53	7440-43-9	
Chromium	**71.3**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 10:53	7440-47-3	B
Cobalt	**172**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 10:53	7440-48-4	
Copper	**1350**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 10:53	7440-50-8	
Iron	**216000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:34	7439-89-6	
Lead	**1600**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 10:53	7439-92-1	
Manganese	**40600**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 10:53	7439-96-5	
Molybdenum	**14.9J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:34	7439-98-7	
Nickel	**297**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 10:53	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:34	7782-49-2	D3
Silver	**23.7**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:34	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:34	7440-28-0	D3
Vanadium	**372**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 10:53	7440-62-2	
Zinc	**36800**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 10:53	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W1C121206 LEACHATE **Lab ID: 60135088024** Collected: 12/06/12 16:00 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**58900**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:37	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:37	7440-36-0	D3
Arsenic	**52.8**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:37	7440-38-2	
Barium	**4440**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 10:56	7440-39-3	
Beryllium	**8.9**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:37	7440-41-7	
Cadmium	**77.0**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 10:56	7440-43-9	
Chromium	**81.8**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 10:56	7440-47-3	B
Cobalt	**121**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 10:56	7440-48-4	
Copper	**879**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 10:56	7440-50-8	
Iron	**197000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:37	7439-89-6	
Lead	**1720**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 10:56	7439-92-1	
Manganese	**24500**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 10:56	7439-96-5	
Molybdenum	**10.9J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:37	7439-98-7	
Nickel	**241**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 10:56	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:37	7782-49-2	D3
Silver	**22.6**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:37	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:37	7440-28-0	D3
Vanadium	**383**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 10:56	7440-62-2	
Zinc	**10400**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 10:56	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W2A121206 LEACHATE **Lab ID: 60135088025** Collected: 12/06/12 16:10 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**54700**	ug/L	750	250	10	12/17/12 16:45	12/19/12 11:03	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:41	7440-36-0	D3
Arsenic	**69.7**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:41	7440-38-2	
Barium	**2810**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:03	7440-39-3	
Beryllium	ND	ug/L	10.0	5.0	10	12/17/12 16:45	12/19/12 11:03	7440-41-7	D3
Cadmium	**44.8J**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:03	7440-43-9	
Chromium	**74.8**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:03	7440-47-3	B
Cobalt	**83.6**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:03	7440-48-4	
Copper	**895**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:03	7440-50-8	
Iron	**150000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:41	7439-89-6	
Lead	**1370**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:03	7439-92-1	
Manganese	**23700**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:03	7439-96-5	
Molybdenum	**11.7J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:41	7439-98-7	
Nickel	**158**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:03	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:41	7782-49-2	D3
Silver	ND	ug/L	70.0	13.0	10	12/17/12 16:45	12/19/12 11:03	7440-22-4	D3
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:41	7440-28-0	D3
Vanadium	**319**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:03	7440-62-2	
Zinc	**4670**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:03	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W2B121206 LEACHATE **Lab ID: 60135088026** Collected: 12/06/12 16:15 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**71500**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:44	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:44	7440-36-0	D3
Arsenic	**48.3**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:44	7440-38-2	
Barium	**5450**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:07	7440-39-3	
Beryllium	**10.6**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:44	7440-41-7	
Cadmium	**112**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:07	7440-43-9	
Chromium	**78.5**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:07	7440-47-3	B
Cobalt	**135**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:07	7440-48-4	
Copper	**945**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:07	7440-50-8	
Iron	**223000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:44	7439-89-6	
Lead	**1660**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:07	7439-92-1	
Manganese	**38800**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:07	7439-96-5	
Molybdenum	**7.4J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:44	7439-98-7	
Nickel	**274**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:07	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:44	7782-49-2	D3
Silver	**22.7**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:44	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:44	7440-28-0	D3
Vanadium	**424**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:07	7440-62-2	
Zinc	**15700**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:07	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W2C121206 LEACHATE **Lab ID: 60135088027** Collected: 12/06/12 16:25 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**54600**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:48	7429-90-5	
Antimony	**8.9J**	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:48	7440-36-0	
Arsenic	**46.9**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:48	7440-38-2	
Barium	**3620**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:10	7440-39-3	
Beryllium	**8.7**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:48	7440-41-7	
Cadmium	**99.4**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:10	7440-43-9	
Chromium	**66.0**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:10	7440-47-3	B
Cobalt	**113**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:10	7440-48-4	
Copper	**909**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:10	7440-50-8	
Iron	**170000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:48	7439-89-6	
Lead	**1300**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:10	7439-92-1	
Manganese	**22900**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:10	7439-96-5	
Molybdenum	**15.0J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:48	7439-98-7	
Nickel	**212**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:10	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:48	7782-49-2	D3
Silver	**21.1**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:48	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:48	7440-28-0	D3
Vanadium	**325**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:10	7440-62-2	
Zinc	**14200**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:10	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W3A121206 LEACHATE **Lab ID: 60135088028** Collected: 12/06/12 16:40 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**46300**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:51	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:51	7440-36-0	D3
Arsenic	**33.6**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:51	7440-38-2	
Barium	**3070**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:13	7440-39-3	
Beryllium	**5.7**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:51	7440-41-7	
Cadmium	**37.9J**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:13	7440-43-9	
Chromium	**55.0**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:13	7440-47-3	B
Cobalt	**70.0**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:13	7440-48-4	
Copper	**548**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:13	7440-50-8	
Iron	**127000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:51	7439-89-6	
Lead	**894**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:13	7439-92-1	
Manganese	**16000**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:13	7439-96-5	
Molybdenum	**3.9J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:51	7439-98-7	
Nickel	**168**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:13	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:51	7782-49-2	D3
Silver	**13.5J**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:51	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:51	7440-28-0	D3
Vanadium	**259**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:13	7440-62-2	
Zinc	**5350**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:13	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W3B121206 LEACHATE **Lab ID: 60135088029** Collected: 12/06/12 16:35 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**44100**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 17:55	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 17:55	7440-36-0	D3
Arsenic	**38.0**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 17:55	7440-38-2	
Barium	**2930**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:17	7440-39-3	
Beryllium	**8.7**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 17:55	7440-41-7	
Cadmium	**62.7**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:17	7440-43-9	
Chromium	**55.9**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:17	7440-47-3	B
Cobalt	**72.8**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:17	7440-48-4	
Copper	**673**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:17	7440-50-8	
Iron	**149000**	ug/L	100	34.4	2	12/17/12 16:45	12/18/12 17:55	7439-89-6	
Lead	**994**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:17	7439-92-1	
Manganese	**19200**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:17	7439-96-5	
Molybdenum	**5.0J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 17:55	7439-98-7	
Nickel	**164**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:17	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 17:55	7782-49-2	D3
Silver	**15.1**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 17:55	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 17:55	7440-28-0	D3
Vanadium	**288**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:17	7440-62-2	
Zinc	**8820**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:17	7440-66-6	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Sample: P9W3C121206 LEACHATE **Lab ID: 60135088030** Collected: 12/06/12 16:30 Received: 12/10/12 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**82800**	ug/L	150	50.0	2	12/17/12 16:45	12/18/12 18:05	7429-90-5	
Antimony	ND	ug/L	20.0	6.2	2	12/17/12 16:45	12/18/12 18:05	7440-36-0	D3
Arsenic	**54.9**	ug/L	20.0	9.2	2	12/17/12 16:45	12/18/12 18:05	7440-38-2	
Barium	**5520**	ug/L	100	7.7	10	12/17/12 16:45	12/19/12 11:27	7440-39-3	
Beryllium	**10.7**	ug/L	2.0	1.0	2	12/17/12 16:45	12/18/12 18:05	7440-41-7	
Cadmium	**92.2**	ug/L	50.0	3.9	10	12/17/12 16:45	12/19/12 11:27	7440-43-9	
Chromium	**100**	ug/L	50.0	6.9	10	12/17/12 16:45	12/19/12 11:27	7440-47-3	B
Cobalt	**151**	ug/L	50.0	7.6	10	12/17/12 16:45	12/19/12 11:27	7440-48-4	
Copper	**1100**	ug/L	100	9.9	10	12/17/12 16:45	12/19/12 11:27	7440-50-8	
Iron	**340000**	ug/L	500	172	10	12/17/12 16:45	12/19/12 11:27	7439-89-6	M6
Lead	**2160**	ug/L	50.0	24.0	10	12/17/12 16:45	12/19/12 11:27	7439-92-1	
Manganese	**32900**	ug/L	50.0	6.0	10	12/17/12 16:45	12/19/12 11:27	7439-96-5	M6
Molybdenum	**6.8J**	ug/L	40.0	3.0	2	12/17/12 16:45	12/18/12 18:05	7439-98-7	
Nickel	**341**	ug/L	50.0	8.0	10	12/17/12 16:45	12/19/12 11:27	7440-02-0	
Selenium	ND	ug/L	30.0	5.4	2	12/17/12 16:45	12/18/12 18:05	7782-49-2	D3
Silver	**29.2**	ug/L	14.0	2.6	2	12/17/12 16:45	12/18/12 18:05	7440-22-4	
Thallium	ND	ug/L	40.0	8.6	2	12/17/12 16:45	12/18/12 18:05	7440-28-0	D3,M1
Vanadium	**501**	ug/L	100	12.0	10	12/17/12 16:45	12/19/12 11:27	7440-62-2	
Zinc	**11500**	ug/L	500	73.0	10	12/17/12 16:45	12/19/12 11:27	7440-66-6	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

QC Batch: MPRP/20842 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60135088022, 60135088023, 60135088024, 60135088025, 60135088026, 60135088027, 60135088028, 60135088029, 60135088030

METHOD BLANK: 1113740 Matrix: Water
Associated Lab Samples: 60135088022, 60135088023, 60135088024, 60135088025, 60135088026, 60135088027, 60135088028, 60135088029, 60135088030

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	31.6J	75.0	12/18/12 17:23	
Antimony	ug/L	ND	10.0	12/18/12 17:23	
Arsenic	ug/L	ND	10.0	12/18/12 17:23	
Barium	ug/L	2.5J	10.0	12/18/12 17:23	
Beryllium	ug/L	ND	1.0	12/18/12 17:23	
Cadmium	ug/L	ND	5.0	12/18/12 17:23	
Chromium	ug/L	4.1J	5.0	12/19/12 10:46	
Cobalt	ug/L	ND	5.0	12/18/12 17:23	
Copper	ug/L	1.8J	10.0	12/18/12 17:23	
Iron	ug/L	278	50.0	12/18/12 17:23	
Lead	ug/L	7.7	5.0	12/19/12 10:46	
Manganese	ug/L	4.8J	5.0	12/18/12 17:23	
Molybdenum	ug/L	ND	20.0	12/18/12 17:23	
Nickel	ug/L	1.0J	5.0	12/18/12 17:23	
Selenium	ug/L	ND	15.0	12/18/12 17:23	
Silver	ug/L	ND	7.0	12/18/12 17:23	
Thallium	ug/L	ND	20.0	12/18/12 17:23	
Vanadium	ug/L	ND	10.0	12/18/12 17:23	
Zinc	ug/L	24.2J	50.0	12/18/12 17:23	

LABORATORY CONTROL SAMPLE: 1113741

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	10100	101	80-120	
Antimony	ug/L	1000	1030	103	80-120	
Arsenic	ug/L	1000	999	100	80-120	
Barium	ug/L	1000	980	98	80-120	
Beryllium	ug/L	1000	982	98	80-120	
Cadmium	ug/L	1000	998	100	80-120	
Chromium	ug/L	1000	996	100	80-120	
Cobalt	ug/L	1000	1030	103	80-120	
Copper	ug/L	1000	957	96	80-120	
Iron	ug/L	10000	9140	91	80-120	
Lead	ug/L	1000	992	99	80-120	
Manganese	ug/L	1000	973	97	80-120	
Molybdenum	ug/L	1000	1020	102	80-120	
Nickel	ug/L	1000	1030	103	80-120	
Selenium	ug/L	1000	984	98	80-120	
Silver	ug/L	500	480	96	80-120	
Thallium	ug/L	1000	1050	105	80-120	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

LABORATORY CONTROL SAMPLE: 1113741

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Vanadium	ug/L	1000	962	96	80-120	
Zinc	ug/L	1000	972	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1113783 1113784

Parameter	Units	60135088030 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	82800	10000	10000	92600	93000	97	102	75-125	0	20	
Antimony	ug/L	ND	1000	1000	828	811	83	81	75-125	2	20	
Arsenic	ug/L	54.9	1000	1000	885	874	83	82	75-125	1	20	
Barium	ug/L	5520	1000	1000	6590	6540	107	103	75-125	1	20	
Beryllium	ug/L	10.7	1000	1000	799	787	79	78	75-125	1	20	
Cadmium	ug/L	92.2	1000	1000	1030	1000	93	91	75-125	3	20	
Chromium	ug/L	100	1000	1000	990	958	89	86	75-125	3	20	
Cobalt	ug/L	151	1000	1000	1060	1030	90	88	75-125	2	20	
Copper	ug/L	1100	1000	1000	2060	2030	96	93	75-125	1	20	
Iron	ug/L	340000	10000	10000	358000	358000	186	180	75-125	0	20	M6
Lead	ug/L	2160	1000	1000	3070	3070	90	91	75-125	0	20	
Manganese	ug/L	32900	1000	1000	34500	34500	160	152	75-125	0	20	M6
Molybdenum	ug/L	6.8J	1000	1000	770	759	76	75	75-125	1	20	
Nickel	ug/L	341	1000	1000	1260	1240	92	90	75-125	2	20	
Selenium	ug/L	ND	1000	1000	800	797	80	80	75-125	0	20	
Silver	ug/L	29.2	500	500	428	422	80	79	75-125	1	20	
Thallium	ug/L	ND	1000	1000	662	648	66	65	75-125	2	20	2e,M1
Vanadium	ug/L	501	1000	1000	1420	1400	92	90	75-125	2	20	
Zinc	ug/L	11500	1000	1000	12600	12600	113	105	75-125	1	20	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

QC Batch: MPRP/20844 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60135088016, 60135088017, 60135088018, 60135088019, 60135088020, 60135088021

METHOD BLANK: 1113779 Matrix: Water
Associated Lab Samples: 60135088016, 60135088017, 60135088018, 60135088019, 60135088020, 60135088021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	75.0	12/20/12 13:41	
Antimony	ug/L	ND	10.0	12/20/12 13:41	
Arsenic	ug/L	ND	10.0	12/20/12 13:41	
Barium	ug/L	1.9J	10.0	12/20/12 13:41	
Beryllium	ug/L	ND	1.0	12/20/12 13:41	
Cadmium	ug/L	ND	5.0	12/20/12 13:41	
Chromium	ug/L	10.2	5.0	12/20/12 13:41	
Cobalt	ug/L	ND	5.0	12/20/12 13:41	
Copper	ug/L	1.2J	10.0	12/20/12 13:41	
Iron	ug/L	65.3	50.0	12/20/12 13:41	
Lead	ug/L	13.8	5.0	12/20/12 13:41	
Manganese	ug/L	0.91J	5.0	12/20/12 13:41	
Molybdenum	ug/L	1.7J	20.0	12/20/12 13:41	
Nickel	ug/L	5.2	5.0	12/20/12 13:41	
Selenium	ug/L	ND	15.0	12/20/12 13:41	
Silver	ug/L	ND	7.0	12/20/12 13:41	
Thallium	ug/L	ND	20.0	12/20/12 13:41	
Vanadium	ug/L	ND	10.0	12/20/12 13:41	
Zinc	ug/L	13.9J	50.0	12/20/12 13:41	

LABORATORY CONTROL SAMPLE: 1113780

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9730	97	80-120	
Antimony	ug/L	1000	951	95	80-120	
Arsenic	ug/L	1000	953	95	80-120	
Barium	ug/L	1000	958	96	80-120	
Beryllium	ug/L	1000	996	100	80-120	
Cadmium	ug/L	1000	961	96	80-120	
Chromium	ug/L	1000	1000	100	80-120	
Cobalt	ug/L	1000	996	100	80-120	
Copper	ug/L	1000	954	95	80-120	
Iron	ug/L	10000	9930	99	80-120	
Lead	ug/L	1000	1020	102	80-120	
Manganese	ug/L	1000	1010	101	80-120	
Molybdenum	ug/L	1000	991	99	80-120	
Nickel	ug/L	1000	1020	102	80-120	
Selenium	ug/L	1000	950	95	80-120	
Silver	ug/L	500	483	97	80-120	
Thallium	ug/L	1000	1010	101	80-120	
Vanadium	ug/L	1000	987	99	80-120	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

LABORATORY CONTROL SAMPLE: 1113780

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	1000	1030	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1113781 1113782

Parameter	Units	60135088016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	20700	10000	10000	32700	34000	120	133	75-125	4	20	1e,M1
Antimony	ug/L	ND	1000	1000	802	839	80	84	75-125	4	20	
Arsenic	ug/L	36.1	1000	1000	883	927	85	89	75-125	5	20	
Barium	ug/L	1780	1000	1000	2620	2660	85	88	75-125	1	20	
Beryllium	ug/L	6.8	1000	1000	841	860	83	85	75-125	2	20	
Cadmium	ug/L	114	1000	1000	947	990	83	88	75-125	4	20	
Chromium	ug/L	20.4	1000	1000	844	849	82	83	75-125	1	20	
Cobalt	ug/L	94.2	1000	1000	924	965	83	87	75-125	4	20	
Copper	ug/L	851	1000	1000	1720	1740	87	89	75-125	1	20	
Iron	ug/L	45100	10000	10000	53800	55800	86	107	75-125	4	20	
Lead	ug/L	3060	1000	1000	3840	3970	78	91	75-125	3	20	
Manganese	ug/L	50400	1000	1000	40000	51100	-1039	75	75-125	24	20	D6,M1
Molybdenum	ug/L	23.8J	1000	1000	872	915	85	89	75-125	5	20	
Nickel	ug/L	139	1000	1000	973	1010	83	87	75-125	4	20	
Selenium	ug/L	ND	1000	1000	37.2	44.3	3	4	75-125	17	20	3e,M1
Silver	ug/L	8.9J	500	500	416	419	81	82	75-125	1	20	
Thallium	ug/L	ND	1000	1000	802	843	80	84	75-125	5	20	
Vanadium	ug/L	157	1000	1000	969	976	81	82	75-125	1	20	
Zinc	ug/L	28300	1000	1000	28300	29000	2	74	75-125	3	20	M1

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QUALIFIERS

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	Post Digestion Spike Performed - 141% Recovery
2e	Post Digestion Spike Performed - 72.7% Recovery
3e	Post Digestion Spike Performed - 95.8% Recovery
B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Rico-Argentine Mine Site
Pace Project No.: 60135088

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60135088016	**P9RD1A121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088017	**P9RD1B121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088018	**P9RD1C121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088019	**P9RD2A121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088020	**P9RD2B121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088021	**P9RD2C121206 LEACHATE**	EPA 3010	MPRP/20844	EPA 6010	ICP/16910
60135088022	**P9W1A121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088023	**P9W1B121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088024	**P9W1C121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088025	**P9W2A121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088026	**P9W2B121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088027	**P9W2C121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088028	**P9W3A121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088029	**P9W3B121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927
60135088030	**P9W3C121206 LEACHATE**	EPA 3010	MPRP/20842	EPA 6010	ICP/16927

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60135088

60135088

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: On Coc Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☑ Zplc

Thermometer Used: T-191 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 5.3

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 12-8-12 BA

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: SL		13.
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☑No ☐N/A	17. List State: CO

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: 12/10/12

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1040	Start:
End: 1048	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level: Standard X ; Full Data Package ___

6013508B

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor		No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Acid Extractable Metals-see notes (SW3020/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)			IZPLC		MS/MSD	HOLD	Comments
	P9RD1a121206	12/6/2012	13:45	X				1	X						X	X						X	001/016	Leachate according to project specific
	P9RD1b121206	12/6/2012	14:15	X				1	X						X	X							002/017	SOPs provided. Following leachate, total
	P9RD1c121206	12/6/2012	14:30	X				1	X						X	X							003/018	metals are: Ag, Al, As, Ba, Be, Cd, Co,
	P9RD2a121206	12/6/2012	14:00	X				1	X						X	X							004/019	Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Tl,
	P9RD2b121206	12/6/2012	14:25	X				1	X						X	X							005/020	V, Zn
	P9RD2c121206	12/6/2012	14:40	X				1	X						X	X							006/021	

Sampler's Name: Hallie Bevan Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	Hallie B Simpson / AMEC	12/7/12	13:30	Bennett Clews	12-8-12	815
Shipment Method: UPS Ship Date: 12/7/2012						
Shipment Tracking No: 1Z9AE5810294371664						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: (Yes) / No | Temp Blank: (Yes) / No | Cooler Temp on Receipt: 5.3 °F/C | Trip Blank: Yes / (No) | MS/MSD Sample Submitted: (Yes) / No

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC X Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix:	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Acid Extractable Metals-see notes (SW3020/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)					MS/MSD	HOLD
	P9W1a121206	12/6/2012	15:40	X				1	X						X		X		12 PLC				022/22
	P9W1b121206	12/6/2012	15:50	X				1	X						X		X						023/23
	P9W1c121206	12/6/2012	16:00	X				1	X						X		X						024/24
	P9W2a121206	12/6/2012	16:10	X				1	X						X		X						025/25
	P9W2b121206	12/6/2012	16:15	X				1	X						X		X						026/26
	P9W2c121206	12/6/2012	16:25	X				1	X						X		X						027/27
	P9W3a121206	12/6/2012	16:40	X				1	X						X		X						028/28
	P9W3b121206	12/6/2012	16:35	X				1	X						X		X						029/29
	P9W3c121206	12/6/2012	16:30	X				1	X						X		X					X	030/30

60185088

Report Type & QC Level
Standard X
Full Data Package ___

Comments
Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Leachate according to project specific SOPs provided. Following leachate, total metals are: Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb Sb, Se, Tl, V, Zn

Sampler's Name: Hallie Bevan Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	Hallie Simpson / AMEC	12/7/12	13:30	Brandi Cole	12/8/12	8:15
Shipment Method: UPS Ship Date: 12/7/2012						
Shipment Tracking No: 1Z9AE5810294371664						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

January 17, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on January 05, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60136397001	**ROCK DRAIN IN 130104**	Water	01/04/13 11:25	01/05/13 08:50
60136397002	**ROCK DRAIN MP 130104**	Water	01/04/13 12:35	01/05/13 08:50
60136397003	**WETLAND OUT 130104**	Water	01/04/13 13:00	01/05/13 08:50

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SAMPLE ANALYTE COUNT

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60136397001	**ROCK DRAIN IN 130104**	EPA 200.7	TDS	5
		EPA 200.7	SMW, TDS	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60136397002	**ROCK DRAIN MP 130104**	EPA 200.7	TDS	5
		EPA 200.7	SMW, TDS	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		EPA 300.0	AJM	1
60136397003	**WETLAND OUT 130104**	EPA 200.7	TDS	5
		EPA 200.7	SMW, TDS	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: January 17, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21068

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136397001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1122744)
  - Calcium
- MSD (Lab ID: 1122745)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: January 17, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21067

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136397001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1122740)
  - Calcium, Dissolved
- MSD (Lab ID: 1122741)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 17, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21066

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136397001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1122736)
  - Manganese
- MSD (Lab ID: 1122737)
  - Manganese
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21066

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130104 (Lab ID: 60136397001)
  - Silver

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 17, 2013

Analyte Comments:

QC Batch: MPRP/21066

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130104 (Lab ID: 60136397002)
  - Silver
- WETLAND OUT 130104 (Lab ID: 60136397003)
  - Silver
  - Molybdenum

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 17, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21065

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136397001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1122733)
  - Manganese, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21065

1e: Dissolved result is greater than the total. Data was confirmed.

- ROCK DRAIN MP 130104 (Lab ID: 60136397002)
  - Manganese, Dissolved

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130104 (Lab ID: 60136397001)
  - Silver, Dissolved

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 17, 2013

Analyte Comments:

QC Batch: MPRP/21065

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130104 (Lab ID: 60136397001)
  - Thallium, Dissolved
- ROCK DRAIN MP 130104 (Lab ID: 60136397002)
  - Silver, Dissolved
  - Lead, Dissolved
  - Thallium, Dissolved
- WETLAND OUT 130104 (Lab ID: 60136397003)
  - Silver, Dissolved
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: January 17, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: January 17, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: January 17, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/23123

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130104 (Lab ID: 60136397001)
  - Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: ROCK DRAIN IN 130104 **Lab ID: 60136397001** Collected: 01/04/13 11:25 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**239000**	ug/L	200	71.6	2	01/07/13 10:30	01/15/13 09:33	7440-70-2	M1
Iron	**2760**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:33	7439-89-6	
Magnesium	**18800**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:33	7439-95-4	
Potassium	**21300**	ug/L	1000	128	2	01/07/13 10:30	01/15/13 09:33	7440-09-7	
Sodium	**12700**	ug/L	1000	80.2	2	01/07/13 10:30	01/16/13 12:13	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**242000**	ug/L	100	35.8	1	01/07/13 10:30	01/16/13 11:58	7440-70-2	D9,M1
Iron, Dissolved	ND	ug/L	50.0	17.2	1	01/07/13 10:30	01/16/13 11:58	7439-89-6	
Magnesium, Dissolved	**20700**	ug/L	100	34.4	2	01/07/13 10:30	01/11/13 11:56	7439-95-4	D9
Potassium, Dissolved	**21600**	ug/L	500	64.1	1	01/07/13 10:30	01/16/13 11:58	7440-09-7	D9
Sodium, Dissolved	**12300**	ug/L	500	40.1	1	01/07/13 10:30	01/16/13 11:58	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**270**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 13:12	7429-90-5	
Antimony	**0.28J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 13:12	7440-36-0	
Arsenic	**0.62J**	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 13:12	7440-38-2	
Barium	**22.5**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 13:12	7440-39-3	
Beryllium	**0.30J**	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 13:12	7440-41-7	
Cadmium	**12.5**	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 13:12	7440-43-9	
Chromium	**1.2**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 13:12	7440-47-3	
Cobalt	**2.5**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 13:12	7440-48-4	
Copper	**46.0**	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 13:12	7440-50-8	
Lead	**5.6**	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 13:12	7439-92-1	
Manganese	**1820**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 13:12	7439-96-5	M1
Molybdenum	**20.7**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 13:12	7439-98-7	
Nickel	**3.0**	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:12	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:12	7782-49-2	
Silver	**0.19J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 13:12	7440-22-4	B
Thallium	**0.12J**	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 13:12	7440-28-0	
Vanadium	**0.38J**	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 13:12	7440-62-2	
Zinc	**2390**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 13:12	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.7J**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 13:54	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 13:54	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 13:54	7440-38-2	
Barium, Dissolved	**19.4**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 13:54	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 13:54	7440-41-7	
Cadmium, Dissolved	**10.4**	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 13:54	7440-43-9	
Chromium, Dissolved	**0.54J**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 13:54	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 13:54	7440-48-4	
Copper, Dissolved	**2.2**	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 13:54	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 13:54	7439-92-1	
Manganese, Dissolved	**1710**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 13:54	7439-96-5	M1
Molybdenum, Dissolved	**19.7**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 13:54	7439-98-7	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: ROCK DRAIN IN 130104 **Lab ID: 60136397001** Collected: 01/04/13 11:25 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.6**	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:54	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:54	7782-49-2	
Silver, Dissolved	**0.18J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 13:54	7440-22-4	B
Thallium, Dissolved	**0.14J**	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 13:54	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 13:54	7440-62-2	
Zinc, Dissolved	**1970**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 13:54	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	01/05/13 10:09	01/10/13 15:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**639**	mg/L	50.0	3.0	50		01/09/13 15:17	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.81J**	mg/L	1.0	0.092	1		01/08/13 17:55	7440-44-0	B

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: ROCK DRAIN MP 130104 **Lab ID: 60136397002** Collected: 01/04/13 12:35 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**252000**	ug/L	200	71.6	2	01/07/13 10:30	01/15/13 09:38	7440-70-2	
Iron	**285**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:38	7439-89-6	
Magnesium	**21800**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:38	7439-95-4	
Potassium	**23000**	ug/L	1000	128	2	01/07/13 10:30	01/15/13 09:38	7440-09-7	
Sodium	**13800**	ug/L	1000	80.2	2	01/07/13 10:30	01/16/13 12:19	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**238000**	ug/L	100	35.8	1	01/07/13 10:30	01/16/13 12:00	7440-70-2	
Iron, Dissolved	**134**	ug/L	50.0	17.2	1	01/07/13 10:30	01/16/13 12:00	7439-89-6	
Magnesium, Dissolved	**22400**	ug/L	100	34.4	2	01/07/13 10:30	01/11/13 12:03	7439-95-4	D9
Potassium, Dissolved	**22600**	ug/L	500	64.1	1	01/07/13 10:30	01/16/13 12:00	7440-09-7	
Sodium, Dissolved	**13400**	ug/L	500	40.1	1	01/07/13 10:30	01/16/13 12:00	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**44.8J**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 13:29	7429-90-5	
Antimony	**0.26J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 13:29	7440-36-0	
Arsenic	**0.59J**	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 13:29	7440-38-2	
Barium	**35.2**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 13:29	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 13:29	7440-41-7	
Cadmium	**1.3**	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 13:29	7440-43-9	
Chromium	**0.45J**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 13:29	7440-47-3	
Cobalt	**0.51J**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 13:29	7440-48-4	
Copper	**2.7**	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 13:29	7440-50-8	
Lead	**0.54J**	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 13:29	7439-92-1	
Manganese	**3230**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 13:29	7439-96-5	
Molybdenum	**15.5**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 13:29	7439-98-7	
Nickel	**2.4**	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:29	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:29	7782-49-2	
Silver	**0.19J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 13:29	7440-22-4	B
Thallium	**0.078J**	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 13:29	7440-28-0	
Vanadium	**0.87J**	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 13:29	7440-62-2	
Zinc	**1230**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 13:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**16.2J**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 14:10	7429-90-5	
Antimony, Dissolved	**0.29J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 14:10	7440-36-0	
Arsenic, Dissolved	**0.46J**	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 14:10	7440-38-2	
Barium, Dissolved	**37.3**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 14:10	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 14:10	7440-41-7	
Cadmium, Dissolved	**0.57**	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 14:10	7440-43-9	
Chromium, Dissolved	**1.4**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 14:10	7440-47-3	D9
Cobalt, Dissolved	**0.49J**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 14:10	7440-48-4	
Copper, Dissolved	**1.3**	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 14:10	7440-50-8	
Lead, Dissolved	**0.20J**	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 14:10	7439-92-1	B
Manganese, Dissolved	**3950**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 14:10	7439-96-5	1e
Molybdenum, Dissolved	**15.7**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 14:10	7439-98-7	D9

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: ROCK DRAIN MP 130104 **Lab ID: 60136397002** Collected: 01/04/13 12:35 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.5**	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 14:10	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 14:10	7782-49-2	
Silver, Dissolved	**0.20J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 14:10	7440-22-4	B
Thallium, Dissolved	**0.063J**	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 14:10	7440-28-0	B
Vanadium, Dissolved	**0.86J**	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 14:10	7440-62-2	
Zinc, Dissolved	**1030**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 14:10	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**640**	mg/L	50.0	3.0	50		01/09/13 15:35	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: WETLAND OUT 130104 **Lab ID: 60136397003** Collected: 01/04/13 13:00 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**281000**	ug/L	200	71.6	2	01/07/13 10:30	01/15/13 09:40	7440-70-2	
Iron	**89.9J**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:40	7439-89-6	
Magnesium	**26800**	ug/L	100	34.4	2	01/07/13 10:30	01/15/13 09:40	7439-95-4	
Potassium	**30300**	ug/L	1000	128	2	01/07/13 10:30	01/15/13 09:40	7440-09-7	
Sodium	**13300**	ug/L	1000	80.2	2	01/07/13 10:30	01/16/13 12:20	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**306000**	ug/L	100	35.8	1	01/07/13 10:30	01/16/13 12:02	7440-70-2	D9
Iron, Dissolved	**17.2J**	ug/L	50.0	17.2	1	01/07/13 10:30	01/16/13 12:02	7439-89-6	
Magnesium, Dissolved	**29000**	ug/L	100	34.4	2	01/07/13 10:30	01/11/13 12:05	7439-95-4	D9
Potassium, Dissolved	**34000**	ug/L	500	64.1	1	01/07/13 10:30	01/16/13 12:02	7440-09-7	D9
Sodium, Dissolved	**14400**	ug/L	500	40.1	1	01/07/13 10:30	01/16/13 12:02	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**76.4**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 13:33	7429-90-5	
Antimony	**0.62J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 13:33	7440-36-0	
Arsenic	**10.8**	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 13:33	7440-38-2	
Barium	**114**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 13:33	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 13:33	7440-41-7	
Cadmium	**0.81**	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 13:33	7440-43-9	
Chromium	**0.71J**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 13:33	7440-47-3	
Cobalt	**0.30J**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 13:33	7440-48-4	
Copper	ND	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 13:33	7440-50-8	
Lead	**0.15J**	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 13:33	7439-92-1	
Manganese	**4800**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 13:33	7439-96-5	
Molybdenum	**0.21J**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 13:33	7439-98-7	B
Nickel	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:33	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 13:33	7782-49-2	
Silver	**0.098J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 13:33	7440-22-4	B
Thallium	ND	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 13:33	7440-28-0	
Vanadium	**2.3**	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 13:33	7440-62-2	
Zinc	**271**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 13:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**46.6J**	ug/L	50.0	5.2	1	01/07/13 10:30	01/15/13 14:14	7429-90-5	
Antimony, Dissolved	**0.86J**	ug/L	1.0	0.035	1	01/07/13 10:30	01/15/13 14:14	7440-36-0	
Arsenic, Dissolved	**8.2**	ug/L	1.0	0.14	1	01/07/13 10:30	01/15/13 14:14	7440-38-2	
Barium, Dissolved	**117**	ug/L	1.0	0.085	1	01/07/13 10:30	01/15/13 14:14	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/07/13 10:30	01/15/13 14:14	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/07/13 10:30	01/15/13 14:14	7440-43-9	
Chromium, Dissolved	**0.85J**	ug/L	1.0	0.11	1	01/07/13 10:30	01/15/13 14:14	7440-47-3	
Cobalt, Dissolved	**0.10J**	ug/L	1.0	0.048	1	01/07/13 10:30	01/15/13 14:14	7440-48-4	
Copper, Dissolved	**0.55J**	ug/L	1.0	0.45	1	01/07/13 10:30	01/15/13 14:14	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/07/13 10:30	01/15/13 14:14	7439-92-1	
Manganese, Dissolved	**4990**	ug/L	1.0	0.23	1	01/07/13 10:30	01/15/13 14:14	7439-96-5	D9
Molybdenum, Dissolved	**0.17J**	ug/L	1.0	0.16	1	01/07/13 10:30	01/15/13 14:14	7439-98-7	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Sample: WETLAND OUT 130104 **Lab ID: 60136397003** Collected: 01/04/13 13:00 Received: 01/05/13 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 14:14	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/07/13 10:30	01/15/13 14:14	7782-49-2	
Silver, Dissolved	**0.082J**	ug/L	0.50	0.059	1	01/07/13 10:30	01/15/13 14:14	7440-22-4	B
Thallium, Dissolved	ND	ug/L	1.0	0.022	1	01/07/13 10:30	01/15/13 14:14	7440-28-0	
Vanadium, Dissolved	**1.6**	ug/L	1.0	0.27	1	01/07/13 10:30	01/15/13 14:14	7440-62-2	
Zinc, Dissolved	**3.5J**	ug/L	10.0	1.6	1	01/07/13 10:30	01/15/13 14:14	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**112**	mg/L	2.0	2.0	1	01/05/13 10:19	01/10/13 15:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**600**	mg/L	50.0	3.0	50		01/09/13 15:52	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**28.1**	mg/L	1.0	0.092	1		01/08/13 17:27	7440-44-0	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: MPRP/21068 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60136397001, 60136397002, 60136397003

METHOD BLANK: 1122742 Matrix: Water
Associated Lab Samples: 60136397001, 60136397002, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	200	01/15/13 09:29	
Iron	ug/L	ND	100	01/15/13 09:29	
Magnesium	ug/L	ND	100	01/15/13 09:29	
Potassium	ug/L	ND	1000	01/15/13 09:29	
Sodium	ug/L	ND	1000	01/16/13 12:06	

LABORATORY CONTROL SAMPLE: 1122743

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	20000	18700	93	85-115	
Iron	ug/L	20000	19100	96	85-115	
Magnesium	ug/L	20000	18000	90	85-115	
Potassium	ug/L	20000	19000	95	85-115	
Sodium	ug/L	20000	19600	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1122744 1122745

Parameter	Units	60136397001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	239000	10000	10000	244000	258000	56	188	70-130	5	9	M1
Iron	ug/L	2760	10000	10000	12100	12800	93	100	70-130	6	10	
Magnesium	ug/L	18800	10000	10000	27100	29800	84	110	70-130	9	9	
Potassium	ug/L	21300	10000	10000	30700	31900	94	106	70-130	4	7	
Sodium	ug/L	12700	10000	10000	23100	23300	105	106	70-130	1	8	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: MPRP/21067 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60136397001, 60136397002, 60136397003

METHOD BLANK: 1122738 Matrix: Water
Associated Lab Samples: 60136397001, 60136397002, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	01/16/13 11:51	
Iron, Dissolved	ug/L	ND	50.0	01/16/13 11:51	
Magnesium, Dissolved	ug/L	ND	50.0	01/11/13 11:52	
Potassium, Dissolved	ug/L	ND	500	01/16/13 11:51	
Sodium, Dissolved	ug/L	ND	500	01/16/13 11:51	

LABORATORY CONTROL SAMPLE: 1122739

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10100	101	85-115	
Iron, Dissolved	ug/L	10000	10200	102	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	9910	99	85-115	
Sodium, Dissolved	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1122740 1122741

Parameter	Units	60136397001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	242000	10000	10000	255000	249000	133	66	70-130	3	9	M1
Iron, Dissolved	ug/L	ND	10000	10000	10000	9850	100	98	70-130	2	10	
Magnesium, Dissolved	ug/L	20700	10000	10000	29600	30000	89	94	70-130	2	9	
Potassium, Dissolved	ug/L	21600	10000	10000	31700	31500	102	100	70-130	1	7	
Sodium, Dissolved	ug/L	12300	10000	10000	22800	22500	105	103	70-130	1	8	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: MPRP/21066 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60136397001, 60136397002, 60136397003

METHOD BLANK: 1122734 Matrix: Water
Associated Lab Samples: 60136397001, 60136397002, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	01/15/13 13:04	
Antimony	ug/L	ND	2.0	01/15/13 13:04	
Arsenic	ug/L	ND	2.0	01/15/13 13:04	
Barium	ug/L	0.22J	2.0	01/15/13 13:04	
Beryllium	ug/L	ND	1.0	01/15/13 13:04	
Cadmium	ug/L	ND	1.0	01/15/13 13:04	
Chromium	ug/L	ND	2.0	01/15/13 13:04	
Cobalt	ug/L	ND	2.0	01/15/13 13:04	
Copper	ug/L	ND	2.0	01/15/13 13:04	
Lead	ug/L	ND	2.0	01/15/13 13:04	
Manganese	ug/L	ND	2.0	01/15/13 13:04	
Molybdenum	ug/L	ND	2.0	01/15/13 13:04	
Nickel	ug/L	ND	2.0	01/15/13 13:04	
Selenium	ug/L	ND	2.0	01/15/13 13:04	
Silver	ug/L	0.18J	1.0	01/15/13 13:04	
Thallium	ug/L	ND	2.0	01/15/13 13:04	
Vanadium	ug/L	ND	2.0	01/15/13 13:04	
Zinc	ug/L	ND	20.0	01/15/13 13:04	

LABORATORY CONTROL SAMPLE: 1122735

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	2000	1860	93	85-115	
Antimony	ug/L	80	80.8	101	85-115	
Arsenic	ug/L	80	78.8	98	85-115	
Barium	ug/L	80	77.4	97	85-115	
Beryllium	ug/L	80	76.2	95	85-115	
Cadmium	ug/L	80	78.9	99	85-115	
Chromium	ug/L	80	77.3	97	85-115	
Cobalt	ug/L	80	76.3	95	85-115	
Copper	ug/L	80	77.6	97	85-115	
Lead	ug/L	80	76.3	95	85-115	
Manganese	ug/L	80	78.0	97	85-115	
Molybdenum	ug/L	80	79.4	99	85-115	
Nickel	ug/L	80	78.4	98	85-115	
Selenium	ug/L	80	78.6	98	85-115	
Silver	ug/L	40	37.6	94	85-115	
Thallium	ug/L	80	76.2	95	85-115	
Vanadium	ug/L	80	78.1	98	85-115	
Zinc	ug/L	200	206	103	85-115	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1122736 1122737

Parameter	Units	60136397001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	270	1000	1000	1170	1190	90	92	70-130	1	20	
Antimony	ug/L	0.28J	40	40	40.4	40.3	100	100	70-130	0	20	
Arsenic	ug/L	0.62J	40	40	39.7	39.2	98	96	70-130	1	20	
Barium	ug/L	22.5	40	40	59.7	58.6	93	90	70-130	2	20	
Beryllium	ug/L	0.30J	40	40	35.3	35.6	88	88	70-130	1	20	
Cadmium	ug/L	12.5	40	40	50.8	50.2	96	94	70-130	1	20	
Chromium	ug/L	1.2	40	40	39.3	38.9	95	94	70-130	1	20	
Cobalt	ug/L	2.5	40	40	39.6	38.8	93	91	70-130	2	20	
Copper	ug/L	46.0	40	40	85.8	80.0	99	85	70-130	7	20	
Lead	ug/L	5.6	40	40	45.1	44.2	99	96	70-130	2	20	
Manganese	ug/L	1820	40	40	1880	1840	168	42	70-130	3	20	M1
Molybdenum	ug/L	20.7	40	40	62.2	61.1	104	101	70-130	2	20	
Nickel	ug/L	3.0	40	40	39.6	38.9	92	90	70-130	2	20	
Selenium	ug/L	ND	40	40	36.5	36.4	91	91	70-130	0	20	
Silver	ug/L	0.19J	20	20	18.2	18.0	90	89	70-130	1	20	
Thallium	ug/L	0.12J	40	40	39.0	38.6	97	96	70-130	1	20	
Vanadium	ug/L	0.38J	40	40	39.5	39.0	98	97	70-130	1	20	
Zinc	ug/L	2390	100	100	2500	2460	108	64	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: MPRP/21065 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60136397001, 60136397002, 60136397003

METHOD BLANK: 1122730 Matrix: Water
Associated Lab Samples: 60136397001, 60136397002, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	100	01/15/13 13:46	
Antimony, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Arsenic, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Barium, Dissolved	ug/L	0.22J	2.0	01/15/13 13:46	
Beryllium, Dissolved	ug/L	ND	1.0	01/15/13 13:46	
Cadmium, Dissolved	ug/L	ND	1.0	01/15/13 13:46	
Chromium, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Cobalt, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Copper, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Lead, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Manganese, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Molybdenum, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Nickel, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Selenium, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Silver, Dissolved	ug/L	0.18J	1.0	01/15/13 13:46	
Thallium, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Vanadium, Dissolved	ug/L	ND	2.0	01/15/13 13:46	
Zinc, Dissolved	ug/L	ND	20.0	01/15/13 13:46	

LABORATORY CONTROL SAMPLE: 1122731

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	2000	1950	97	85-115	
Antimony, Dissolved	ug/L	80	80.3	100	85-115	
Arsenic, Dissolved	ug/L	80	76.6	96	85-115	
Barium, Dissolved	ug/L	80	76.2	95	85-115	
Beryllium, Dissolved	ug/L	80	79.8	100	85-115	
Cadmium, Dissolved	ug/L	80	79.6	99	85-115	
Chromium, Dissolved	ug/L	80	77.7	97	85-115	
Cobalt, Dissolved	ug/L	80	75.9	95	85-115	
Copper, Dissolved	ug/L	80	75.9	95	85-115	
Lead, Dissolved	ug/L	80	77.1	96	85-115	
Manganese, Dissolved	ug/L	80	78.9	99	85-115	
Molybdenum, Dissolved	ug/L	80	79.7	100	85-115	
Nickel, Dissolved	ug/L	80	76.2	95	85-115	
Selenium, Dissolved	ug/L	80	79.0	99	85-115	
Silver, Dissolved	ug/L	40	37.5	94	85-115	
Thallium, Dissolved	ug/L	80	76.1	95	85-115	
Vanadium, Dissolved	ug/L	80	78.0	97	85-115	
Zinc, Dissolved	ug/L	200	208	104	85-115	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1122732 1122733

Parameter	Units	60136397001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	10.7J	1000	1000	939	934	93	92	70-130	1	20	
Antimony, Dissolved	ug/L	0.26J	40	40	40.1	39.9	100	99	70-130	1	20	
Arsenic, Dissolved	ug/L	ND	40	40	38.4	38.5	96	96	70-130	0	20	
Barium, Dissolved	ug/L	19.4	40	40	56.6	57.4	93	95	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.8	35.1	89	88	70-130	2	20	
Cadmium, Dissolved	ug/L	10.4	40	40	48.8	48.8	96	96	70-130	0	20	
Chromium, Dissolved	ug/L	0.54J	40	40	37.8	38.2	93	94	70-130	1	20	
Cobalt, Dissolved	ug/L	2.3	40	40	38.4	38.4	90	90	70-130	0	20	
Copper, Dissolved	ug/L	2.2	40	40	37.3	37.4	88	88	70-130	0	20	
Lead, Dissolved	ug/L	ND	40	40	38.6	38.9	96	97	70-130	1	20	
Manganese, Dissolved	ug/L	1710	40	40	1750	1770	102	145	70-130	1	20	M1
Molybdenum, Dissolved	ug/L	19.7	40	40	60.8	61.3	103	104	70-130	1	20	
Nickel, Dissolved	ug/L	2.6	40	40	38.3	38.7	89	90	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	37.2	36.6	93	91	70-130	2	20	
Silver, Dissolved	ug/L	0.18J	20	20	17.9	18.1	89	89	70-130	1	20	
Thallium, Dissolved	ug/L	0.14J	40	40	38.5	39.1	96	97	70-130	2	20	
Vanadium, Dissolved	ug/L	ND	40	40	38.5	38.5	96	96	70-130	0	20	
Zinc, Dissolved	ug/L	1970	100	100	2080	2080	106	108	70-130	0	20	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: WET/39130 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60136397001, 60136397003

METHOD BLANK: 1122361 Matrix: Water
Associated Lab Samples: 60136397001, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	01/10/13 14:57	

LABORATORY CONTROL SAMPLE: 1122362

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	176	89	85-115	

SAMPLE DUPLICATE: 1122363

Parameter	Units	60136275001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	111	108	2	17	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: WETA/23119 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60136397001, 60136397002, 60136397003

METHOD BLANK: 1123005 Matrix: Water
Associated Lab Samples: 60136397001, 60136397002, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/09/13 12:31	

LABORATORY CONTROL SAMPLE: 1123006

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1123007 1123008

Parameter	Units	60136397003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	600	250	250	789	845	76	98	61-119	7	10	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

QC Batch: WETA/23123 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60136397001, 60136397003

METHOD BLANK: 1123022 Matrix: Water
Associated Lab Samples: 60136397001, 60136397003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.45J	1.0	01/08/13 16:30	

LABORATORY CONTROL SAMPLE: 1123023

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.4	109	80-120	

MATRIX SPIKE SAMPLE: 1123024

Parameter	Units	60136433001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	ND	5	6.0	112	80-120	

SAMPLE DUPLICATE: 1123025

Parameter	Units	60136397001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	0.81J	1.8		25	

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QUALIFIERS

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	Dissolved result is greater than the total. Data was confirmed.
B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Rico-Argentine Mine Site
Pace Project No.: 60136397

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60136397001	**ROCK DRAIN IN 130104**	EPA 200.7	MPRP/21068	EPA 200.7	ICP/17039
60136397002	**ROCK DRAIN MP 130104**	EPA 200.7	MPRP/21068	EPA 200.7	ICP/17039
60136397003	**WETLAND OUT 130104**	EPA 200.7	MPRP/21068	EPA 200.7	ICP/17039
60136397001	**ROCK DRAIN IN 130104**	EPA 200.7	MPRP/21067	EPA 200.7	ICP/17038
60136397002	**ROCK DRAIN MP 130104**	EPA 200.7	MPRP/21067	EPA 200.7	ICP/17038
60136397003	**WETLAND OUT 130104**	EPA 200.7	MPRP/21067	EPA 200.7	ICP/17038
60136397001	**ROCK DRAIN IN 130104**	EPA 200.8	MPRP/21066	EPA 200.8	ICPM/1955
60136397002	**ROCK DRAIN MP 130104**	EPA 200.8	MPRP/21066	EPA 200.8	ICPM/1955
60136397003	**WETLAND OUT 130104**	EPA 200.8	MPRP/21066	EPA 200.8	ICPM/1955
60136397001	**ROCK DRAIN IN 130104**	EPA 200.8	MPRP/21065	EPA 200.8	ICPM/1954
60136397002	**ROCK DRAIN MP 130104**	EPA 200.8	MPRP/21065	EPA 200.8	ICPM/1954
60136397003	**WETLAND OUT 130104**	EPA 200.8	MPRP/21065	EPA 200.8	ICPM/1954
60136397001	**ROCK DRAIN IN 130104**	SM 5210B	WET/39130	SM 5210B	WET/39207
60136397003	**WETLAND OUT 130104**	SM 5210B	WET/39130	SM 5210B	WET/39207
60136397001	**ROCK DRAIN IN 130104**	EPA 300.0	WETA/23119		
60136397002	**ROCK DRAIN MP 130104**	EPA 300.0	WETA/23119		
60136397003	**WETLAND OUT 130104**	EPA 300.0	WETA/23119		
60136397001	**ROCK DRAIN IN 130104**	SM 5310C	WETA/23123		
60136397003	**WETLAND OUT 130104**	SM 5310C	WETA/23123		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60136397

60136397

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 7484 Pace Shipping Label Used? Yes ☑ No ☐ BA 1/5/13

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: T-193 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 2.3

Date and initials of person examining contents: 1/5/13 BA

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start:	Start:
End:	End:
Temp:	Temp:

Project Manager Review: AMW Date: 1/7/13

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number:

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0001 (WR 256704)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

60136397

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor		Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl		Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	Rock Drain IN 130104	1BP3N 1BP3F	1125		X			5	2	Ø	2	1	1BP3U	X	X	X	X	X	1BP1U	1AG3S		6A1/5/13 ~~1BP2U~~		Dissolved metals are field filtered. 001
	Rock Drain MP 130104	↓ ↓	1235		X			3	1	Ø	2	Ø		X	X	X						1BP2U		002
	Wetland Out 130104	↓ ↓	1300		X			5	2	Ø	2	1		X	X	X	X	X	1BP1U	1AG3S		↓		Metals are: Ca, Fe, K, Na, Mg (E200.7); 003
																								Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn,
																								Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

1/4/13

		Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Abby Cazier	[signature] / AMEC	1/4/12	1400	[signature]	1/5/13	850
Sampler's Company:	AMEC						
Shipment Method:	UPS Ship Date: 1/4/12						
Shipment Tracking No:	1Z733W87 221005 7484						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

January 24, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on January 10, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60136659001	**ROCK DRAIN 130109**	Water	01/09/13 11:05	01/10/13 10:20
60136659002	**ROCK DRAIN MP130109**	Water	01/09/13 12:45	01/10/13 10:20
60136659003	**WETLAND OUT130109**	Water	01/09/13 11:50	01/10/13 10:20
60136659004	**DUP130109**	Water	01/09/13 12:20	01/10/13 10:20

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60136659001	**ROCK DRAIN 130109**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60136659002	**ROCK DRAIN MP130109**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		EPA 300.0	AJM	1
60136659003	**WETLAND OUT130109**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60136659004	**DUP130109**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: January 24, 2013

General Information:
4 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: January 24, 2013

General Information:
4 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21149

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136659001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1124991)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 24, 2013

General Information:
4 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21152

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136659002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1125002)
  - Manganese
- MSD (Lab ID: 1125003)
  - Manganese
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21152

B: Analyte was detected in the associated method blank.

- DUP130109 (Lab ID: 60136659004)
  - Silver

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 24, 2013

Analyte Comments:

QC Batch: MPRP/21152

B: Analyte was detected in the associated method blank.

- DUP130109 (Lab ID: 60136659004)
  - Molybdenum
- ROCK DRAIN 130109 (Lab ID: 60136659001)
  - Silver
- ROCK DRAIN MP130109 (Lab ID: 60136659002)
  - Silver
- WETLAND OUT130109 (Lab ID: 60136659003)
  - Silver
  - Molybdenum

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 24, 2013

General Information:
4 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21151

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60136659001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1124998)
  - Manganese, Dissolved
- MSD (Lab ID: 1124999)
  - Manganese, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21151

B: Analyte was detected in the associated method blank.

- DUP130109 (Lab ID: 60136659004)
  - Silver, Dissolved
  - Molybdenum, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 24, 2013

Analyte Comments:

QC Batch: MPRP/21151

B: Analyte was detected in the associated method blank.

- DUP130109 (Lab ID: 60136659004)
  - Thallium, Dissolved
  - Zinc, Dissolved
- ROCK DRAIN 130109 (Lab ID: 60136659001)
  - Silver, Dissolved
  - Thallium, Dissolved
- ROCK DRAIN MP130109 (Lab ID: 60136659002)
  - Silver, Dissolved
  - Thallium, Dissolved
- WETLAND OUT130109 (Lab ID: 60136659003)
  - Silver, Dissolved
  - Molybdenum, Dissolved
  - Thallium, Dissolved
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: January 24, 2013

General Information:
3 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: January 24, 2013

General Information:
4 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: January 24, 2013

General Information:
3 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: ROCK DRAIN 130109 **Lab ID: 60136659001** Collected: 01/09/13 11:05 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**231000**	ug/L	200	71.6	2	01/11/13 13:10	01/17/13 15:04	7440-70-2	
Iron	**2230**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:04	7439-89-6	
Magnesium	**19500**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:04	7439-95-4	
Potassium	**19000**	ug/L	1000	128	2	01/11/13 13:10	01/17/13 15:04	7440-09-7	
Sodium	**12000**	ug/L	1000	80.2	2	01/11/13 13:10	01/17/13 15:04	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**229000**	ug/L	100	35.8	1	01/11/13 13:10	01/17/13 15:19	7440-70-2	M1
Iron, Dissolved	ND	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:19	7439-89-6	
Magnesium, Dissolved	**19000**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:19	7439-95-4	
Potassium, Dissolved	**19300**	ug/L	500	64.1	1	01/11/13 13:10	01/17/13 15:19	7440-09-7	D9
Sodium, Dissolved	**12200**	ug/L	500	40.1	1	01/11/13 13:10	01/17/13 15:19	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**189**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 09:49	7429-90-5	
Antimony	**0.28J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 09:49	7440-36-0	
Arsenic	**0.48J**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 09:49	7440-38-2	
Barium	**19.7**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 09:49	7440-39-3	
Beryllium	**0.26J**	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 09:49	7440-41-7	
Cadmium	**11.6**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 09:49	7440-43-9	
Chromium	**2.0**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 09:49	7440-47-3	
Cobalt	**2.4**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 09:49	7440-48-4	
Copper	**37.4**	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 09:49	7440-50-8	
Lead	**4.2**	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 09:49	7439-92-1	
Manganese	**1720**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 09:49	7439-96-5	
Molybdenum	**20.4**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 09:49	7439-98-7	
Nickel	**2.8**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 09:49	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 09:49	7782-49-2	
Silver	**0.22J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 09:49	7440-22-4	B
Thallium	**0.12J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 09:49	7440-28-0	
Vanadium	ND	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 09:49	7440-62-2	
Zinc	**2220**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 09:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**8.8J**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 10:39	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 10:39	7440-36-0	
Arsenic, Dissolved	**0.15J**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 10:39	7440-38-2	
Barium, Dissolved	**19.0**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 10:39	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 10:39	7440-41-7	
Cadmium, Dissolved	**9.6**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 10:39	7440-43-9	
Chromium, Dissolved	**1.1**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 10:39	7440-47-3	
Cobalt, Dissolved	**2.2**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 10:39	7440-48-4	
Copper, Dissolved	**2.3**	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 10:39	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 10:39	7439-92-1	
Manganese, Dissolved	**1640**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 10:39	7439-96-5	M1
Molybdenum, Dissolved	**19.2**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 10:39	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: ROCK DRAIN 130109 **Lab ID: 60136659001** Collected: 01/09/13 11:05 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.4**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:39	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:39	7782-49-2	
Silver, Dissolved	**0.21J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 10:39	7440-22-4	B
Thallium, Dissolved	**0.38J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 10:39	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 10:39	7440-62-2	
Zinc, Dissolved	**1810**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 10:39	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	01/11/13 10:35	01/16/13 12:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**632**	mg/L	50.0	3.0	50		01/15/13 17:51	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.98J**	mg/L	1.0	0.092	1		01/14/13 12:20	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: ROCK DRAIN MP130109 **Lab ID: 60136659002** Collected: 01/09/13 12:45 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**247000**	ug/L	200	71.6	2	01/11/13 13:10	01/17/13 15:12	7440-70-2	
Iron	**643**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:12	7439-89-6	
Magnesium	**22400**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:12	7439-95-4	
Potassium	**21300**	ug/L	1000	128	2	01/11/13 13:10	01/17/13 15:12	7440-09-7	
Sodium	**13900**	ug/L	1000	80.2	2	01/11/13 13:10	01/17/13 15:12	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**239000**	ug/L	100	35.8	1	01/11/13 13:10	01/17/13 15:25	7440-70-2	
Iron, Dissolved	**122**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:25	7439-89-6	
Magnesium, Dissolved	**21500**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:25	7439-95-4	
Potassium, Dissolved	**21400**	ug/L	500	64.1	1	01/11/13 13:10	01/17/13 15:25	7440-09-7	D9
Sodium, Dissolved	**14000**	ug/L	500	40.1	1	01/11/13 13:10	01/17/13 15:25	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**144**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 09:53	7429-90-5	
Antimony	**0.32J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 09:53	7440-36-0	
Arsenic	**0.83J**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 09:53	7440-38-2	
Barium	**36.4**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 09:53	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 09:53	7440-41-7	
Cadmium	**2.8**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 09:53	7440-43-9	
Chromium	**0.42J**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 09:53	7440-47-3	
Cobalt	**0.64J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 09:53	7440-48-4	
Copper	**5.8**	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 09:53	7440-50-8	
Lead	**1.4**	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 09:53	7439-92-1	
Manganese	**4560**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 09:53	7439-96-5	M1
Molybdenum	**16.2**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 09:53	7439-98-7	
Nickel	**2.6**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 09:53	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 09:53	7782-49-2	
Silver	**0.12J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 09:53	7440-22-4	B
Thallium	**0.053J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 09:53	7440-28-0	
Vanadium	**1.2**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 09:53	7440-62-2	
Zinc	**1140**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 09:53	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**6.2J**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 10:56	7429-90-5	
Antimony, Dissolved	**0.29J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 10:56	7440-36-0	
Arsenic, Dissolved	**0.42J**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 10:56	7440-38-2	
Barium, Dissolved	**32.3**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 10:56	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 10:56	7440-41-7	
Cadmium, Dissolved	**0.68**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 10:56	7440-43-9	
Chromium, Dissolved	**0.21J**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 10:56	7440-47-3	
Cobalt, Dissolved	**0.51J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 10:56	7440-48-4	
Copper, Dissolved	**0.58J**	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 10:56	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 10:56	7439-92-1	
Manganese, Dissolved	**4550**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 10:56	7439-96-5	
Molybdenum, Dissolved	**16.1**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 10:56	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: ROCK DRAIN MP130109 **Lab ID: 60136659002** Collected: 01/09/13 12:45 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.2**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:56	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:56	7782-49-2	
Silver, Dissolved	**0.20J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 10:56	7440-22-4	B
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 10:56	7440-28-0	B
Vanadium, Dissolved	**0.84J**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 10:56	7440-62-2	
Zinc, Dissolved	**970**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 10:56	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**623**	mg/L	50.0	3.0	50		01/15/13 18:44	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: WETLAND OUT130109 **Lab ID: 60136659003** Collected: 01/09/13 11:50 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**275000**	ug/L	200	71.6	2	01/11/13 13:10	01/17/13 15:14	7440-70-2	
Iron	**68.1J**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:14	7439-89-6	
Magnesium	**27100**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:14	7439-95-4	
Potassium	**30100**	ug/L	1000	128	2	01/11/13 13:10	01/17/13 15:14	7440-09-7	
Sodium	**13800**	ug/L	1000	80.2	2	01/11/13 13:10	01/17/13 15:14	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**271000**	ug/L	100	35.8	1	01/11/13 13:10	01/17/13 15:28	7440-70-2	
Iron, Dissolved	**28.8J**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:28	7439-89-6	
Magnesium, Dissolved	**26500**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:28	7439-95-4	
Potassium, Dissolved	**30500**	ug/L	500	64.1	1	01/11/13 13:10	01/17/13 15:28	7440-09-7	D9
Sodium, Dissolved	**13900**	ug/L	500	40.1	1	01/11/13 13:10	01/17/13 15:28	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**50.8**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 10:10	7429-90-5	
Antimony	**0.67J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 10:10	7440-36-0	
Arsenic	**11.2**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 10:10	7440-38-2	
Barium	**116**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 10:10	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 10:10	7440-41-7	
Cadmium	**0.69**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 10:10	7440-43-9	
Chromium	**0.58J**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 10:10	7440-47-3	
Cobalt	**0.28J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 10:10	7440-48-4	
Copper	ND	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 10:10	7440-50-8	
Lead	**0.16J**	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 10:10	7439-92-1	
Manganese	**4650**	ug/L	100	23.0	100	01/14/13 10:15	01/17/13 11:21	7439-96-5	
Molybdenum	**0.41J**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 10:10	7439-98-7	B
Nickel	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:10	7440-02-0	
Selenium	**9.0**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:10	7782-49-2	
Silver	**0.19J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 10:10	7440-22-4	B
Thallium	**0.049J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 10:10	7440-28-0	
Vanadium	**1.9**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 10:10	7440-62-2	
Zinc	**242**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 10:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**40.8J**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 11:00	7429-90-5	
Antimony, Dissolved	**0.54J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 11:00	7440-36-0	
Arsenic, Dissolved	**7.4**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 11:00	7440-38-2	
Barium, Dissolved	**115**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 11:00	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 11:00	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 11:00	7440-43-9	
Chromium, Dissolved	**1.6**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 11:00	7440-47-3	D9
Cobalt, Dissolved	**0.11J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 11:00	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 11:00	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 11:00	7439-92-1	
Manganese, Dissolved	**4600**	ug/L	100	23.0	100	01/14/13 10:15	01/17/13 11:29	7439-96-5	
Molybdenum, Dissolved	**0.31J**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 11:00	7439-98-7	B

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: WETLAND OUT130109 **Lab ID: 60136659003** Collected: 01/09/13 11:50 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 11:00	7440-02-0	
Selenium, Dissolved	**4.0**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 11:00	7782-49-2	
Silver, Dissolved	**0.11J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 11:00	7440-22-4	B
Thallium, Dissolved	**0.20J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 11:00	7440-28-0	B
Vanadium, Dissolved	**1.4**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 11:00	7440-62-2	
Zinc, Dissolved	**2.4J**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 11:00	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**118**	mg/L	2.0	2.0	1	01/11/13 10:52	01/16/13 12:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**616**	mg/L	50.0	3.0	50		01/15/13 19:02	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**25.5**	mg/L	1.0	0.092	1		01/14/13 12:06	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: DUP130109 **Lab ID: 60136659004** Collected: 01/09/13 12:20 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**274000**	ug/L	200	71.6	2	01/11/13 13:10	01/17/13 15:17	7440-70-2	
Iron	**61.1J**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:17	7439-89-6	
Magnesium	**27000**	ug/L	100	34.4	2	01/11/13 13:10	01/17/13 15:17	7439-95-4	
Potassium	**30200**	ug/L	1000	128	2	01/11/13 13:10	01/17/13 15:17	7440-09-7	
Sodium	**13700**	ug/L	1000	80.2	2	01/11/13 13:10	01/17/13 15:17	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**268000**	ug/L	100	35.8	1	01/11/13 13:10	01/17/13 15:30	7440-70-2	
Iron, Dissolved	**28.7J**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:30	7439-89-6	
Magnesium, Dissolved	**26200**	ug/L	50.0	17.2	1	01/11/13 13:10	01/17/13 15:30	7439-95-4	
Potassium, Dissolved	**30100**	ug/L	500	64.1	1	01/11/13 13:10	01/17/13 15:30	7440-09-7	
Sodium, Dissolved	**13700**	ug/L	500	40.1	1	01/11/13 13:10	01/17/13 15:30	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**44.5J**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 10:14	7429-90-5	
Antimony	**0.72J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 10:14	7440-36-0	
Arsenic	**11.1**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 10:14	7440-38-2	
Barium	**114**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 10:14	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 10:14	7440-41-7	
Cadmium	**0.64**	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 10:14	7440-43-9	
Chromium	**0.55J**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 10:14	7440-47-3	
Cobalt	**0.29J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 10:14	7440-48-4	
Copper	**0.80J**	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 10:14	7440-50-8	
Lead	**0.15J**	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 10:14	7439-92-1	
Manganese	**5000**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 10:14	7439-96-5	
Molybdenum	**0.33J**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 10:14	7439-98-7	B
Nickel	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:14	7440-02-0	
Selenium	**7.2**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 10:14	7782-49-2	
Silver	**0.10J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 10:14	7440-22-4	B
Thallium	ND	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 10:14	7440-28-0	
Vanadium	**1.8**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 10:14	7440-62-2	
Zinc	**241**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 10:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**42.6J**	ug/L	50.0	5.2	1	01/14/13 10:15	01/17/13 11:04	7429-90-5	
Antimony, Dissolved	**0.49J**	ug/L	1.0	0.035	1	01/14/13 10:15	01/17/13 11:04	7440-36-0	
Arsenic, Dissolved	**7.7**	ug/L	1.0	0.14	1	01/14/13 10:15	01/17/13 11:04	7440-38-2	
Barium, Dissolved	**113**	ug/L	1.0	0.085	1	01/14/13 10:15	01/17/13 11:04	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/14/13 10:15	01/17/13 11:04	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/14/13 10:15	01/17/13 11:04	7440-43-9	
Chromium, Dissolved	**0.78J**	ug/L	1.0	0.11	1	01/14/13 10:15	01/17/13 11:04	7440-47-3	
Cobalt, Dissolved	**0.12J**	ug/L	1.0	0.048	1	01/14/13 10:15	01/17/13 11:04	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.45	1	01/14/13 10:15	01/17/13 11:04	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/14/13 10:15	01/17/13 11:04	7439-92-1	
Manganese, Dissolved	**4970**	ug/L	1.0	0.23	1	01/14/13 10:15	01/17/13 11:04	7439-96-5	
Molybdenum, Dissolved	**0.27J**	ug/L	1.0	0.16	1	01/14/13 10:15	01/17/13 11:04	7439-98-7	B

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Sample: DUP130109 **Lab ID: 60136659004** Collected: 01/09/13 12:20 Received: 01/10/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 11:04	7440-02-0	
Selenium, Dissolved	**5.5**	ug/L	1.0	0.35	1	01/14/13 10:15	01/17/13 11:04	7782-49-2	
Silver, Dissolved	**0.091J**	ug/L	0.50	0.059	1	01/14/13 10:15	01/17/13 11:04	7440-22-4	B
Thallium, Dissolved	**0.066J**	ug/L	1.0	0.022	1	01/14/13 10:15	01/17/13 11:04	7440-28-0	B
Vanadium, Dissolved	**1.5**	ug/L	1.0	0.27	1	01/14/13 10:15	01/17/13 11:04	7440-62-2	
Zinc, Dissolved	**3.7J**	ug/L	10.0	1.6	1	01/14/13 10:15	01/17/13 11:04	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**453**	mg/L	2.0	2.0	1	01/11/13 12:13	01/16/13 14:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**621**	mg/L	50.0	3.0	50		01/15/13 19:20	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**25.0**	mg/L	1.0	0.092	1		01/14/13 11:52	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: MPRP/21150 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

METHOD BLANK: 1124992 Matrix: Water
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	01/17/13 14:59	
Iron	ug/L	ND	50.0	01/17/13 14:59	
Magnesium	ug/L	ND	50.0	01/17/13 14:59	
Potassium	ug/L	ND	500	01/17/13 14:59	
Sodium	ug/L	ND	500	01/17/13 14:59	

LABORATORY CONTROL SAMPLE: 1124993

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	5000	4850	97	85-115	
Iron	ug/L	5000	4980	100	85-115	
Magnesium	ug/L	5000	5080	102	85-115	
Potassium	ug/L	5000	4880	98	85-115	
Sodium	ug/L	5000	5230	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1124994 1124995

Parameter	Units	60136659001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	231000	10000	10000	242000	241000	106	94	70-130	0	9	
Iron	ug/L	2230	10000	10000	12100	12000	98	98	70-130	0	10	
Magnesium	ug/L	19500	10000	10000	29600	29300	101	99	70-130	1	9	
Potassium	ug/L	19000	10000	10000	29200	29100	102	101	70-130	1	7	
Sodium	ug/L	12000	10000	10000	22800	22700	108	107	70-130	1	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: MPRP/21149 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

METHOD BLANK: 1124988 Matrix: Water
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	01/17/13 14:22	
Iron, Dissolved	ug/L	ND	50.0	01/17/13 14:22	
Magnesium, Dissolved	ug/L	ND	50.0	01/17/13 14:22	
Potassium, Dissolved	ug/L	ND	500	01/17/13 14:22	
Sodium, Dissolved	ug/L	ND	500	01/17/13 14:22	

LABORATORY CONTROL SAMPLE: 1124989

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9710	97	85-115	
Iron, Dissolved	ug/L	10000	10000	100	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	9930	99	85-115	
Sodium, Dissolved	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1124990 1124991

Parameter	Units	60136659001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	229000	10000	10000	240000	249000	102	198	70-130	4	9	M1
Iron, Dissolved	ug/L	ND	10000	10000	10200	10000	101	100	70-130	1	10	
Magnesium, Dissolved	ug/L	19000	10000	10000	29500	30100	105	111	70-130	2	9	
Potassium, Dissolved	ug/L	19300	10000	10000	29300	30000	100	107	70-130	2	7	
Sodium, Dissolved	ug/L	12200	10000	10000	22800	23300	106	111	70-130	2	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: MPRP/21152 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

METHOD BLANK: 1125000 Matrix: Water
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	01/17/13 09:41	
Antimony	ug/L	ND	1.0	01/17/13 09:41	
Arsenic	ug/L	ND	1.0	01/17/13 09:41	
Barium	ug/L	ND	1.0	01/17/13 09:41	
Beryllium	ug/L	ND	0.50	01/17/13 09:41	
Cadmium	ug/L	ND	0.50	01/17/13 09:41	
Chromium	ug/L	ND	1.0	01/17/13 09:41	
Cobalt	ug/L	ND	1.0	01/17/13 09:41	
Copper	ug/L	ND	1.0	01/17/13 09:41	
Lead	ug/L	ND	1.0	01/17/13 09:41	
Manganese	ug/L	ND	1.0	01/17/13 09:41	
Molybdenum	ug/L	0.28J	1.0	01/17/13 09:41	
Nickel	ug/L	ND	1.0	01/17/13 09:41	
Selenium	ug/L	ND	1.0	01/17/13 09:41	
Silver	ug/L	0.11J	0.50	01/17/13 09:41	
Thallium	ug/L	ND	1.0	01/17/13 09:41	
Vanadium	ug/L	ND	1.0	01/17/13 09:41	
Zinc	ug/L	2.5J	10.0	01/17/13 09:41	

LABORATORY CONTROL SAMPLE: 1125001

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	923	92	85-115	
Antimony	ug/L	40	39.3	98	85-115	
Arsenic	ug/L	40	39.8	100	85-115	
Barium	ug/L	40	38.7	97	85-115	
Beryllium	ug/L	40	37.8	94	85-115	
Cadmium	ug/L	40	39.8	99	85-115	
Chromium	ug/L	40	39.6	99	85-115	
Cobalt	ug/L	40	39.3	98	85-115	
Copper	ug/L	40	39.3	98	85-115	
Lead	ug/L	40	38.9	97	85-115	
Manganese	ug/L	40	39.7	99	85-115	
Molybdenum	ug/L	40	39.8	99	85-115	
Nickel	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	41.0	102	85-115	
Silver	ug/L	20	19.3	97	85-115	
Thallium	ug/L	40	37.7	94	85-115	
Vanadium	ug/L	40	39.8	99	85-115	
Zinc	ug/L	100	105	105	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1125002 1125003

Parameter	Units	60136659002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	144	1000	1000	1090	1060	94	91	70-130	3	20	
Antimony	ug/L	0.32J	40	40	39.3	38.7	98	96	70-130	2	20	
Arsenic	ug/L	0.83J	40	40	39.6	39.0	97	95	70-130	2	20	
Barium	ug/L	36.4	40	40	74.6	72.2	95	90	70-130	3	20	
Beryllium	ug/L	ND	40	40	35.7	35.4	89	88	70-130	1	20	
Cadmium	ug/L	2.8	40	40	40.9	40.5	95	94	70-130	1	20	
Chromium	ug/L	0.42J	40	40	39.3	38.0	97	94	70-130	3	20	
Cobalt	ug/L	0.64J	40	40	38.1	37.1	94	91	70-130	3	20	
Copper	ug/L	5.8	40	40	42.0	40.8	90	88	70-130	3	20	
Lead	ug/L	1.4	40	40	40.9	39.6	99	95	70-130	3	20	
Manganese	ug/L	4560	40	40	4630	4360	170	-495	70-130	6	20	M1
Molybdenum	ug/L	16.2	40	40	58.1	55.9	105	99	70-130	4	20	
Nickel	ug/L	2.6	40	40	39.6	38.1	92	89	70-130	4	20	
Selenium	ug/L	ND	40	40	36.1	36.0	90	90	70-130	0	20	
Silver	ug/L	0.12J	20	20	18.7	18.4	93	91	70-130	2	20	
Thallium	ug/L	0.053J	40	40	38.2	37.4	95	93	70-130	2	20	
Vanadium	ug/L	1.2	40	40	40.7	39.5	99	96	70-130	3	20	
Zinc	ug/L	1140	100	100	1210	1170	70	31	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: MPRP/21151 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

METHOD BLANK: 1124996 Matrix: Water
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	01/17/13 10:31	
Antimony, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Arsenic, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Barium, Dissolved	ug/L	0.10J	1.0	01/17/13 10:31	
Beryllium, Dissolved	ug/L	ND	0.50	01/17/13 10:31	
Cadmium, Dissolved	ug/L	ND	0.50	01/17/13 10:31	
Chromium, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Cobalt, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Copper, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Lead, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Manganese, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Molybdenum, Dissolved	ug/L	0.21J	1.0	01/17/13 10:31	
Nickel, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Selenium, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Silver, Dissolved	ug/L	0.10J	0.50	01/17/13 10:31	
Thallium, Dissolved	ug/L	0.15J	1.0	01/17/13 10:31	
Vanadium, Dissolved	ug/L	ND	1.0	01/17/13 10:31	
Zinc, Dissolved	ug/L	1.8J	10.0	01/17/13 10:31	

LABORATORY CONTROL SAMPLE: 1124997

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	978	98	85-115	
Antimony, Dissolved	ug/L	40	39.6	99	85-115	
Arsenic, Dissolved	ug/L	40	39.0	97	85-115	
Barium, Dissolved	ug/L	40	38.4	96	85-115	
Beryllium, Dissolved	ug/L	40	41.5	104	85-115	
Cadmium, Dissolved	ug/L	40	40.5	101	85-115	
Chromium, Dissolved	ug/L	40	39.6	99	85-115	
Cobalt, Dissolved	ug/L	40	38.5	96	85-115	
Copper, Dissolved	ug/L	40	38.2	95	85-115	
Lead, Dissolved	ug/L	40	38.9	97	85-115	
Manganese, Dissolved	ug/L	40	39.7	99	85-115	
Molybdenum, Dissolved	ug/L	40	39.2	98	85-115	
Nickel, Dissolved	ug/L	40	38.5	96	85-115	
Selenium, Dissolved	ug/L	40	41.1	103	85-115	
Silver, Dissolved	ug/L	20	19.0	95	85-115	
Thallium, Dissolved	ug/L	40	36.8	92	85-115	
Vanadium, Dissolved	ug/L	40	38.7	97	85-115	
Zinc, Dissolved	ug/L	100	106	106	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1124998 1124999

Parameter	Units	60136659001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	8.8J	1000	1000	929	941	92	93	70-130	1	20	
Antimony, Dissolved	ug/L	0.26J	40	40	38.7	39.3	96	98	70-130	2	20	
Arsenic, Dissolved	ug/L	0.15J	40	40	38.4	38.5	96	96	70-130	0	20	
Barium, Dissolved	ug/L	19.0	40	40	55.6	56.2	92	93	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.9	36.1	90	90	70-130	1	20	
Cadmium, Dissolved	ug/L	9.6	40	40	47.6	48.2	95	97	70-130	1	20	
Chromium, Dissolved	ug/L	1.1	40	40	39.6	40.0	96	97	70-130	1	20	
Cobalt, Dissolved	ug/L	2.2	40	40	39.0	39.2	92	92	70-130	1	20	
Copper, Dissolved	ug/L	2.3	40	40	37.5	37.8	88	89	70-130	1	20	
Lead, Dissolved	ug/L	ND	40	40	38.6	39.3	96	98	70-130	2	20	
Manganese, Dissolved	ug/L	1640	40	40	1700	1720	132	182	70-130	1	20	M1
Molybdenum, Dissolved	ug/L	19.2	40	40	59.6	60.2	101	103	70-130	1	20	
Nickel, Dissolved	ug/L	2.4	40	40	38.3	39.0	90	92	70-130	2	20	
Selenium, Dissolved	ug/L	ND	40	40	36.0	36.1	90	90	70-130	0	20	
Silver, Dissolved	ug/L	0.21J	20	20	18.4	18.7	91	93	70-130	2	20	
Thallium, Dissolved	ug/L	0.38J	40	40	37.4	38.2	93	94	70-130	2	20	
Vanadium, Dissolved	ug/L	ND	40	40	38.8	39.0	97	98	70-130	1	20	
Zinc, Dissolved	ug/L	1810	100	100	1910	1930	107	127	70-130	1	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: WET/39215 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60136659001, 60136659003

METHOD BLANK: 1124781 Matrix: Water
Associated Lab Samples: 60136659001, 60136659003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	01/16/13 12:09	

LABORATORY CONTROL SAMPLE: 1124782

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	180	91	85-115	

SAMPLE DUPLICATE: 1124783

Parameter	Units	60136728001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	171	172	1	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: WET/39220
QC Batch Method: SM 5210B
Analysis Method: SM 5210B
Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60136659004

METHOD BLANK: 1124943 Matrix: Water
Associated Lab Samples: 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	01/16/13 14:15	

LABORATORY CONTROL SAMPLE: 1124944

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	176	89	85-115	

SAMPLE DUPLICATE: 1124945

Parameter	Units	60136615001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	3.0	ND		17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: WETA/23209 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

METHOD BLANK: 1126244 Matrix: Water
Associated Lab Samples: 60136659001, 60136659002, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/15/13 13:44	

LABORATORY CONTROL SAMPLE: 1126245

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE SAMPLE: 1126246

Parameter	Units	201057804 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	2020	1000	2900	88	61-119	

MATRIX SPIKE SAMPLE: 1126247

Parameter	Units	60136659001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	632	250	843	85	61-119	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

QC Batch: WETA/23166 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60136659001, 60136659003, 60136659004

METHOD BLANK: 1126250 Matrix: Water
Associated Lab Samples: 60136659001, 60136659003, 60136659004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	01/14/13 09:58	

LABORATORY CONTROL SAMPLE: 1126251

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.7	93	80-120	

MATRIX SPIKE SAMPLE: 1124737

Parameter	Units	60136657002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.7	5	8.0	105	80-120	

SAMPLE DUPLICATE: 1124738

Parameter	Units	60136626001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	0.93J	0.82J		25	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60136659

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60136659001	**ROCK DRAIN 130109**	EPA 200.7	MPRP/21150	EPA 200.7	ICP/17086
60136659002	**ROCK DRAIN MP130109**	EPA 200.7	MPRP/21150	EPA 200.7	ICP/17086
60136659003	**WETLAND OUT130109**	EPA 200.7	MPRP/21150	EPA 200.7	ICP/17086
60136659004	**DUP130109**	EPA 200.7	MPRP/21150	EPA 200.7	ICP/17086
60136659001	**ROCK DRAIN 130109**	EPA 200.7	MPRP/21149	EPA 200.7	ICP/17085
60136659002	**ROCK DRAIN MP130109**	EPA 200.7	MPRP/21149	EPA 200.7	ICP/17085
60136659003	**WETLAND OUT130109**	EPA 200.7	MPRP/21149	EPA 200.7	ICP/17085
60136659004	**DUP130109**	EPA 200.7	MPRP/21149	EPA 200.7	ICP/17085
60136659001	**ROCK DRAIN 130109**	EPA 200.8	MPRP/21152	EPA 200.8	ICPM/1973
60136659002	**ROCK DRAIN MP130109**	EPA 200.8	MPRP/21152	EPA 200.8	ICPM/1973
60136659003	**WETLAND OUT130109**	EPA 200.8	MPRP/21152	EPA 200.8	ICPM/1973
60136659004	**DUP130109**	EPA 200.8	MPRP/21152	EPA 200.8	ICPM/1973
60136659001	**ROCK DRAIN 130109**	EPA 200.8	MPRP/21151	EPA 200.8	ICPM/1972
60136659002	**ROCK DRAIN MP130109**	EPA 200.8	MPRP/21151	EPA 200.8	ICPM/1972
60136659003	**WETLAND OUT130109**	EPA 200.8	MPRP/21151	EPA 200.8	ICPM/1972
60136659004	**DUP130109**	EPA 200.8	MPRP/21151	EPA 200.8	ICPM/1972
60136659001	**ROCK DRAIN 130109**	SM 5210B	WET/39215	SM 5210B	WET/39287
60136659003	**WETLAND OUT130109**	SM 5210B	WET/39215	SM 5210B	WET/39287
60136659004	**DUP130109**	SM 5210B	WET/39220	SM 5210B	WET/39296
60136659001	**ROCK DRAIN 130109**	EPA 300.0	WETA/23209		
60136659002	**ROCK DRAIN MP130109**	EPA 300.0	WETA/23209		
60136659003	**WETLAND OUT130109**	EPA 300.0	WETA/23209		
60136659004	**DUP130109**	EPA 300.0	WETA/23209		
60136659001	**ROCK DRAIN 130109**	SM 5310C	WETA/23166		
60136659003	**WETLAND OUT130109**	SM 5310C	WETA/23166		
60136659004	**DUP130109**	SM 5310C	WETA/23166		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60136659

60136659

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 7493 Pace Shipping Label Used? Yes ☒ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☒ Bubble Bags ☐ Foam ☐ None ☐ Other ☐

Thermometer Used: T-191 / T-194 (T-112) **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 4-2

Date and initials of person examining contents: JM 1/10/13 1150

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☒N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: water		13.
All containers needing preservation have been checked.	☐Yes ☐No ☒N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☒N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed: MA / Lot # of added preservative:
Trip Blank present:	☐Yes ☐No ☒N/A	
Pace Trip Blank lot # (if purchased): MA		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☒N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMW Date: 1/10/13

Temp Log Record start and finish times when unpacking cooler. if >20 min, recheck sample temps.

Start:	1140	Start:	
End:	1150	End:	
Temp:		Temp:	

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lab... Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number:

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC X Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	MS/MSD	HOLD
	RockDrainIN 130109	1/9/13	1105		X		5	2	Ø	2	1	X	X	X	X	X	1(BP1N) 1(BP2N) 1(BP3N)-MS 1(BP3N)-MSD	
	RockDrain MP130109		1245		X		3	1	Ø	2	Ø	X	X	X			1(BP2N) 1(BP3N)-MS 1(BP3N)-MSD	
	Wetland Out 130109		1150		X		5	2	Ø	2	1	X	X	X	X	X	1(BP1N) 1(BP2N) 1(PA-B3) 1(BP3N)-MS 1(BP3N)-MSD	
	Dup 130109	1/9/13	1220		X		5	2	Ø	2	1	X	X	X	X	X		

Report Type & QC Level: Standard X; Full Data Package ___

60136659

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Dissolved metals are field filtered.

Metals are: Ca, Fe, K, Na, Mg (E200.7); Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

Sampler's Name: Abby Cazier	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date / Time
Sampler's Company: AMEC	Abby S / AMEC	1/9/13	1930	Tim Barbee	1/9/13 1400
Shipment Method: UPS Ship Date: 1/9/13					1/10/13 1020
Shipment Tracking No:					

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical Services, Inc.
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(913)599-5665

January 30, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on January 17, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60137058001	**ROCK DRAIN IN 130116**	Water	01/16/13 11:30	01/17/13 10:15
60137058002	**ROCK DRAIN MP 130116**	Water	01/16/13 12:15	01/17/13 10:15
60137058003	**WETLAND OUT 130116**	Water	01/16/13 13:15	01/17/13 10:15

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60137058001	**ROCK DRAIN IN 130116**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60137058002	**ROCK DRAIN MP 130116**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		EPA 300.0	AJM	1
60137058003	**WETLAND OUT 130116**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
		SM 5210B	NDL	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: January 30, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21215

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60137073003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1127406)
  - Calcium
  - Sodium
- MSD (Lab ID: 1127407)
  - Sodium

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: January 30, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 30, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21218

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60137058001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1127425)
  - Manganese
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 30, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21217

B: Analyte was detected in the associated method blank.
- ROCK DRAIN IN 130116 (Lab ID: 60137058001)
  - Thallium, Dissolved
- ROCK DRAIN MP 130116 (Lab ID: 60137058002)
  - Thallium, Dissolved
- WETLAND OUT 130116 (Lab ID: 60137058003)
  - Zinc, Dissolved

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
- WETLAND OUT 130116 (Lab ID: 60137058003)
  - Nickel, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: January 30, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: January 30, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: January 30, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WETA/23257

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
- DUP (Lab ID: 1128925)
  - Total Organic Carbon

Additional Comments:

Analyte Comments:

QC Batch: WETA/23257

B: Analyte was detected in the associated method blank.
- ROCK DRAIN IN 130116 (Lab ID: 60137058001)
  - Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: ROCK DRAIN IN 130116 **Lab ID: 60137058001** Collected: 01/16/13 11:30 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**256000**	ug/L	200	71.6	2	01/17/13 15:00	01/22/13 11:53	7440-70-2	
Iron	**2820**	ug/L	100	34.4	2	01/17/13 15:00	01/22/13 11:53	7439-89-6	
Magnesium	**21400**	ug/L	100	34.4	2	01/17/13 15:00	01/22/13 11:53	7439-95-4	
Potassium	**16200**	ug/L	1000	128	2	01/17/13 15:00	01/22/13 11:53	7440-09-7	
Sodium	**12300**	ug/L	1000	80.2	2	01/17/13 15:00	01/22/13 11:53	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**245000**	ug/L	100	35.8	1	01/17/13 15:00	01/23/13 12:13	7440-70-2	
Iron, Dissolved	ND	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:13	7439-89-6	
Magnesium, Dissolved	**20700**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:13	7439-95-4	
Potassium, Dissolved	**17000**	ug/L	500	64.1	1	01/17/13 15:00	01/23/13 12:13	7440-09-7	D9
Sodium, Dissolved	**12200**	ug/L	500	40.1	1	01/17/13 15:00	01/23/13 12:13	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**218**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 13:24	7429-90-5	
Antimony	**0.26J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 13:24	7440-36-0	
Arsenic	**0.58J**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 13:24	7440-38-2	
Barium	**19.6**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 13:24	7440-39-3	
Beryllium	**0.32J**	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 13:24	7440-41-7	
Cadmium	**11.7**	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 13:24	7440-43-9	
Chromium	**0.41J**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 13:24	7440-47-3	
Cobalt	**2.4**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 13:24	7440-48-4	
Copper	**46.2**	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 13:24	7440-50-8	
Lead	**5.1**	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 13:24	7439-92-1	
Manganese	**1710**	ug/L	1.0	0.23	1	01/17/13 15:00	01/23/13 13:24	7439-96-5	M1
Molybdenum	**18.9**	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 13:24	7439-98-7	
Nickel	**2.0**	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:24	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:24	7782-49-2	
Silver	**0.12J**	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 13:24	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 13:24	7440-28-0	
Vanadium	ND	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 13:24	7440-62-2	
Zinc	**2240**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 13:24	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**6.7J**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 17:22	7429-90-5	
Antimony, Dissolved	**0.23J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 14:15	7440-36-0	
Arsenic, Dissolved	**0.21J**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 14:15	7440-38-2	
Barium, Dissolved	**19.5**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 14:15	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 17:22	7440-41-7	
Cadmium, Dissolved	**10.2**	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 14:15	7440-43-9	
Chromium, Dissolved	**1.3**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 14:15	7440-47-3	D9
Cobalt, Dissolved	**2.4**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 14:15	7440-48-4	
Copper, Dissolved	**2.3**	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 14:15	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 14:15	7439-92-1	
Manganese, Dissolved	**1720**	ug/L	1.0	0.23	1	01/17/13 15:00	01/23/13 14:15	7439-96-5	D9
Molybdenum, Dissolved	**18.6**	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 14:15	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: ROCK DRAIN IN 130116 **Lab ID: 60137058001** Collected: 01/16/13 11:30 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.3**	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 14:15	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 14:15	7782-49-2	
Silver, Dissolved	**0.14J**	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 14:15	7440-22-4	
Thallium, Dissolved	**0.18J**	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 14:15	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 14:15	7440-62-2	
Zinc, Dissolved	**1940**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 14:15	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	01/18/13 10:59	01/23/13 15:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**632**	mg/L	50.0	3.0	50		01/18/13 13:40	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.33J**	mg/L	1.0	0.092	1		01/23/13 12:14	7440-44-0	B

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: ROCK DRAIN MP 130116 **Lab ID: 60137058002** Collected: 01/16/13 12:15 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**253000**	ug/L	200	71.6	2	01/17/13 15:00	01/22/13 11:55	7440-70-2	
Iron	**945**	ug/L	100	34.4	2	01/17/13 15:00	01/22/13 11:55	7439-89-6	
Magnesium	**25500**	ug/L	100	34.4	2	01/17/13 15:00	01/22/13 11:55	7439-95-4	
Potassium	**19800**	ug/L	1000	128	2	01/17/13 15:00	01/22/13 11:55	7440-09-7	
Sodium	**15100**	ug/L	1000	80.2	2	01/17/13 15:00	01/22/13 11:55	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**242000**	ug/L	100	35.8	1	01/17/13 15:00	01/23/13 12:21	7440-70-2	
Iron, Dissolved	**282**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:21	7439-89-6	
Magnesium, Dissolved	**24100**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:21	7439-95-4	
Potassium, Dissolved	**20700**	ug/L	500	64.1	1	01/17/13 15:00	01/23/13 12:21	7440-09-7	D9
Sodium, Dissolved	**15200**	ug/L	500	40.1	1	01/17/13 15:00	01/23/13 12:21	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**468**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 13:41	7429-90-5	
Antimony	**0.41J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 13:41	7440-36-0	
Arsenic	**1.6**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 13:41	7440-38-2	
Barium	**65.6**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 13:41	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 13:41	7440-41-7	
Cadmium	**3.0**	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 13:41	7440-43-9	
Chromium	**0.79J**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 13:41	7440-47-3	
Cobalt	**1.1**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 13:41	7440-48-4	
Copper	**7.4**	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 13:41	7440-50-8	
Lead	**2.8**	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 13:41	7439-92-1	
Manganese	**12800**	ug/L	200	46.0	200	01/17/13 15:00	01/23/13 13:55	7439-96-5	
Molybdenum	**12.8**	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 13:41	7439-98-7	
Nickel	**3.0**	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:41	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:41	7782-49-2	
Silver	**0.14J**	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 13:41	7440-22-4	
Thallium	**0.11J**	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 13:41	7440-28-0	
Vanadium	**3.4**	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 13:41	7440-62-2	
Zinc	**934**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 13:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.4J**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 17:24	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 14:32	7440-36-0	
Arsenic, Dissolved	**0.61J**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 14:32	7440-38-2	
Barium, Dissolved	**47.0**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 14:32	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 17:24	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 14:32	7440-43-9	
Chromium, Dissolved	**0.74J**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 14:32	7440-47-3	
Cobalt, Dissolved	**0.60J**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 14:32	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 14:32	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 14:32	7439-92-1	
Manganese, Dissolved	**10400**	ug/L	100	23.0	100	01/17/13 15:00	01/23/13 14:44	7439-96-5	M6
Molybdenum, Dissolved	**11.8**	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 14:32	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: ROCK DRAIN MP 130116 **Lab ID: 60137058002** Collected: 01/16/13 12:15 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.2**	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 14:32	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 14:32	7782-49-2	
Silver, Dissolved	**0.13J**	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 14:32	7440-22-4	
Thallium, Dissolved	**0.063J**	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 14:32	7440-28-0	B
Vanadium, Dissolved	**1.7**	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 14:32	7440-62-2	
Zinc, Dissolved	**516**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 14:32	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**611**	mg/L	50.0	3.0	50		01/18/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: WETLAND OUT 130116 **Lab ID: 60137058003** Collected: 01/16/13 13:15 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**273000**	ug/L	200	71.6	2	01/17/13 15:00	01/22/13 12:01	7440-70-2	
Iron	**62.4**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:26	7439-89-6	
Magnesium	**24600**	ug/L	100	34.4	2	01/17/13 15:00	01/22/13 12:01	7439-95-4	
Potassium	**24300**	ug/L	1000	128	2	01/17/13 15:00	01/22/13 12:01	7440-09-7	
Sodium	**12400**	ug/L	1000	80.2	2	01/17/13 15:00	01/22/13 12:01	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**270000**	ug/L	100	35.8	1	01/17/13 15:00	01/23/13 12:24	7440-70-2	
Iron, Dissolved	**25.9J**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:24	7439-89-6	
Magnesium, Dissolved	**24800**	ug/L	50.0	17.2	1	01/17/13 15:00	01/23/13 12:24	7439-95-4	D9
Potassium, Dissolved	**26600**	ug/L	500	64.1	1	01/17/13 15:00	01/23/13 12:24	7440-09-7	D9
Sodium, Dissolved	**13100**	ug/L	500	40.1	1	01/17/13 15:00	01/23/13 12:24	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**34.3J**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 13:45	7429-90-5	
Antimony	**0.56J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 13:45	7440-36-0	
Arsenic	**8.6**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 13:45	7440-38-2	
Barium	**115**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 13:45	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 13:45	7440-41-7	
Cadmium	**0.57**	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 13:45	7440-43-9	
Chromium	**0.57J**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 13:45	7440-47-3	
Cobalt	**0.23J**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 13:45	7440-48-4	
Copper	**0.45J**	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 13:45	7440-50-8	
Lead	**0.18J**	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 13:45	7439-92-1	
Manganese	**4010**	ug/L	1.0	0.23	1	01/17/13 15:00	01/23/13 13:45	7439-96-5	
Molybdenum	ND	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 13:45	7439-98-7	
Nickel	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:45	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 13:45	7782-49-2	
Silver	ND	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 13:45	7440-22-4	
Thallium	ND	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 13:45	7440-28-0	
Vanadium	**1.5**	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 13:45	7440-62-2	
Zinc	**219**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 13:45	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**30.3J**	ug/L	50.0	5.2	1	01/17/13 15:00	01/23/13 17:32	7429-90-5	
Antimony, Dissolved	**0.58J**	ug/L	1.0	0.035	1	01/17/13 15:00	01/23/13 14:36	7440-36-0	
Arsenic, Dissolved	**6.2**	ug/L	1.0	0.14	1	01/17/13 15:00	01/23/13 14:36	7440-38-2	
Barium, Dissolved	**116**	ug/L	1.0	0.085	1	01/17/13 15:00	01/23/13 14:36	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/17/13 15:00	01/23/13 17:32	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/17/13 15:00	01/23/13 14:36	7440-43-9	
Chromium, Dissolved	**0.57J**	ug/L	1.0	0.11	1	01/17/13 15:00	01/23/13 14:36	7440-47-3	
Cobalt, Dissolved	**0.083J**	ug/L	1.0	0.048	1	01/17/13 15:00	01/23/13 14:36	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.45	1	01/17/13 15:00	01/23/13 14:36	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/17/13 15:00	01/23/13 14:36	7439-92-1	
Manganese, Dissolved	**4050**	ug/L	1.0	0.23	1	01/17/13 15:00	01/23/13 14:36	7439-96-5	D9
Molybdenum, Dissolved	ND	ug/L	1.0	0.16	1	01/17/13 15:00	01/23/13 14:36	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Sample: WETLAND OUT 130116 **Lab ID: 60137058003** Collected: 01/16/13 13:15 Received: 01/17/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	2.0	0.70	2	01/17/13 15:00	01/24/13 12:27	7440-02-0	D3
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/17/13 15:00	01/23/13 14:36	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.059	1	01/17/13 15:00	01/23/13 14:36	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.022	1	01/17/13 15:00	01/23/13 14:36	7440-28-0	
Vanadium, Dissolved	**1.1**	ug/L	1.0	0.27	1	01/17/13 15:00	01/23/13 14:36	7440-62-2	
Zinc, Dissolved	**4.5J**	ug/L	10.0	1.6	1	01/17/13 15:00	01/23/13 14:36	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**109**	mg/L	2.0	2.0	1	01/18/13 11:22	01/23/13 15:23		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**592**	mg/L	50.0	3.0	50		01/18/13 14:33	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**21.2**	mg/L	1.0	0.092	1		01/23/13 12:57	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: MPRP/21215 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60137058001, 60137058002, 60137058003

METHOD BLANK: 1127404 Matrix: Water
Associated Lab Samples: 60137058001, 60137058002, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	41.9J	100	01/22/13 11:36	
Iron	ug/L	ND	50.0	01/22/13 11:36	
Magnesium	ug/L	ND	50.0	01/22/13 11:36	
Potassium	ug/L	ND	500	01/22/13 11:36	
Sodium	ug/L	ND	500	01/22/13 11:36	

LABORATORY CONTROL SAMPLE: 1127405

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10000	100	85-115	
Iron	ug/L	10000	10200	102	85-115	
Magnesium	ug/L	10000	10400	104	85-115	
Potassium	ug/L	10000	9770	98	85-115	
Sodium	ug/L	10000	10200	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127406 1127407

Parameter	Units	60137073003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	161 mg/L	10000	10000	167000	169000	62	83	70-130	1	9	M1
Iron	ug/L	2.8 mg/L	10000	10000	12900	12900	100	101	70-130	0	10	
Magnesium	ug/L	109 mg/L	10000	10000	117000	117000	80	74	70-130	1	9	
Potassium	ug/L	5.9 mg/L	10000	10000	16500	16500	105	106	70-130	0	7	
Sodium	ug/L	307 mg/L	10000	10000	313000	313000	60	56	70-130	0	8	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: MPRP/21216 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60137058001, 60137058002, 60137058003

METHOD BLANK: 1127409 Matrix: Water
Associated Lab Samples: 60137058001, 60137058002, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	01/23/13 12:09	
Iron, Dissolved	ug/L	ND	50.0	01/23/13 12:09	
Magnesium, Dissolved	ug/L	ND	50.0	01/23/13 12:09	
Potassium, Dissolved	ug/L	ND	500	01/23/13 12:09	
Sodium, Dissolved	ug/L	ND	500	01/23/13 12:09	

LABORATORY CONTROL SAMPLE: 1127410

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9590	96	85-115	
Iron, Dissolved	ug/L	10000	9870	99	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	9930	99	85-115	
Sodium, Dissolved	ug/L	10000	9840	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127411 1127412

Parameter	Units	60137058001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	245000	10000	10000	254000	257000	93	122	70-130	1	9	
Iron, Dissolved	ug/L	ND	10000	10000	9910	9990	99	100	70-130	1	10	
Magnesium, Dissolved	ug/L	20700	10000	10000	30800	31100	101	104	70-130	1	9	
Potassium, Dissolved	ug/L	17000	10000	10000	28200	28200	112	112	70-130	0	7	
Sodium, Dissolved	ug/L	12200	10000	10000	23300	23400	111	112	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: MPRP/21218 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60137058001, 60137058002, 60137058003

METHOD BLANK: 1127422 Matrix: Water
Associated Lab Samples: 60137058001, 60137058002, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	01/23/13 13:16	
Antimony	ug/L	ND	1.0	01/23/13 13:16	
Arsenic	ug/L	ND	1.0	01/23/13 13:16	
Barium	ug/L	0.094J	1.0	01/23/13 13:16	
Beryllium	ug/L	ND	0.50	01/23/13 13:16	
Cadmium	ug/L	ND	0.50	01/23/13 13:16	
Chromium	ug/L	ND	1.0	01/23/13 13:16	
Cobalt	ug/L	ND	1.0	01/23/13 13:16	
Copper	ug/L	ND	1.0	01/23/13 13:16	
Lead	ug/L	ND	1.0	01/23/13 13:16	
Manganese	ug/L	ND	1.0	01/23/13 13:16	
Molybdenum	ug/L	ND	1.0	01/23/13 13:16	
Nickel	ug/L	ND	1.0	01/23/13 13:16	
Selenium	ug/L	ND	1.0	01/23/13 13:16	
Silver	ug/L	ND	0.50	01/23/13 13:16	
Thallium	ug/L	ND	1.0	01/23/13 13:16	
Vanadium	ug/L	ND	1.0	01/23/13 13:16	
Zinc	ug/L	5.2J	10.0	01/23/13 13:16	

LABORATORY CONTROL SAMPLE: 1127423

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	986	99	85-115	
Antimony	ug/L	40	40.4	101	85-115	
Arsenic	ug/L	40	40.8	102	85-115	
Barium	ug/L	40	40.1	100	85-115	
Beryllium	ug/L	40	41.6	104	85-115	
Cadmium	ug/L	40	40.3	101	85-115	
Chromium	ug/L	40	40.6	101	85-115	
Cobalt	ug/L	40	39.8	100	85-115	
Copper	ug/L	40	40.2	100	85-115	
Lead	ug/L	40	39.8	100	85-115	
Manganese	ug/L	40	40.6	102	85-115	
Molybdenum	ug/L	40	40.7	102	85-115	
Nickel	ug/L	40	40.4	101	85-115	
Selenium	ug/L	40	41.3	103	85-115	
Silver	ug/L	20	19.5	97	85-115	
Thallium	ug/L	40	39.2	98	85-115	
Vanadium	ug/L	40	40.7	102	85-115	
Zinc	ug/L	100	112	112	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127424 1127425

Parameter	Units	60137058001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	218	1000	1000	1150	1170	93	95	70-130	1	20	
Antimony	ug/L	0.26J	40	40	40.2	40.4	100	100	70-130	0	20	
Arsenic	ug/L	0.58J	40	40	40.3	40.8	99	101	70-130	1	20	
Barium	ug/L	19.6	40	40	57.6	58.3	95	97	70-130	1	20	
Beryllium	ug/L	0.32J	40	40	37.9	37.8	94	94	70-130	0	20	
Cadmium	ug/L	11.7	40	40	50.3	50.9	96	98	70-130	1	20	
Chromium	ug/L	0.41J	40	40	39.8	40.1	99	99	70-130	1	20	
Cobalt	ug/L	2.4	40	40	39.9	40.0	94	94	70-130	0	20	
Copper	ug/L	46.2	40	40	82.5	83.3	91	93	70-130	1	20	
Lead	ug/L	5.1	40	40	44.6	45.1	99	100	70-130	1	20	
Manganese	ug/L	1710	40	40	1740	1780	95	190	70-130	2	20	M1
Molybdenum	ug/L	18.9	40	40	59.0	60.0	100	103	70-130	2	20	
Nickel	ug/L	2.0	40	40	39.2	39.2	93	93	70-130	0	20	
Selenium	ug/L	ND	40	40	38.1	38.0	95	95	70-130	0	20	
Silver	ug/L	0.12J	20	20	18.8	18.9	93	94	70-130	1	20	
Thallium	ug/L	0.14J	40	40	39.5	39.7	98	99	70-130	0	20	
Vanadium	ug/L	ND	40	40	40.2	40.2	100	100	70-130	0	20	
Zinc	ug/L	2240	100	100	2330	2380	86	135	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: MPRP/21217 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60137058001, 60137058002, 60137058003

METHOD BLANK: 1127414 Matrix: Water
Associated Lab Samples: 60137058001, 60137058002, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	01/23/13 17:17	
Antimony, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Arsenic, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Barium, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Beryllium, Dissolved	ug/L	ND	0.50	01/23/13 17:17	
Cadmium, Dissolved	ug/L	ND	0.50	01/23/13 14:07	
Chromium, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Cobalt, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Copper, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Lead, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Manganese, Dissolved	ug/L	0.25J	1.0	01/23/13 14:07	
Molybdenum, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Nickel, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Selenium, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Silver, Dissolved	ug/L	ND	0.50	01/23/13 14:07	
Thallium, Dissolved	ug/L	0.038J	1.0	01/23/13 14:07	
Vanadium, Dissolved	ug/L	ND	1.0	01/23/13 14:07	
Zinc, Dissolved	ug/L	3.0J	10.0	01/23/13 14:07	

LABORATORY CONTROL SAMPLE: 1127415

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	971	97	85-115	
Antimony, Dissolved	ug/L	40	40.6	101	85-115	
Arsenic, Dissolved	ug/L	40	40.7	102	85-115	
Barium, Dissolved	ug/L	40	39.8	99	85-115	
Beryllium, Dissolved	ug/L	40	40.3	101	85-115	
Cadmium, Dissolved	ug/L	40	40.5	101	85-115	
Chromium, Dissolved	ug/L	40	40.4	101	85-115	
Cobalt, Dissolved	ug/L	40	39.5	99	85-115	
Copper, Dissolved	ug/L	40	39.4	98	85-115	
Lead, Dissolved	ug/L	40	39.6	99	85-115	
Manganese, Dissolved	ug/L	40	40.9	102	85-115	
Molybdenum, Dissolved	ug/L	40	39.8	99	85-115	
Nickel, Dissolved	ug/L	40	39.2	98	85-115	
Selenium, Dissolved	ug/L	40	43.2	108	85-115	
Silver, Dissolved	ug/L	20	18.9	95	85-115	
Thallium, Dissolved	ug/L	40	39.2	98	85-115	
Vanadium, Dissolved	ug/L	40	40.0	100	85-115	
Zinc, Dissolved	ug/L	100	107	107	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127416 1127417

Parameter	Units	60137058002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	7.4J	1000	1000	930	931	92	92	70-130	0	20	
Antimony, Dissolved	ug/L	0.26J	40	40	41.1	40.6	102	101	70-130	1	20	
Arsenic, Dissolved	ug/L	0.61J	40	40	41.2	41.0	101	101	70-130	1	20	
Barium, Dissolved	ug/L	47.0	40	40	87.4	85.9	101	97	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	36.8	36.7	92	92	70-130	0	20	
Cadmium, Dissolved	ug/L	ND	40	40	39.1	39.1	97	98	70-130	0	20	
Chromium, Dissolved	ug/L	0.74J	40	40	40.5	39.6	99	97	70-130	2	20	
Cobalt, Dissolved	ug/L	0.60J	40	40	38.4	38.0	94	93	70-130	1	20	
Copper, Dissolved	ug/L	ND	40	40	36.4	35.9	90	89	70-130	1	20	
Lead, Dissolved	ug/L	ND	40	40	40.4	40.0	101	100	70-130	1	20	
Manganese, Dissolved	ug/L	10400	40	40	21200	20700	26975	25575	70-130	3	20	M6
Molybdenum, Dissolved	ug/L	11.8	40	40	54.5	54.1	107	106	70-130	1	20	
Nickel, Dissolved	ug/L	2.2	40	40	39.2	39.0	92	92	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	38.8	39.9	97	99	70-130	3	20	
Silver, Dissolved	ug/L	0.13J	20	20	19.0	19.0	94	95	70-130	0	20	
Thallium, Dissolved	ug/L	0.063J	40	40	40.0	39.8	100	99	70-130	1	20	
Vanadium, Dissolved	ug/L	1.7	40	40	42.2	41.8	101	100	70-130	1	20	
Zinc, Dissolved	ug/L	516	100	100	622	609	106	93	70-130	2	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: WET/39319 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60137058001, 60137058003

METHOD BLANK: 1127891 Matrix: Water
Associated Lab Samples: 60137058001, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	01/23/13 13:06	

LABORATORY CONTROL SAMPLE: 1127892

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	215	109	85-115	

SAMPLE DUPLICATE: 1127893

Parameter	Units	60137126001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	164	163	1	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: WETA/23240 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60137058001, 60137058002, 60137058003

METHOD BLANK: 1127858 Matrix: Water
Associated Lab Samples: 60137058001, 60137058002, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/18/13 10:26	

LABORATORY CONTROL SAMPLE: 1127859

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	97	90-110	

MATRIX SPIKE SAMPLE: 1127861

Parameter	Units	60137058001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	632	250	839	83	61-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127862 1127863

Parameter	Units	60137090001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	520	250	250	752	744	93	89	61-119	1	10	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

QC Batch: WETA/23257 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60137058001, 60137058003

METHOD BLANK: 1128922 Matrix: Water
Associated Lab Samples: 60137058001, 60137058003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.11J	1.0	01/23/13 09:24	

LABORATORY CONTROL SAMPLE: 1128923

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.9	98	80-120	

MATRIX SPIKE SAMPLE: 1128924

Parameter	Units	60137145008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	ND	5	5.9	105	80-120	

SAMPLE DUPLICATE: 1128925

Parameter	Units	60136996001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	12.6	3.9	105	25	D6

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60137058

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60137058001	**ROCK DRAIN IN 130116**	EPA 200.7	MPRP/21215	EPA 200.7	ICP/17125
60137058002	**ROCK DRAIN MP 130116**	EPA 200.7	MPRP/21215	EPA 200.7	ICP/17125
60137058003	**WETLAND OUT 130116**	EPA 200.7	MPRP/21215	EPA 200.7	ICP/17125
60137058001	**ROCK DRAIN IN 130116**	EPA 200.7	MPRP/21216	EPA 200.7	ICP/17126
60137058002	**ROCK DRAIN MP 130116**	EPA 200.7	MPRP/21216	EPA 200.7	ICP/17126
60137058003	**WETLAND OUT 130116**	EPA 200.7	MPRP/21216	EPA 200.7	ICP/17126
60137058001	**ROCK DRAIN IN 130116**	EPA 200.8	MPRP/21218	EPA 200.8	ICPM/1983
60137058002	**ROCK DRAIN MP 130116**	EPA 200.8	MPRP/21218	EPA 200.8	ICPM/1983
60137058003	**WETLAND OUT 130116**	EPA 200.8	MPRP/21218	EPA 200.8	ICPM/1983
60137058001	**ROCK DRAIN IN 130116**	EPA 200.8	MPRP/21217	EPA 200.8	ICPM/1982
60137058002	**ROCK DRAIN MP 130116**	EPA 200.8	MPRP/21217	EPA 200.8	ICPM/1982
60137058003	**WETLAND OUT 130116**	EPA 200.8	MPRP/21217	EPA 200.8	ICPM/1982
60137058001	**ROCK DRAIN IN 130116**	SM 5210B	WET/39319	SM 5210B	WET/39378
60137058003	**WETLAND OUT 130116**	SM 5210B	WET/39319	SM 5210B	WET/39378
60137058001	**ROCK DRAIN IN 130116**	EPA 300.0	WETA/23240		
60137058002	**ROCK DRAIN MP 130116**	EPA 300.0	WETA/23240		
60137058003	**WETLAND OUT 130116**	EPA 300.0	WETA/23240		
60137058001	**ROCK DRAIN IN 130116**	SM 5310C	WETA/23257		
60137058003	**WETLAND OUT 130116**	SM 5310C	WETA/23257		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60137058

60137058

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 4567 Pace Shipping Label Used? Yes ☒ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☒ Bubble Bags ☐ Foam ☐ None ☐ Other ☐

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1-6

Temperature should be above freezing to 6°C

Date and initials of person examining contents: JDS 1/17/13 1050

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☒N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix: water	☑Yes ☐No ☐N/A	13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed DF / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased): N/A	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start:	Start:
End:	End:
Temp:	Temp:

Project Manager Review: dmw Date: 1/17/13

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number:

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0001 (WR 256704)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

66137058

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	RockDrainIn130116	1/16/13	11:30		X		5	2	Ø	2	1	X	X	X	X	X	1(AE3S) 1(BP1N)	1(BP2N)	1(BP3N) 1.5	1(BP3F) 1.5		Dissolved metals are field filtered. a1
	RockDrainMP130116	1/16/13	12:15		X		3	1	Ø	2	Ø	X	X	X			1(BP2N)	1(BP3N) 1.5	1(BP3F) 1.5			a2
	WetlandOut130116	1/16/13	13:15		X		5	2	Ø	2	1	X	X	X	X	X	1(BP1N) 1(BP2N)	1(BP3N) 1(BP3F) 1.5	1(AE3S)			Metals are: Ca, Fe, K, Na, Mg (E200.7); a3
																						Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn,
																						Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: Hallie Bevan Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	Hallie M Simpson / AMEC	1/16/13	14:10	[signature] / Pace	1/17/13	1015
Shipment Method: UPS Ship Date: 1/16/13						
Shipment Tracking No: 1Z 733 W87 2210054567						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
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(913)599-5665

February 06, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60137346001	**ROCK DRAIN IN 130122**	Water	01/22/13 10:05	01/23/13 10:00
60137346002	**WETLANDOUT 130122**	Water	01/22/13 10:35	01/23/13 10:00
60137346003	**ROCK DRAIN MP 130122**	Water	01/22/13 11:20	01/23/13 10:00

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SAMPLE ANALYTE COUNT

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60137346001	**ROCK DRAIN IN 130122**	SM 5210B	JML	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60137346002	**WETLANDOUT 130122**	SM 5210B	JML	1
		EPA 300.0	AJM	1
		SM 5310C	SEL	1
60137346003	**ROCK DRAIN MP 130122**	EPA 300.0	AJM	1

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: February 06, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: February 06, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: February 06, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Sample: ROCK DRAIN IN 130122 **Lab ID: 60137346001** Collected: 01/22/13 10:05 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	01/24/13 09:52	01/29/13 09:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**626**	mg/L	50.0	9.0	50		01/27/13 22:40	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.33J**	mg/L	1.0	0.092	1		01/28/13 16:38	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Sample: WETLANDOUT 130122 **Lab ID: 60137346002** Collected: 01/22/13 10:35 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**94.9**	mg/L	2.0	2.0	1	01/24/13 10:00	01/29/13 09:21		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**589**	mg/L	50.0	9.0	50		01/27/13 22:56	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**20.2**	mg/L	1.0	0.092	1		01/28/13 17:21	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Sample: ROCK DRAIN MP 130122 **Lab ID: 60137346003** Collected: 01/22/13 11:20 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**641**	mg/L	50.0	9.0	50		01/27/13 23:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

QC Batch: WET/39391 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60137346001, 60137346002

METHOD BLANK: 1130030 Matrix: Water
Associated Lab Samples: 60137346001, 60137346002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	01/29/13 09:04	

LABORATORY CONTROL SAMPLE: 1130031

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	174	88	85-115	

SAMPLE DUPLICATE: 1130032

Parameter	Units	60137375001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	2.6	ND		17	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

QC Batch: WETA/23327 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60137346001, 60137346002, 60137346003

METHOD BLANK: 1131843 Matrix: Water
Associated Lab Samples: 60137346001, 60137346002, 60137346003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/27/13 16:18	

LABORATORY CONTROL SAMPLE: 1131844

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE SAMPLE: 1131845

Parameter	Units	60137289002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	1740	1000	2620	88	61-119	

MATRIX SPIKE SAMPLE: 1131846

Parameter	Units	60137346002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	589	250	794	82	61-119	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

QC Batch: WETA/23336 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60137346001, 60137346002

METHOD BLANK: 1131949 Matrix: Water
Associated Lab Samples: 60137346001, 60137346002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	01/28/13 12:23	

LABORATORY CONTROL SAMPLE: 1131950

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.9	97	80-120	

MATRIX SPIKE SAMPLE: 1131951

Parameter	Units	60137148001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	184	25	205	82	80-120	

SAMPLE DUPLICATE: 1131952

Parameter	Units	60137331003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	2.4	2.2	8	25	

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QUALIFIERS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137346

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60137346001	**ROCK DRAIN IN 130122**	SM 5210B	WET/39391	SM 5210B	WET/39465
60137346002	**WETLANDOUT 130122**	SM 5210B	WET/39391	SM 5210B	WET/39465
60137346001	**ROCK DRAIN IN 130122**	EPA 300.0	WETA/23327		
60137346002	**WETLANDOUT 130122**	EPA 300.0	WETA/23327		
60137346003	**ROCK DRAIN MP 130122**	EPA 300.0	WETA/23327		
60137346001	**ROCK DRAIN IN 130122**	SM 5310C	WETA/23336		
60137346002	**WETLANDOUT 130122**	SM 5310C	WETA/23336		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60137346

60137346

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W8 7221005 4558 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☐ No ☑ Seals intact: Yes ☐ No ☑

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ 2 PLC

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.8

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 1/23/13 BA

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	14.
Exceptions: VOA, coliform, (TOC) O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: TAMW Date: 1/23/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1105	Start:
End: 1110	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lab... Chain of Custody Record

Page 2 of 2

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Lab Work Order Number:
Rush TAT: Yes ___ No X

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0001 (WR 256704)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Matrix / No. Containers / Preservative / Requested Analyses

Report Type & QC Level: Standard X; Full Data Package ___

60137346

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	ROCKDRAININ130122	1/22/13	1005		X		3	2	1	Ø	Ø			X	X	X	2BP1U	1AG3S				Dissolved metals are field filtered. a1
	WETLANDOUT130122	1/22/13	1035		X		3	2	1	Ø	Ø			X	X	X	1BP1U	1BP2U ↓				a2
	ROCKDRAINMP130122	1/22/13	1120		X		3	1	Ø	Ø	Ø			X				↓				Metals are: Ca, Fe, K, Na, Mg (E200.7); a3
																						Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn,
																						Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

1/22/13

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name:	ABBY CAZIER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	AMEC	[signature] / AMEC	1/22/13	1152	[signature]	1/22/13	1152
Shipment Method:	UPS Ship Date: 1/22/13	[signature]	1/22/13	1210	[signature]	1/22/13	1210
Shipment Tracking No:	1Z733W8722100545 58	[signature] / AMEC	1/22/13	1300	[signature]	1/23/13	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

January 25, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Mary Jane Walls for
Heather Wilson
heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

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SAMPLE SUMMARY

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60137347001	**ROCK DRAIN IN 130122**	Water	01/22/13 10:05	01/23/13 10:00
60137347002	**WETLANDOUT 130122**	Water	01/22/13 10:35	01/23/13 10:00
60137347003	**ROCK DRAIN MP 130122**	Water	01/22/13 11:20	01/23/13 10:00

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SAMPLE ANALYTE COUNT

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60137347001	**ROCK DRAIN IN 130122**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
60137347002	**WETLANDOUT 130122**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18
60137347003	**ROCK DRAIN MP 130122**	EPA 200.7	SMW	5
		EPA 200.7	SMW	5
		EPA 200.8	JGP	18
		EPA 200.8	JGP	18

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: January 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21269

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60137347002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1129621)
  - Calcium
- MSD (Lab ID: 1129622)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: January 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21268

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60137347001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1129612)
  - Manganese
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21268

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130122 (Lab ID: 60137347001)
  - Thallium
- ROCK DRAIN MP 130122 (Lab ID: 60137347003)
  - Thallium

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: January 25, 2013

Analyte Comments:

QC Batch: MPRP/21268

B: Analyte was detected in the associated method blank.

- WETLANDOUT 130122 (Lab ID: 60137347002)
  - Molybdenum
  - Thallium

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21271

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60137347001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1129633)
  - Manganese, Dissolved
  - Zinc, Dissolved
- MSD (Lab ID: 1129634)
  - Manganese, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21271

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- WETLANDOUT 130122 (Lab ID: 60137347002)
  - Nickel, Dissolved

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: January 25, 2013

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: ROCK DRAIN IN 130122 **Lab ID: 60137347001** Collected: 01/22/13 10:05 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**243000**	ug/L	200	71.6	2	01/23/13 13:25	01/24/13 10:39	7440-70-2	
Iron	**2260**	ug/L	100	34.4	2	01/23/13 13:25	01/24/13 10:39	7439-89-6	
Magnesium	**20600**	ug/L	100	34.4	2	01/23/13 13:25	01/24/13 10:39	7439-95-4	
Potassium	**14000**	ug/L	1000	128	2	01/23/13 13:25	01/24/13 10:39	7440-09-7	
Sodium	**12000**	ug/L	1000	80.2	2	01/23/13 13:25	01/24/13 10:39	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**238000**	ug/L	100	35.8	1	01/23/13 13:25	01/24/13 10:07	7440-70-2	
Iron, Dissolved	ND	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:07	7439-89-6	
Magnesium, Dissolved	**19900**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:07	7439-95-4	
Potassium, Dissolved	**14000**	ug/L	500	64.1	1	01/23/13 13:25	01/24/13 10:07	7440-09-7	
Sodium, Dissolved	**12000**	ug/L	500	40.1	1	01/23/13 13:25	01/24/13 10:07	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**181**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 11:13	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 11:13	7440-36-0	
Arsenic	**0.48J**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 11:13	7440-38-2	
Barium	**19.2**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 11:13	7440-39-3	
Beryllium	**0.25J**	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 11:13	7440-41-7	
Cadmium	**10.6**	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 11:13	7440-43-9	
Chromium	**0.44J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 11:13	7440-47-3	
Cobalt	**2.3**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 11:13	7440-48-4	
Copper	**39.8**	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 11:13	7440-50-8	
Lead	**4.2**	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 11:13	7439-92-1	
Manganese	**1660**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 11:13	7439-96-5	M1
Molybdenum	**18.2**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 11:13	7439-98-7	
Nickel	**1.8**	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:13	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:13	7782-49-2	
Silver	**0.15J**	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 11:13	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 11:13	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 11:13	7440-62-2	
Zinc	**1930**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 11:13	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.2J**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 12:02	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 12:02	7440-36-0	
Arsenic, Dissolved	**0.25J**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 12:02	7440-38-2	
Barium, Dissolved	**19.8**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 12:02	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 12:02	7440-41-7	
Cadmium, Dissolved	**9.4**	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 12:02	7440-43-9	
Chromium, Dissolved	**0.28J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 12:02	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 12:02	7440-48-4	
Copper, Dissolved	**2.3**	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 12:02	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 12:02	7439-92-1	
Manganese, Dissolved	**1660**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 12:02	7439-96-5	M1
Molybdenum, Dissolved	**18.0**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 12:02	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: ROCK DRAIN IN 130122 **Lab ID: 60137347001** Collected: 01/22/13 10:05 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**1.7**	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 12:02	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 12:02	7782-49-2	
Silver, Dissolved	**0.12J**	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 12:02	7440-22-4	
Thallium, Dissolved	**0.15J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 12:02	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 12:02	7440-62-2	
Zinc, Dissolved	**1660**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 12:02	7440-66-6	M1

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: WETLANDOUT 130122 **Lab ID: 60137347002** Collected: 01/22/13 10:35 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**278000**	ug/L	200	71.6	2	01/23/13 13:25	01/24/13 10:41	7440-70-2	M1
Iron	**67.9**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 11:25	7439-89-6	
Magnesium	**24400**	ug/L	100	34.4	2	01/23/13 13:25	01/24/13 10:41	7439-95-4	
Potassium	**24400**	ug/L	1000	128	2	01/23/13 13:25	01/24/13 10:41	7440-09-7	
Sodium	**12800**	ug/L	1000	80.2	2	01/23/13 13:25	01/24/13 10:41	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**265000**	ug/L	100	35.8	1	01/23/13 13:25	01/24/13 10:11	7440-70-2	
Iron, Dissolved	**33.7J**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:11	7439-89-6	
Magnesium, Dissolved	**23300**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:11	7439-95-4	
Potassium, Dissolved	**24200**	ug/L	500	64.1	1	01/23/13 13:25	01/24/13 10:11	7440-09-7	
Sodium, Dissolved	**12900**	ug/L	500	40.1	1	01/23/13 13:25	01/24/13 10:11	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**46.0J**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 11:29	7429-90-5	
Antimony	**0.80J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 11:29	7440-36-0	
Arsenic	**8.8**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 11:29	7440-38-2	
Barium	**118**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 11:29	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 11:29	7440-41-7	
Cadmium	**0.48J**	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 11:29	7440-43-9	
Chromium	**0.69J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 11:29	7440-47-3	
Cobalt	**0.24J**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 11:29	7440-48-4	
Copper	ND	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 11:29	7440-50-8	
Lead	**0.14J**	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 11:29	7439-92-1	
Manganese	**3710**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 11:29	7439-96-5	
Molybdenum	**0.49J**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 11:29	7439-98-7	B
Nickel	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:29	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:29	7782-49-2	
Silver	**0.15J**	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 11:29	7440-22-4	
Thallium	**0.073J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 11:29	7440-28-0	B
Vanadium	**1.6**	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 11:29	7440-62-2	
Zinc	**181**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 11:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**30.8J**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 12:19	7429-90-5	
Antimony, Dissolved	**0.58J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 12:19	7440-36-0	
Arsenic, Dissolved	**6.1**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 12:19	7440-38-2	
Barium, Dissolved	**116**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 12:19	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 12:19	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 12:19	7440-43-9	
Chromium, Dissolved	**0.90J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 12:19	7440-47-3	
Cobalt, Dissolved	**0.084J**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 12:19	7440-48-4	
Copper, Dissolved	**0.46J**	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 12:19	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 12:19	7439-92-1	
Manganese, Dissolved	**3630**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 12:19	7439-96-5	
Molybdenum, Dissolved	**0.42J**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 12:19	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: WETLANDOUT 130122 **Lab ID: 60137347002** Collected: 01/22/13 10:35 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	2.0	0.70	2	01/23/13 13:25	01/24/13 12:31	7440-02-0	D3
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 12:19	7782-49-2	
Silver, Dissolved	**0.14J**	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 12:19	7440-22-4	
Thallium, Dissolved	**0.068J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 12:19	7440-28-0	
Vanadium, Dissolved	**1.1**	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 12:19	7440-62-2	
Zinc, Dissolved	**6.0J**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 12:19	7440-66-6	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: ROCK DRAIN MP 130122 **Lab ID: 60137347003** Collected: 01/22/13 11:20 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**238000**	ug/L	200	71.6	2	01/23/13 13:25	01/24/13 10:50	7440-70-2	
Iron	**389**	ug/L	100	34.4	2	01/23/13 13:25	01/24/13 10:50	7439-89-6	
Magnesium	**21200**	ug/L	100	34.4	2	01/23/13 13:25	01/24/13 10:50	7439-95-4	
Potassium	**15800**	ug/L	1000	128	2	01/23/13 13:25	01/24/13 10:50	7440-09-7	
Sodium	**12500**	ug/L	1000	80.2	2	01/23/13 13:25	01/24/13 10:50	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**238000**	ug/L	100	35.8	1	01/23/13 13:25	01/24/13 10:18	7440-70-2	D9
Iron, Dissolved	**57.3**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:18	7439-89-6	
Magnesium, Dissolved	**21000**	ug/L	50.0	17.2	1	01/23/13 13:25	01/24/13 10:18	7439-95-4	
Potassium, Dissolved	**16100**	ug/L	500	64.1	1	01/23/13 13:25	01/24/13 10:18	7440-09-7	D9
Sodium, Dissolved	**13000**	ug/L	500	40.1	1	01/23/13 13:25	01/24/13 10:18	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**63.2**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 11:33	7429-90-5	
Antimony	**0.26J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 11:33	7440-36-0	
Arsenic	**0.44J**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 11:33	7440-38-2	
Barium	**26.3**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 11:33	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 11:33	7440-41-7	
Cadmium	**3.6**	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 11:33	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 11:33	7440-47-3	
Cobalt	**0.34J**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 11:33	7440-48-4	
Copper	**4.3**	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 11:33	7440-50-8	
Lead	**0.79J**	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 11:33	7439-92-1	
Manganese	**2170**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 11:33	7439-96-5	
Molybdenum	**13.9**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 11:33	7439-98-7	
Nickel	**1.2**	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:33	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 11:33	7782-49-2	
Silver	ND	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 11:33	7440-22-4	
Thallium	**0.054J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 11:33	7440-28-0	B
Vanadium	**0.72J**	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 11:33	7440-62-2	
Zinc	**1010**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 11:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**5.4J**	ug/L	50.0	5.2	1	01/23/13 13:25	01/24/13 12:23	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.035	1	01/23/13 13:25	01/24/13 12:23	7440-36-0	
Arsenic, Dissolved	**0.34J**	ug/L	1.0	0.14	1	01/23/13 13:25	01/24/13 12:23	7440-38-2	
Barium, Dissolved	**25.4**	ug/L	1.0	0.085	1	01/23/13 13:25	01/24/13 12:23	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	01/23/13 13:25	01/24/13 12:23	7440-41-7	
Cadmium, Dissolved	**1.7**	ug/L	0.50	0.097	1	01/23/13 13:25	01/24/13 12:23	7440-43-9	
Chromium, Dissolved	**0.11J**	ug/L	1.0	0.11	1	01/23/13 13:25	01/24/13 12:23	7440-47-3	
Cobalt, Dissolved	**0.27J**	ug/L	1.0	0.048	1	01/23/13 13:25	01/24/13 12:23	7440-48-4	
Copper, Dissolved	**1.7**	ug/L	1.0	0.45	1	01/23/13 13:25	01/24/13 12:23	7440-50-8	
Lead, Dissolved	ND	ug/L	1.0	0.051	1	01/23/13 13:25	01/24/13 12:23	7439-92-1	
Manganese, Dissolved	**2080**	ug/L	1.0	0.23	1	01/23/13 13:25	01/24/13 12:23	7439-96-5	
Molybdenum, Dissolved	**13.8**	ug/L	1.0	0.16	1	01/23/13 13:25	01/24/13 12:23	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Sample: ROCK DRAIN MP 130122 **Lab ID: 60137347003** Collected: 01/22/13 11:20 Received: 01/23/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**1.0**	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 12:23	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	01/23/13 13:25	01/24/13 12:23	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.059	1	01/23/13 13:25	01/24/13 12:23	7440-22-4	
Thallium, Dissolved	**0.041J**	ug/L	1.0	0.022	1	01/23/13 13:25	01/24/13 12:23	7440-28-0	
Vanadium, Dissolved	**0.66J**	ug/L	1.0	0.27	1	01/23/13 13:25	01/24/13 12:23	7440-62-2	
Zinc, Dissolved	**950**	ug/L	10.0	1.6	1	01/23/13 13:25	01/24/13 12:23	7440-66-6	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

QC Batch: MPRP/21269 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60137347001, 60137347002, 60137347003

METHOD BLANK: 1129619 Matrix: Water
Associated Lab Samples: 60137347001, 60137347002, 60137347003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	01/24/13 10:03	
Iron	ug/L	ND	50.0	01/24/13 10:03	
Magnesium	ug/L	ND	50.0	01/24/13 10:03	
Potassium	ug/L	ND	500	01/24/13 10:03	
Sodium	ug/L	ND	500	01/24/13 10:03	

LABORATORY CONTROL SAMPLE: 1129620

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9710	97	85-115	
Iron	ug/L	10000	9830	98	85-115	
Magnesium	ug/L	10000	9990	100	85-115	
Potassium	ug/L	10000	9890	99	85-115	
Sodium	ug/L	10000	9800	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1129621 1129622

Parameter	Units	60137347002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	278000	10000	10000	284000	283000	66	58	70-130	0	9	M1
Iron	ug/L	67.9	10000	10000	9940	9830	99	98	70-130	1	10	
Magnesium	ug/L	24400	10000	10000	34200	34000	97	95	70-130	1	9	
Potassium	ug/L	24400	10000	10000	35100	35200	107	108	70-130	0	7	
Sodium	ug/L	12800	10000	10000	23400	23500	106	106	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

QC Batch: MPRP/21270 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60137347001, 60137347002, 60137347003

METHOD BLANK: 1129627 Matrix: Water
Associated Lab Samples: 60137347001, 60137347002, 60137347003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	01/24/13 10:03	
Iron, Dissolved	ug/L	ND	50.0	01/24/13 10:03	
Magnesium, Dissolved	ug/L	ND	50.0	01/24/13 10:03	
Potassium, Dissolved	ug/L	ND	500	01/24/13 10:03	
Sodium, Dissolved	ug/L	ND	500	01/24/13 10:03	

LABORATORY CONTROL SAMPLE: 1129628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9710	97	85-115	
Iron, Dissolved	ug/L	10000	9830	98	85-115	
Magnesium, Dissolved	ug/L	10000	9990	100	85-115	
Potassium, Dissolved	ug/L	10000	9890	99	85-115	
Sodium, Dissolved	ug/L	10000	9800	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1129629 1129630

Parameter	Units	60137347002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	265000	10000	10000	276000	277000	108	118	70-130	0	9	
Iron, Dissolved	ug/L	33.7J	10000	10000	9720	9740	97	97	70-130	0	10	
Magnesium, Dissolved	ug/L	23300	10000	10000	32900	33300	96	100	70-130	1	9	
Potassium, Dissolved	ug/L	24200	10000	10000	35700	36000	114	117	70-130	1	7	
Sodium, Dissolved	ug/L	12900	10000	10000	24100	24300	112	114	70-130	1	8	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

QC Batch: MPRP/21268 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60137347001, 60137347002, 60137347003

METHOD BLANK: 1129609 Matrix: Water
Associated Lab Samples: 60137347001, 60137347002, 60137347003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	01/24/13 11:04	
Antimony	ug/L	ND	1.0	01/24/13 11:04	
Arsenic	ug/L	ND	1.0	01/24/13 11:04	
Barium	ug/L	ND	1.0	01/24/13 11:04	
Beryllium	ug/L	ND	0.50	01/24/13 11:04	
Cadmium	ug/L	ND	0.50	01/24/13 11:04	
Chromium	ug/L	ND	1.0	01/24/13 11:04	
Cobalt	ug/L	ND	1.0	01/24/13 11:04	
Copper	ug/L	ND	1.0	01/24/13 11:04	
Lead	ug/L	ND	1.0	01/24/13 11:04	
Manganese	ug/L	ND	1.0	01/24/13 11:04	
Molybdenum	ug/L	0.22J	1.0	01/24/13 11:04	
Nickel	ug/L	ND	1.0	01/24/13 11:04	
Selenium	ug/L	ND	1.0	01/24/13 11:04	
Silver	ug/L	ND	0.50	01/24/13 11:04	
Thallium	ug/L	0.024J	1.0	01/24/13 11:04	
Vanadium	ug/L	ND	1.0	01/24/13 11:04	
Zinc	ug/L	ND	10.0	01/24/13 11:04	

LABORATORY CONTROL SAMPLE: 1129610

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	988	99	85-115	
Antimony	ug/L	40	40.8	102	85-115	
Arsenic	ug/L	40	40.8	102	85-115	
Barium	ug/L	40	40.2	101	85-115	
Beryllium	ug/L	40	40.8	102	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	41.2	103	85-115	
Cobalt	ug/L	40	40.6	101	85-115	
Copper	ug/L	40	40.6	102	85-115	
Lead	ug/L	40	39.7	99	85-115	
Manganese	ug/L	40	41.0	102	85-115	
Molybdenum	ug/L	40	40.2	101	85-115	
Nickel	ug/L	40	40.5	101	85-115	
Selenium	ug/L	40	40.6	101	85-115	
Silver	ug/L	20	20.1	100	85-115	
Thallium	ug/L	40	38.8	97	85-115	
Vanadium	ug/L	40	40.9	102	85-115	
Zinc	ug/L	100	106	106	85-115	

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1129611 1129612

Parameter	Units	60137347001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	181	1000	1000	1140	1140	96	96	70-130	0	20	
Antimony	ug/L	0.23J	40	40	40.8	41.0	101	102	70-130	1	20	
Arsenic	ug/L	0.48J	40	40	41.3	41.9	102	104	70-130	1	20	
Barium	ug/L	19.2	40	40	58.4	58.8	98	99	70-130	1	20	
Beryllium	ug/L	0.25J	40	40	37.7	38.0	94	94	70-130	1	20	
Cadmium	ug/L	10.6	40	40	50.1	50.1	99	99	70-130	0	20	
Chromium	ug/L	0.44J	40	40	40.6	40.1	100	99	70-130	1	20	
Cobalt	ug/L	2.3	40	40	41.1	40.7	97	96	70-130	1	20	
Copper	ug/L	39.8	40	40	76.8	77.8	93	95	70-130	1	20	
Lead	ug/L	4.2	40	40	44.6	45.1	101	102	70-130	1	20	
Manganese	ug/L	1660	40	40	1700	1720	110	158	70-130	1	20	M1
Molybdenum	ug/L	18.2	40	40	59.6	60.4	104	105	70-130	1	20	
Nickel	ug/L	1.8	40	40	40.2	39.9	96	95	70-130	1	20	
Selenium	ug/L	ND	40	40	38.6	38.8	96	97	70-130	0	20	
Silver	ug/L	0.15J	20	20	19.2	19.2	95	95	70-130	0	20	
Thallium	ug/L	0.14J	40	40	40.0	39.9	100	99	70-130	0	20	
Vanadium	ug/L	ND	40	40	41.4	40.9	103	102	70-130	1	20	
Zinc	ug/L	1930	100	100	2030	2070	103	146	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

QC Batch: MPRP/21271 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60137347001, 60137347002, 60137347003

METHOD BLANK: 1129631 Matrix: Water
Associated Lab Samples: 60137347001, 60137347002, 60137347003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	01/24/13 11:54	
Antimony, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Arsenic, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Barium, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Beryllium, Dissolved	ug/L	ND	0.50	01/24/13 11:54	
Cadmium, Dissolved	ug/L	ND	0.50	01/24/13 11:54	
Chromium, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Cobalt, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Copper, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Lead, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Manganese, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Molybdenum, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Nickel, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Selenium, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Silver, Dissolved	ug/L	ND	0.50	01/24/13 11:54	
Thallium, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Vanadium, Dissolved	ug/L	ND	1.0	01/24/13 11:54	
Zinc, Dissolved	ug/L	ND	10.0	01/24/13 11:54	

LABORATORY CONTROL SAMPLE: 1129632

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	1000	100	85-115	
Antimony, Dissolved	ug/L	40	40.8	102	85-115	
Arsenic, Dissolved	ug/L	40	41.2	103	85-115	
Barium, Dissolved	ug/L	40	39.7	99	85-115	
Beryllium, Dissolved	ug/L	40	41.4	104	85-115	
Cadmium, Dissolved	ug/L	40	41.1	103	85-115	
Chromium, Dissolved	ug/L	40	40.4	101	85-115	
Cobalt, Dissolved	ug/L	40	39.8	100	85-115	
Copper, Dissolved	ug/L	40	40.0	100	85-115	
Lead, Dissolved	ug/L	40	39.8	100	85-115	
Manganese, Dissolved	ug/L	40	40.3	101	85-115	
Molybdenum, Dissolved	ug/L	40	40.2	101	85-115	
Nickel, Dissolved	ug/L	40	40.6	101	85-115	
Selenium, Dissolved	ug/L	40	41.4	104	85-115	
Silver, Dissolved	ug/L	20	19.8	99	85-115	
Thallium, Dissolved	ug/L	40	38.7	97	85-115	
Vanadium, Dissolved	ug/L	40	40.9	102	85-115	
Zinc, Dissolved	ug/L	100	107	107	85-115	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1129633 1129634

Parameter	Units	60137347001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	7.2J	1000	1000	962	969	95	96	70-130	1	20	
Antimony, Dissolved	ug/L	0.26J	40	40	40.5	41.1	101	102	70-130	1	20	
Arsenic, Dissolved	ug/L	0.25J	40	40	41.1	41.0	102	102	70-130	0	20	
Barium, Dissolved	ug/L	19.8	40	40	58.1	59.2	96	99	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	37.8	37.5	94	94	70-130	1	20	
Cadmium, Dissolved	ug/L	9.4	40	40	48.3	49.1	97	99	70-130	2	20	
Chromium, Dissolved	ug/L	0.28J	40	40	40.0	40.1	99	99	70-130	0	20	
Cobalt, Dissolved	ug/L	2.3	40	40	40.1	40.4	95	95	70-130	1	20	
Copper, Dissolved	ug/L	2.3	40	40	38.8	39.1	91	92	70-130	1	20	
Lead, Dissolved	ug/L	ND	40	40	40.3	40.5	101	101	70-130	0	20	
Manganese, Dissolved	ug/L	1660	40	40	1660	1720	20	155	70-130	3	20	M1
Molybdenum, Dissolved	ug/L	18.0	40	40	59.6	60.3	104	106	70-130	1	20	
Nickel, Dissolved	ug/L	1.7	40	40	39.5	39.9	95	95	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	38.6	39.0	96	97	70-130	1	20	
Silver, Dissolved	ug/L	0.12J	20	20	18.6	19.1	93	95	70-130	2	20	
Thallium, Dissolved	ug/L	0.15J	40	40	39.7	39.9	99	99	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	40.9	40.5	102	101	70-130	1	20	
Zinc, Dissolved	ug/L	1660	100	100	1730	1780	65	122	70-130	3	20	M1

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QUALIFIERS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60137347

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60137347001	**ROCK DRAIN IN 130122**	EPA 200.7	MPRP/21269	EPA 200.7	ICP/17159
60137347002	**WETLANDOUT 130122**	EPA 200.7	MPRP/21269	EPA 200.7	ICP/17159
60137347003	**ROCK DRAIN MP 130122**	EPA 200.7	MPRP/21269	EPA 200.7	ICP/17159
60137347001	**ROCK DRAIN IN 130122**	EPA 200.7	MPRP/21270	EPA 200.7	ICP/17158
60137347002	**WETLANDOUT 130122**	EPA 200.7	MPRP/21270	EPA 200.7	ICP/17158
60137347003	**ROCK DRAIN MP 130122**	EPA 200.7	MPRP/21270	EPA 200.7	ICP/17158
60137347001	**ROCK DRAIN IN 130122**	EPA 200.8	MPRP/21268	EPA 200.8	ICPM/1991
60137347002	**WETLANDOUT 130122**	EPA 200.8	MPRP/21268	EPA 200.8	ICPM/1991
60137347003	**ROCK DRAIN MP 130122**	EPA 200.8	MPRP/21268	EPA 200.8	ICPM/1991
60137347001	**ROCK DRAIN IN 130122**	EPA 200.8	MPRP/21271	EPA 200.8	ICPM/1990
60137347002	**WETLANDOUT 130122**	EPA 200.8	MPRP/21271	EPA 200.8	ICPM/1990
60137347003	**ROCK DRAIN MP 130122**	EPA 200.8	MPRP/21271	EPA 200.8	ICPM/1990

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Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60137347

60137347

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W8722 1605 4558 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☐ No ☑ Seals intact: Yes ☐ No ☑

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLS

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.8

Date and initials of person examining contents: 1/23/13 BA

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☑Yes ☐No ☐N/A	7. 48 hr
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	BA 1/23/13 ☑Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: MW Date: 1/23/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1105	Start:
End: 1110	End:
Temp:	Temp:

F-KS-C-004-Rev 2, 04December2012

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lab... Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____
Rush TAT: Yes X No ~~X~~
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC x Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	* RUSH		MS/MSD	HOLD
	ROCKDRAININ130122	1/22/13	1005		X		2	Ø	Ø	2	Ø	X	X				X			
	WETLANDOUT130122	1/22/13	1035		X		2	Ø	Ø	2	Ø	X	X				X			
	ROCKDRAINMID130122	1/22/13	1120		X		2	Ø	Ø	2	Ø	X	X				X			

Report Type & QC Level: Standard X; Full Data Package ___

60137347

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Dissolved metals are field filtered. a/

Metals are: Ca, Fe, K, Na, Mg (E200.7); Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

* 48 HR TURN-AROUND

1/22/13

Sampler's Name: ABBY CALLIER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC		1/22/13	1152		1/22/13	1652
Shipment Method: UPS Ship Date: 1/22/13		1/22/13	1210		1/22/13	1210
Shipment Tracking No: 1Z733W8722 1005 4559		1/22/13	1300		1/23/13	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1-8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical Services, Inc.
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(913)599-5665

February 13, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on February 06, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60138137001	**ROCK DRAIN IN 130205**	Water	02/05/13 11:45	02/06/13 08:25
60138137002	**ROCK DRAIN MP 130205**	Water	02/05/13 12:40	02/06/13 08:25
60138137003	**WETLAND OUT 130205**	Water	02/05/13 13:20	02/06/13 08:25

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60138137001	**ROCK DRAIN IN 130205**	EPA 200.7	NDJ	5	PASI-K
		EPA 200.7	NDJ	5	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	18	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60138137002	**ROCK DRAIN MP 130205**	EPA 200.7	NDJ	5	PASI-K
		EPA 200.7	NDJ	5	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 300.0	AJM	1	PASI-K
60138137003	**WETLAND OUT 130205**	EPA 200.7	NDJ	5	PASI-K
		EPA 200.7	NDJ	5	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	18	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: February 13, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21433

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138137003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1137023)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: February 13, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21434

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138137002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1137027)
  - Calcium, Dissolved
- MSD (Lab ID: 1137028)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: February 13, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/21428

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 1136914)
  - Aluminum
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21428

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138137002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1136917)
  - Manganese

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: February 13, 2013

Analyte Comments:

QC Batch: MPRP/21428

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 1136914)
  - Aluminum
  - Lead
- ROCK DRAIN MP 130205 (Lab ID: 60138137002)
  - Aluminum
  - Lead
- WETLAND OUT 130205 (Lab ID: 60138137003)
  - Aluminum
  - Lead

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: February 13, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/21426

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 1136900)
  - Aluminum, Dissolved
  - Lead, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21426

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 1136900)
  - Aluminum, Dissolved
  - Lead, Dissolved
- ROCK DRAIN IN 130205 (Lab ID: 60138137001)
  - Aluminum, Dissolved
  - Lead, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: February 13, 2013

Analyte Comments:

QC Batch: MPRP/21426

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130205 (Lab ID: 60138137002)
  - Aluminum, Dissolved
  - Lead, Dissolved
- WETLAND OUT 130205 (Lab ID: 60138137003)
  - Aluminum, Dissolved
  - Lead, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: February 13, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: February 13, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: February 13, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: ROCK DRAIN IN 130205 **Lab ID: 60138137001** Collected: 02/05/13 11:45 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**258000**	ug/L	500	179	5	02/07/13 12:50	02/08/13 11:36	7440-70-2	
Iron	**2150**	ug/L	250	86.0	5	02/07/13 12:50	02/08/13 11:36	7439-89-6	
Magnesium	**20700**	ug/L	250	86.0	5	02/07/13 12:50	02/08/13 11:36	7439-95-4	
Potassium	**8910**	ug/L	2500	320	5	02/07/13 12:50	02/08/13 11:36	7440-09-7	
Sodium	**11600**	ug/L	2500	200	5	02/07/13 12:50	02/08/13 11:36	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**254000**	ug/L	100	35.8	1	02/07/13 12:50	02/08/13 11:51	7440-70-2	
Iron, Dissolved	ND	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 11:51	7439-89-6	
Magnesium, Dissolved	**20600**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 11:51	7439-95-4	
Potassium, Dissolved	**9610**	ug/L	500	64.1	1	02/07/13 12:50	02/08/13 11:51	7440-09-7	D9
Sodium, Dissolved	**12700**	ug/L	500	40.1	1	02/07/13 12:50	02/08/13 11:51	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**170**	ug/L	50.0	5.2	1	02/07/13 11:00	02/07/13 17:39	7429-90-5	
Antimony	**0.22J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/07/13 17:39	7440-36-0	
Arsenic	**0.63J**	ug/L	1.0	0.14	1	02/07/13 11:00	02/07/13 17:39	7440-38-2	
Barium	**19.5**	ug/L	1.0	0.085	1	02/07/13 11:00	02/07/13 17:39	7440-39-3	
Beryllium	**0.20J**	ug/L	0.50	0.066	1	02/07/13 11:00	02/07/13 17:39	7440-41-7	
Cadmium	**10.2**	ug/L	0.50	0.097	1	02/07/13 11:00	02/07/13 17:39	7440-43-9	
Chromium	**0.28J**	ug/L	1.0	0.11	1	02/07/13 11:00	02/07/13 17:39	7440-47-3	
Cobalt	**2.2**	ug/L	1.0	0.048	1	02/07/13 11:00	02/07/13 17:39	7440-48-4	
Copper	**37.7**	ug/L	1.0	0.45	1	02/07/13 11:00	02/07/13 17:39	7440-50-8	
Lead	**3.9**	ug/L	1.0	0.051	1	02/07/13 11:00	02/07/13 17:39	7439-92-1	
Manganese	**1630**	ug/L	1.0	0.23	1	02/07/13 11:00	02/07/13 17:39	7439-96-5	
Molybdenum	**17.0**	ug/L	1.0	0.16	1	02/07/13 11:00	02/07/13 17:39	7439-98-7	
Nickel	**2.2**	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 17:39	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 17:39	7782-49-2	
Silver	ND	ug/L	0.50	0.059	1	02/07/13 11:00	02/07/13 17:39	7440-22-4	
Thallium	**0.072J**	ug/L	1.0	0.022	1	02/07/13 11:00	02/07/13 17:39	7440-28-0	
Vanadium	ND	ug/L	1.0	0.27	1	02/07/13 11:00	02/07/13 17:39	7440-62-2	
Zinc	**1900**	ug/L	10.0	1.6	1	02/07/13 11:00	02/07/13 17:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**12.4J**	ug/L	50.0	5.2	1	02/07/13 11:00	02/07/13 18:28	7429-90-5	B
Antimony, Dissolved	**0.19J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/07/13 18:28	7440-36-0	
Arsenic, Dissolved	**0.19J**	ug/L	1.0	0.14	1	02/07/13 11:00	02/07/13 18:28	7440-38-2	
Barium, Dissolved	**18.7**	ug/L	1.0	0.085	1	02/07/13 11:00	02/07/13 18:28	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	02/07/13 11:00	02/07/13 18:28	7440-41-7	
Cadmium, Dissolved	**8.9**	ug/L	0.50	0.097	1	02/07/13 11:00	02/07/13 18:28	7440-43-9	
Chromium, Dissolved	**0.18J**	ug/L	1.0	0.11	1	02/07/13 11:00	02/07/13 18:28	7440-47-3	
Cobalt, Dissolved	**2.1**	ug/L	1.0	0.048	1	02/07/13 11:00	02/07/13 18:28	7440-48-4	
Copper, Dissolved	**1.9**	ug/L	1.0	0.45	1	02/07/13 11:00	02/07/13 18:28	7440-50-8	
Lead, Dissolved	**0.098J**	ug/L	1.0	0.051	1	02/07/13 11:00	02/07/13 18:28	7439-92-1	B
Manganese, Dissolved	**1600**	ug/L	1.0	0.23	1	02/07/13 11:00	02/07/13 18:28	7439-96-5	
Molybdenum, Dissolved	**16.5**	ug/L	1.0	0.16	1	02/07/13 11:00	02/07/13 18:28	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: ROCK DRAIN IN 130205 **Lab ID: 60138137001** Collected: 02/05/13 11:45 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.2**	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 18:28	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 18:28	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.059	1	02/07/13 11:00	02/07/13 18:28	7440-22-4	
Thallium, Dissolved	**0.11J**	ug/L	1.0	0.022	1	02/07/13 11:00	02/07/13 18:28	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.27	1	02/07/13 11:00	02/07/13 18:28	7440-62-2	
Zinc, Dissolved	**1590**	ug/L	10.0	1.6	1	02/07/13 11:00	02/07/13 18:28	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/07/13 10:58	02/12/13 08:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**648**	mg/L	50.0	3.0	50		02/07/13 16:33	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	ND	mg/L	0.50	0.041	1		02/08/13 15:32	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: ROCK DRAIN MP 130205 **Lab ID: 60138137002** Collected: 02/05/13 12:40 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**256000**	ug/L	500	179	5	02/07/13 12:50	02/08/13 11:42	7440-70-2	
Iron	**289**	ug/L	250	86.0	5	02/07/13 12:50	02/08/13 11:42	7439-89-6	
Magnesium	**20900**	ug/L	250	86.0	5	02/07/13 12:50	02/08/13 11:42	7439-95-4	
Potassium	**10200**	ug/L	2500	320	5	02/07/13 12:50	02/08/13 11:42	7440-09-7	
Sodium	**11600**	ug/L	2500	200	5	02/07/13 12:50	02/08/13 11:42	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**255000**	ug/L	100	35.8	1	02/07/13 12:50	02/08/13 11:53	7440-70-2	M1
Iron, Dissolved	**32.6J**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 11:53	7439-89-6	
Magnesium, Dissolved	**21100**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 11:53	7439-95-4	D9
Potassium, Dissolved	**10900**	ug/L	500	64.1	1	02/07/13 12:50	02/08/13 11:53	7440-09-7	D9
Sodium, Dissolved	**12600**	ug/L	500	40.1	1	02/07/13 12:50	02/08/13 11:53	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**25.4J**	ug/L	50.0	5.2	1	02/07/13 11:00	02/07/13 17:43	7429-90-5	B
Antimony	**0.21J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/07/13 17:43	7440-36-0	
Arsenic	**0.43J**	ug/L	1.0	0.14	1	02/07/13 11:00	02/07/13 17:43	7440-38-2	
Barium	**21.3**	ug/L	1.0	0.085	1	02/07/13 11:00	02/07/13 17:43	7440-39-3	
Beryllium	ND	ug/L	0.50	0.066	1	02/07/13 11:00	02/07/13 17:43	7440-41-7	
Cadmium	**3.8**	ug/L	0.50	0.097	1	02/07/13 11:00	02/07/13 17:43	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.11	1	02/07/13 11:00	02/07/13 17:43	7440-47-3	
Cobalt	**0.16J**	ug/L	1.0	0.048	1	02/07/13 11:00	02/07/13 17:43	7440-48-4	
Copper	**3.5**	ug/L	1.0	0.45	1	02/07/13 11:00	02/07/13 17:43	7440-50-8	
Lead	**0.49J**	ug/L	1.0	0.051	1	02/07/13 11:00	02/07/13 17:43	7439-92-1	B
Manganese	**675**	ug/L	1.0	0.23	1	02/07/13 11:00	02/07/13 17:43	7439-96-5	M1
Molybdenum	**13.3**	ug/L	1.0	0.16	1	02/07/13 11:00	02/07/13 17:43	7439-98-7	
Nickel	**1.3**	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 17:43	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 17:43	7782-49-2	
Silver	ND	ug/L	0.50	0.059	1	02/07/13 11:00	02/07/13 17:43	7440-22-4	
Thallium	**0.037J**	ug/L	1.0	0.022	1	02/07/13 11:00	02/07/13 17:43	7440-28-0	
Vanadium	**0.36J**	ug/L	1.0	0.27	1	02/07/13 11:00	02/07/13 17:43	7440-62-2	
Zinc	**971**	ug/L	10.0	1.6	1	02/07/13 11:00	02/07/13 17:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.5J**	ug/L	50.0	5.2	1	02/07/13 11:00	02/07/13 18:44	7429-90-5	B
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/07/13 18:44	7440-36-0	
Arsenic, Dissolved	**0.29J**	ug/L	1.0	0.14	1	02/07/13 11:00	02/07/13 18:44	7440-38-2	
Barium, Dissolved	**21.1**	ug/L	1.0	0.085	1	02/07/13 11:00	02/07/13 18:44	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	02/07/13 11:00	02/07/13 18:44	7440-41-7	
Cadmium, Dissolved	**2.9**	ug/L	0.50	0.097	1	02/07/13 11:00	02/07/13 18:44	7440-43-9	
Chromium, Dissolved	**2.9**	ug/L	1.0	0.11	1	02/07/13 11:00	02/07/13 18:44	7440-47-3	
Cobalt, Dissolved	**0.18J**	ug/L	1.0	0.048	1	02/07/13 11:00	02/07/13 18:44	7440-48-4	
Copper, Dissolved	**0.53J**	ug/L	1.0	0.45	1	02/07/13 11:00	02/07/13 18:44	7440-50-8	
Lead, Dissolved	**0.15J**	ug/L	1.0	0.051	1	02/07/13 11:00	02/07/13 18:44	7439-92-1	B
Manganese, Dissolved	**662**	ug/L	1.0	0.23	1	02/07/13 11:00	02/07/13 18:44	7439-96-5	
Molybdenum, Dissolved	**13.2**	ug/L	1.0	0.16	1	02/07/13 11:00	02/07/13 18:44	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: ROCK DRAIN MP 130205 **Lab ID: 60138137002** Collected: 02/05/13 12:40 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.9**	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 18:44	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/07/13 18:44	7782-49-2	
Silver, Dissolved	**0.059J**	ug/L	0.50	0.059	1	02/07/13 11:00	02/07/13 18:44	7440-22-4	
Thallium, Dissolved	**0.075J**	ug/L	1.0	0.022	1	02/07/13 11:00	02/07/13 18:44	7440-28-0	
Vanadium, Dissolved	**0.38J**	ug/L	1.0	0.27	1	02/07/13 11:00	02/07/13 18:44	7440-62-2	
Zinc, Dissolved	**918**	ug/L	10.0	1.6	1	02/07/13 11:00	02/07/13 18:44	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**640**	mg/L	50.0	3.0	50		02/07/13 17:26	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: WETLAND OUT 130205 **Lab ID: 60138137003** Collected: 02/05/13 13:20 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**276000**	ug/L	100	35.8	1	02/07/13 12:50	02/08/13 12:12	7440-70-2	M1
Iron	**42.6J**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 12:12	7439-89-6	
Magnesium	**22000**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 12:12	7439-95-4	
Potassium	**17900**	ug/L	500	64.1	1	02/07/13 12:50	02/08/13 12:12	7440-09-7	
Sodium	**12200**	ug/L	500	40.1	1	02/07/13 12:50	02/08/13 12:12	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**279000**	ug/L	100	35.8	1	02/07/13 12:50	02/08/13 12:00	7440-70-2	D9
Iron, Dissolved	ND	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 12:00	7439-89-6	
Magnesium, Dissolved	**22400**	ug/L	50.0	17.2	1	02/07/13 12:50	02/08/13 12:00	7439-95-4	D9
Potassium, Dissolved	**18000**	ug/L	500	64.1	1	02/07/13 12:50	02/08/13 12:00	7440-09-7	D9
Sodium, Dissolved	**12200**	ug/L	500	40.1	1	02/07/13 12:50	02/08/13 12:00	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**37.3J**	ug/L	50.0	6.4	1	02/07/13 11:00	02/11/13 13:36	7429-90-5	B
Antimony	**0.59J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/08/13 16:05	7440-36-0	
Arsenic	**6.4**	ug/L	1.0	0.14	1	02/07/13 11:00	02/08/13 16:05	7440-38-2	
Barium	**113**	ug/L	1.0	0.085	1	02/07/13 11:00	02/08/13 16:05	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	02/07/13 11:00	02/11/13 13:36	7440-41-7	
Cadmium	**0.22J**	ug/L	0.50	0.097	1	02/07/13 11:00	02/08/13 16:05	7440-43-9	
Chromium	**0.44J**	ug/L	1.0	0.11	1	02/07/13 11:00	02/08/13 16:05	7440-47-3	
Cobalt	**0.17J**	ug/L	1.0	0.048	1	02/07/13 11:00	02/08/13 16:05	7440-48-4	
Copper	ND	ug/L	1.0	0.45	1	02/07/13 11:00	02/08/13 16:05	7440-50-8	
Lead	**0.25J**	ug/L	1.0	0.051	1	02/07/13 11:00	02/08/13 16:05	7439-92-1	B
Manganese	**2960**	ug/L	1.0	0.23	1	02/07/13 11:00	02/08/13 16:05	7439-96-5	
Molybdenum	ND	ug/L	1.0	0.16	1	02/07/13 11:00	02/08/13 16:05	7439-98-7	
Nickel	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/08/13 16:05	7440-02-0	
Selenium	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/08/13 16:05	7782-49-2	
Silver	ND	ug/L	0.50	0.059	1	02/07/13 11:00	02/08/13 16:05	7440-22-4	
Thallium	ND	ug/L	1.0	0.022	1	02/07/13 11:00	02/08/13 16:05	7440-28-0	
Vanadium	**1.3**	ug/L	1.0	0.27	1	02/07/13 11:00	02/08/13 16:05	7440-62-2	
Zinc	**112**	ug/L	10.0	1.6	1	02/07/13 11:00	02/08/13 16:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**31.1J**	ug/L	50.0	5.2	1	02/07/13 11:00	02/11/13 13:31	7429-90-5	B
Antimony, Dissolved	**0.49J**	ug/L	1.0	0.035	1	02/07/13 11:00	02/08/13 15:57	7440-36-0	
Arsenic, Dissolved	**5.0**	ug/L	1.0	0.14	1	02/07/13 11:00	02/08/13 15:57	7440-38-2	
Barium, Dissolved	**112**	ug/L	1.0	0.085	1	02/07/13 11:00	02/08/13 15:57	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.066	1	02/07/13 11:00	02/11/13 13:31	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.097	1	02/07/13 11:00	02/08/13 15:57	7440-43-9	
Chromium, Dissolved	**0.72J**	ug/L	1.0	0.11	1	02/07/13 11:00	02/08/13 15:57	7440-47-3	
Cobalt, Dissolved	**0.072J**	ug/L	1.0	0.048	1	02/07/13 11:00	02/08/13 15:57	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.45	1	02/07/13 11:00	02/08/13 15:57	7440-50-8	
Lead, Dissolved	**0.18J**	ug/L	1.0	0.051	1	02/07/13 11:00	02/08/13 15:57	7439-92-1	B
Manganese, Dissolved	**2900**	ug/L	1.0	0.23	1	02/07/13 11:00	02/08/13 15:57	7439-96-5	
Molybdenum, Dissolved	ND	ug/L	1.0	0.16	1	02/07/13 11:00	02/08/13 15:57	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Sample: WETLAND OUT 130205 **Lab ID: 60138137003** Collected: 02/05/13 13:20 Received: 02/06/13 08:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/08/13 15:57	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.35	1	02/07/13 11:00	02/08/13 15:57	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.059	1	02/07/13 11:00	02/08/13 15:57	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.022	1	02/07/13 11:00	02/08/13 15:57	7440-28-0	
Vanadium, Dissolved	**1.1**	ug/L	1.0	0.27	1	02/07/13 11:00	02/08/13 15:57	7440-62-2	
Zinc, Dissolved	**3.5J**	ug/L	10.0	1.6	1	02/07/13 11:00	02/08/13 15:57	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**138**	mg/L	2.0	2.0	1	02/07/13 11:21	02/12/13 08:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**569**	mg/L	50.0	3.0	50		02/07/13 18:19	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**37.8**	mg/L	30.0	2.5	60		02/08/13 16:27	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: MPRP/21433 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60138137001, 60138137002, 60138137003

METHOD BLANK: 1137021 Matrix: Water
Associated Lab Samples: 60138137001, 60138137002, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	02/08/13 11:34	
Iron	ug/L	ND	50.0	02/08/13 11:34	
Magnesium	ug/L	ND	50.0	02/08/13 11:34	
Potassium	ug/L	ND	500	02/08/13 11:34	
Sodium	ug/L	ND	500	02/08/13 11:34	

LABORATORY CONTROL SAMPLE: 1137022

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9900	99	85-115	
Iron	ug/L	10000	10100	101	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Potassium	ug/L	10000	9720	97	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1137023 1137024

Parameter	Units	60138137003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	276000	10000	10000	294000	288000	182	120	70-130	2	9	M1
Iron	ug/L	42.6J	10000	10000	10100	9950	101	99	70-130	1	10	
Magnesium	ug/L	22000	10000	10000	32800	32400	108	104	70-130	1	9	
Potassium	ug/L	17900	10000	10000	29200	29300	112	113	70-130	0	7	
Sodium	ug/L	12200	10000	10000	23300	23400	111	112	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: MPRP/21434 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60138137001, 60138137002, 60138137003

METHOD BLANK: 1137025 Matrix: Water
Associated Lab Samples: 60138137001, 60138137002, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	02/08/13 11:16	
Iron, Dissolved	ug/L	ND	50.0	02/08/13 11:16	
Magnesium, Dissolved	ug/L	ND	50.0	02/08/13 11:16	
Potassium, Dissolved	ug/L	ND	500	02/08/13 11:16	
Sodium, Dissolved	ug/L	ND	500	02/08/13 11:16	

LABORATORY CONTROL SAMPLE: 1137026

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10200	102	85-115	
Iron, Dissolved	ug/L	10000	10300	103	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	9420	94	85-115	
Sodium, Dissolved	ug/L	10000	9670	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1137027 1137028

Parameter	Units	60138137002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	255000	10000	10000	255000	260000	-4	46	70-130	2	9	M1
Iron, Dissolved	ug/L	32.6J	10000	10000	9890	10000	99	100	70-130	1	10	
Magnesium, Dissolved	ug/L	21100	10000	10000	30400	30700	94	97	70-130	1	9	
Potassium, Dissolved	ug/L	10900	10000	10000	21200	21300	104	104	70-130	0	7	
Sodium, Dissolved	ug/L	12600	10000	10000	23300	23300	107	106	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: MPRP/21428 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60138137001, 60138137002, 60138137003

METHOD BLANK: 1136914 Matrix: Water
Associated Lab Samples: 60138137001, 60138137002, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	11.1J	50.0	02/07/13 17:26	B
Antimony	ug/L	ND	1.0	02/07/13 17:26	
Arsenic	ug/L	ND	1.0	02/07/13 17:26	
Barium	ug/L	0.14J	1.0	02/07/13 17:26	
Beryllium	ug/L	ND	0.50	02/07/13 17:26	
Cadmium	ug/L	ND	0.50	02/07/13 17:26	
Chromium	ug/L	ND	1.0	02/07/13 17:26	
Cobalt	ug/L	ND	1.0	02/07/13 17:26	
Copper	ug/L	ND	1.0	02/07/13 17:26	
Lead	ug/L	0.094J	1.0	02/07/13 17:26	B
Manganese	ug/L	ND	1.0	02/07/13 17:26	
Molybdenum	ug/L	ND	1.0	02/07/13 17:26	
Nickel	ug/L	ND	1.0	02/07/13 17:26	
Selenium	ug/L	ND	1.0	02/07/13 17:26	
Silver	ug/L	ND	0.50	02/07/13 17:26	
Thallium	ug/L	ND	1.0	02/07/13 17:26	
Vanadium	ug/L	ND	1.0	02/07/13 17:26	
Zinc	ug/L	ND	10.0	02/07/13 17:26	

LABORATORY CONTROL SAMPLE: 1136915

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	935	94	85-115	
Antimony	ug/L	40	40.9	102	85-115	
Arsenic	ug/L	40	41.6	104	85-115	
Barium	ug/L	40	40.6	101	85-115	
Beryllium	ug/L	40	37.8	94	85-115	
Cadmium	ug/L	40	41.0	103	85-115	
Chromium	ug/L	40	41.3	103	85-115	
Cobalt	ug/L	40	40.3	101	85-115	
Copper	ug/L	40	40.5	101	85-115	
Lead	ug/L	40	40.2	100	85-115	
Manganese	ug/L	40	40.0	100	85-115	
Molybdenum	ug/L	40	40.8	102	85-115	
Nickel	ug/L	40	41.5	104	85-115	
Selenium	ug/L	40	40.7	102	85-115	
Silver	ug/L	20	19.9	100	85-115	
Thallium	ug/L	40	37.9	95	85-115	
Vanadium	ug/L	40	40.8	102	85-115	
Zinc	ug/L	100	106	106	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1136916 1136917

Parameter	Units	60138137002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	25.4J	1000	1000	941	918	92	89	70-130	2	20	
Antimony	ug/L	0.21J	40	40	40.3	40.5	100	101	70-130	0	20	
Arsenic	ug/L	0.43J	40	40	41.4	41.4	102	102	70-130	0	20	
Barium	ug/L	21.3	40	40	59.5	59.3	96	95	70-130	0	20	
Beryllium	ug/L	ND	40	40	35.0	34.0	87	85	70-130	3	20	
Cadmium	ug/L	3.8	40	40	42.9	43.4	98	99	70-130	1	20	
Chromium	ug/L	0.22J	40	40	40.2	40.0	100	99	70-130	1	20	
Cobalt	ug/L	0.16J	40	40	38.8	38.2	97	95	70-130	2	20	
Copper	ug/L	3.5	40	40	39.9	39.8	91	91	70-130	0	20	
Lead	ug/L	0.49J	40	40	40.2	40.0	99	99	70-130	0	20	
Manganese	ug/L	675	40	40	716	702	102	66	70-130	2	20	M1
Molybdenum	ug/L	13.3	40	40	55.4	54.9	105	104	70-130	1	20	
Nickel	ug/L	1.3	40	40	39.5	39.4	96	95	70-130	0	20	
Selenium	ug/L	ND	40	40	39.6	38.7	99	97	70-130	2	20	
Silver	ug/L	ND	20	20	18.8	18.3	94	92	70-130	3	20	
Thallium	ug/L	0.037J	40	40	38.1	38.2	95	95	70-130	0	20	
Vanadium	ug/L	0.36J	40	40	41.1	40.5	102	100	70-130	1	20	
Zinc	ug/L	971	100	100	1060	1040	91	72	70-130	2	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: MPRP/21426 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60138137001, 60138137002, 60138137003

METHOD BLANK: 1136900 Matrix: Water
Associated Lab Samples: 60138137001, 60138137002, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	7.3J	50.0	02/07/13 18:20	B
Antimony, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Arsenic, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Barium, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Beryllium, Dissolved	ug/L	ND	0.50	02/07/13 18:20	
Cadmium, Dissolved	ug/L	ND	0.50	02/07/13 18:20	
Chromium, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Cobalt, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Copper, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Lead, Dissolved	ug/L	0.089J	1.0	02/07/13 18:20	B
Manganese, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Molybdenum, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Nickel, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Selenium, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Silver, Dissolved	ug/L	ND	0.50	02/07/13 18:20	
Thallium, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Vanadium, Dissolved	ug/L	ND	1.0	02/07/13 18:20	
Zinc, Dissolved	ug/L	ND	10.0	02/07/13 18:20	

LABORATORY CONTROL SAMPLE: 1136901

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	942	94	85-115	
Antimony, Dissolved	ug/L	40	40.1	100	85-115	
Arsenic, Dissolved	ug/L	40	40.3	101	85-115	
Barium, Dissolved	ug/L	40	40.6	102	85-115	
Beryllium, Dissolved	ug/L	40	38.0	95	85-115	
Cadmium, Dissolved	ug/L	40	40.0	100	85-115	
Chromium, Dissolved	ug/L	40	40.1	100	85-115	
Cobalt, Dissolved	ug/L	40	39.1	98	85-115	
Copper, Dissolved	ug/L	40	39.0	98	85-115	
Lead, Dissolved	ug/L	40	39.1	98	85-115	
Manganese, Dissolved	ug/L	40	40.4	101	85-115	
Molybdenum, Dissolved	ug/L	40	39.6	99	85-115	
Nickel, Dissolved	ug/L	40	39.8	99	85-115	
Selenium, Dissolved	ug/L	40	39.2	98	85-115	
Silver, Dissolved	ug/L	20	19.5	97	85-115	
Thallium, Dissolved	ug/L	40	37.0	93	85-115	
Vanadium, Dissolved	ug/L	40	40.4	101	85-115	
Zinc, Dissolved	ug/L	100	104	104	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1136902 1136903

Parameter	Units	60138137001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	12.4J	1000	1000	932	939	92	93	70-130	1	20	
Antimony, Dissolved	ug/L	0.19J	40	40	40.4	40.5	101	101	70-130	0	20	
Arsenic, Dissolved	ug/L	0.19J	40	40	41.3	41.4	103	103	70-130	0	20	
Barium, Dissolved	ug/L	18.7	40	40	58.5	58.2	100	99	70-130	0	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.2	35.8	88	89	70-130	2	20	
Cadmium, Dissolved	ug/L	8.9	40	40	48.0	48.0	98	98	70-130	0	20	
Chromium, Dissolved	ug/L	0.18J	40	40	38.9	38.7	97	96	70-130	0	20	
Cobalt, Dissolved	ug/L	2.1	40	40	39.6	39.7	94	94	70-130	0	20	
Copper, Dissolved	ug/L	1.9	40	40	37.9	37.6	90	89	70-130	1	20	
Lead, Dissolved	ug/L	0.098J	40	40	39.6	39.6	99	99	70-130	0	20	
Manganese, Dissolved	ug/L	1600	40	40	1640	1640	85	102	70-130	0	20	
Molybdenum, Dissolved	ug/L	16.5	40	40	57.7	58.7	103	106	70-130	2	20	
Nickel, Dissolved	ug/L	2.2	40	40	39.5	39.7	93	94	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	40.5	39.8	101	99	70-130	2	20	
Silver, Dissolved	ug/L	ND	20	20	18.6	18.7	93	93	70-130	0	20	
Thallium, Dissolved	ug/L	0.11J	40	40	38.0	37.8	95	94	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	40.3	40.0	101	100	70-130	1	20	
Zinc, Dissolved	ug/L	1590	100	100	1700	1700	116	114	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: WET/39616 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60138137001, 60138137003

METHOD BLANK: 1136708 Matrix: Water
Associated Lab Samples: 60138137001, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	02/12/13 08:28	

LABORATORY CONTROL SAMPLE: 1136709

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	217	110	85-115	

SAMPLE DUPLICATE: 1136710

Parameter	Units	60138115001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	27.0	28.0	4	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: WETA/23460 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60138137001, 60138137002, 60138137003

METHOD BLANK: 1136875 Matrix: Water
Associated Lab Samples: 60138137001, 60138137002, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	02/07/13 15:58	

LABORATORY CONTROL SAMPLE: 1136876

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1136877 1136878

Parameter	Units	60138137001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	648	250	250	871	865	89	87	61-119	1	10	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

QC Batch: WETA/16228 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60138137001, 60138137003

METHOD BLANK: 747256 Matrix: Water
Associated Lab Samples: 60138137001, 60138137003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	02/08/13 14:55	

LABORATORY CONTROL SAMPLE: 747257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 747258 747259

Parameter	Units	60138137001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	ND	2.5	2.5	2.7	2.8	108	109	80-120	1	20	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60138137

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60138137001	**ROCK DRAIN IN 130205**	EPA 200.7	MPRP/21433	EPA 200.7	ICP/17251
60138137002	**ROCK DRAIN MP 130205**	EPA 200.7	MPRP/21433	EPA 200.7	ICP/17251
60138137003	**WETLAND OUT 130205**	EPA 200.7	MPRP/21433	EPA 200.7	ICP/17251
60138137001	**ROCK DRAIN IN 130205**	EPA 200.7	MPRP/21434	EPA 200.7	ICP/17250
60138137002	**ROCK DRAIN MP 130205**	EPA 200.7	MPRP/21434	EPA 200.7	ICP/17250
60138137003	**WETLAND OUT 130205**	EPA 200.7	MPRP/21434	EPA 200.7	ICP/17250
60138137001	**ROCK DRAIN IN 130205**	EPA 200.8	MPRP/21428	EPA 200.8	ICPM/2018
60138137002	**ROCK DRAIN MP 130205**	EPA 200.8	MPRP/21428	EPA 200.8	ICPM/2018
60138137003	**WETLAND OUT 130205**	EPA 200.8	MPRP/21428	EPA 200.8	ICPM/2018
60138137001	**ROCK DRAIN IN 130205**	EPA 200.8	MPRP/21426	EPA 200.8	ICPM/2017
60138137002	**ROCK DRAIN MP 130205**	EPA 200.8	MPRP/21426	EPA 200.8	ICPM/2017
60138137003	**WETLAND OUT 130205**	EPA 200.8	MPRP/21426	EPA 200.8	ICPM/2017
60138137001	**ROCK DRAIN IN 130205**	SM 5210B	WET/39616	SM 5210B	WET/39685
60138137003	**WETLAND OUT 130205**	SM 5210B	WET/39616	SM 5210B	WET/39685
60138137001	**ROCK DRAIN IN 130205**	EPA 300.0	WETA/23460		
60138137002	**ROCK DRAIN MP 130205**	EPA 300.0	WETA/23460		
60138137003	**WETLAND OUT 130205**	EPA 300.0	WETA/23460		
60138137001	**ROCK DRAIN IN 130205**	SM 5310C	WETA/16228		
60138137003	**WETLAND OUT 130205**	SM 5310C	WETA/16228		

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Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60138137

60138137

Client Name: BP AMEC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W872210057742 Pace Shipping Label Used? Yes ☒ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ 2AL

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.2

Date and initials of person examining contents: PV 2-6-13

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☑Yes ☐No ☐N/A	7. Rush
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMW Date: 2/6/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1115	Start:
End: 1120	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program La... Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____
Rush TAT: Yes X No
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC X Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Report Type & QC Level: Standard X; Full Data Package ___

60138137

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	MS/MSD	HOLD	Comments
	RockDrainIn130205	2/5/13	11:45		X	1AG3S	5	2	1	2	Ø	1BP1U	X	X	X	X	X	1BP3U 1-5 1BP3N 1-5 1BP3F	Dissolved metals are field filtered.
	RockDrainMP130205	2/5/13	12:40		X		3	1	Ø	2	Ø		X	X	X				GW
	WetlandOut130205	2/5/13	13:20		X	1AG3S	5	2	1	2	Ø	1BP1U	X	X	X	X	X		Metals are: Ca, Fe, K, Na, Mg (E200.7); Ag, Al, As, Ba, Be, Gd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
																			* Rush 1-week TAT

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Hallie Bevan Simpson	Hallie B. Simpson	2/5/13	14:30		2/6/13	0820
Sampler's Company: AMEC						1030
Shipment Method: UPS Ship Date: 2/5/13						
Shipment Tracking No: 1Z733W87221005 7742						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: (Yes) No | Temp Blank: (Yes) No | Cooler Temp on Receipt: 1-2 °F/C | Trip Blank: Yes / (No) | MS/MSD Sample Submitted: Yes / (No)

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March 01, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on February 14, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60138740001	**ROCK DRAIN IN 130213**	Water	02/13/13 12:00	02/14/13 10:40
60138740002	**ROCK DRAIN MP 130213**	Water	02/13/13 13:00	02/14/13 10:40
60138740003	**WETLAND OUT 130213**	Water	02/13/13 13:20	02/14/13 10:40

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SAMPLE ANALYTE COUNT

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60138740001	**ROCK DRAIN IN 130213**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	JGP	5	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60138740002	**ROCK DRAIN MP 130213**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	JGP, TJT	5	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 300.0	AJM	1	PASI-K
60138740003	**WETLAND OUT 130213**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	SMW	5	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21565

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138635001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1142270)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21575

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138740002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1142471)
  - Calcium, Dissolved
- MSD (Lab ID: 1142472)
  - Calcium, Dissolved

QC Batch: MPRP/21653

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138740003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1144782)
  - Calcium, Dissolved
- MSD (Lab ID: 1144783)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 01, 2013

Analyte Comments:

QC Batch: MPRP/21653

B: Analyte was detected in the associated method blank.

- WETLAND OUT 130213 (Lab ID: 60138740003)
  - Iron, Dissolved

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21577

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138740001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1142483)
  - Manganese

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21577

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130213 (Lab ID: 60138740001)
  - Chromium
  - Antimony
  - Thallium

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 01, 2013

Analyte Comments:

QC Batch: MPRP/21577

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130213 (Lab ID: 60138740002)
  - Chromium
  - Lead
  - Antimony
  - Thallium
- WETLAND OUT 130213 (Lab ID: 60138740003)
  - Chromium
  - Lead
  - Antimony
  - Thallium

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21576

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130213 (Lab ID: 60138740001)
  - Chromium, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved
- ROCK DRAIN MP 130213 (Lab ID: 60138740002)
  - Chromium, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 01, 2013

Analyte Comments:

QC Batch: MPRP/21576

B: Analyte was detected in the associated method blank.

- WETLAND OUT 130213 (Lab ID: 60138740003)
  - Chromium, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 01, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WET/39758

B2: Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.

- WETLAND OUT 130213 (Lab ID: 60138740003)
  - BOD, 5 day

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 01, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16318

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60138699001,60138699002

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 750703)
  - Total Organic Carbon
- MSD (Lab ID: 750704)
  - Total Organic Carbon

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: ROCK DRAIN IN 130213 **Lab ID: 60138740001** Collected: 02/13/13 12:00 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**258000**	ug/L	100	10.4	1	02/18/13 14:45	02/19/13 13:14	7440-70-2	
Iron	**2320**	ug/L	50.0	11.6	1	02/18/13 14:45	02/19/13 13:14	7439-89-6	
Magnesium	**19900**	ug/L	50.0	6.5	1	02/18/13 14:45	02/19/13 13:14	7439-95-4	
Potassium	**8460**	ug/L	500	44.4	1	02/18/13 14:45	02/19/13 13:14	7440-09-7	
Sodium	**12800**	ug/L	500	21.7	1	02/18/13 14:45	02/19/13 13:14	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**260000**	ug/L	100	10.4	1	02/19/13 09:45	02/20/13 12:09	7440-70-2	D9
Iron, Dissolved	**22.1J**	ug/L	50.0	11.6	1	02/19/13 09:45	02/20/13 12:09	7439-89-6	
Magnesium, Dissolved	**20400**	ug/L	50.0	6.5	1	02/19/13 09:45	02/20/13 12:09	7439-95-4	D9
Potassium, Dissolved	**8470**	ug/L	500	44.4	1	02/19/13 09:45	02/20/13 12:09	7440-09-7	D9
Sodium, Dissolved	**12800**	ug/L	500	21.7	1	02/19/13 09:45	02/20/13 12:09	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**155**	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 12:39	7429-90-5	
Antimony	**0.35J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:51	7440-36-0	B
Arsenic	**0.41J**	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 19:51	7440-38-2	
Barium	**19.8**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:51	7440-39-3	
Beryllium	**0.22J**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:51	7440-41-7	
Cadmium	**10.7**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:51	7440-43-9	
Chromium	**0.32J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:51	7440-47-3	B
Cobalt	**2.3**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:51	7440-48-4	
Copper	**36.8**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:51	7440-50-8	
Lead	**4.0**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:51	7439-92-1	
Manganese	**1680**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:51	7439-96-5	M1
Molybdenum	**17.4**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:51	7439-98-7	
Nickel	**3.5**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:51	7440-02-0	
Selenium	**0.15J**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:51	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 19:51	7440-22-4	
Thallium	**0.15J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 19:51	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 12:39	7440-62-2	
Zinc	**2090**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 19:51	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.4J**	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 11:46	7429-90-5	
Antimony, Dissolved	**0.28J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 18:49	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 18:49	7440-38-2	
Barium, Dissolved	**20.3**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 18:49	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 18:49	7440-41-7	
Cadmium, Dissolved	**9.6**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 18:49	7440-43-9	
Chromium, Dissolved	**0.18J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 18:49	7440-47-3	B
Cobalt, Dissolved	**2.2**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 18:49	7440-48-4	
Copper, Dissolved	**4.8**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 18:49	7440-50-8	
Lead, Dissolved	**0.25J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 18:49	7439-92-1	B
Manganese, Dissolved	**1700**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 18:49	7439-96-5	D9
Molybdenum, Dissolved	**17.0**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 18:49	7439-98-7	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: ROCK DRAIN IN 130213 **Lab ID: 60138740001** Collected: 02/13/13 12:00 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**4.0**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 18:49	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 18:49	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 18:49	7440-22-4	
Thallium, Dissolved	**0.15J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 18:49	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 11:46	7440-62-2	
Zinc, Dissolved	**1820**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 18:49	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/15/13 10:41	02/20/13 10:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**647**	mg/L	50.0	3.0	50		02/17/13 12:17	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.094J**	mg/L	0.50	0.041	1		02/18/13 20:46	7440-44-0	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: ROCK DRAIN MP 130213 **Lab ID: 60138740002** Collected: 02/13/13 13:00 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**254000**	ug/L	100	10.4	1	02/18/13 14:45	02/19/13 13:19	7440-70-2	
Iron	**429**	ug/L	50.0	11.6	1	02/18/13 14:45	02/19/13 13:19	7439-89-6	
Magnesium	**20000**	ug/L	50.0	6.5	1	02/18/13 14:45	02/19/13 13:19	7439-95-4	
Potassium	**8910**	ug/L	500	44.4	1	02/18/13 14:45	02/19/13 13:19	7440-09-7	
Sodium	**12600**	ug/L	500	21.7	1	02/18/13 14:45	02/19/13 13:19	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**255000**	ug/L	100	10.4	1	02/19/13 09:45	02/20/13 12:11	7440-70-2	D9,M1
Iron, Dissolved	ND	ug/L	50.0	11.6	1	02/27/13 16:00	03/01/13 15:45	7439-89-6	
Magnesium, Dissolved	**19900**	ug/L	50.0	6.5	1	02/19/13 09:45	02/20/13 12:11	7439-95-4	
Potassium, Dissolved	**8930**	ug/L	500	44.4	1	02/19/13 09:45	02/20/13 12:11	7440-09-7	D9
Sodium, Dissolved	**12600**	ug/L	500	21.7	1	02/19/13 09:45	02/20/13 12:11	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**31.8J**	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 12:53	7429-90-5	
Antimony	**0.28J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 20:08	7440-36-0	B
Arsenic	**0.16J**	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 20:08	7440-38-2	
Barium	**19.0**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 20:08	7440-39-3	
Beryllium	**0.062J**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 20:08	7440-41-7	
Cadmium	**5.3**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 20:08	7440-43-9	
Chromium	**0.23J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 20:08	7440-47-3	B
Cobalt	**0.090J**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 20:08	7440-48-4	
Copper	**5.8**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 20:08	7440-50-8	
Lead	**1.1**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 20:08	7439-92-1	B
Manganese	**118**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 20:08	7439-96-5	
Molybdenum	**13.5**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 20:08	7439-98-7	
Nickel	**2.7**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 20:08	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 20:08	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 20:08	7440-22-4	
Thallium	**0.12J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 20:08	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 12:53	7440-62-2	
Zinc	**1180**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 20:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 12:00	7429-90-5	
Antimony, Dissolved	**0.31J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:05	7440-36-0	B
Arsenic, Dissolved	**0.11J**	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 19:05	7440-38-2	
Barium, Dissolved	**19.1**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:05	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:05	7440-41-7	
Cadmium, Dissolved	**4.9**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:05	7440-43-9	
Chromium, Dissolved	**0.50J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:05	7440-47-3	B
Cobalt, Dissolved	**0.085J**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:05	7440-48-4	
Copper, Dissolved	**0.55J**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:05	7440-50-8	
Lead, Dissolved	**0.26J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:05	7439-92-1	B
Manganese, Dissolved	**122**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:05	7439-96-5	D9
Molybdenum, Dissolved	**13.4**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:05	7439-98-7	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: ROCK DRAIN MP 130213 **Lab ID: 60138740002** Collected: 02/13/13 13:00 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.0**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:05	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:05	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 19:05	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 19:05	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 12:00	7440-62-2	
Zinc, Dissolved	**1120**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 19:05	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**636**	mg/L	50.0	3.0	50		02/17/13 13:33	14808-79-8	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: WETLAND OUT 130213 **Lab ID: 60138740003** Collected: 02/13/13 13:20 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**268000**	ug/L	100	10.4	1	02/18/13 14:45	02/19/13 13:21	7440-70-2	
Iron	**60.1**	ug/L	50.0	11.6	1	02/18/13 14:45	02/19/13 13:21	7439-89-6	
Magnesium	**20200**	ug/L	50.0	6.5	1	02/18/13 14:45	02/19/13 13:21	7439-95-4	
Potassium	**11400**	ug/L	500	44.4	1	02/18/13 14:45	02/19/13 13:21	7440-09-7	
Sodium	**12100**	ug/L	500	21.7	1	02/18/13 14:45	02/19/13 13:21	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**282000**	ug/L	100	10.4	1	02/22/13 15:00	02/25/13 13:41	7440-70-2	D9,M1
Iron, Dissolved	**27.3J**	ug/L	50.0	11.6	1	02/22/13 15:00	02/27/13 11:38	7439-89-6	B
Magnesium, Dissolved	**20900**	ug/L	50.0	6.5	1	02/22/13 15:00	02/27/13 11:38	7439-95-4	
Potassium, Dissolved	**11700**	ug/L	500	44.4	1	02/22/13 15:00	02/25/13 13:41	7440-09-7	D9
Sodium, Dissolved	**12300**	ug/L	500	21.7	1	02/22/13 15:00	02/25/13 13:41	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**16.0J**	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 12:56	7429-90-5	
Antimony	**0.40J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 20:12	7440-36-0	B
Arsenic	**3.2**	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 20:12	7440-38-2	
Barium	**95.3**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 20:12	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 20:12	7440-41-7	
Cadmium	**0.80**	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 20:12	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 20:12	7440-47-3	B
Cobalt	ND	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 20:12	7440-48-4	
Copper	**0.19J**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 20:12	7440-50-8	
Lead	**0.27J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 20:12	7439-92-1	B
Manganese	**2040**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 20:12	7439-96-5	
Molybdenum	**0.12J**	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 20:12	7439-98-7	
Nickel	**0.32J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 20:12	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 20:12	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 20:12	7440-22-4	
Thallium	**0.051J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 20:12	7440-28-0	B
Vanadium	**0.33J**	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 12:56	7440-62-2	
Zinc	**281**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 20:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**14.6J**	ug/L	50.0	6.4	1	02/19/13 09:45	02/23/13 12:03	7429-90-5	
Antimony, Dissolved	**0.34J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:09	7440-36-0	B
Arsenic, Dissolved	**1.7**	ug/L	1.0	0.050	1	02/19/13 09:45	02/20/13 19:09	7440-38-2	
Barium, Dissolved	**94.0**	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:09	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:09	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	02/19/13 09:45	02/20/13 19:09	7440-43-9	
Chromium, Dissolved	**0.98J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:09	7440-47-3	B
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	02/19/13 09:45	02/20/13 19:09	7440-48-4	
Copper, Dissolved	ND	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:09	7440-50-8	
Lead, Dissolved	**0.20J**	ug/L	1.0	0.030	1	02/19/13 09:45	02/20/13 19:09	7439-92-1	B
Manganese, Dissolved	**2040**	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:09	7439-96-5	D9
Molybdenum, Dissolved	ND	ug/L	1.0	0.12	1	02/19/13 09:45	02/20/13 19:09	7439-98-7	

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ANALYTICAL RESULTS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Sample: WETLAND OUT 130213 **Lab ID: 60138740003** Collected: 02/13/13 13:20 Received: 02/14/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.25J**	ug/L	1.0	0.070	1	02/19/13 09:45	02/20/13 19:09	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/19/13 09:45	02/20/13 19:09	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	02/19/13 09:45	02/20/13 19:09	7440-22-4	
Thallium, Dissolved	**0.050J**	ug/L	1.0	0.020	1	02/19/13 09:45	02/20/13 19:09	7440-28-0	B
Vanadium, Dissolved	**0.18J**	ug/L	1.0	0.11	1	02/19/13 09:45	02/23/13 12:03	7440-62-2	
Zinc, Dissolved	**1.6J**	ug/L	10.0	1.0	1	02/19/13 09:45	02/20/13 19:09	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**15.3**	mg/L	2.0	2.0	1	02/15/13 11:14	02/20/13 11:00		B2
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**605**	mg/L	50.0	3.0	50		02/17/13 13:50	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**17.0**	mg/L	7.5	0.61	15		02/18/13 21:04	7440-44-0	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21565 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60138740001, 60138740002, 60138740003

METHOD BLANK: 1142267 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	02/19/13 12:57	
Iron	ug/L	ND	50.0	02/19/13 12:57	
Magnesium	ug/L	ND	50.0	02/19/13 12:57	
Potassium	ug/L	ND	500	02/19/13 12:57	
Sodium	ug/L	ND	500	02/19/13 12:57	

LABORATORY CONTROL SAMPLE: 1142268

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10300	103	85-115	
Magnesium	ug/L	10000	10400	104	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1142269 1142270

Parameter	Units	60138635001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	158000	10000	10000	171000	174000	128	157	70-130	2	9	M1
Iron	ug/L	7000	10000	10000	16900	17200	99	102	70-130	2	10	
Magnesium	ug/L	34400	10000	10000	44300	45100	99	107	70-130	2	9	
Potassium	ug/L	7680	10000	10000	17800	18100	102	105	70-130	2	7	
Sodium	ug/L	61500	10000	10000	73200	74300	117	128	70-130	1	8	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21575 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60138740001, 60138740002, 60138740003

METHOD BLANK: 1142469 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	02/20/13 12:06	
Iron, Dissolved	ug/L	ND	50.0	02/20/13 12:06	
Magnesium, Dissolved	ug/L	ND	50.0	02/20/13 12:06	
Potassium, Dissolved	ug/L	ND	500	02/20/13 12:06	
Sodium, Dissolved	ug/L	ND	500	02/20/13 12:06	

LABORATORY CONTROL SAMPLE: 1142470

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10200	102	85-115	
Iron, Dissolved	ug/L	10000	9950	99	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	10000	100	85-115	
Sodium, Dissolved	ug/L	10000	10500	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1142471 1142472

Parameter	Units	60138740002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	255000	10000	10000	261000	257000	60	16	70-130	2	9	M1
Iron, Dissolved	ug/L	ND			9840	9740				1	10	
Magnesium, Dissolved	ug/L	19900	10000	10000	29300	28800	94	89	70-130	2	9	
Potassium, Dissolved	ug/L	8930	10000	10000	19200	18600	102	97	70-130	3	7	
Sodium, Dissolved	ug/L	12600	10000	10000	23100	22500	105	99	70-130	3	8	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21653
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60138740003

METHOD BLANK: 1144780 Matrix: Water
Associated Lab Samples: 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	71.0J	100	02/25/13 13:38	
Iron, Dissolved	ug/L	12.6J	50.0	02/27/13 11:34	
Magnesium, Dissolved	ug/L	8.3J	50.0	02/27/13 11:34	
Potassium, Dissolved	ug/L	ND	500	02/25/13 13:38	
Sodium, Dissolved	ug/L	ND	500	02/25/13 13:38	

LABORATORY CONTROL SAMPLE: 1144781

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10000	100	85-115	
Iron, Dissolved	ug/L	10000	10500	105	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	9690	97	85-115	
Sodium, Dissolved	ug/L	10000	9940	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1144782 1144783

Parameter	Units	60138740003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	282000	10000	10000	273000	277000	-99	-55	70-130	2	9	M1
Iron, Dissolved	ug/L	27.3J	10000	10000	10000	9810	100	98	70-130	2	10	
Magnesium, Dissolved	ug/L	20900	10000	10000	29500	29000	86	81	70-130	2	9	
Potassium, Dissolved	ug/L	11700	10000	10000	20800	21200	91	95	70-130	2	7	
Sodium, Dissolved	ug/L	12300	10000	10000	21400	21800	91	95	70-130	2	8	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21680
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60138740002

METHOD BLANK: 1145490 Matrix: Water
Associated Lab Samples: 60138740002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	50.0	03/01/13 15:41	

LABORATORY CONTROL SAMPLE: 1145491

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9530	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1145492 1145493

Parameter	Units	60138740002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9270	9370	93	94	70-130	1	10	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21577 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60138740001, 60138740002, 60138740003

METHOD BLANK: 1142481 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	02/23/13 12:32	
Antimony	ug/L	0.078J	1.0	02/20/13 19:43	
Arsenic	ug/L	ND	1.0	02/20/13 19:43	
Barium	ug/L	0.14J	1.0	02/20/13 19:43	
Beryllium	ug/L	ND	0.50	02/20/13 19:43	
Cadmium	ug/L	ND	0.50	02/20/13 19:43	
Chromium	ug/L	0.12J	1.0	02/20/13 19:43	
Cobalt	ug/L	ND	1.0	02/20/13 19:43	
Copper	ug/L	ND	1.0	02/20/13 19:43	
Lead	ug/L	0.23J	1.0	02/20/13 19:43	
Manganese	ug/L	0.47J	1.0	02/20/13 19:43	
Molybdenum	ug/L	ND	1.0	02/20/13 19:43	
Nickel	ug/L	ND	1.0	02/20/13 19:43	
Selenium	ug/L	ND	1.0	02/20/13 19:43	
Silver	ug/L	ND	0.50	02/20/13 19:43	
Thallium	ug/L	0.043J	1.0	02/20/13 19:43	
Vanadium	ug/L	ND	1.0	02/23/13 12:32	
Zinc	ug/L	2.9J	10.0	02/20/13 19:43	

LABORATORY CONTROL SAMPLE: 1142482

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	945	95	85-115	
Antimony	ug/L	40	41.2	103	85-115	
Arsenic	ug/L	40	41.2	103	85-115	
Barium	ug/L	40	39.7	99	85-115	
Beryllium	ug/L	40	41.1	103	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	40.2	100	85-115	
Cobalt	ug/L	40	39.1	98	85-115	
Copper	ug/L	40	39.5	99	85-115	
Lead	ug/L	40	39.2	98	85-115	
Manganese	ug/L	40	39.8	100	85-115	
Molybdenum	ug/L	40	41.2	103	85-115	
Nickel	ug/L	40	39.4	99	85-115	
Selenium	ug/L	40	42.3	106	85-115	
Silver	ug/L	20	19.9	99	85-115	
Thallium	ug/L	40	38.4	96	85-115	
Vanadium	ug/L	40	40.4	101	85-115	
Zinc	ug/L	100	105	105	85-115	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1142483 1142484

Parameter	Units	60138740001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	155	1000	1000	1070	1060	91	91	70-130	0	20	
Antimony	ug/L	0.35J	40	40	40.8	40.6	101	101	70-130	0	20	
Arsenic	ug/L	0.41J	40	40	42.7	42.9	106	106	70-130	0	20	
Barium	ug/L	19.8	40	40	58.3	59.2	96	99	70-130	1	20	
Beryllium	ug/L	0.22J	40	40	36.2	36.4	90	90	70-130	1	20	
Cadmium	ug/L	10.7	40	40	50.0	50.0	98	98	70-130	0	20	
Chromium	ug/L	0.32J	40	40	39.4	39.4	98	98	70-130	0	20	
Cobalt	ug/L	2.3	40	40	39.7	39.5	93	93	70-130	0	20	
Copper	ug/L	36.8	40	40	73.2	72.6	91	90	70-130	1	20	
Lead	ug/L	4.0	40	40	43.4	43.3	99	98	70-130	0	20	
Manganese	ug/L	1680	40	40	1740	1720	138	90	70-130	1	20	M1
Molybdenum	ug/L	17.4	40	40	61.2	61.6	109	110	70-130	1	20	
Nickel	ug/L	3.5	40	40	40.7	40.0	93	91	70-130	2	20	
Selenium	ug/L	0.15J	40	40	42.3	43.0	105	107	70-130	2	20	
Silver	ug/L	ND	20	20	18.6	18.7	93	94	70-130	1	20	
Thallium	ug/L	0.15J	40	40	39.3	39.2	98	98	70-130	0	20	
Vanadium	ug/L	ND	40	40	39.9	40.8	100	102	70-130	2	20	
Zinc	ug/L	2090	100	100	2200	2200	117	115	70-130	0	20	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: MPRP/21576 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60138740001, 60138740002, 60138740003

METHOD BLANK: 1142473 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	02/23/13 11:38	
Antimony, Dissolved	ug/L	0.12J	1.0	02/20/13 18:41	
Arsenic, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Barium, Dissolved	ug/L	0.12J	1.0	02/20/13 18:41	
Beryllium, Dissolved	ug/L	ND	0.50	02/20/13 18:41	
Cadmium, Dissolved	ug/L	ND	0.50	02/20/13 18:41	
Chromium, Dissolved	ug/L	0.11J	1.0	02/20/13 18:41	
Cobalt, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Copper, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Lead, Dissolved	ug/L	0.22J	1.0	02/20/13 18:41	
Manganese, Dissolved	ug/L	0.46J	1.0	02/20/13 18:41	
Molybdenum, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Nickel, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Selenium, Dissolved	ug/L	ND	1.0	02/20/13 18:41	
Silver, Dissolved	ug/L	ND	0.50	02/20/13 18:41	
Thallium, Dissolved	ug/L	0.046J	1.0	02/20/13 18:41	
Vanadium, Dissolved	ug/L	ND	1.0	02/23/13 11:38	
Zinc, Dissolved	ug/L	1.8J	10.0	02/20/13 18:41	

LABORATORY CONTROL SAMPLE: 1142474

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	939	94	85-115	
Antimony, Dissolved	ug/L	40	40.2	101	85-115	
Arsenic, Dissolved	ug/L	40	41.4	103	85-115	
Barium, Dissolved	ug/L	40	39.4	98	85-115	
Beryllium, Dissolved	ug/L	40	37.6	94	85-115	
Cadmium, Dissolved	ug/L	40	39.8	100	85-115	
Chromium, Dissolved	ug/L	40	39.7	99	85-115	
Cobalt, Dissolved	ug/L	40	39.0	98	85-115	
Copper, Dissolved	ug/L	40	39.7	99	85-115	
Lead, Dissolved	ug/L	40	38.7	97	85-115	
Manganese, Dissolved	ug/L	40	39.1	98	85-115	
Molybdenum, Dissolved	ug/L	40	40.3	101	85-115	
Nickel, Dissolved	ug/L	40	39.7	99	85-115	
Selenium, Dissolved	ug/L	40	41.0	102	85-115	
Silver, Dissolved	ug/L	20	19.4	97	85-115	
Thallium, Dissolved	ug/L	40	38.2	95	85-115	
Vanadium, Dissolved	ug/L	40	40.0	100	85-115	
Zinc, Dissolved	ug/L	100	106	106	85-115	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1142475 1142476

Parameter	Units	60138740001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	10.4J	1000	1000	912	904	90	89	70-130	1	20	
Antimony, Dissolved	ug/L	0.28J	40	40	41.2	40.8	102	101	70-130	1	20	
Arsenic, Dissolved	ug/L	ND	40	40	42.9	42.6	107	106	70-130	1	20	
Barium, Dissolved	ug/L	20.3	40	40	58.5	58.4	96	95	70-130	0	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.9	35.5	90	89	70-130	1	20	
Cadmium, Dissolved	ug/L	9.6	40	40	49.2	49.2	99	99	70-130	0	20	
Chromium, Dissolved	ug/L	0.18J	40	40	39.7	39.6	99	99	70-130	0	20	
Cobalt, Dissolved	ug/L	2.2	40	40	40.3	39.8	95	94	70-130	1	20	
Copper, Dissolved	ug/L	4.8	40	40	38.7	38.3	85	84	70-130	1	20	
Lead, Dissolved	ug/L	0.25J	40	40	39.8	39.6	99	98	70-130	0	20	
Manganese, Dissolved	ug/L	1700	40	40	1740	1740	82	95	70-130	0	20	
Molybdenum, Dissolved	ug/L	17.0	40	40	61.6	60.9	112	110	70-130	1	20	
Nickel, Dissolved	ug/L	4.0	40	40	41.3	40.9	93	92	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	43.5	42.0	109	105	70-130	4	20	
Silver, Dissolved	ug/L	ND	20	20	19.0	18.7	95	94	70-130	1	20	
Thallium, Dissolved	ug/L	0.15J	40	40	39.6	39.1	99	97	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	41.1	40.8	103	102	70-130	1	20	
Zinc, Dissolved	ug/L	1820	100	100	1890	1910	72	88	70-130	1	20	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: WET/39758 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60138740001, 60138740003

METHOD BLANK: 1140989 Matrix: Water
Associated Lab Samples: 60138740001, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	02/20/13 10:04	

LABORATORY CONTROL SAMPLE: 1140990

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	191	97	85-115	

SAMPLE DUPLICATE: 1140991

Parameter	Units	60138791003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	210	218	4	17	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: WETA/23557 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60138740001, 60138740002, 60138740003

METHOD BLANK: 1141027 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	02/16/13 09:58	

METHOD BLANK: 1141905 Matrix: Water
Associated Lab Samples: 60138740001, 60138740002, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	02/17/13 09:02	

LABORATORY CONTROL SAMPLE: 1141028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.2	105	90-110	

LABORATORY CONTROL SAMPLE: 1141906

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE SAMPLE: 1141029

Parameter	Units	60138740001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	647	250	875	91	61-119	

MATRIX SPIKE SAMPLE: 1141030

Parameter	Units	60138740003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	605	250	848	97	61-119	

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QUALITY CONTROL DATA

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

QC Batch: WETA/16318 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60138740001, 60138740003

METHOD BLANK: 750699 Matrix: Water
Associated Lab Samples: 60138740001, 60138740003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	02/18/13 18:20	

LABORATORY CONTROL SAMPLE: 750700

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 750701 750702

Parameter	Units	60138699001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	11.4	37.5	37.5	45.2	45.1	90	90	80-120	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 750703 750704

Parameter	Units	60138699002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	1.1	2.5	2.5	2.8	2.8	66	68	80-120	2	20	M0

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QUALIFIERS

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Rico-Argentine Mine Site
Pace Project No.: 60138740

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60138740001	**ROCK DRAIN IN 130213**	EPA 200.7	MPRP/21565	EPA 200.7	ICP/17328
60138740002	**ROCK DRAIN MP 130213**	EPA 200.7	MPRP/21565	EPA 200.7	ICP/17328
60138740003	**WETLAND OUT 130213**	EPA 200.7	MPRP/21565	EPA 200.7	ICP/17328
60138740001	**ROCK DRAIN IN 130213**	EPA 200.7	MPRP/21575	EPA 200.7	ICP/17335
60138740002	**ROCK DRAIN MP 130213**	EPA 200.7	MPRP/21575	EPA 200.7	ICP/17335
60138740002	**ROCK DRAIN MP 130213**	EPA 200.7	MPRP/21680	EPA 200.7	ICP/17387
60138740003	**WETLAND OUT 130213**	EPA 200.7	MPRP/21575	EPA 200.7	ICP/17335
60138740003	**WETLAND OUT 130213**	EPA 200.7	MPRP/21653	EPA 200.7	ICP/17377
60138740001	**ROCK DRAIN IN 130213**	EPA 200.8	MPRP/21577	EPA 200.8	ICPM/2040
60138740002	**ROCK DRAIN MP 130213**	EPA 200.8	MPRP/21577	EPA 200.8	ICPM/2040
60138740003	**WETLAND OUT 130213**	EPA 200.8	MPRP/21577	EPA 200.8	ICPM/2040
60138740001	**ROCK DRAIN IN 130213**	EPA 200.8	MPRP/21576	EPA 200.8	ICPM/2039
60138740002	**ROCK DRAIN MP 130213**	EPA 200.8	MPRP/21576	EPA 200.8	ICPM/2039
60138740003	**WETLAND OUT 130213**	EPA 200.8	MPRP/21576	EPA 200.8	ICPM/2039
60138740001	**ROCK DRAIN IN 130213**	SM 5210B	WET/39758	SM 5210B	WET/39844
60138740003	**WETLAND OUT 130213**	SM 5210B	WET/39758	SM 5210B	WET/39844
60138740001	**ROCK DRAIN IN 130213**	EPA 300.0	WETA/23557		
60138740002	**ROCK DRAIN MP 130213**	EPA 300.0	WETA/23557		
60138740003	**WETLAND OUT 130213**	EPA 300.0	WETA/23557		
60138740001	**ROCK DRAIN IN 130213**	SM 5310C	WETA/16318		
60138740003	**WETLAND OUT 130213**	SM 5310C	WETA/16318		

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March 01, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on February 20, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60139031001	**ROCK DRAIN IN 130219**	Water	02/19/13 11:30	02/20/13 10:30
60139031002	**ROCK DRAIN MP 130219**	Water	02/19/13 12:30	02/20/13 10:30
60139031003	**WETLANDOUT 130219**	Water	02/19/13 13:00	02/20/13 10:30

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60139031001	**ROCK DRAIN IN 130219**	EPA 200.7	SMW	5	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60139031002	**ROCK DRAIN MP 130219**	EPA 200.7	SMW	5	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 300.0	AJM	1	PASI-K
60139031003	**WETLANDOUT 130219**	EPA 200.7	SMW	5	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21629

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139031001

R1: RPD value was outside control limits.

- MSD (Lab ID: 1143716)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21627

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139031001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1143707)
  - Calcium, Dissolved
- MSD (Lab ID: 1143708)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21630

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139031002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1143722)
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21630

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130219 (Lab ID: 60139031001)
  - Vanadium
- ROCK DRAIN MP 130219 (Lab ID: 60139031002)
  - Vanadium

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 01, 2013

Analyte Comments:

QC Batch: MPRP/21630

B: Analyte was detected in the associated method blank.

- WETLANDOUT 130219 (Lab ID: 60139031003)
  - Copper
  - Lead
  - Vanadium

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21628

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130219 (Lab ID: 60139031001)
  - Antimony, Dissolved
- ROCK DRAIN MP 130219 (Lab ID: 60139031002)
  - Antimony, Dissolved
- WETLANDOUT 130219 (Lab ID: 60139031003)
  - Antimony, Dissolved
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 01, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 01, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 01, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: ROCK DRAIN IN 130219 **Lab ID: 60139031001** Collected: 02/19/13 11:30 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**260000**	ug/L	1000	104	10	02/21/13 09:30	02/25/13 14:34	7440-70-2	M6,R1
Iron	**2100**	ug/L	50.0	11.6	1	02/21/13 09:30	02/25/13 10:59	7439-89-6	
Magnesium	**19500**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 10:59	7439-95-4	
Potassium	**7480**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 10:59	7440-09-7	
Sodium	**12100**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 10:59	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**266000**	ug/L	100	10.4	1	02/21/13 09:30	02/25/13 10:23	7440-70-2	D9,M1
Magnesium, Dissolved	**20200**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 10:23	7439-95-4	D9
Potassium, Dissolved	**7740**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 10:23	7440-09-7	D9
Sodium, Dissolved	**12600**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 10:23	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**163**	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 12:59	7429-90-5	
Antimony	**0.28J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 17:55	7440-36-0	
Arsenic	**0.49J**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 17:05	7440-38-2	
Barium	**20.0**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:05	7440-39-3	
Beryllium	**0.25J**	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 17:55	7440-41-7	
Cadmium	**10.5**	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 17:05	7440-43-9	
Chromium	**0.45J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:05	7440-47-3	
Cobalt	**2.2**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:05	7440-48-4	
Copper	**32.1**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:05	7440-50-8	
Lead	**3.5**	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 17:05	7439-92-1	
Manganese	**1620**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:05	7439-96-5	
Molybdenum	**17.4**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:05	7439-98-7	
Nickel	**1.7**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:05	7440-02-0	
Selenium	**0.20J**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:05	7782-49-2	
Silver	**0.030J**	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 17:05	7440-22-4	
Thallium	**0.13J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 17:05	7440-28-0	
Vanadium	**0.13J**	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 12:59	7440-62-2	B
Zinc	**2020**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 17:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 13:41	7429-90-5	
Antimony, Dissolved	**0.23J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 18:36	7440-36-0	B
Arsenic, Dissolved	**0.14J**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 17:46	7440-38-2	
Barium, Dissolved	**19.7**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:46	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 18:36	7440-41-7	
Cadmium, Dissolved	**9.3**	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 17:46	7440-43-9	
Chromium, Dissolved	**0.27J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:46	7440-47-3	
Cobalt, Dissolved	**2.2**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:46	7440-48-4	D9
Copper, Dissolved	**1.7**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:46	7440-50-8	
Iron, Dissolved	**7.7J**	ug/L	50.0	3.0	1	02/21/13 09:30	02/25/13 17:46	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 17:46	7439-92-1	
Manganese, Dissolved	**1640**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:46	7439-96-5	D9
Molybdenum, Dissolved	**17.4**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:46	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: ROCK DRAIN IN 130219 **Lab ID: 60139031001** Collected: 02/19/13 11:30 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**1.8**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:46	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:46	7782-49-2	
Silver, Dissolved	**0.028J**	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 17:46	7440-22-4	
Thallium, Dissolved	**0.13J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 17:46	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 13:41	7440-62-2	
Zinc, Dissolved	**1720**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 17:46	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/20/13 16:46	02/25/13 12:09		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**642**	mg/L	50.0	3.0	50		02/21/13 12:53	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.16J**	mg/L	0.50	0.041	1		02/28/13 00:35	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: ROCK DRAIN MP 130219 **Lab ID: 60139031002** Collected: 02/19/13 12:30 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**265000**	ug/L	1000	104	10	02/21/13 09:30	02/25/13 14:42	7440-70-2	
Iron	**429**	ug/L	50.0	11.6	1	02/21/13 09:30	02/25/13 11:06	7439-89-6	
Magnesium	**19600**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 11:06	7439-95-4	
Potassium	**8310**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 11:06	7440-09-7	
Sodium	**12800**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 11:06	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**270000**	ug/L	100	10.4	1	02/21/13 09:30	02/25/13 10:30	7440-70-2	D9
Magnesium, Dissolved	**20100**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 10:30	7439-95-4	D9
Potassium, Dissolved	**8300**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 10:30	7440-09-7	
Sodium, Dissolved	**12700**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 10:30	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**30.1J**	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 13:03	7429-90-5	
Antimony	**0.25J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 17:59	7440-36-0	
Arsenic	**0.23J**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 17:09	7440-38-2	
Barium	**18.8**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:09	7440-39-3	
Beryllium	**0.070J**	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 17:59	7440-41-7	
Cadmium	**5.0**	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 17:09	7440-43-9	
Chromium	**0.27J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:09	7440-47-3	
Cobalt	**0.15J**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:09	7440-48-4	
Copper	**6.0**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:09	7440-50-8	
Lead	**0.66J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 17:09	7439-92-1	
Manganese	**112**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:09	7439-96-5	
Molybdenum	**14.4**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:09	7439-98-7	
Nickel	**0.71J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:09	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:09	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 17:09	7440-22-4	
Thallium	**0.044J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 17:09	7440-28-0	
Vanadium	**0.40J**	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 13:03	7440-62-2	B
Zinc	**1130**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 17:09	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 13:45	7429-90-5	
Antimony, Dissolved	**0.18J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 18:40	7440-36-0	B
Arsenic, Dissolved	**0.16J**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 17:50	7440-38-2	
Barium, Dissolved	**19.2**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:50	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 18:40	7440-41-7	
Cadmium, Dissolved	**4.9**	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 17:50	7440-43-9	
Chromium, Dissolved	**0.30J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:50	7440-47-3	
Cobalt, Dissolved	**0.13J**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:50	7440-48-4	
Copper, Dissolved	**0.73J**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:50	7440-50-8	
Iron, Dissolved	**3.6J**	ug/L	50.0	3.0	1	02/21/13 09:30	02/25/13 17:50	7439-89-6	
Lead, Dissolved	**0.034J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 17:50	7439-92-1	
Manganese, Dissolved	**114**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:50	7439-96-5	D9
Molybdenum, Dissolved	**14.1**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:50	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: ROCK DRAIN MP 130219 **Lab ID: 60139031002** Collected: 02/19/13 12:30 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.76J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:50	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:50	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 17:50	7440-22-4	
Thallium, Dissolved	**0.046J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 17:50	7440-28-0	
Vanadium, Dissolved	**0.35J**	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 13:45	7440-62-2	
Zinc, Dissolved	**1070**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 17:50	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**630**	mg/L	50.0	3.0	50		02/21/13 13:46	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: WETLANDOUT 130219 **Lab ID: 60139031003** Collected: 02/19/13 13:00 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**278000**	ug/L	1000	104	10	02/21/13 09:30	02/25/13 14:44	7440-70-2	
Iron	**29.7J**	ug/L	50.0	11.6	1	02/21/13 09:30	02/25/13 11:08	7439-89-6	
Magnesium	**19100**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 11:08	7439-95-4	
Potassium	**10000**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 11:08	7440-09-7	
Sodium	**11900**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 11:08	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**286000**	ug/L	100	10.4	1	02/21/13 09:30	02/25/13 10:32	7440-70-2	D9
Magnesium, Dissolved	**20400**	ug/L	50.0	6.5	1	02/21/13 09:30	02/25/13 10:32	7439-95-4	D9
Potassium, Dissolved	**10400**	ug/L	500	44.4	1	02/21/13 09:30	02/25/13 10:32	7440-09-7	D9
Sodium, Dissolved	**12400**	ug/L	500	21.7	1	02/21/13 09:30	02/25/13 10:32	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**16.9J**	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 13:20	7429-90-5	
Antimony	**0.36J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 18:16	7440-36-0	
Arsenic	**2.9**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 17:26	7440-38-2	
Barium	**93.5**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:26	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 18:16	7440-41-7	
Cadmium	**1.1**	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 17:26	7440-43-9	
Chromium	**0.34J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 17:26	7440-47-3	
Cobalt	**0.13J**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 17:26	7440-48-4	
Copper	**0.39J**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:26	7440-50-8	B
Lead	**0.12J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 17:26	7439-92-1	B
Manganese	**1620**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:26	7439-96-5	
Molybdenum	**0.36J**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 17:26	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	02/21/13 09:30	02/28/13 13:20	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 17:26	7782-49-2	
Silver	**0.028J**	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 17:26	7440-22-4	
Thallium	**0.068J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 17:26	7440-28-0	
Vanadium	**0.62J**	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 13:20	7440-62-2	B
Zinc	**295**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 17:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**15.1J**	ug/L	50.0	6.4	1	02/21/13 09:30	02/28/13 14:02	7429-90-5	
Antimony, Dissolved	**0.28J**	ug/L	1.0	0.030	1	02/21/13 09:30	02/27/13 18:57	7440-36-0	B
Arsenic, Dissolved	**1.3**	ug/L	1.0	0.050	1	02/21/13 09:30	02/25/13 18:07	7440-38-2	
Barium, Dissolved	**95.5**	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 18:07	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	02/21/13 09:30	02/27/13 18:57	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	02/21/13 09:30	02/25/13 18:07	7440-43-9	
Chromium, Dissolved	**0.71J**	ug/L	1.0	0.070	1	02/21/13 09:30	02/25/13 18:07	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	02/21/13 09:30	02/25/13 18:07	7440-48-4	
Copper, Dissolved	**0.28J**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 18:07	7440-50-8	
Iron, Dissolved	**21.8J**	ug/L	50.0	3.0	1	02/21/13 09:30	02/25/13 18:07	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	02/21/13 09:30	02/25/13 18:07	7439-92-1	
Manganese, Dissolved	**1640**	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 18:07	7439-96-5	D9
Molybdenum, Dissolved	**0.35J**	ug/L	1.0	0.12	1	02/21/13 09:30	02/25/13 18:07	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Sample: WETLANDOUT 130219 **Lab ID: 60139031003** Collected: 02/19/13 13:00 Received: 02/20/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	02/21/13 09:30	02/28/13 14:02	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	02/21/13 09:30	02/25/13 18:07	7782-49-2	
Silver, Dissolved	**0.028J**	ug/L	0.50	0.010	1	02/21/13 09:30	02/25/13 18:07	7440-22-4	
Thallium, Dissolved	**0.068J**	ug/L	1.0	0.020	1	02/21/13 09:30	02/25/13 18:07	7440-28-0	
Vanadium, Dissolved	**0.55J**	ug/L	1.0	0.11	1	02/21/13 09:30	02/28/13 14:02	7440-62-2	
Zinc, Dissolved	**2.6J**	ug/L	10.0	1.0	1	02/21/13 09:30	02/25/13 18:07	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**78.4**	mg/L	2.0	2.0	1	02/20/13 16:50	02/25/13 12:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**600**	mg/L	50.0	3.0	50		02/21/13 14:21	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**17.0**	mg/L	7.5	0.61	15		02/28/13 11:45	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: MPRP/21629 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60139031001, 60139031002, 60139031003

METHOD BLANK: 1143713 Matrix: Water
Associated Lab Samples: 60139031001, 60139031002, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	15.3J	100	02/25/13 14:31	
Iron	ug/L	ND	50.0	02/25/13 10:56	
Magnesium	ug/L	14.8J	50.0	02/25/13 10:56	
Potassium	ug/L	ND	500	02/25/13 10:56	
Sodium	ug/L	ND	500	02/25/13 10:56	

LABORATORY CONTROL SAMPLE: 1143714

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10700	107	85-115	
Magnesium	ug/L	10000	9970	100	85-115	
Potassium	ug/L	10000	9710	97	85-115	
Sodium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1143715 1143716

Parameter	Units	60139031001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	260000	10000	10000	2800000	273000	25443	125	70-130	165	9	M6,R1
Iron	ug/L	2100	10000	10000	12600	12700	105	106	70-130	1	10	
Magnesium	ug/L	19500	10000	10000	29500	29800	100	103	70-130	1	9	
Potassium	ug/L	7480	10000	10000	17800	18000	103	105	70-130	1	7	
Sodium	ug/L	12100	10000	10000	22800	22900	107	108	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: MPRP/21627 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60139031001, 60139031002, 60139031003

METHOD BLANK: 1143705 Matrix: Water
Associated Lab Samples: 60139031001, 60139031002, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	02/25/13 10:20	
Magnesium, Dissolved	ug/L	ND	50.0	02/25/13 10:20	
Potassium, Dissolved	ug/L	ND	500	02/25/13 10:20	
Sodium, Dissolved	ug/L	ND	500	02/25/13 10:20	

LABORATORY CONTROL SAMPLE: 1143706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10800	108	85-115	
Magnesium, Dissolved	ug/L	10000	9930	99	85-115	
Potassium, Dissolved	ug/L	10000	10300	103	85-115	
Sodium, Dissolved	ug/L	10000	10500	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1143707 1143708

Parameter	Units	60139031001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	266000	10000	10000	266000	285000	0	198	70-130	7	9	M1
Magnesium, Dissolved	ug/L	20200	10000	10000	28500	30400	83	102	70-130	6	9	
Potassium, Dissolved	ug/L	7740	10000	10000	17400	18700	96	109	70-130	7	7	
Sodium, Dissolved	ug/L	12600	10000	10000	22200	23800	96	113	70-130	7	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: MPRP/21630 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60139031001, 60139031002, 60139031003

METHOD BLANK: 1143720 Matrix: Water
Associated Lab Samples: 60139031001, 60139031002, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	02/28/13 12:51	
Antimony	ug/L	ND	1.0	02/27/13 17:47	
Arsenic	ug/L	ND	1.0	02/25/13 16:57	
Barium	ug/L	ND	1.0	02/25/13 16:57	
Beryllium	ug/L	ND	0.50	02/27/13 17:47	
Cadmium	ug/L	ND	0.50	02/25/13 16:57	
Chromium	ug/L	ND	1.0	02/25/13 16:57	
Cobalt	ug/L	ND	1.0	02/25/13 16:57	
Copper	ug/L	0.15J	1.0	02/25/13 16:57	
Lead	ug/L	0.047J	1.0	02/25/13 16:57	
Manganese	ug/L	0.21J	1.0	02/25/13 16:57	
Molybdenum	ug/L	ND	1.0	02/25/13 16:57	
Nickel	ug/L	ND	1.0	02/25/13 16:57	
Selenium	ug/L	ND	1.0	02/25/13 16:57	
Silver	ug/L	ND	0.50	02/25/13 16:57	
Thallium	ug/L	ND	1.0	02/25/13 16:57	
Vanadium	ug/L	0.13J	1.0	02/28/13 12:51	
Zinc	ug/L	3.4J	10.0	02/25/13 16:57	

LABORATORY CONTROL SAMPLE: 1143721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	984	98	85-115	
Antimony	ug/L	40	41.6	104	85-115	
Arsenic	ug/L	40	42.4	106	85-115	
Barium	ug/L	40	40.5	101	85-115	
Beryllium	ug/L	40	42.5	106	85-115	
Cadmium	ug/L	40	40.3	101	85-115	
Chromium	ug/L	40	40.1	100	85-115	
Cobalt	ug/L	40	39.7	99	85-115	
Copper	ug/L	40	40.3	101	85-115	
Lead	ug/L	40	39.6	99	85-115	
Manganese	ug/L	40	39.9	100	85-115	
Molybdenum	ug/L	40	40.7	102	85-115	
Nickel	ug/L	40	39.9	100	85-115	
Selenium	ug/L	40	44.9	112	85-115	
Silver	ug/L	20	19.8	99	85-115	
Thallium	ug/L	40	38.5	96	85-115	
Vanadium	ug/L	40	40.7	102	85-115	
Zinc	ug/L	100	111	111	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1143722 1143723

Parameter	Units	60139031002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	30.1J	1000	1000	938	948	91	92	70-130	1	20	
Antimony	ug/L	0.25J	40	40	41.0	40.5	102	101	70-130	1	20	
Arsenic	ug/L	0.23J	40	40	43.4	43.4	108	108	70-130	0	20	
Barium	ug/L	18.8	40	40	57.3	58.0	96	98	70-130	1	20	
Beryllium	ug/L	0.070J	40	40	39.2	38.8	98	97	70-130	1	20	
Cadmium	ug/L	5.0	40	40	43.8	44.4	97	99	70-130	1	20	
Chromium	ug/L	0.27J	40	40	38.8	39.0	96	97	70-130	0	20	
Cobalt	ug/L	0.15J	40	40	37.8	38.0	94	95	70-130	0	20	
Copper	ug/L	6.0	40	40	42.5	42.7	91	92	70-130	0	20	
Lead	ug/L	0.66J	40	40	40.1	40.6	99	100	70-130	1	20	
Manganese	ug/L	112	40	40	149	152	94	101	70-130	2	20	
Molybdenum	ug/L	14.4	40	40	57.3	57.6	107	108	70-130	0	20	
Nickel	ug/L	0.71J	40	40	37.6	37.8	92	93	70-130	1	20	
Selenium	ug/L	ND	40	40	45.0	44.0	112	110	70-130	2	20	
Silver	ug/L	ND	20	20	18.6	18.6	93	93	70-130	0	20	
Thallium	ug/L	0.044J	40	40	39.4	39.7	98	99	70-130	1	20	
Vanadium	ug/L	0.40J	40	40	39.9	39.5	99	98	70-130	1	20	
Zinc	ug/L	1130	100	100	1200	1220	68	86	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: MPRP/21628 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60139031001, 60139031002, 60139031003

METHOD BLANK: 1143709 Matrix: Water
Associated Lab Samples: 60139031001, 60139031002, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	02/28/13 13:33	
Antimony, Dissolved	ug/L	0.030J	1.0	02/27/13 18:28	
Arsenic, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Barium, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Beryllium, Dissolved	ug/L	ND	0.50	02/27/13 18:28	
Cadmium, Dissolved	ug/L	ND	0.50	02/25/13 17:38	
Chromium, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Cobalt, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Copper, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Iron, Dissolved	ug/L	ND	50.0	02/25/13 17:38	
Lead, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Manganese, Dissolved	ug/L	0.18J	1.0	02/25/13 17:38	
Molybdenum, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Nickel, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Selenium, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Silver, Dissolved	ug/L	ND	0.50	02/25/13 17:38	
Thallium, Dissolved	ug/L	ND	1.0	02/25/13 17:38	
Vanadium, Dissolved	ug/L	ND	1.0	02/28/13 13:33	
Zinc, Dissolved	ug/L	2.1J	10.0	02/25/13 17:38	

LABORATORY CONTROL SAMPLE: 1143710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	950	95	85-115	
Antimony, Dissolved	ug/L	40	42.2	105	85-115	
Arsenic, Dissolved	ug/L	40	41.8	105	85-115	
Barium, Dissolved	ug/L	40	40.8	102	85-115	
Beryllium, Dissolved	ug/L	40	42.5	106	85-115	
Cadmium, Dissolved	ug/L	40	41.0	103	85-115	
Chromium, Dissolved	ug/L	40	40.1	100	85-115	
Cobalt, Dissolved	ug/L	40	39.4	99	85-115	
Copper, Dissolved	ug/L	40	39.4	99	85-115	
Iron, Dissolved	ug/L	1000	923	92	85-115	
Lead, Dissolved	ug/L	40	40.6	101	85-115	
Manganese, Dissolved	ug/L	40	40.2	101	85-115	
Molybdenum, Dissolved	ug/L	40	40.7	102	85-115	
Nickel, Dissolved	ug/L	40	39.6	99	85-115	
Selenium, Dissolved	ug/L	40	43.7	109	85-115	
Silver, Dissolved	ug/L	20	19.6	98	85-115	
Thallium, Dissolved	ug/L	40	39.1	98	85-115	
Vanadium, Dissolved	ug/L	40	38.6	96	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

LABORATORY CONTROL SAMPLE: 1143710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	108	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1143711 1143712

Parameter	Units	60139031002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	910	914	91	91	70-130	0	20	
Antimony, Dissolved	ug/L	0.18J	40	40	41.2	41.4	103	103	70-130	1	20	
Arsenic, Dissolved	ug/L	0.16J	40	40	43.3	43.0	108	107	70-130	1	20	
Barium, Dissolved	ug/L	19.2	40	40	57.8	58.4	96	98	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	38.8	39.2	97	98	70-130	1	20	
Cadmium, Dissolved	ug/L	4.9	40	40	43.7	43.2	97	96	70-130	1	20	
Chromium, Dissolved	ug/L	0.30J	40	40	38.7	38.8	96	96	70-130	0	20	
Cobalt, Dissolved	ug/L	0.13J	40	40	37.2	37.1	93	92	70-130	0	20	
Copper, Dissolved	ug/L	0.73J	40	40	36.4	36.7	89	90	70-130	1	20	
Iron, Dissolved	ug/L	3.6J	1000	1000	890	889	89	89	70-130	0	20	
Lead, Dissolved	ug/L	0.034J	40	40	39.2	39.7	98	99	70-130	1	20	
Manganese, Dissolved	ug/L	114	40	40	151	150	91	89	70-130	1	20	
Molybdenum, Dissolved	ug/L	14.1	40	40	57.1	56.7	107	106	70-130	1	20	
Nickel, Dissolved	ug/L	0.76J	40	40	37.4	37.1	92	91	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	44.9	44.6	112	111	70-130	1	20	
Silver, Dissolved	ug/L	ND	20	20	18.5	18.4	92	92	70-130	1	20	
Thallium, Dissolved	ug/L	0.046J	40	40	39.0	39.1	97	98	70-130	0	20	
Vanadium, Dissolved	ug/L	0.35J	40	40	39.4	39.9	98	99	70-130	1	20	
Zinc, Dissolved	ug/L	1070	100	100	1160	1150	87	84	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: WET/39850 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60139031001, 60139031003

METHOD BLANK: 1143323 Matrix: Water
Associated Lab Samples: 60139031001, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	02/25/13 11:01	

LABORATORY CONTROL SAMPLE: 1143324

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	187	95	85-115	

SAMPLE DUPLICATE: 1143325

Parameter	Units	60139000004 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	214	211	1	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: WETA/23623 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60139031001, 60139031002, 60139031003

METHOD BLANK: 1143669 Matrix: Water
Associated Lab Samples: 60139031001, 60139031002, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	02/21/13 09:38	

LABORATORY CONTROL SAMPLE: 1143670

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.2	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1143671 1143672

Parameter	Units	60139031001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	642	250	250	874	870	93	91	61-119	0	10	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

QC Batch: WETA/16438 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60139031001, 60139031003

METHOD BLANK: 754251 Matrix: Water
Associated Lab Samples: 60139031001, 60139031003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	02/27/13 23:57	

LABORATORY CONTROL SAMPLE: 754252

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.6	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 754253 754254

Parameter	Units	60139031001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	0.16J	2.5	2.5	2.8	2.8	107	105	80-120	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 754255 754256

Parameter	Units	4074328001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	5.7	15	15	20.8	20.8	101	101	80-120	0	20	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139031

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60139031001	**ROCK DRAIN IN 130219**	EPA 200.7	MPRP/21629	EPA 200.7	ICP/17366
60139031002	**ROCK DRAIN MP 130219**	EPA 200.7	MPRP/21629	EPA 200.7	ICP/17366
60139031003	**WETLANDOUT 130219**	EPA 200.7	MPRP/21629	EPA 200.7	ICP/17366
60139031001	**ROCK DRAIN IN 130219**	EPA 200.7	MPRP/21627	EPA 200.7	ICP/17365
60139031002	**ROCK DRAIN MP 130219**	EPA 200.7	MPRP/21627	EPA 200.7	ICP/17365
60139031003	**WETLANDOUT 130219**	EPA 200.7	MPRP/21627	EPA 200.7	ICP/17365
60139031001	**ROCK DRAIN IN 130219**	EPA 200.8	MPRP/21630	EPA 200.8	ICPM/2058
60139031002	**ROCK DRAIN MP 130219**	EPA 200.8	MPRP/21630	EPA 200.8	ICPM/2058
60139031003	**WETLANDOUT 130219**	EPA 200.8	MPRP/21630	EPA 200.8	ICPM/2058
60139031001	**ROCK DRAIN IN 130219**	EPA 200.8	MPRP/21628	EPA 200.8	ICPM/2057
60139031002	**ROCK DRAIN MP 130219**	EPA 200.8	MPRP/21628	EPA 200.8	ICPM/2057
60139031003	**WETLANDOUT 130219**	EPA 200.8	MPRP/21628	EPA 200.8	ICPM/2057
60139031001	**ROCK DRAIN IN 130219**	SM 5210B	WET/39850	SM 5210B	WET/39923
60139031003	**WETLANDOUT 130219**	SM 5210B	WET/39850	SM 5210B	WET/39923
60139031001	**ROCK DRAIN IN 130219**	EPA 300.0	WETA/23623		
60139031002	**ROCK DRAIN MP 130219**	EPA 300.0	WETA/23623		
60139031003	**WETLANDOUT 130219**	EPA 300.0	WETA/23623		
60139031001	**ROCK DRAIN IN 130219**	SM 5310C	WETA/16438		
60139031003	**WETLANDOUT 130219**	SM 5310C	WETA/16438		

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March 07, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on February 28, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60139383001	**ROCK DRAIN IN 130227**	Water	02/27/13 11:10	02/28/13 10:15
60139383002	**ROCK DRAIN MP 130227**	Water	02/27/13 12:05	02/28/13 10:15
60139383003	**WETLAND OUT 130227**	Water	02/27/13 13:00	02/28/13 10:15

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SAMPLE ANALYTE COUNT

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60139383001	**ROCK DRAIN IN 130227**	EPA 200.7	SMW	4	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60139383002	**ROCK DRAIN MP 130227**	EPA 200.7	SMW	4	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 300.0	AJM	1	PASI-K
60139383003	**WETLAND OUT 130227**	EPA 200.7	SMW	4	PASI-K
		EPA 200.7	SMW	4	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 07, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21707

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139383002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1146856)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 07, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21706

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139383002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1146850)
  - Calcium, Dissolved
- MSD (Lab ID: 1146851)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 07, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21708

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139383001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1146859)
  - Manganese
  - Zinc
- MSD (Lab ID: 1146860)
  - Manganese
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 07, 2013

Analyte Comments:

QC Batch: MPRP/21708

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- WETLAND OUT 130227 (Lab ID: 60139383003)
  - Nickel

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 07, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21705

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- WETLAND OUT 130227 (Lab ID: 60139383003)
  - Nickel, Dissolved

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 07, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

QC Batch: WET/39972

L0: Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

- LCS (Lab ID: 1146101)
  - BOD, 5 day

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 07, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 07, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: ROCK DRAIN IN 130227 **Lab ID: 60139383001** Collected: 02/27/13 11:10 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**265000**	ug/L	200	20.7	2	03/01/13 16:00	03/06/13 13:45	7440-70-2	
Magnesium	**21100**	ug/L	100	13.0	2	03/01/13 16:00	03/06/13 13:45	7439-95-4	
Potassium	**7350**	ug/L	1000	88.8	2	03/01/13 16:00	03/06/13 13:45	7440-09-7	
Sodium	**13400**	ug/L	1000	43.4	2	03/01/13 16:00	03/06/13 13:45	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**255000**	ug/L	100	10.4	1	03/01/13 16:00	03/06/13 12:41	7440-70-2	
Magnesium, Dissolved	**20400**	ug/L	50.0	6.5	1	03/01/13 16:00	03/06/13 12:41	7439-95-4	
Potassium, Dissolved	**7100**	ug/L	500	44.4	1	03/01/13 16:00	03/06/13 12:41	7440-09-7	
Sodium, Dissolved	**12800**	ug/L	500	21.7	1	03/01/13 16:00	03/06/13 12:41	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**185**	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 12:03	7429-90-5	
Antimony	**0.24J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:03	7440-36-0	
Arsenic	**0.48J**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 12:03	7440-38-2	
Barium	**19.7**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:03	7440-39-3	
Beryllium	**0.21J**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:03	7440-41-7	
Cadmium	**10.9**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:03	7440-43-9	
Chromium	**0.31J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:03	7440-47-3	
Cobalt	**2.3**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:03	7440-48-4	
Copper	**40.9**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:03	7440-50-8	
Iron	**2230**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 12:03	7439-89-6	
Lead	**4.1**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:03	7439-92-1	
Manganese	**1690**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:03	7439-96-5	M1
Molybdenum	**16.5**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:03	7439-98-7	
Nickel	**2.3**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:03	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:03	7782-49-2	
Silver	**0.041J**	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 12:03	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 12:03	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 12:03	7440-62-2	
Zinc	**2060**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 12:03	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 12:44	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:44	7440-36-0	
Arsenic, Dissolved	**0.16J**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 12:44	7440-38-2	
Barium, Dissolved	**18.8**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:44	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:44	7440-41-7	
Cadmium, Dissolved	**9.4**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:44	7440-43-9	
Chromium, Dissolved	**0.27J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:44	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:44	7440-48-4	
Copper, Dissolved	**2.0**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:44	7440-50-8	
Iron, Dissolved	**6.3J**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 12:44	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:44	7439-92-1	
Manganese, Dissolved	**1630**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:44	7439-96-5	
Molybdenum, Dissolved	**15.7**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:44	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: ROCK DRAIN IN 130227 **Lab ID: 60139383001** Collected: 02/27/13 11:10 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.1**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:44	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:44	7782-49-2	
Silver, Dissolved	**0.030J**	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 12:44	7440-22-4	
Thallium, Dissolved	**0.14J**	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 12:44	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 12:44	7440-62-2	
Zinc, Dissolved	**1740**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 12:44	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**4.9**	mg/L	2.0	2.0	1	02/28/13 15:51	03/05/13 13:30		L2
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**628**	mg/L	50.0	3.0	50		03/02/13 16:53	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.10J**	mg/L	0.50	0.041	1		03/05/13 06:27	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: ROCK DRAIN MP 130227 **Lab ID: 60139383002** Collected: 02/27/13 12:05 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**257000**	ug/L	200	20.7	2	03/01/13 16:00	03/06/13 13:47	7440-70-2	M1
Magnesium	**20900**	ug/L	100	13.0	2	03/01/13 16:00	03/06/13 13:47	7439-95-4	
Potassium	**7280**	ug/L	1000	88.8	2	03/01/13 16:00	03/06/13 13:47	7440-09-7	
Sodium	**13000**	ug/L	1000	43.4	2	03/01/13 16:00	03/06/13 13:47	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**259000**	ug/L	100	10.4	1	03/01/13 16:00	03/06/13 12:43	7440-70-2	D9,M1
Magnesium, Dissolved	**21500**	ug/L	50.0	6.5	1	03/01/13 16:00	03/06/13 12:43	7439-95-4	D9
Potassium, Dissolved	**7560**	ug/L	500	44.4	1	03/01/13 16:00	03/06/13 12:43	7440-09-7	D9
Sodium, Dissolved	**13300**	ug/L	500	21.7	1	03/01/13 16:00	03/06/13 12:43	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**35.6J**	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 12:19	7429-90-5	
Antimony	**0.19J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:19	7440-36-0	
Arsenic	**0.20J**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 12:19	7440-38-2	
Barium	**18.3**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:19	7440-39-3	
Beryllium	**0.054J**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:19	7440-41-7	
Cadmium	**6.0**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:19	7440-43-9	
Chromium	**0.31J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:19	7440-47-3	
Cobalt	**0.20J**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:19	7440-48-4	
Copper	**8.3**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:19	7440-50-8	
Iron	**482**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 12:19	7439-89-6	
Lead	**0.86J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:19	7439-92-1	
Manganese	**170**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:19	7439-96-5	
Molybdenum	**13.7**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:19	7439-98-7	
Nickel	**1.3**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:19	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:19	7782-49-2	
Silver	**0.027J**	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 12:19	7440-22-4	
Thallium	**0.10J**	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 12:19	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 12:19	7440-62-2	
Zinc	**1240**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 12:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 13:01	7429-90-5	
Antimony, Dissolved	**0.19J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 13:01	7440-36-0	
Arsenic, Dissolved	**0.13J**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 13:01	7440-38-2	
Barium, Dissolved	**18.5**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 13:01	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 13:01	7440-41-7	
Cadmium, Dissolved	**5.6**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 13:01	7440-43-9	
Chromium, Dissolved	**0.24J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 13:01	7440-47-3	
Cobalt, Dissolved	**0.21J**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 13:01	7440-48-4	
Copper, Dissolved	**0.83J**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 13:01	7440-50-8	
Iron, Dissolved	**4.3J**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 13:01	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 13:01	7439-92-1	
Manganese, Dissolved	**168**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 13:01	7439-96-5	
Molybdenum, Dissolved	**14.0**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 13:01	7439-98-7	D9

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: ROCK DRAIN MP 130227 **Lab ID: 60139383002** Collected: 02/27/13 12:05 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**1.6**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 13:01	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 13:01	7782-49-2	
Silver, Dissolved	**0.026J**	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 13:01	7440-22-4	
Thallium, Dissolved	**0.10J**	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 13:01	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 13:01	7440-62-2	
Zinc, Dissolved	**1200**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 13:01	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**621**	mg/L	50.0	3.0	50		03/02/13 17:28	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: WETLAND OUT 130227 **Lab ID: 60139383003** Collected: 02/27/13 13:00 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**276000**	ug/L	200	20.7	2	03/01/13 16:00	03/06/13 13:54	7440-70-2	
Magnesium	**20900**	ug/L	100	13.0	2	03/01/13 16:00	03/06/13 13:54	7439-95-4	
Potassium	**9160**	ug/L	1000	88.8	2	03/01/13 16:00	03/06/13 13:54	7440-09-7	
Sodium	**12800**	ug/L	1000	43.4	2	03/01/13 16:00	03/06/13 13:54	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**280000**	ug/L	100	10.4	1	03/01/13 16:00	03/06/13 12:50	7440-70-2	D9
Magnesium, Dissolved	**21100**	ug/L	50.0	6.5	1	03/01/13 16:00	03/06/13 12:50	7439-95-4	D9
Potassium, Dissolved	**9460**	ug/L	500	44.4	1	03/01/13 16:00	03/06/13 12:50	7440-09-7	D9
Sodium, Dissolved	**13000**	ug/L	500	21.7	1	03/01/13 16:00	03/06/13 12:50	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**16.7J**	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 12:23	7429-90-5	
Antimony	**0.24J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:23	7440-36-0	
Arsenic	**2.5**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 12:23	7440-38-2	
Barium	**88.3**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:23	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:23	7440-41-7	
Cadmium	**0.44J**	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 12:23	7440-43-9	
Chromium	**0.30J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 12:23	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 12:23	7440-48-4	
Copper	**0.28J**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:23	7440-50-8	
Iron	**48.4J**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 12:23	7439-89-6	
Lead	**0.090J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 12:23	7439-92-1	
Manganese	**1320**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:23	7439-96-5	
Molybdenum	**0.23J**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 12:23	7439-98-7	
Nickel	ND	ug/L	2.0	0.14	2	03/01/13 16:00	03/06/13 13:17	7440-02-0	D3
Selenium	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 12:23	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 12:23	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 12:23	7440-28-0	
Vanadium	**0.36J**	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 12:23	7440-62-2	
Zinc	**249**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 12:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**13.8J**	ug/L	50.0	6.4	1	03/01/13 16:00	03/06/13 13:05	7429-90-5	
Antimony, Dissolved	**0.18J**	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 13:05	7440-36-0	
Arsenic, Dissolved	**1.2**	ug/L	1.0	0.050	1	03/01/13 16:00	03/06/13 13:05	7440-38-2	
Barium, Dissolved	**89.6**	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 13:05	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 13:05	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	03/01/13 16:00	03/06/13 13:05	7440-43-9	
Chromium, Dissolved	**0.34J**	ug/L	1.0	0.070	1	03/01/13 16:00	03/06/13 13:05	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	03/01/13 16:00	03/06/13 13:05	7440-48-4	
Copper, Dissolved	**0.13J**	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 13:05	7440-50-8	
Iron, Dissolved	**20.4J**	ug/L	50.0	3.0	1	03/01/13 16:00	03/06/13 13:05	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/01/13 16:00	03/06/13 13:05	7439-92-1	
Manganese, Dissolved	**1320**	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 13:05	7439-96-5	D9
Molybdenum, Dissolved	ND	ug/L	1.0	0.12	1	03/01/13 16:00	03/06/13 13:05	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Sample: WETLAND OUT 130227 **Lab ID: 60139383003** Collected: 02/27/13 13:00 Received: 02/28/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	2.0	0.14	2	03/01/13 16:00	03/06/13 13:21	7440-02-0	D3
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/01/13 16:00	03/06/13 13:05	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/01/13 16:00	03/06/13 13:05	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.020	1	03/01/13 16:00	03/06/13 13:05	7440-28-0	
Vanadium, Dissolved	**0.28J**	ug/L	1.0	0.11	1	03/01/13 16:00	03/06/13 13:05	7440-62-2	
Zinc, Dissolved	**1.9J**	ug/L	10.0	1.0	1	03/01/13 16:00	03/06/13 13:05	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**74.7**	mg/L	2.0	2.0	1	02/28/13 15:59	03/05/13 13:42		L2
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**581**	mg/L	50.0	3.0	50		03/02/13 18:21	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**15.5**	mg/L	5.0	0.41	10		03/06/13 17:15	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: MPRP/21707 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60139383001, 60139383002, 60139383003

METHOD BLANK: 1146853 Matrix: Water
Associated Lab Samples: 60139383001, 60139383002, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	03/06/13 13:41	
Magnesium	ug/L	ND	50.0	03/06/13 13:41	
Potassium	ug/L	ND	500	03/06/13 13:41	
Sodium	ug/L	25.9J	500	03/06/13 13:41	

LABORATORY CONTROL SAMPLE: 1146854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9450	94	85-115	
Magnesium	ug/L	10000	9700	97	85-115	
Potassium	ug/L	10000	9730	97	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1146855 1146856

Parameter	Units	60139383002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	257000	10000	10000	269000	278000	120	212	70-130	3	9	M1
Magnesium	ug/L	20900	10000	10000	29500	31200	86	103	70-130	6	9	
Potassium	ug/L	7280	10000	10000	17600	18000	103	107	70-130	2	7	
Sodium	ug/L	13000	10000	10000	23500	24200	105	113	70-130	3	8	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: MPRP/21706 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60139383001, 60139383002, 60139383003

METHOD BLANK: 1146848 Matrix: Water
Associated Lab Samples: 60139383001, 60139383002, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	03/06/13 12:37	
Magnesium, Dissolved	ug/L	ND	50.0	03/06/13 12:37	
Potassium, Dissolved	ug/L	ND	500	03/06/13 12:37	
Sodium, Dissolved	ug/L	30.1J	500	03/06/13 12:37	

LABORATORY CONTROL SAMPLE: 1146849

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10300	103	85-115	
Magnesium, Dissolved	ug/L	10000	10600	106	85-115	
Potassium, Dissolved	ug/L	10000	10500	105	85-115	
Sodium, Dissolved	ug/L	10000	10900	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1146850 1146851

Parameter	Units	60139383002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	259000	10000	10000	273000	280000	140	209	70-130	2	9	M1
Magnesium, Dissolved	ug/L	21500	10000	10000	30700	31900	92	104	70-130	4	9	
Potassium, Dissolved	ug/L	7560	10000	10000	18000	18400	104	108	70-130	2	7	
Sodium, Dissolved	ug/L	13300	10000	10000	24200	24600	109	113	70-130	2	8	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: MPRP/21708 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60139383001, 60139383002, 60139383003

METHOD BLANK: 1146857 Matrix: Water
Associated Lab Samples: 60139383001, 60139383002, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	03/06/13 11:54	
Antimony	ug/L	ND	1.0	03/06/13 11:54	
Arsenic	ug/L	ND	1.0	03/06/13 11:54	
Barium	ug/L	ND	1.0	03/06/13 11:54	
Beryllium	ug/L	ND	0.50	03/06/13 11:54	
Cadmium	ug/L	ND	0.50	03/06/13 11:54	
Chromium	ug/L	ND	1.0	03/06/13 11:54	
Cobalt	ug/L	ND	1.0	03/06/13 11:54	
Copper	ug/L	ND	1.0	03/06/13 11:54	
Iron	ug/L	ND	50.0	03/06/13 11:54	
Lead	ug/L	ND	1.0	03/06/13 11:54	
Manganese	ug/L	ND	1.0	03/06/13 11:54	
Molybdenum	ug/L	ND	1.0	03/06/13 11:54	
Nickel	ug/L	ND	1.0	03/06/13 11:54	
Selenium	ug/L	ND	1.0	03/06/13 11:54	
Silver	ug/L	ND	0.50	03/06/13 11:54	
Thallium	ug/L	ND	1.0	03/06/13 11:54	
Vanadium	ug/L	ND	1.0	03/06/13 11:54	
Zinc	ug/L	ND	10.0	03/06/13 11:54	

LABORATORY CONTROL SAMPLE: 1146858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	1010	101	85-115	
Antimony	ug/L	40	40.3	101	85-115	
Arsenic	ug/L	40	41.9	105	85-115	
Barium	ug/L	40	39.6	99	85-115	
Beryllium	ug/L	40	39.1	98	85-115	
Cadmium	ug/L	40	40.5	101	85-115	
Chromium	ug/L	40	40.2	100	85-115	
Cobalt	ug/L	40	39.6	99	85-115	
Copper	ug/L	40	40.6	102	85-115	
Iron	ug/L	1000	944	94	85-115	
Lead	ug/L	40	39.0	98	85-115	
Manganese	ug/L	40	40.1	100	85-115	
Molybdenum	ug/L	40	41.0	102	85-115	
Nickel	ug/L	40	40.9	102	85-115	
Selenium	ug/L	40	40.9	102	85-115	
Silver	ug/L	20	19.8	99	85-115	
Thallium	ug/L	40	38.9	97	85-115	
Vanadium	ug/L	40	39.9	100	85-115	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

LABORATORY CONTROL SAMPLE: 1146858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	107	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1146859 1146860

Parameter	Units	60139383001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	185	1000	1000	1140	1110	95	93	70-130	2	20	
Antimony	ug/L	0.24J	40	40	39.9	38.9	99	97	70-130	3	20	
Arsenic	ug/L	0.48J	40	40	42.9	41.3	106	102	70-130	4	20	
Barium	ug/L	19.7	40	40	58.8	57.5	98	94	70-130	2	20	
Beryllium	ug/L	0.21J	40	40	33.4	32.6	83	81	70-130	3	20	
Cadmium	ug/L	10.9	40	40	49.0	48.0	95	93	70-130	2	20	
Chromium	ug/L	0.31J	40	40	39.9	38.4	99	95	70-130	4	20	
Cobalt	ug/L	2.3	40	40	40.6	39.6	96	93	70-130	2	20	
Copper	ug/L	40.9	40	40	77.5	76.7	92	90	70-130	1	20	
Iron	ug/L	2230	1000	1000	3130	3090	90	86	70-130	1	20	
Lead	ug/L	4.1	40	40	44.0	42.6	100	96	70-130	3	20	
Manganese	ug/L	1690	40	40	1700	1680	45	-5	70-130	1	20	M1
Molybdenum	ug/L	16.5	40	40	58.3	56.5	104	100	70-130	3	20	
Nickel	ug/L	2.3	40	40	39.7	38.7	94	91	70-130	3	20	
Selenium	ug/L	ND	40	40	40.1	39.1	100	97	70-130	3	20	
Silver	ug/L	0.041J	20	20	18.3	17.7	91	88	70-130	4	20	
Thallium	ug/L	0.14J	40	40	40.3	39.1	100	97	70-130	3	20	
Vanadium	ug/L	ND	40	40	41.0	38.8	103	97	70-130	6	20	
Zinc	ug/L	2060	100	100	2120	2110	63	52	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: MPRP/21705 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60139383001, 60139383002, 60139383003

METHOD BLANK: 1146840 Matrix: Water
Associated Lab Samples: 60139383001, 60139383002, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	03/06/13 12:36	
Antimony, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Arsenic, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Barium, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Beryllium, Dissolved	ug/L	ND	0.50	03/06/13 12:36	
Cadmium, Dissolved	ug/L	ND	0.50	03/06/13 12:36	
Chromium, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Cobalt, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Copper, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Iron, Dissolved	ug/L	ND	50.0	03/06/13 12:36	
Lead, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Manganese, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Molybdenum, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Nickel, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Selenium, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Silver, Dissolved	ug/L	ND	0.50	03/06/13 12:36	
Thallium, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Vanadium, Dissolved	ug/L	ND	1.0	03/06/13 12:36	
Zinc, Dissolved	ug/L	ND	10.0	03/06/13 12:36	

LABORATORY CONTROL SAMPLE: 1146841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	1010	101	85-115	
Antimony, Dissolved	ug/L	40	41.2	103	85-115	
Arsenic, Dissolved	ug/L	40	42.0	105	85-115	
Barium, Dissolved	ug/L	40	40.1	100	85-115	
Beryllium, Dissolved	ug/L	40	38.6	96	85-115	
Cadmium, Dissolved	ug/L	40	40.7	102	85-115	
Chromium, Dissolved	ug/L	40	40.8	102	85-115	
Cobalt, Dissolved	ug/L	40	39.7	99	85-115	
Copper, Dissolved	ug/L	40	44.3	111	85-115	
Iron, Dissolved	ug/L	1000	956	96	85-115	
Lead, Dissolved	ug/L	40	39.4	99	85-115	
Manganese, Dissolved	ug/L	40	40.7	102	85-115	
Molybdenum, Dissolved	ug/L	40	40.6	102	85-115	
Nickel, Dissolved	ug/L	40	41.2	103	85-115	
Selenium, Dissolved	ug/L	40	41.2	103	85-115	
Silver, Dissolved	ug/L	20	19.8	99	85-115	
Thallium, Dissolved	ug/L	40	39.4	99	85-115	
Vanadium, Dissolved	ug/L	40	40.5	101	85-115	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

LABORATORY CONTROL SAMPLE: 1146841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	111	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1146842 1146843

Parameter	Units	60139383001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	956	950	95	94	70-130	1	20	
Antimony, Dissolved	ug/L	0.21J	40	40	40.2	39.8	100	99	70-130	1	20	
Arsenic, Dissolved	ug/L	0.16J	40	40	42.9	42.6	107	106	70-130	1	20	
Barium, Dissolved	ug/L	18.8	40	40	58.1	57.9	98	98	70-130	0	20	
Beryllium, Dissolved	ug/L	ND	40	40	33.1	33.0	83	82	70-130	0	20	
Cadmium, Dissolved	ug/L	9.4	40	40	47.9	47.8	96	96	70-130	0	20	
Chromium, Dissolved	ug/L	0.27J	40	40	39.7	39.3	99	98	70-130	1	20	
Cobalt, Dissolved	ug/L	2.3	40	40	39.9	40.1	94	95	70-130	1	20	
Copper, Dissolved	ug/L	2.0	40	40	38.7	38.5	92	91	70-130	0	20	
Iron, Dissolved	ug/L	6.3J	1000	1000	917	921	91	91	70-130	0	20	
Lead, Dissolved	ug/L	ND	40	40	39.8	39.7	99	99	70-130	0	20	
Manganese, Dissolved	ug/L	1630	40	40	1680	1670	130	102	70-130	1	20	
Molybdenum, Dissolved	ug/L	15.7	40	40	58.0	57.7	106	105	70-130	0	20	
Nickel, Dissolved	ug/L	2.1	40	40	40.1	39.8	95	94	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	40.9	39.7	102	99	70-130	3	20	
Silver, Dissolved	ug/L	0.030J	20	20	18.2	18.1	91	90	70-130	0	20	
Thallium, Dissolved	ug/L	0.14J	40	40	40.2	40.1	100	100	70-130	0	20	
Vanadium, Dissolved	ug/L	ND	40	40	40.8	41.0	102	102	70-130	0	20	
Zinc, Dissolved	ug/L	1740	100	100	1840	1850	104	108	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: WET/39972 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60139383001, 60139383003

METHOD BLANK: 1146100 Matrix: Water
Associated Lab Samples: 60139383001, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	03/05/13 12:37	

LABORATORY CONTROL SAMPLE: 1146101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	139	70	85-115	L0

SAMPLE DUPLICATE: 1146102

Parameter	Units	60139378001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	1360	1440	5	17	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: WETA/23715 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60139383001, 60139383002, 60139383003

METHOD BLANK: 1147209 Matrix: Water
Associated Lab Samples: 60139383001, 60139383002, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/02/13 09:48	

LABORATORY CONTROL SAMPLE: 1147210

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE SAMPLE: 1147211

Parameter	Units	60139383001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	628	250	852	90	61-119	

MATRIX SPIKE SAMPLE: 1147212

Parameter	Units	60139383002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	621	250	854	93	61-119	

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QUALITY CONTROL DATA

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

QC Batch: WETA/16484 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60139383001, 60139383003

METHOD BLANK: 756007 Matrix: Water
Associated Lab Samples: 60139383001, 60139383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	03/05/13 04:00	

LABORATORY CONTROL SAMPLE: 756008

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 756009 756010

Parameter	Units	60139266001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	10.4	15	15	26.9	27.0	110	111	80-120	0	20	

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QUALIFIERS

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO- ARGENTINE MINE SITE
Pace Project No.: 60139383

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60139383001	**ROCK DRAIN IN 130227**	EPA 200.7	MPRP/21707	EPA 200.7	ICP/17411
60139383002	**ROCK DRAIN MP 130227**	EPA 200.7	MPRP/21707	EPA 200.7	ICP/17411
60139383003	**WETLAND OUT 130227**	EPA 200.7	MPRP/21707	EPA 200.7	ICP/17411
60139383001	**ROCK DRAIN IN 130227**	EPA 200.7	MPRP/21706	EPA 200.7	ICP/17410
60139383002	**ROCK DRAIN MP 130227**	EPA 200.7	MPRP/21706	EPA 200.7	ICP/17410
60139383003	**WETLAND OUT 130227**	EPA 200.7	MPRP/21706	EPA 200.7	ICP/17410
60139383001	**ROCK DRAIN IN 130227**	EPA 200.8	MPRP/21708	EPA 200.8	ICPM/2080
60139383002	**ROCK DRAIN MP 130227**	EPA 200.8	MPRP/21708	EPA 200.8	ICPM/2080
60139383003	**WETLAND OUT 130227**	EPA 200.8	MPRP/21708	EPA 200.8	ICPM/2080
60139383001	**ROCK DRAIN IN 130227**	EPA 200.8	MPRP/21705	EPA 200.8	ICPM/2079
60139383002	**ROCK DRAIN MP 130227**	EPA 200.8	MPRP/21705	EPA 200.8	ICPM/2079
60139383003	**WETLAND OUT 130227**	EPA 200.8	MPRP/21705	EPA 200.8	ICPM/2079
60139383001	**ROCK DRAIN IN 130227**	SM 5210B	WET/39972	SM 5210B	WET/40046
60139383003	**WETLAND OUT 130227**	SM 5210B	WET/39972	SM 5210B	WET/40046
60139383001	**ROCK DRAIN IN 130227**	EPA 300.0	WETA/23715		
60139383002	**ROCK DRAIN MP 130227**	EPA 300.0	WETA/23715		
60139383003	**WETLAND OUT 130227**	EPA 300.0	WETA/23715		
60139383001	**ROCK DRAIN IN 130227**	SM 5310C	WETA/16484		
60139383003	**WETLAND OUT 130227**	SM 5310C	WETA/16484		

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March 20, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on March 07, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60139873001	**ROCK DRAIN IN 130306**	Water	03/06/13 09:55	03/07/13 11:15
60139873002	**ROCK DRAIN MP 130306**	Water	03/06/13 10:35	03/07/13 11:15
60139873003	**WETLAND OUT 130306**	Water	03/06/13 11:05	03/07/13 11:15

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60139873001	**ROCK DRAIN IN 130306**	EPA 200.7	TJT	5	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60139873002	**ROCK DRAIN MP 130306**	EPA 200.7	TJT	5	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 300.0	AJM	1	PASI-K
60139873003	**WETLAND OUT 130306**	EPA 200.7	TJT	5	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP	18	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	JMC1	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 20, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 20, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 20, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21784

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139873001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1151076)
  - Manganese
- MSD (Lab ID: 1151077)
  - Manganese

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21784

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130306 (Lab ID: 60139873002)
  - Nickel

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 20, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21781

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60139873001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1151066)
  - Manganese, Dissolved
  - Zinc, Dissolved
- MSD (Lab ID: 1151067)
  - Zinc, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21781

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130306 (Lab ID: 60139873001)
  - Antimony, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 20, 2013

Analyte Comments:

QC Batch: MPRP/21781

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130306 (Lab ID: 60139873002)
  - Antimony, Dissolved
- WETLAND OUT 130306 (Lab ID: 60139873003)
  - Antimony, Dissolved

- ROCK DRAIN MP 130306 (Lab ID: 60139873002)
  - Copper, Dissolved

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 20, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 20, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 20, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: ROCK DRAIN IN 130306 **Lab ID: 60139873001** Collected: 03/06/13 09:55 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**247000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 15:33	7440-70-2	
Iron	**1720**	ug/L	50.0	11.6	1	03/11/13 10:00	03/12/13 10:39	7439-89-6	
Magnesium	**20600**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 10:39	7439-95-4	
Potassium	**6170**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 15:33	7440-09-7	
Sodium	**12000**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 15:33	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**248000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 15:11	7440-70-2	D9
Magnesium, Dissolved	**20600**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 11:12	7439-95-4	D9
Potassium, Dissolved	**6250**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 15:11	7440-09-7	D9
Sodium, Dissolved	**12200**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 15:11	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**137**	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 15:09	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:09	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 15:09	7440-38-2	
Barium	**18.8**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:09	7440-39-3	
Beryllium	**0.15J**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:09	7440-41-7	
Cadmium	**10**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:09	7440-43-9	
Chromium	**0.84J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:09	7440-47-3	
Cobalt	**2.0**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:09	7440-48-4	
Copper	**27.4**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:09	7440-50-8	
Lead	**2.9**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:09	7439-92-1	
Manganese	**1560**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:09	7439-96-5	M1
Molybdenum	**15.5**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:09	7439-98-7	
Nickel	**2.4**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:09	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:09	7782-49-2	
Silver	**0.033J**	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 15:09	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 15:09	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 15:09	7440-62-2	
Zinc	**1680**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 15:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 14:28	7429-90-5	
Antimony, Dissolved	**0.22J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:28	7440-36-0	B
Arsenic, Dissolved	**0.064J**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 14:28	7440-38-2	
Barium, Dissolved	**18.3**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:28	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:28	7440-41-7	
Cadmium, Dissolved	**8.7**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:28	7440-43-9	
Chromium, Dissolved	**0.25J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:28	7440-47-3	
Cobalt, Dissolved	**2.1**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:28	7440-48-4	D9
Copper, Dissolved	**2.0**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:28	7440-50-8	
Iron, Dissolved	**5.9J**	ug/L	50.0	3.0	1	03/11/13 10:00	03/11/13 14:28	7439-89-6	
Lead, Dissolved	**0.037J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:28	7439-92-1	
Manganese, Dissolved	**1580**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:28	7439-96-5	D9,M1
Molybdenum, Dissolved	**15.4**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:28	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: ROCK DRAIN IN 130306 **Lab ID: 60139873001** Collected: 03/06/13 09:55 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.4**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:28	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:28	7782-49-2	
Silver, Dissolved	**0.038J**	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 14:28	7440-22-4	
Thallium, Dissolved	**0.13J**	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 14:28	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 14:28	7440-62-2	
Zinc, Dissolved	**1520**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 14:28	7440-66-6	M1
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	03/07/13 18:13	03/12/13 17:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**613**	mg/L	50.0	3.0	50		03/08/13 15:17	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.15J**	mg/L	0.50	0.041	1		03/12/13 12:41	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: ROCK DRAIN MP 130306 **Lab ID: 60139873002** Collected: 03/06/13 10:35 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**245000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 15:37	7440-70-2	
Iron	**295**	ug/L	50.0	11.6	1	03/11/13 10:00	03/12/13 10:47	7439-89-6	
Magnesium	**20600**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 10:47	7439-95-4	
Potassium	**6590**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 15:37	7440-09-7	
Sodium	**12100**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 15:37	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**246000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 15:16	7440-70-2	D9
Magnesium, Dissolved	**20500**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 11:21	7439-95-4	
Potassium, Dissolved	**6630**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 15:16	7440-09-7	D9
Sodium, Dissolved	**12000**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 15:16	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**32.2J**	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 15:26	7429-90-5	
Antimony	**0.18J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:26	7440-36-0	
Arsenic	**0.079J**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 15:26	7440-38-2	
Barium	**17.6**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:26	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:26	7440-41-7	
Cadmium	**4.9**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:26	7440-43-9	
Chromium	**0.29J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:26	7440-47-3	
Cobalt	ND	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:26	7440-48-4	
Copper	**4.0**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:26	7440-50-8	
Lead	**0.47J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:26	7439-92-1	
Manganese	**48.2**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:26	7439-96-5	
Molybdenum	**12.2**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:26	7439-98-7	
Nickel	**1.3**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:26	7440-02-0	B
Selenium	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:26	7782-49-2	
Silver	**0.034J**	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 15:26	7440-22-4	
Thallium	**0.10J**	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 15:26	7440-28-0	
Vanadium	**0.39J**	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 15:26	7440-62-2	
Zinc	**886**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 15:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 14:44	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:44	7440-36-0	B
Arsenic, Dissolved	**0.072J**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 14:44	7440-38-2	
Barium, Dissolved	**17.4**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:44	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:44	7440-41-7	
Cadmium, Dissolved	**4.9**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:44	7440-43-9	
Chromium, Dissolved	**0.33J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:44	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:44	7440-48-4	
Copper, Dissolved	**0.94J**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:44	7440-50-8	
Iron, Dissolved	**3.6J**	ug/L	50.0	3.0	1	03/11/13 10:00	03/11/13 14:44	7439-89-6	
Lead, Dissolved	**0.073J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:44	7439-92-1	
Manganese, Dissolved	**49.0**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:44	7439-96-5	D9
Molybdenum, Dissolved	**12.5**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:44	7439-98-7	D9

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: ROCK DRAIN MP 130306 **Lab ID: 60139873002** Collected: 03/06/13 10:35 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**1.2**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:44	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:44	7782-49-2	
Silver, Dissolved	**0.035J**	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 14:44	7440-22-4	
Thallium, Dissolved	**0.10J**	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 14:44	7440-28-0	
Vanadium, Dissolved	**0.12J**	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 14:44	7440-62-2	
Zinc, Dissolved	**898**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 14:44	7440-66-6	D9
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**607**	mg/L	50.0	3.0	50		03/09/13 12:20	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: WETLAND OUT 130306 **Lab ID: 60139873003** Collected: 03/06/13 11:05 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**256000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 16:05	7440-70-2	
Iron	**41.9J**	ug/L	50.0	11.6	1	03/11/13 10:00	03/12/13 10:49	7439-89-6	
Magnesium	**20800**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 10:49	7439-95-4	
Potassium	**9120**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 16:05	7440-09-7	
Sodium	**12500**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 16:05	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**262000**	ug/L	100	10.4	1	03/11/13 10:00	03/11/13 15:22	7440-70-2	D9
Magnesium, Dissolved	**20700**	ug/L	50.0	6.5	1	03/11/13 10:00	03/12/13 11:23	7439-95-4	
Potassium, Dissolved	**8460**	ug/L	500	44.4	1	03/11/13 10:00	03/11/13 15:22	7440-09-7	
Sodium, Dissolved	**11900**	ug/L	500	21.7	1	03/11/13 10:00	03/11/13 15:22	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**18.1J**	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 15:30	7429-90-5	
Antimony	**0.27J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:30	7440-36-0	
Arsenic	**2.4**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 15:30	7440-38-2	
Barium	**87.3**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:30	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:30	7440-41-7	
Cadmium	**0.45J**	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 15:30	7440-43-9	
Chromium	**0.29J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:30	7440-47-3	
Cobalt	**0.12J**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 15:30	7440-48-4	
Copper	**0.26J**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:30	7440-50-8	
Lead	**0.42J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 15:30	7439-92-1	
Manganese	**1110**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:30	7439-96-5	
Molybdenum	**0.16J**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 15:30	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 15:30	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 15:30	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 15:30	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 15:30	7440-28-0	
Vanadium	**0.50J**	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 15:30	7440-62-2	
Zinc	**186**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 15:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**13.8J**	ug/L	50.0	6.4	1	03/11/13 10:00	03/11/13 14:48	7429-90-5	
Antimony, Dissolved	**0.18J**	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:48	7440-36-0	B
Arsenic, Dissolved	**1.1**	ug/L	1.0	0.050	1	03/11/13 10:00	03/11/13 14:48	7440-38-2	
Barium, Dissolved	**85.5**	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:48	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:48	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	03/11/13 10:00	03/11/13 14:48	7440-43-9	
Chromium, Dissolved	**0.26J**	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:48	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	03/11/13 10:00	03/11/13 14:48	7440-48-4	
Copper, Dissolved	**0.16J**	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:48	7440-50-8	
Iron, Dissolved	**14.3J**	ug/L	50.0	3.0	1	03/11/13 10:00	03/11/13 14:48	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/11/13 10:00	03/11/13 14:48	7439-92-1	
Manganese, Dissolved	**1100**	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:48	7439-96-5	
Molybdenum, Dissolved	ND	ug/L	1.0	0.12	1	03/11/13 10:00	03/11/13 14:48	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Sample: WETLAND OUT 130306 **Lab ID: 60139873003** Collected: 03/06/13 11:05 Received: 03/07/13 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	03/11/13 10:00	03/11/13 14:48	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/11/13 10:00	03/11/13 14:48	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/11/13 10:00	03/11/13 14:48	7440-22-4	
Thallium, Dissolved	**0.079J**	ug/L	1.0	0.020	1	03/11/13 10:00	03/11/13 14:48	7440-28-0	
Vanadium, Dissolved	**0.27J**	ug/L	1.0	0.11	1	03/11/13 10:00	03/11/13 14:48	7440-62-2	
Zinc, Dissolved	**2.2J**	ug/L	10.0	1.0	1	03/11/13 10:00	03/11/13 14:48	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**78.2**	mg/L	2.0	2.0	1	03/08/13 10:24	03/13/13 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**531**	mg/L	50.0	3.0	50		03/08/13 16:45	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.7**	mg/L	0.50	0.041	1		03/12/13 13:35	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: MPRP/21785 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60139873001, 60139873002, 60139873003

METHOD BLANK: 1151078 Matrix: Water
Associated Lab Samples: 60139873001, 60139873002, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	44.4J	100	03/11/13 15:24	
Iron	ug/L	ND	50.0	03/12/13 10:34	
Magnesium	ug/L	13.0J	50.0	03/12/13 10:34	
Potassium	ug/L	ND	500	03/11/13 15:24	
Sodium	ug/L	ND	500	03/11/13 15:24	

LABORATORY CONTROL SAMPLE: 1151079

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9620	96	85-115	
Iron	ug/L	10000	10100	101	85-115	
Magnesium	ug/L	10000	10500	105	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1151080 1151081

Parameter	Units	60139873002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	245000	10000	10000	256000	258000	108	122	70-130	1	9	
Iron	ug/L	295	10000	10000	10600	10400	103	101	70-130	2	10	
Magnesium	ug/L	20600	10000	10000	30800	30700	102	101	70-130	0	9	
Potassium	ug/L	6590	10000	10000	16800	16700	102	101	70-130	1	7	
Sodium	ug/L	12100	10000	10000	22800	22700	107	106	70-130	1	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: MPRP/21782 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60139873001, 60139873002, 60139873003

METHOD BLANK: 1151068 Matrix: Water
Associated Lab Samples: 60139873001, 60139873002, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	03/11/13 15:07	
Magnesium, Dissolved	ug/L	13.8J	50.0	03/12/13 11:08	
Potassium, Dissolved	ug/L	56.0J	500	03/11/13 15:07	
Sodium, Dissolved	ug/L	ND	500	03/11/13 15:07	

LABORATORY CONTROL SAMPLE: 1151069

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9920	99	85-115	
Magnesium, Dissolved	ug/L	10000	10500	105	85-115	
Potassium, Dissolved	ug/L	10000	9670	97	85-115	
Sodium, Dissolved	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1151070 1151071

Parameter	Units	60139873002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	246000	10000	10000	253000	255000	74	95	70-130	1	9	
Magnesium, Dissolved	ug/L	20500	10000	10000	30400	30500	99	101	70-130	0	9	
Potassium, Dissolved	ug/L	6630	10000	10000	16700	16800	101	101	70-130	0	7	
Sodium, Dissolved	ug/L	12000	10000	10000	22600	22800	106	107	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: MPRP/21784 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60139873001, 60139873002, 60139873003

METHOD BLANK: 1151074 Matrix: Water
Associated Lab Samples: 60139873001, 60139873002, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	03/11/13 15:01	
Antimony	ug/L	ND	1.0	03/11/13 15:01	
Arsenic	ug/L	ND	1.0	03/11/13 15:01	
Barium	ug/L	ND	1.0	03/11/13 15:01	
Beryllium	ug/L	ND	0.50	03/11/13 15:01	
Cadmium	ug/L	ND	0.50	03/11/13 15:01	
Chromium	ug/L	ND	1.0	03/11/13 15:01	
Cobalt	ug/L	ND	1.0	03/11/13 15:01	
Copper	ug/L	ND	1.0	03/11/13 15:01	
Lead	ug/L	ND	1.0	03/11/13 15:01	
Manganese	ug/L	0.16J	1.0	03/11/13 15:01	
Molybdenum	ug/L	ND	1.0	03/11/13 15:01	
Nickel	ug/L	0.15J	1.0	03/11/13 15:01	
Selenium	ug/L	ND	1.0	03/11/13 15:01	
Silver	ug/L	ND	0.50	03/11/13 15:01	
Thallium	ug/L	ND	1.0	03/11/13 15:01	
Vanadium	ug/L	ND	1.0	03/11/13 15:01	
Zinc	ug/L	1.8J	10.0	03/11/13 15:01	

LABORATORY CONTROL SAMPLE: 1151075

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	934	93	85-115	
Antimony	ug/L	40	41.0	102	85-115	
Arsenic	ug/L	40	39.0	98	85-115	
Barium	ug/L	40	39.7	99	85-115	
Beryllium	ug/L	40	38.5	96	85-115	
Cadmium	ug/L	40	40.5	101	85-115	
Chromium	ug/L	40	39.3	98	85-115	
Cobalt	ug/L	40	38.2	96	85-115	
Copper	ug/L	40	37.7	94	85-115	
Lead	ug/L	40	40.3	101	85-115	
Manganese	ug/L	40	39.9	100	85-115	
Molybdenum	ug/L	40	40.0	100	85-115	
Nickel	ug/L	40	38.6	96	85-115	
Selenium	ug/L	40	40.3	101	85-115	
Silver	ug/L	20	19.6	98	85-115	
Thallium	ug/L	40	38.9	97	85-115	
Vanadium	ug/L	40	39.0	97	85-115	
Zinc	ug/L	100	103	103	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1151076 1151077

Parameter	Units	60139873001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	137	1000	1000	1020	1020	88	88	70-130	0	20	
Antimony	ug/L	0.23J	40	40	40.0	39.7	99	99	70-130	1	20	
Arsenic	ug/L	0.29J	40	40	39.5	39.2	98	97	70-130	1	20	
Barium	ug/L	18.8	40	40	57.9	57.7	98	97	70-130	0	20	
Beryllium	ug/L	0.15J	40	40	32.6	32.4	81	81	70-130	1	20	
Cadmium	ug/L	10	40	40	48.4	48.4	96	96	70-130	0	20	
Chromium	ug/L	0.84J	40	40	38.5	38.4	94	94	70-130	0	20	
Cobalt	ug/L	2.0	40	40	38.1	38.0	90	90	70-130	0	20	
Copper	ug/L	27.4	40	40	62.0	61.0	87	84	70-130	2	20	
Lead	ug/L	2.9	40	40	41.0	41.4	95	96	70-130	1	20	
Manganese	ug/L	1560	40	40	1620	1610	145	135	70-130	0	20	M1
Molybdenum	ug/L	15.5	40	40	56.3	56.0	102	101	70-130	0	20	
Nickel	ug/L	2.4	40	40	37.8	37.6	88	88	70-130	0	20	
Selenium	ug/L	ND	40	40	39.3	39.2	98	98	70-130	0	20	
Silver	ug/L	0.033J	20	20	18.1	18.0	90	90	70-130	1	20	
Thallium	ug/L	0.14J	40	40	37.5	38.0	94	95	70-130	1	20	
Vanadium	ug/L	ND	40	40	39.4	39.0	98	97	70-130	1	20	
Zinc	ug/L	1680	100	100	1770	1750	94	79	70-130	1	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: MPRP/21781 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60139873001, 60139873002, 60139873003

METHOD BLANK: 1151064 Matrix: Water
Associated Lab Samples: 60139873001, 60139873002, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	03/11/13 14:19	
Antimony, Dissolved	ug/L	0.035J	1.0	03/11/13 14:19	
Arsenic, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Barium, Dissolved	ug/L	0.17J	1.0	03/11/13 14:19	
Beryllium, Dissolved	ug/L	ND	0.50	03/11/13 14:19	
Cadmium, Dissolved	ug/L	ND	0.50	03/11/13 14:19	
Chromium, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Cobalt, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Copper, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Iron, Dissolved	ug/L	ND	50.0	03/11/13 14:19	
Lead, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Manganese, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Molybdenum, Dissolved	ug/L	0.16J	1.0	03/11/13 14:19	
Nickel, Dissolved	ug/L	0.10J	1.0	03/11/13 14:19	
Selenium, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Silver, Dissolved	ug/L	ND	0.50	03/11/13 14:19	
Thallium, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Vanadium, Dissolved	ug/L	ND	1.0	03/11/13 14:19	
Zinc, Dissolved	ug/L	ND	10.0	03/11/13 14:19	

LABORATORY CONTROL SAMPLE: 1151065

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	937	94	85-115	
Antimony, Dissolved	ug/L	40	39.8	99	85-115	
Arsenic, Dissolved	ug/L	40	40.6	102	85-115	
Barium, Dissolved	ug/L	40	39.1	98	85-115	
Beryllium, Dissolved	ug/L	40	39.2	98	85-115	
Cadmium, Dissolved	ug/L	40	40.4	101	85-115	
Chromium, Dissolved	ug/L	40	40.1	100	85-115	
Cobalt, Dissolved	ug/L	40	39.6	99	85-115	
Copper, Dissolved	ug/L	40	40.2	100	85-115	
Iron, Dissolved	ug/L	1000	947	95	85-115	
Lead, Dissolved	ug/L	40	39.0	98	85-115	
Manganese, Dissolved	ug/L	40	40.0	100	85-115	
Molybdenum, Dissolved	ug/L	40	40.5	101	85-115	
Nickel, Dissolved	ug/L	40	40.6	101	85-115	
Selenium, Dissolved	ug/L	40	41.1	103	85-115	
Silver, Dissolved	ug/L	20	19.6	98	85-115	
Thallium, Dissolved	ug/L	40	37.7	94	85-115	
Vanadium, Dissolved	ug/L	40	39.6	99	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

LABORATORY CONTROL SAMPLE: 1151065

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	106	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1151066 1151067

Parameter	Units	60139873001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	877	897	87	89	70-130	2	20	
Antimony, Dissolved	ug/L	0.22J	40	40	38.7	39.2	96	98	70-130	1	20	
Arsenic, Dissolved	ug/L	0.064J	40	40	39.6	39.5	99	99	70-130	0	20	
Barium, Dissolved	ug/L	18.3	40	40	56.0	57.3	94	97	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	32.2	32.9	80	82	70-130	2	20	
Cadmium, Dissolved	ug/L	8.7	40	40	46.3	47.2	94	96	70-130	2	20	
Chromium, Dissolved	ug/L	0.25J	40	40	38.3	38.8	95	96	70-130	1	20	
Cobalt, Dissolved	ug/L	2.1	40	40	38.4	38.8	91	92	70-130	1	20	
Copper, Dissolved	ug/L	2.0	40	40	36.8	36.9	87	87	70-130	0	20	
Iron, Dissolved	ug/L	5.9J	1000	1000	889	915	88	91	70-130	3	20	
Lead, Dissolved	ug/L	0.037J	40	40	36.9	37.2	92	93	70-130	1	20	
Manganese, Dissolved	ug/L	1580	40	40	1590	1630	25	108	70-130	2	20	M1
Molybdenum, Dissolved	ug/L	15.4	40	40	55.3	56.2	100	102	70-130	2	20	
Nickel, Dissolved	ug/L	2.4	40	40	38.2	38.3	90	90	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	38.9	39.2	97	98	70-130	1	20	
Silver, Dissolved	ug/L	0.038J	20	20	17.9	18.0	89	90	70-130	1	20	
Thallium, Dissolved	ug/L	0.13J	40	40	36.4	37.1	91	92	70-130	2	20	
Vanadium, Dissolved	ug/L	ND	40	40	38.7	39.4	97	98	70-130	2	20	
Zinc, Dissolved	ug/L	1520	100	100	1560	1570	38	57	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: WET/40087
QC Batch Method: SM 5210B
Analysis Method: SM 5210B
Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60139873001

METHOD BLANK: 1149533 Matrix: Water
Associated Lab Samples: 60139873001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	03/12/13 16:52	

LABORATORY CONTROL SAMPLE: 1149534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	205	104	85-115	

SAMPLE DUPLICATE: 1149570

Parameter	Units	60139835002 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	166	155	6	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: WET/40098
QC Batch Method: SM 5210B
Analysis Method: SM 5210B
Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60139873003

METHOD BLANK: 1149789 Matrix: Water
Associated Lab Samples: 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	03/13/13 11:54	

LABORATORY CONTROL SAMPLE: 1149790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	195	99	85-115	

SAMPLE DUPLICATE: 1149791

Parameter	Units	60139937001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	84.1	82.2	2	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: WETA/23793 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60139873001, 60139873002, 60139873003

METHOD BLANK: 1149861 Matrix: Water
Associated Lab Samples: 60139873001, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/09/13 01:54	

METHOD BLANK: 1150493 Matrix: Water
Associated Lab Samples: 60139873002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/09/13 11:09	

LABORATORY CONTROL SAMPLE: 1149862

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	99	90-110	

LABORATORY CONTROL SAMPLE: 1150494

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE SAMPLE: 1149863

Parameter	Units	60139873001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	613	250	835	89	61-119	

MATRIX SPIKE SAMPLE: 1149864

Parameter	Units	60139873002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	607	250	807	80	61-119	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

QC Batch: WETA/16584 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60139873001, 60139873003

METHOD BLANK: 758869 Matrix: Water
Associated Lab Samples: 60139873001, 60139873003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	03/12/13 12:04	

LABORATORY CONTROL SAMPLE: 758870

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.6	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 758871 758872

Parameter	Units	60139873001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	0.15J	2.5	2.5	2.9	2.9	108	111	80-120	3	20	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60139873

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60139873001	**ROCK DRAIN IN 130306**	EPA 200.7	MPRP/21785	EPA 200.7	ICP/17446
60139873002	**ROCK DRAIN MP 130306**	EPA 200.7	MPRP/21785	EPA 200.7	ICP/17446
60139873003	**WETLAND OUT 130306**	EPA 200.7	MPRP/21785	EPA 200.7	ICP/17446
60139873001	**ROCK DRAIN IN 130306**	EPA 200.7	MPRP/21782	EPA 200.7	ICP/17445
60139873002	**ROCK DRAIN MP 130306**	EPA 200.7	MPRP/21782	EPA 200.7	ICP/17445
60139873003	**WETLAND OUT 130306**	EPA 200.7	MPRP/21782	EPA 200.7	ICP/17445
60139873001	**ROCK DRAIN IN 130306**	EPA 200.8	MPRP/21784	EPA 200.8	ICPM/2091
60139873002	**ROCK DRAIN MP 130306**	EPA 200.8	MPRP/21784	EPA 200.8	ICPM/2091
60139873003	**WETLAND OUT 130306**	EPA 200.8	MPRP/21784	EPA 200.8	ICPM/2091
60139873001	**ROCK DRAIN IN 130306**	EPA 200.8	MPRP/21781	EPA 200.8	ICPM/2090
60139873002	**ROCK DRAIN MP 130306**	EPA 200.8	MPRP/21781	EPA 200.8	ICPM/2090
60139873003	**WETLAND OUT 130306**	EPA 200.8	MPRP/21781	EPA 200.8	ICPM/2090
60139873001	**ROCK DRAIN IN 130306**	SM 5210B	WET/40087	SM 5210B	WET/40162
60139873003	**WETLAND OUT 130306**	SM 5210B	WET/40098	SM 5210B	WET/40175
60139873001	**ROCK DRAIN IN 130306**	EPA 300.0	WETA/23793		
60139873002	**ROCK DRAIN MP 130306**	EPA 300.0	WETA/23793		
60139873003	**WETLAND OUT 130306**	EPA 300.0	WETA/23793		
60139873001	**ROCK DRAIN IN 130306**	SM 5310C	WETA/16584		
60139873003	**WETLAND OUT 130306**	SM 5310C	WETA/16584		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60139873

60139873

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 127336872210057797 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 0.6

Date and initials of person examining contents: 3/7/13 BA

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☑Yes ☐No ☐N/A	7. 3 Days
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix: WT	☑Yes ☐No ☐N/A	13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, (TOC), O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased):	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMW Date: 3/7/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1245	Start:
End: 1250	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes X No ~~X~~ x
Lab Work Order Number: 60139873

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0001 (WR 256704)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision x OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

60139873

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor		Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl		Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	Rush *			MS/MSD	HOLD	Comments
	ROCK DRAIN IN 130306	3/6/13	0955		X			5	2	1	2	1BP1U	1BP2U	X	X	X	X	X	X	1BP3S	1BP3N		MG3S	Dissolved metals are field filtered.
	ROCK DRAIN MP 130306	3/6/13	1035		X			3	1	0	2		1BP3U	X	X	X			X					
	WETLAND OUT 130306	3/6/13	1105		X			5	2	1	2	↓	↓	X	X	X	X	X	X	↓	↓		↓	Metals are: Ca, Fe, K, Na, Mg (E200.7); Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

* Rush 5-day Turn

Sampler's Name: Abby Cazier	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	[signature]	3/6/13	14:40	[signature]	3/7/13	1115
Shipment Method: UPS Ship Date: 3/6/2013						
Shipment Tracking No: 1Z733W87221005 7797						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Chain of Custody

VMV

4074734

Pace Analytical
www.pacelabs.com

Workorder: 60139873 **Workorder Name:** RICO-ARGENTINE MINE SITE **Owner Received Date:** 3/7/2013 **Results Requested By:** 3/14/2013

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

						Preserved Containers						Requested Analysis												
Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	H2SO4						5310C TOC												LAB USE ONLY
1	ROCK DRAIN IN 130306 001	PS	3/6/2013 09:55	60139873001	Water	1						X												1-250mlp^C
2	WETLAND OUT 130306 002	PS	3/6/2013 11:05	60139873003	Water	1						X												↓
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] FedEx	3/7/13 1700		
2		3/8/13 1010	[signature] Pace GB	3/8/13 1010
3				

Comments

Cooler Temperature on Receipt 4 °C **Custody Seal** Y or N **Received on Ice** Y or N **Samples Intact** Y or N

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Sample Condition Upon Receipt

Client Name: Pace KS Project # 4074734

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 5552 4796 0883

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used SR25 Type of Ice: (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 4 /Corr: 4 Biological Tissue is Frozen: ☐ yes ☐ no

Temp Blank Present: ☑ yes ☐ no

Person examining contents:
Date: 3/8/13
Initials: EMH

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: CW **Date:** 3/8/13

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

March 25, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on March 13, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60140247001	**ROCK DRAIN IN 130312**	Water	03/12/13 11:42	03/13/13 10:20
60140247002	**ROCK DRAIN MP 130312**	Water	03/12/13 12:55	03/13/13 10:20
60140247003	**WETLAND OUT 130312**	Water	03/12/13 13:30	03/13/13 10:20

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SAMPLE ANALYTE COUNT

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60140247001	**ROCK DRAIN IN 130312**	EPA 200.7	TDS	5	PASI-K
		EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60140247002	**ROCK DRAIN MP 130312**	EPA 200.7	TDS	5	PASI-K
		EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60140247003	**WETLAND OUT 130312**	EPA 200.7	TDS	5	PASI-K
		EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP, SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21835

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60140247001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1153197)
  - Zinc
- MSD (Lab ID: 1153198)
  - Manganese
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21858

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60140247002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1154272)
  - Zinc, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21858

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130312 (Lab ID: 60140247001)
  - Copper, Dissolved
  - Iron, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 25, 2013

Analyte Comments:

QC Batch: MPRP/21858

B: Analyte was detected in the associated method blank.

- ROCK DRAIN MP 130312 (Lab ID: 60140247002)
  - Copper, Dissolved
  - Iron, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved
- WETLAND OUT 130312 (Lab ID: 60140247003)
  - Cadmium, Dissolved
  - Copper, Dissolved
  - Iron, Dissolved
  - Nickel, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 25, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 25, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 25, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: ROCK DRAIN IN 130312 **Lab ID: 60140247001** Collected: 03/12/13 11:42 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**252000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 12:46	7440-70-2	
Iron	**1760**	ug/L	50.0	11.6	1	03/15/13 16:30	03/18/13 12:46	7439-89-6	
Magnesium	**20400**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 12:46	7439-95-4	
Potassium	**5860**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 12:46	7440-09-7	
Sodium	**12100**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 12:46	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**252000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 13:01	7440-70-2	D9
Magnesium, Dissolved	**20500**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 13:01	7439-95-4	D9
Potassium, Dissolved	**5970**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 13:01	7440-09-7	D9
Sodium, Dissolved	**12300**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 13:01	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**135**	ug/L	50.0	6.4	1	03/14/13 15:15	03/15/13 14:12	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:12	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.050	1	03/14/13 15:15	03/15/13 14:12	7440-38-2	
Barium	**19.3**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:12	7440-39-3	
Beryllium	**0.15J**	ug/L	0.50	0.050	1	03/14/13 15:15	03/21/13 11:23	7440-41-7	
Cadmium	**9.4**	ug/L	0.50	0.050	1	03/14/13 15:15	03/15/13 14:12	7440-43-9	
Chromium	**0.47J**	ug/L	1.0	0.070	1	03/14/13 15:15	03/15/13 14:12	7440-47-3	
Cobalt	**2.1**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:12	7440-48-4	
Copper	**27.5**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:12	7440-50-8	
Lead	**3.0**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:12	7439-92-1	
Manganese	**1540**	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:12	7439-96-5	M1
Molybdenum	**15.6**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:12	7439-98-7	
Nickel	**1.7**	ug/L	1.0	0.070	1	03/14/13 15:15	03/15/13 14:12	7440-02-0	
Selenium	**0.15J**	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:12	7782-49-2	
Silver	**0.033J**	ug/L	0.50	0.010	1	03/14/13 15:15	03/15/13 14:12	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.020	1	03/14/13 15:15	03/15/13 14:12	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/14/13 15:15	03/15/13 14:12	7440-62-2	
Zinc	**1610**	ug/L	10.0	1.0	1	03/14/13 15:15	03/15/13 14:12	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.7J**	ug/L	50.0	6.4	1	03/15/13 16:30	03/21/13 13:29	7429-90-5	
Antimony, Dissolved	**0.52J**	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:29	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/15/13 16:30	03/21/13 13:29	7440-38-2	
Barium, Dissolved	**19.6**	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:29	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:29	7440-41-7	
Cadmium, Dissolved	**8.5**	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:29	7440-43-9	
Chromium, Dissolved	**0.24J**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:29	7440-47-3	
Cobalt, Dissolved	**2.2**	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:29	7440-48-4	D9
Copper, Dissolved	**2.3**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:29	7440-50-8	B
Iron, Dissolved	**10.5J**	ug/L	50.0	3.0	1	03/15/13 16:30	03/21/13 13:29	7439-89-6	B
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:29	7439-92-1	
Manganese, Dissolved	**1560**	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:29	7439-96-5	D9
Molybdenum, Dissolved	**16.1**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:29	7439-98-7	D9

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: ROCK DRAIN IN 130312 **Lab ID: 60140247001** Collected: 03/12/13 11:42 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.5**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:29	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:29	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/15/13 16:30	03/21/13 13:29	7440-22-4	
Thallium, Dissolved	**0.47J**	ug/L	1.0	0.020	1	03/15/13 16:30	03/21/13 13:29	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/15/13 16:30	03/21/13 13:29	7440-62-2	
Zinc, Dissolved	**1390**	ug/L	10.0	1.0	1	03/15/13 16:30	03/21/13 13:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 09:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 10:12	7439-97-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	03/14/13 11:30	03/19/13 09:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**605**	mg/L	100	10.0	100		03/19/13 19:20	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.18J**	mg/L	0.50	0.041	1		03/20/13 10:08	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: ROCK DRAIN MP 130312 **Lab ID: 60140247002** Collected: 03/12/13 12:55 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**246000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 12:52	7440-70-2	
Iron	**387**	ug/L	50.0	11.6	1	03/15/13 16:30	03/18/13 12:52	7439-89-6	
Magnesium	**20100**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 12:52	7439-95-4	
Potassium	**6230**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 12:52	7440-09-7	
Sodium	**11900**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 12:52	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**247000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 13:12	7440-70-2	D9
Magnesium, Dissolved	**20300**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 13:12	7439-95-4	D9
Potassium, Dissolved	**6230**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 13:12	7440-09-7	D9
Sodium, Dissolved	**12100**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 13:12	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**27.9J**	ug/L	50.0	6.4	1	03/14/13 15:15	03/15/13 14:29	7429-90-5	
Antimony	**0.21J**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:29	7440-36-0	
Arsenic	**0.13J**	ug/L	1.0	0.050	1	03/14/13 15:15	03/15/13 14:29	7440-38-2	
Barium	**18.2**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:29	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/14/13 15:15	03/21/13 11:41	7440-41-7	
Cadmium	**5.8**	ug/L	0.50	0.050	1	03/14/13 15:15	03/15/13 14:29	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.070	1	03/14/13 15:15	03/15/13 14:29	7440-47-3	
Cobalt	**0.24J**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:29	7440-48-4	
Copper	**5.9**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:29	7440-50-8	
Lead	**0.73J**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:29	7439-92-1	
Manganese	**177**	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:29	7439-96-5	
Molybdenum	**13.7**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:29	7439-98-7	
Nickel	**1.3**	ug/L	1.0	0.070	1	03/14/13 15:15	03/15/13 14:29	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:29	7782-49-2	
Silver	**0.026J**	ug/L	0.50	0.010	1	03/14/13 15:15	03/15/13 14:29	7440-22-4	
Thallium	**0.11J**	ug/L	1.0	0.020	1	03/14/13 15:15	03/15/13 14:29	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/14/13 15:15	03/15/13 14:29	7440-62-2	
Zinc	**1020**	ug/L	10.0	1.0	1	03/14/13 15:15	03/15/13 14:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/15/13 16:30	03/21/13 13:33	7429-90-5	
Antimony, Dissolved	**0.47J**	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:33	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/15/13 16:30	03/21/13 13:33	7440-38-2	
Barium, Dissolved	**18.2**	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:33	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:33	7440-41-7	
Cadmium, Dissolved	**5.6**	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:33	7440-43-9	
Chromium, Dissolved	**0.24J**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:33	7440-47-3	
Cobalt, Dissolved	**0.29J**	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:33	7440-48-4	
Copper, Dissolved	**0.93J**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:33	7440-50-8	B
Iron, Dissolved	**9.7J**	ug/L	50.0	3.0	1	03/15/13 16:30	03/21/13 13:33	7439-89-6	B
Lead, Dissolved	**0.034J**	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:33	7439-92-1	
Manganese, Dissolved	**182**	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:33	7439-96-5	D9
Molybdenum, Dissolved	**13.6**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:33	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: ROCK DRAIN MP 130312 **Lab ID: 60140247002** Collected: 03/12/13 12:55 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.6**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:33	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:33	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/15/13 16:30	03/21/13 13:33	7440-22-4	
Thallium, Dissolved	**0.39J**	ug/L	1.0	0.020	1	03/15/13 16:30	03/21/13 13:33	7440-28-0	B
Vanadium, Dissolved	**0.23J**	ug/L	1.0	0.11	1	03/15/13 16:30	03/21/13 13:33	7440-62-2	
Zinc, Dissolved	**881**	ug/L	10.0	1.0	1	03/15/13 16:30	03/21/13 13:33	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 09:45	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 10:23	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**615**	mg/L	100	10.0	100		03/19/13 19:36	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: WETLAND OUT 130312 **Lab ID: 60140247003** Collected: 03/12/13 13:30 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**265000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 12:55	7440-70-2	
Iron	**75.3**	ug/L	50.0	11.6	1	03/15/13 16:30	03/18/13 12:55	7439-89-6	
Magnesium	**20800**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 12:55	7439-95-4	
Potassium	**7240**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 12:55	7440-09-7	
Sodium	**12300**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 12:55	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**259000**	ug/L	100	10.4	1	03/15/13 16:30	03/18/13 13:14	7440-70-2	
Magnesium, Dissolved	**20400**	ug/L	50.0	6.5	1	03/15/13 16:30	03/18/13 13:14	7439-95-4	
Potassium, Dissolved	**7000**	ug/L	500	44.4	1	03/15/13 16:30	03/18/13 13:14	7440-09-7	
Sodium, Dissolved	**12100**	ug/L	500	21.7	1	03/15/13 16:30	03/18/13 13:14	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**12.6J**	ug/L	50.0	6.4	1	03/14/13 15:15	03/15/13 14:33	7429-90-5	
Antimony	**0.20J**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:33	7440-36-0	
Arsenic	**1.1**	ug/L	1.0	0.050	1	03/14/13 15:15	03/15/13 14:33	7440-38-2	
Barium	**81.9**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:33	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/14/13 15:15	03/21/13 11:45	7440-41-7	
Cadmium	**0.87**	ug/L	0.50	0.050	1	03/14/13 15:15	03/15/13 14:33	7440-43-9	
Chromium	**0.23J**	ug/L	1.0	0.070	1	03/14/13 15:15	03/15/13 14:33	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.080	1	03/14/13 15:15	03/15/13 14:33	7440-48-4	
Copper	**0.52J**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:33	7440-50-8	
Lead	**0.11J**	ug/L	1.0	0.030	1	03/14/13 15:15	03/15/13 14:33	7439-92-1	
Manganese	**815**	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:33	7439-96-5	
Molybdenum	**0.42J**	ug/L	1.0	0.12	1	03/14/13 15:15	03/15/13 14:33	7439-98-7	
Nickel	**0.23J**	ug/L	1.0	0.070	1	03/14/13 15:15	03/21/13 11:45	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/14/13 15:15	03/15/13 14:33	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/14/13 15:15	03/15/13 14:33	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	03/14/13 15:15	03/15/13 14:33	7440-28-0	
Vanadium	**0.22J**	ug/L	1.0	0.11	1	03/14/13 15:15	03/15/13 14:33	7440-62-2	
Zinc	**268**	ug/L	10.0	1.0	1	03/14/13 15:15	03/15/13 14:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**8.5J**	ug/L	50.0	6.4	1	03/15/13 16:30	03/21/13 13:49	7429-90-5	
Antimony, Dissolved	**0.46J**	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:49	7440-36-0	B
Arsenic, Dissolved	**0.26J**	ug/L	1.0	0.050	1	03/15/13 16:30	03/21/13 13:49	7440-38-2	
Barium, Dissolved	**78.5**	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:49	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:49	7440-41-7	
Cadmium, Dissolved	**0.18J**	ug/L	0.50	0.050	1	03/15/13 16:30	03/21/13 13:49	7440-43-9	B
Chromium, Dissolved	**0.32J**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:49	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	03/15/13 16:30	03/21/13 13:49	7440-48-4	
Copper, Dissolved	**0.34J**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:49	7440-50-8	B
Iron, Dissolved	**30.7J**	ug/L	50.0	3.0	1	03/15/13 16:30	03/21/13 13:49	7439-89-6	B
Lead, Dissolved	ND	ug/L	1.0	0.030	1	03/15/13 16:30	03/21/13 13:49	7439-92-1	
Manganese, Dissolved	**807**	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:49	7439-96-5	
Molybdenum, Dissolved	**0.33J**	ug/L	1.0	0.12	1	03/15/13 16:30	03/21/13 13:49	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Sample: WETLAND OUT 130312 **Lab ID: 60140247003** Collected: 03/12/13 13:30 Received: 03/13/13 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.28J**	ug/L	1.0	0.070	1	03/15/13 16:30	03/21/13 13:49	7440-02-0	B
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/15/13 16:30	03/21/13 13:49	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/15/13 16:30	03/21/13 13:49	7440-22-4	
Thallium, Dissolved	**0.41J**	ug/L	1.0	0.020	1	03/15/13 16:30	03/21/13 13:49	7440-28-0	B
Vanadium, Dissolved	**0.19J**	ug/L	1.0	0.11	1	03/15/13 16:30	03/21/13 13:49	7440-62-2	
Zinc, Dissolved	**1.3J**	ug/L	10.0	1.0	1	03/15/13 16:30	03/21/13 13:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 09:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	ug/L	0.20	0.14	1	03/14/13 16:00	03/15/13 10:25	7439-97-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**32.8**	mg/L	2.0	2.0	1	03/14/13 12:11	03/19/13 10:01		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**574**	mg/L	100	10.0	100		03/19/13 19:51	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**10**	mg/L	5.0	0.41	10		03/20/13 11:03	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MERP/7162 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1153372 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	03/15/13 09:27	

LABORATORY CONTROL SAMPLE: 1153373

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1153374 1153375

Parameter	Units	60139734001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.9	4.7	97	92	70-130	5	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MERP/7163 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1153377 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	ND	0.20	03/15/13 10:07	

LABORATORY CONTROL SAMPLE: 1153378

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	5	4.7	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1153379 1153380

Parameter	Units	60140247001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	ND	5	5	4.4	4.8	88	96	70-130	8	20	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MPRP/21856 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1154261 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	30.2J	100	03/18/13 12:42	
Iron	ug/L	ND	50.0	03/18/13 12:42	
Magnesium	ug/L	ND	50.0	03/18/13 12:42	
Potassium	ug/L	ND	500	03/18/13 12:42	
Sodium	ug/L	ND	500	03/18/13 12:42	

LABORATORY CONTROL SAMPLE: 1154262

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9820	98	85-115	
Iron	ug/L	10000	9760	98	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Potassium	ug/L	10000	9200	92	85-115	
Sodium	ug/L	10000	9620	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1154263 1154264

Parameter	Units	60140247002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	246000	10000	10000	259000	261000	133	148	70-130	1	9	
Iron	ug/L	387	10000	10000	10100	9990	97	96	70-130	1	10	
Magnesium	ug/L	20100	10000	10000	30100	30200	100	102	70-130	1	9	
Potassium	ug/L	6230	10000	10000	16500	16600	103	103	70-130	0	7	
Sodium	ug/L	11900	10000	10000	22700	22900	108	109	70-130	1	8	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MPRP/21857 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1154265 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	79.0J	100	03/18/13 12:57	
Magnesium, Dissolved	ug/L	7.7J	50.0	03/18/13 12:57	
Potassium, Dissolved	ug/L	ND	500	03/18/13 12:57	
Sodium, Dissolved	ug/L	ND	500	03/18/13 12:57	

LABORATORY CONTROL SAMPLE: 1154266

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9820	98	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	9320	93	85-115	
Sodium, Dissolved	ug/L	10000	9730	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1154267 1154268

Parameter	Units	60140247002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	247000	10000	10000	254000	257000	71	102	70-130	1	9	
Magnesium, Dissolved	ug/L	20300	10000	10000	29600	30000	93	97	70-130	1	9	
Potassium, Dissolved	ug/L	6230	10000	10000	16100	16100	99	99	70-130	0	7	
Sodium, Dissolved	ug/L	12100	10000	10000	22600	22700	105	106	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MPRP/21835 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1153195 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	03/15/13 14:04	
Antimony	ug/L	ND	1.0	03/15/13 14:04	
Arsenic	ug/L	ND	1.0	03/15/13 14:04	
Barium	ug/L	0.25J	1.0	03/15/13 14:04	
Beryllium	ug/L	ND	0.50	03/21/13 11:14	
Cadmium	ug/L	ND	0.50	03/15/13 14:04	
Chromium	ug/L	ND	1.0	03/15/13 14:04	
Cobalt	ug/L	ND	1.0	03/15/13 14:04	
Copper	ug/L	ND	1.0	03/15/13 14:04	
Lead	ug/L	ND	1.0	03/15/13 14:04	
Manganese	ug/L	ND	1.0	03/15/13 14:04	
Molybdenum	ug/L	ND	1.0	03/15/13 14:04	
Nickel	ug/L	ND	1.0	03/15/13 14:04	
Selenium	ug/L	ND	1.0	03/15/13 14:04	
Silver	ug/L	ND	0.50	03/15/13 14:04	
Thallium	ug/L	ND	1.0	03/15/13 14:04	
Vanadium	ug/L	ND	1.0	03/15/13 14:04	
Zinc	ug/L	ND	10.0	03/15/13 14:04	

LABORATORY CONTROL SAMPLE: 1153196

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	981	98	85-115	
Antimony	ug/L	40	37.7	94	85-115	
Arsenic	ug/L	40	37.3	93	85-115	
Barium	ug/L	40	38.8	97	85-115	
Beryllium	ug/L	40	38.0	95	85-115	
Cadmium	ug/L	40	37.9	95	85-115	
Chromium	ug/L	40	38.8	97	85-115	
Cobalt	ug/L	40	38.1	95	85-115	
Copper	ug/L	40	38.0	95	85-115	
Lead	ug/L	40	38.6	96	85-115	
Manganese	ug/L	40	39.3	98	85-115	
Molybdenum	ug/L	40	38.8	97	85-115	
Nickel	ug/L	40	38.8	97	85-115	
Selenium	ug/L	40	37.5	94	85-115	
Silver	ug/L	20	19.2	96	85-115	
Thallium	ug/L	40	37.6	94	85-115	
Vanadium	ug/L	40	38.6	97	85-115	
Zinc	ug/L	100	96.7	97	85-115	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1153197 1153198

Parameter	Units	60140247001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	135	1000	1000	1080	1040	94	91	70-130	3	20	
Antimony	ug/L	0.23J	40	40	40.6	41.7	101	104	70-130	3	20	
Arsenic	ug/L	0.29J	40	40	41.6	42.4	103	105	70-130	2	20	
Barium	ug/L	19.3	40	40	59.0	59.3	99	100	70-130	1	20	
Beryllium	ug/L	0.15J	40	40	30.7	30.5	76	76	70-130	1	20	
Cadmium	ug/L	9.4	40	40	47.2	47.4	94	95	70-130	0	20	
Chromium	ug/L	0.47J	40	40	39.4	39.8	97	98	70-130	1	20	
Cobalt	ug/L	2.1	40	40	39.5	39.8	94	94	70-130	1	20	
Copper	ug/L	27.5	40	40	64.1	65.8	92	96	70-130	3	20	
Lead	ug/L	3.0	40	40	42.2	41.5	98	96	70-130	2	20	
Manganese	ug/L	1540	40	40	1590	1620	120	202	70-130	2	20	M1
Molybdenum	ug/L	15.6	40	40	57.4	57.4	104	104	70-130	0	20	
Nickel	ug/L	1.7	40	40	38.6	39.1	92	94	70-130	1	20	
Selenium	ug/L	0.15J	40	40	38.5	38.1	96	95	70-130	1	20	
Silver	ug/L	0.033J	20	20	18.0	18.0	90	90	70-130	0	20	
Thallium	ug/L	0.14J	40	40	38.7	38.2	96	95	70-130	1	20	
Vanadium	ug/L	ND	40	40	40.0	41.3	100	103	70-130	3	20	
Zinc	ug/L	1610	100	100	1760	1850	146	240	70-130	5	20	M1

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: MPRP/21858 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1154269 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	03/21/13 13:21	
Antimony, Dissolved	ug/L	0.30J	1.0	03/21/13 13:21	
Arsenic, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Barium, Dissolved	ug/L	0.24J	1.0	03/21/13 13:21	
Beryllium, Dissolved	ug/L	ND	0.50	03/21/13 13:21	
Cadmium, Dissolved	ug/L	0.17J	0.50	03/21/13 13:21	
Chromium, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Cobalt, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Copper, Dissolved	ug/L	0.24J	1.0	03/21/13 13:21	
Iron, Dissolved	ug/L	8.7J	50.0	03/21/13 13:21	
Lead, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Manganese, Dissolved	ug/L	0.14J	1.0	03/21/13 13:21	
Molybdenum, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Nickel, Dissolved	ug/L	0.076J	1.0	03/21/13 13:21	
Selenium, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Silver, Dissolved	ug/L	ND	0.50	03/21/13 13:21	
Thallium, Dissolved	ug/L	0.35J	1.0	03/21/13 13:21	
Vanadium, Dissolved	ug/L	ND	1.0	03/21/13 13:21	
Zinc, Dissolved	ug/L	ND	10.0	03/21/13 13:21	

LABORATORY CONTROL SAMPLE: 1154270

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	972	97	85-115	
Antimony, Dissolved	ug/L	40	38.6	96	85-115	
Arsenic, Dissolved	ug/L	40	36.4	91	85-115	
Barium, Dissolved	ug/L	40	37.4	93	85-115	
Beryllium, Dissolved	ug/L	40	36.5	91	85-115	
Cadmium, Dissolved	ug/L	40	36.6	92	85-115	
Chromium, Dissolved	ug/L	40	38.0	95	85-115	
Cobalt, Dissolved	ug/L	40	37.4	93	85-115	
Copper, Dissolved	ug/L	40	37.6	94	85-115	
Iron, Dissolved	ug/L	1000	979	98	85-115	
Lead, Dissolved	ug/L	40	37.7	94	85-115	
Manganese, Dissolved	ug/L	40	37.6	94	85-115	
Molybdenum, Dissolved	ug/L	40	39.8	99	85-115	
Nickel, Dissolved	ug/L	40	37.8	94	85-115	
Selenium, Dissolved	ug/L	40	36.5	91	85-115	
Silver, Dissolved	ug/L	20	19.1	96	85-115	
Thallium, Dissolved	ug/L	40	36.0	90	85-115	
Vanadium, Dissolved	ug/L	40	37.6	94	85-115	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

LABORATORY CONTROL SAMPLE: 1154270

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	92.0	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1154271 1154272

Parameter	Units	60140247002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	896	881	89	88	70-130	2	20	
Antimony, Dissolved	ug/L	0.47J	40	40	37.7	36.7	93	91	70-130	3	20	
Arsenic, Dissolved	ug/L	ND	40	40	37.2	35.7	93	89	70-130	4	20	
Barium, Dissolved	ug/L	18.2	40	40	54.6	53.4	91	88	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	29.1	28.3	73	71	70-130	3	20	
Cadmium, Dissolved	ug/L	5.6	40	40	40.0	39.4	86	85	70-130	1	20	
Chromium, Dissolved	ug/L	0.24J	40	40	37.2	36.2	92	90	70-130	3	20	
Cobalt, Dissolved	ug/L	0.29J	40	40	35.8	35.1	89	87	70-130	2	20	
Copper, Dissolved	ug/L	0.93J	40	40	34.1	33.8	83	82	70-130	1	20	
Iron, Dissolved	ug/L	9.7J	1000	1000	944	919	93	91	70-130	3	20	
Lead, Dissolved	ug/L	0.034J	40	40	38.2	37.9	95	95	70-130	1	20	
Manganese, Dissolved	ug/L	182	40	40	216	213	85	76	70-130	2	20	
Molybdenum, Dissolved	ug/L	13.6	40	40	54.0	53.2	101	99	70-130	2	20	
Nickel, Dissolved	ug/L	2.6	40	40	36.9	35.7	86	83	70-130	3	20	
Selenium, Dissolved	ug/L	ND	40	40	36.4	34.7	91	87	70-130	5	20	
Silver, Dissolved	ug/L	ND	20	20	17.2	17.1	86	85	70-130	1	20	
Thallium, Dissolved	ug/L	0.39J	40	40	37.0	36.4	91	90	70-130	1	20	
Vanadium, Dissolved	ug/L	0.23J	40	40	37.6	36.7	94	91	70-130	3	20	
Zinc, Dissolved	ug/L	881	100	100	965	941	85	60	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: WET/40186 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60140247001, 60140247003

METHOD BLANK: 1152823 Matrix: Water
Associated Lab Samples: 60140247001, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	03/19/13 09:27	

LABORATORY CONTROL SAMPLE: 1152824

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	208	105	85-115	

SAMPLE DUPLICATE: 1152825

Parameter	Units	60140247001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	ND		17	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: WETA/23901 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60140247001, 60140247002, 60140247003

METHOD BLANK: 1155249 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/19/13 11:19	

METHOD BLANK: 1157132 Matrix: Water
Associated Lab Samples: 60140247001, 60140247002, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/21/13 08:51	

LABORATORY CONTROL SAMPLE: 1155250

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	99	90-110	

LABORATORY CONTROL SAMPLE: 1157133

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE SAMPLE: 1155253

Parameter	Units	60140371002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	144	250	389	98	61-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1155256 1155257

Parameter	Units	60140184013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	616	500	500	1120	1140	100	104	61-119	2	10	

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QUALITY CONTROL DATA

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

QC Batch: WETA/16666 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60140247001, 60140247003

METHOD BLANK: 761814 Matrix: Water
Associated Lab Samples: 60140247001, 60140247003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	03/19/13 11:33	

LABORATORY CONTROL SAMPLE: 761815

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 761816 761817

Parameter	Units	60140247001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	0.18J	2.5	2.5	2.9	3.0	110	113	80-120	3	20	

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QUALIFIERS

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO ARGENTINE MINE SITE
Pace Project No.: 60140247

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60140247001	**ROCK DRAIN IN 130312**	EPA 200.7	MPRP/21856	EPA 200.7	ICP/17497
60140247002	**ROCK DRAIN MP 130312**	EPA 200.7	MPRP/21856	EPA 200.7	ICP/17497
60140247003	**WETLAND OUT 130312**	EPA 200.7	MPRP/21856	EPA 200.7	ICP/17497
60140247001	**ROCK DRAIN IN 130312**	EPA 200.7	MPRP/21857	EPA 200.7	ICP/17498
60140247002	**ROCK DRAIN MP 130312**	EPA 200.7	MPRP/21857	EPA 200.7	ICP/17498
60140247003	**WETLAND OUT 130312**	EPA 200.7	MPRP/21857	EPA 200.7	ICP/17498
60140247001	**ROCK DRAIN IN 130312**	EPA 200.8	MPRP/21835	EPA 200.8	ICPM/2107
60140247002	**ROCK DRAIN MP 130312**	EPA 200.8	MPRP/21835	EPA 200.8	ICPM/2107
60140247003	**WETLAND OUT 130312**	EPA 200.8	MPRP/21835	EPA 200.8	ICPM/2107
60140247001	**ROCK DRAIN IN 130312**	EPA 200.8	MPRP/21858	EPA 200.8	ICPM/2112
60140247002	**ROCK DRAIN MP 130312**	EPA 200.8	MPRP/21858	EPA 200.8	ICPM/2112
60140247003	**WETLAND OUT 130312**	EPA 200.8	MPRP/21858	EPA 200.8	ICPM/2112
60140247001	**ROCK DRAIN IN 130312**	EPA 245.1	MERP/7162	EPA 245.1	MERC/7122
60140247002	**ROCK DRAIN MP 130312**	EPA 245.1	MERP/7162	EPA 245.1	MERC/7122
60140247003	**WETLAND OUT 130312**	EPA 245.1	MERP/7162	EPA 245.1	MERC/7122
60140247001	**ROCK DRAIN IN 130312**	EPA 245.1	MERP/7163	EPA 245.1	MERC/7123
60140247002	**ROCK DRAIN MP 130312**	EPA 245.1	MERP/7163	EPA 245.1	MERC/7123
60140247003	**WETLAND OUT 130312**	EPA 245.1	MERP/7163	EPA 245.1	MERC/7123
60140247001	**ROCK DRAIN IN 130312**	SM 5210B	WET/40186	SM 5210B	WET/40263
60140247003	**WETLAND OUT 130312**	SM 5210B	WET/40186	SM 5210B	WET/40263
60140247001	**ROCK DRAIN IN 130312**	EPA 300.0	WETA/23901		
60140247002	**ROCK DRAIN MP 130312**	EPA 300.0	WETA/23901		
60140247003	**WETLAND OUT 130312**	EPA 300.0	WETA/23901		
60140247001	**ROCK DRAIN IN 130312**	SM 5310C	WETA/16666		
60140247003	**WETLAND OUT 130312**	SM 5310C	WETA/16666		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60140247

60140247

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 12733 W87221005 6618 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None (circle one) ☐ Samples received on ice, cooling process has begun.

Cooler Temperature: 2.2

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 3/13/13 BA

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☑N/A BA 3/13/13	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix: WT	☑Yes ☐No ☐N/A	13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased):	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 3/13/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1040	Start:
End: 1045	End:
Temp:	Temp:

F-KS-C-004-Rev.2, 04December2012

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program La... Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ Rush TAT: Yes X No X
BP/ARC Facility No: _____
Lab Work Order Number: 60140247

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0001 (WR 256704)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC x Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl		Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	5 DAY TAT		MS/MSD	HOLD	Report Type & QC Level / Comments
	ROCKDRAIN IN130312	03/12/13	1142		X			5	2	2*	2	0	1AG3S	X	X	X	X	X	X	1BP1A 1BP2A 1BP3F 1BP3N		LT	Dissolved metals are field filtered.
	ROCKDRAIN MD130312		1255		X			3	1	0	2	0		X	X	X			X				
	WETLANDOUT130312	↓	1330		X			5	2	2*	2	0	↓	X	X	X	X	X	X	↓	↓	↓	Metals are: Ca, Fe, K, Na, Mg (E200.7); Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8) & Hg *5 DAY TAT

Standard X
Full Data Package ___

Comments
Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name:	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	[signature] / AMEC	3/12/13	1400	[signature] / AMEC	3/12/13	1400
Shipment Method: UPS Ship Date: 3/12/13	[signature] / AMEC	3/12/13	1430	[signature]	3/13/13	1020
Shipment Tracking No: 1Z 733W87 2240 0516 18						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

March 29, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on March 20, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60140767001	**ROCK DRAIN IN 130319**	Water	03/19/13 11:05	03/20/13 10:00
60140767002	**ROCK DRAIN MP 130319**	Water	03/19/13 12:20	03/20/13 10:00
60140767003	**WETLAND OUT 130319**	Water	03/19/13 13:05	03/20/13 10:00

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60140767001	**ROCK DRAIN IN 130319**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60140767002	**ROCK DRAIN MP 130319**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60140767003	**WETLAND OUT 130319**	EPA 200.7	JGP	5	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	18	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: March 29, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21938

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60140767001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1156767)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: March 29, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21937

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60140767001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1156762)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: March 29, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21940

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130319 (Lab ID: 60140767001)
  - Thallium
- ROCK DRAIN MP 130319 (Lab ID: 60140767002)
  - Thallium
- WETLAND OUT 130319 (Lab ID: 60140767003)
  - Thallium

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 29, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21939

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60140767002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1156770)
  - Zinc, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21939

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130319 (Lab ID: 60140767001)
  - Silver, Dissolved
  - Iron, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: March 29, 2013

Analyte Comments:

QC Batch: MPRP/21939

B: Analyte was detected in the associated method blank.

- ROCK DRAIN IN 130319 (Lab ID: 60140767001)
  - Thallium, Dissolved
- ROCK DRAIN MP 130319 (Lab ID: 60140767002)
  - Silver, Dissolved
  - Iron, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved
- WETLAND OUT 130319 (Lab ID: 60140767003)
  - Silver, Dissolved
  - Iron, Dissolved
  - Molybdenum, Dissolved
  - Lead, Dissolved
  - Antimony, Dissolved
  - Thallium, Dissolved

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: March 29, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: March 29, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: March 29, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: ROCK DRAIN IN 130319 **Lab ID: 60140767001** Collected: 03/19/13 11:05 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**257000**	ug/L	100	10.4	1	03/20/13 15:00	03/26/13 15:58	7440-70-2	M1
Iron	**1750**	ug/L	50.0	11.6	1	03/20/13 15:00	03/26/13 15:58	7439-89-6	
Magnesium	**20900**	ug/L	50.0	6.5	1	03/20/13 15:00	03/26/13 15:58	7439-95-4	
Potassium	**5960**	ug/L	500	44.4	1	03/20/13 15:00	03/26/13 15:58	7440-09-7	
Sodium	**12800**	ug/L	500	21.7	1	03/20/13 15:00	03/27/13 10:01	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**253000**	ug/L	100	10.4	1	03/20/13 13:30	03/26/13 16:19	7440-70-2	M1
Magnesium, Dissolved	**20800**	ug/L	50.0	6.5	1	03/20/13 13:30	03/26/13 16:19	7439-95-4	
Potassium, Dissolved	**5730**	ug/L	500	44.4	1	03/20/13 13:30	03/26/13 16:19	7440-09-7	
Sodium, Dissolved	**12600**	ug/L	500	21.7	1	03/20/13 13:30	03/27/13 10:22	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**151**	ug/L	50.0	6.4	1	03/20/13 15:00	03/28/13 15:21	7429-90-5	
Antimony	ND	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 11:25	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.050	1	03/20/13 15:00	03/28/13 11:25	7440-38-2	
Barium	**20.0**	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 11:25	7440-39-3	
Beryllium	**0.19J**	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 15:21	7440-41-7	
Cadmium	**10.5**	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 11:25	7440-43-9	
Chromium	**0.23J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 11:25	7440-47-3	
Cobalt	**2.0**	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 11:25	7440-48-4	
Copper	**27.1**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 11:25	7440-50-8	
Lead	**3.1**	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 15:21	7439-92-1	
Manganese	**1620**	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 11:25	7439-96-5	
Molybdenum	**15.8**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 11:25	7439-98-7	
Nickel	**3.5**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 11:25	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 11:25	7782-49-2	
Silver	**0.036J**	ug/L	0.50	0.010	1	03/20/13 15:00	03/28/13 11:25	7440-22-4	
Thallium	**0.22J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/28/13 15:21	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	03/20/13 15:00	03/28/13 11:25	7440-62-2	
Zinc	**1840**	ug/L	10.0	1.0	1	03/20/13 15:00	03/28/13 11:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/20/13 15:00	03/26/13 12:09	7429-90-5	
Antimony, Dissolved	**0.24J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:09	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/20/13 15:00	03/26/13 12:09	7440-38-2	
Barium, Dissolved	**20.8**	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:09	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:09	7440-41-7	
Cadmium, Dissolved	**9.4**	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:09	7440-43-9	
Chromium, Dissolved	**0.58J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:09	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:09	7440-48-4	D9
Copper, Dissolved	**2.7**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:09	7440-50-8	
Iron, Dissolved	**12.6J**	ug/L	50.0	3.0	1	03/20/13 15:00	03/26/13 12:09	7439-89-6	B
Lead, Dissolved	**0.60J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:09	7439-92-1	B
Manganese, Dissolved	**1720**	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:09	7439-96-5	D9
Molybdenum, Dissolved	**16.8**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:09	7439-98-7	D9

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: ROCK DRAIN IN 130319 **Lab ID: 60140767001** Collected: 03/19/13 11:05 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.4**	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:09	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:09	7782-49-2	
Silver, Dissolved	**0.040J**	ug/L	0.50	0.010	1	03/20/13 15:00	03/26/13 12:09	7440-22-4	B
Thallium, Dissolved	**0.43J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/26/13 12:09	7440-28-0	B
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/20/13 15:00	03/26/13 12:09	7440-62-2	
Zinc, Dissolved	**1620**	ug/L	10.0	1.0	1	03/20/13 15:00	03/26/13 12:09	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	03/21/13 10:11	03/26/13 10:19		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**618**	mg/L	100	10.0	100		03/23/13 04:24	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.10J**	mg/L	0.50	0.041	1		03/22/13 13:09	7440-44-0	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: ROCK DRAIN MP 130319 **Lab ID: 60140767002** Collected: 03/19/13 12:20 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**252000**	ug/L	100	10.4	1	03/20/13 15:00	03/26/13 16:10	7440-70-2	
Iron	**485**	ug/L	50.0	11.6	1	03/20/13 15:00	03/26/13 16:10	7439-89-6	
Magnesium	**20800**	ug/L	50.0	6.5	1	03/20/13 15:00	03/26/13 16:10	7439-95-4	
Potassium	**6030**	ug/L	500	44.4	1	03/20/13 15:00	03/26/13 16:10	7440-09-7	
Sodium	**12600**	ug/L	500	21.7	1	03/20/13 15:00	03/27/13 10:09	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**245000**	ug/L	100	10.4	1	03/20/13 13:30	03/26/13 16:25	7440-70-2	
Magnesium, Dissolved	**20200**	ug/L	50.0	6.5	1	03/20/13 13:30	03/26/13 16:25	7439-95-4	
Potassium, Dissolved	**5860**	ug/L	500	44.4	1	03/20/13 13:30	03/26/13 16:25	7440-09-7	
Sodium, Dissolved	**12100**	ug/L	500	21.7	1	03/20/13 13:30	03/27/13 10:29	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**47.6J**	ug/L	50.0	6.4	1	03/20/13 15:00	03/28/13 15:25	7429-90-5	
Antimony	ND	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 11:33	7440-36-0	
Arsenic	**0.11J**	ug/L	1.0	0.050	1	03/20/13 15:00	03/28/13 11:33	7440-38-2	
Barium	**19.2**	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 11:33	7440-39-3	
Beryllium	**0.060J**	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 15:25	7440-41-7	
Cadmium	**6.1**	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 11:33	7440-43-9	
Chromium	**0.21J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 11:33	7440-47-3	
Cobalt	ND	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 11:33	7440-48-4	
Copper	**7.7**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 11:33	7440-50-8	
Lead	**1.1**	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 15:25	7439-92-1	
Manganese	**188**	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 11:33	7439-96-5	
Molybdenum	**14.4**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 11:33	7439-98-7	
Nickel	**2.4**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 11:33	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 11:33	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/20/13 15:00	03/28/13 11:33	7440-22-4	
Thallium	**0.14J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/28/13 15:25	7440-28-0	B
Vanadium	**0.23J**	ug/L	1.0	0.11	1	03/20/13 15:00	03/28/13 11:33	7440-62-2	
Zinc	**957**	ug/L	10.0	1.0	1	03/20/13 15:00	03/28/13 11:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/20/13 15:00	03/26/13 12:17	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:17	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/20/13 15:00	03/26/13 12:17	7440-38-2	
Barium, Dissolved	**18.6**	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:17	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:17	7440-41-7	
Cadmium, Dissolved	**5.5**	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:17	7440-43-9	
Chromium, Dissolved	**0.68J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:17	7440-47-3	
Cobalt, Dissolved	**0.26J**	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:17	7440-48-4	
Copper, Dissolved	**1.9**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:17	7440-50-8	
Iron, Dissolved	**11.4J**	ug/L	50.0	3.0	1	03/20/13 15:00	03/26/13 12:17	7439-89-6	B
Lead, Dissolved	**0.19J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:17	7439-92-1	B
Manganese, Dissolved	**175**	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:17	7439-96-5	
Molybdenum, Dissolved	**14.4**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:17	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: ROCK DRAIN MP 130319 **Lab ID: 60140767002** Collected: 03/19/13 12:20 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.4**	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:17	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:17	7782-49-2	
Silver, Dissolved	**0.028J**	ug/L	0.50	0.010	1	03/20/13 15:00	03/26/13 12:17	7440-22-4	B
Thallium, Dissolved	**0.39J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/26/13 12:17	7440-28-0	B
Vanadium, Dissolved	**0.26J**	ug/L	1.0	0.11	1	03/20/13 15:00	03/26/13 12:17	7440-62-2	
Zinc, Dissolved	**870**	ug/L	10.0	1.0	1	03/20/13 15:00	03/26/13 12:17	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**615**	mg/L	100	10.0	100		03/23/13 04:40	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: WETLAND OUT 130319 **Lab ID: 60140767003** Collected: 03/19/13 13:05 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**264000**	ug/L	100	10.4	1	03/20/13 15:00	03/26/13 16:13	7440-70-2	
Iron	**38.6J**	ug/L	50.0	11.6	1	03/20/13 15:00	03/26/13 16:13	7439-89-6	
Magnesium	**21100**	ug/L	50.0	6.5	1	03/20/13 15:00	03/26/13 16:13	7439-95-4	
Potassium	**7120**	ug/L	500	44.4	1	03/20/13 15:00	03/26/13 16:13	7440-09-7	
Sodium	**12800**	ug/L	500	21.7	1	03/20/13 15:00	03/27/13 10:11	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**262000**	ug/L	100	10.4	1	03/20/13 13:30	03/26/13 16:27	7440-70-2	
Magnesium, Dissolved	**20600**	ug/L	50.0	6.5	1	03/20/13 13:30	03/26/13 16:27	7439-95-4	
Potassium, Dissolved	**6930**	ug/L	500	44.4	1	03/20/13 13:30	03/26/13 16:27	7440-09-7	
Sodium, Dissolved	**12400**	ug/L	500	21.7	1	03/20/13 13:30	03/27/13 10:31	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**13.1J**	ug/L	50.0	6.4	1	03/20/13 15:00	03/28/13 15:41	7429-90-5	
Antimony	ND	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 12:03	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.050	1	03/20/13 15:00	03/28/13 12:03	7440-38-2	
Barium	**87.0**	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 12:03	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 15:41	7440-41-7	
Cadmium	**0.72**	ug/L	0.50	0.050	1	03/20/13 15:00	03/28/13 12:03	7440-43-9	
Chromium	**0.72J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 12:03	7440-47-3	
Cobalt	ND	ug/L	1.0	0.080	1	03/20/13 15:00	03/28/13 12:03	7440-48-4	
Copper	**1.1**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 12:03	7440-50-8	
Lead	**0.033J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/28/13 15:41	7439-92-1	
Manganese	**810**	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 12:03	7439-96-5	
Molybdenum	**0.21J**	ug/L	1.0	0.12	1	03/20/13 15:00	03/28/13 12:03	7439-98-7	
Nickel	**0.12J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/28/13 12:03	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/28/13 12:03	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/20/13 15:00	03/28/13 12:03	7440-22-4	
Thallium	**0.16J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/28/13 15:41	7440-28-0	B
Vanadium	**0.53J**	ug/L	1.0	0.11	1	03/20/13 15:00	03/28/13 12:03	7440-62-2	
Zinc	**192**	ug/L	10.0	1.0	1	03/20/13 15:00	03/28/13 12:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**50.1**	ug/L	50.0	6.4	1	03/20/13 15:00	03/26/13 12:42	7429-90-5	D9
Antimony, Dissolved	**0.17J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:42	7440-36-0	B
Arsenic, Dissolved	**0.35J**	ug/L	1.0	0.050	1	03/20/13 15:00	03/26/13 12:42	7440-38-2	
Barium, Dissolved	**87.1**	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:42	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:42	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	03/20/13 15:00	03/26/13 12:42	7440-43-9	
Chromium, Dissolved	**0.97J**	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:42	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	03/20/13 15:00	03/26/13 12:42	7440-48-4	
Copper, Dissolved	**2.3**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:42	7440-50-8	D9
Iron, Dissolved	**31.1J**	ug/L	50.0	3.0	1	03/20/13 15:00	03/26/13 12:42	7439-89-6	B
Lead, Dissolved	**0.20J**	ug/L	1.0	0.030	1	03/20/13 15:00	03/26/13 12:42	7439-92-1	B
Manganese, Dissolved	**802**	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:42	7439-96-5	
Molybdenum, Dissolved	**0.29J**	ug/L	1.0	0.12	1	03/20/13 15:00	03/26/13 12:42	7439-98-7	B

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Sample: WETLAND OUT 130319 **Lab ID: 60140767003** Collected: 03/19/13 13:05 Received: 03/20/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	03/20/13 15:00	03/26/13 12:42	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/20/13 15:00	03/26/13 12:42	7782-49-2	
Silver, Dissolved	**0.035J**	ug/L	0.50	0.010	1	03/20/13 15:00	03/26/13 12:42	7440-22-4	B
Thallium, Dissolved	**0.37J**	ug/L	1.0	0.020	1	03/20/13 15:00	03/26/13 12:42	7440-28-0	B
Vanadium, Dissolved	**0.68J**	ug/L	1.0	0.11	1	03/20/13 15:00	03/26/13 12:42	7440-62-2	
Zinc, Dissolved	**2.0J**	ug/L	10.0	1.0	1	03/20/13 15:00	03/26/13 12:42	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**50.5**	mg/L	2.0	2.0	1	03/21/13 10:23	03/26/13 10:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**540**	mg/L	100	10.0	100		03/23/13 05:26	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**10.9**	mg/L	7.5	0.61	15		03/22/13 14:40	7440-44-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: MPRP/21938 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60140767001, 60140767002, 60140767003

METHOD BLANK: 1156764 Matrix: Water
Associated Lab Samples: 60140767001, 60140767002, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	03/26/13 15:54	
Iron	ug/L	ND	50.0	03/26/13 15:54	
Magnesium	ug/L	ND	50.0	03/26/13 15:54	
Potassium	ug/L	122J	500	03/26/13 15:54	
Sodium	ug/L	72.8J	500	03/27/13 09:57	

LABORATORY CONTROL SAMPLE: 1156765

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9640	96	85-115	
Iron	ug/L	10000	9650	97	85-115	
Magnesium	ug/L	10000	9990	100	85-115	
Potassium	ug/L	10000	9630	96	85-115	
Sodium	ug/L	10000	9710	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1156766 1156767

Parameter	Units	60140767001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	257000	10000	10000	266000	256000	92	-10	70-130	4	9	M1
Iron	ug/L	1750	10000	10000	11300	11200	95	95	70-130	1	10	
Magnesium	ug/L	20900	10000	10000	30700	29600	98	88	70-130	3	9	
Potassium	ug/L	5960	10000	10000	16400	15900	104	99	70-130	3	7	
Sodium	ug/L	12800	10000	10000	23400	22700	106	99	70-130	3	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: MPRP/21937 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60140767001, 60140767002, 60140767003

METHOD BLANK: 1156760 Matrix: Water
Associated Lab Samples: 60140767001, 60140767002, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	03/26/13 16:17	
Magnesium, Dissolved	ug/L	ND	50.0	03/26/13 16:17	
Potassium, Dissolved	ug/L	89.0J	500	03/26/13 16:17	
Sodium, Dissolved	ug/L	50.8J	500	03/27/13 10:18	

LABORATORY CONTROL SAMPLE: 1156761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9800	98	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	9580	96	85-115	
Sodium, Dissolved	ug/L	10000	9940	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1156762 1156763

Parameter	Units	60140767001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	253000	10000	10000	250000	261000	-29	79	70-130	4	9	M1
Magnesium, Dissolved	ug/L	20800	10000	10000	29300	30200	85	94	70-130	3	9	
Potassium, Dissolved	ug/L	5730	10000	10000	15900	16100	102	104	70-130	1	7	
Sodium, Dissolved	ug/L	12600	10000	10000	22700	23500	101	108	70-130	3	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: MPRP/21940 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60140767001, 60140767002, 60140767003

METHOD BLANK: 1156772 Matrix: Water
Associated Lab Samples: 60140767001, 60140767002, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	03/28/13 15:13	
Antimony	ug/L	ND	1.0	03/28/13 11:17	
Arsenic	ug/L	ND	1.0	03/28/13 11:17	
Barium	ug/L	ND	1.0	03/28/13 11:17	
Beryllium	ug/L	ND	0.50	03/28/13 15:13	
Cadmium	ug/L	ND	0.50	03/28/13 11:17	
Chromium	ug/L	ND	1.0	03/28/13 11:17	
Cobalt	ug/L	ND	1.0	03/28/13 11:17	
Copper	ug/L	ND	1.0	03/28/13 11:17	
Lead	ug/L	ND	1.0	03/28/13 15:13	
Manganese	ug/L	ND	1.0	03/28/13 11:17	
Molybdenum	ug/L	ND	1.0	03/28/13 11:17	
Nickel	ug/L	ND	1.0	03/28/13 11:17	
Selenium	ug/L	ND	1.0	03/28/13 11:17	
Silver	ug/L	ND	0.50	03/28/13 11:17	
Thallium	ug/L	0.086J	1.0	03/28/13 15:13	
Vanadium	ug/L	ND	1.0	03/28/13 11:17	
Zinc	ug/L	ND	10.0	03/28/13 11:17	

LABORATORY CONTROL SAMPLE: 1156773

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	957	96	85-115	
Antimony	ug/L	40	38.5	96	85-115	
Arsenic	ug/L	40	38.1	95	85-115	
Barium	ug/L	40	36.7	92	85-115	
Beryllium	ug/L	40	38.3	96	85-115	
Cadmium	ug/L	40	38.2	95	85-115	
Chromium	ug/L	40	38.0	95	85-115	
Cobalt	ug/L	40	36.9	92	85-115	
Copper	ug/L	40	38.1	95	85-115	
Lead	ug/L	40	38.0	95	85-115	
Manganese	ug/L	40	37.2	93	85-115	
Molybdenum	ug/L	40	38.9	97	85-115	
Nickel	ug/L	40	37.7	94	85-115	
Selenium	ug/L	40	39.4	98	85-115	
Silver	ug/L	20	19.0	95	85-115	
Thallium	ug/L	40	36.1	90	85-115	
Vanadium	ug/L	40	37.3	93	85-115	
Zinc	ug/L	100	98.7	99	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1156774 1156775

Parameter	Units	60140767002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	47.6J	1000	1000	1010	988	96	94	70-130	2	20	
Antimony	ug/L	ND	40	40	40.7	40.3	102	101	70-130	1	20	
Arsenic	ug/L	0.11J	40	40	41.0	40.7	102	101	70-130	1	20	
Barium	ug/L	19.2	40	40	57.6	57.0	96	95	70-130	1	20	
Beryllium	ug/L	0.060J	40	40	35.3	34.2	88	85	70-130	3	20	
Cadmium	ug/L	6.1	40	40	45.2	45.1	98	97	70-130	0	20	
Chromium	ug/L	0.21J	40	40	38.9	38.9	97	97	70-130	0	20	
Cobalt	ug/L	ND	40	40	37.7	37.3	94	93	70-130	1	20	
Copper	ug/L	7.7	40	40	44.1	43.3	91	89	70-130	2	20	
Lead	ug/L	1.1	40	40	39.5	38.0	96	92	70-130	4	20	
Manganese	ug/L	188	40	40	227	225	96	91	70-130	1	20	
Molybdenum	ug/L	14.4	40	40	56.9	56.2	106	104	70-130	1	20	
Nickel	ug/L	2.4	40	40	39.4	39.4	92	92	70-130	0	20	
Selenium	ug/L	ND	40	40	42.1	42.4	105	106	70-130	1	20	
Silver	ug/L	ND	20	20	19.0	18.9	95	95	70-130	1	20	
Thallium	ug/L	0.14J	40	40	37.0	35.3	92	88	70-130	5	20	
Vanadium	ug/L	0.23J	40	40	40.0	39.7	100	99	70-130	1	20	
Zinc	ug/L	957	100	100	1060	1040	102	79	70-130	2	20	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: MPRP/21939 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60140767001, 60140767002, 60140767003

METHOD BLANK: 1156768 Matrix: Water
Associated Lab Samples: 60140767001, 60140767002, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	03/26/13 12:05	
Antimony, Dissolved	ug/L	0.038J	1.0	03/26/13 12:05	
Arsenic, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Barium, Dissolved	ug/L	0.30J	1.0	03/26/13 12:05	
Beryllium, Dissolved	ug/L	ND	0.50	03/26/13 12:05	
Cadmium, Dissolved	ug/L	ND	0.50	03/26/13 12:05	
Chromium, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Cobalt, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Copper, Dissolved	ug/L	0.18J	1.0	03/26/13 12:05	
Iron, Dissolved	ug/L	6.3J	50.0	03/26/13 12:05	
Lead, Dissolved	ug/L	0.18J	1.0	03/26/13 12:05	
Manganese, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Molybdenum, Dissolved	ug/L	0.12J	1.0	03/26/13 12:05	
Nickel, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Selenium, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Silver, Dissolved	ug/L	0.085J	0.50	03/26/13 12:05	
Thallium, Dissolved	ug/L	0.44J	1.0	03/26/13 12:05	
Vanadium, Dissolved	ug/L	ND	1.0	03/26/13 12:05	
Zinc, Dissolved	ug/L	ND	10.0	03/26/13 12:05	

LABORATORY CONTROL SAMPLE: 1156769

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	944	94	85-115	
Antimony, Dissolved	ug/L	40	38.1	95	85-115	
Arsenic, Dissolved	ug/L	40	37.4	93	85-115	
Barium, Dissolved	ug/L	40	36.6	91	85-115	
Beryllium, Dissolved	ug/L	40	37.9	95	85-115	
Cadmium, Dissolved	ug/L	40	37.4	93	85-115	
Chromium, Dissolved	ug/L	40	37.1	93	85-115	
Cobalt, Dissolved	ug/L	40	36.6	92	85-115	
Copper, Dissolved	ug/L	40	37.3	93	85-115	
Iron, Dissolved	ug/L	1000	958	96	85-115	
Lead, Dissolved	ug/L	40	36.5	91	85-115	
Manganese, Dissolved	ug/L	40	36.7	92	85-115	
Molybdenum, Dissolved	ug/L	40	38.6	97	85-115	
Nickel, Dissolved	ug/L	40	37.1	93	85-115	
Selenium, Dissolved	ug/L	40	37.9	95	85-115	
Silver, Dissolved	ug/L	20	18.8	94	85-115	
Thallium, Dissolved	ug/L	40	35.2	88	85-115	
Vanadium, Dissolved	ug/L	40	37.2	93	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

LABORATORY CONTROL SAMPLE: 1156769

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	95.3	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1156770 1156771

Parameter	Units	60140767002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	986	986	99	99	70-130	0	20	
Antimony, Dissolved	ug/L	0.21J	40	40	41.3	41.9	103	104	70-130	2	20	
Arsenic, Dissolved	ug/L	ND	40	40	41.7	41.6	104	104	70-130	0	20	
Barium, Dissolved	ug/L	18.6	40	40	58.7	58.8	100	101	70-130	0	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.2	36.0	88	90	70-130	2	20	
Cadmium, Dissolved	ug/L	5.5	40	40	45.7	46.0	100	101	70-130	1	20	
Chromium, Dissolved	ug/L	0.68J	40	40	39.7	39.8	98	98	70-130	0	20	
Cobalt, Dissolved	ug/L	0.26J	40	40	38.7	38.5	96	96	70-130	0	20	
Copper, Dissolved	ug/L	1.9	40	40	38.4	38.0	91	90	70-130	1	20	
Iron, Dissolved	ug/L	11.4J	1000	1000	1020	1020	101	101	70-130	0	20	
Lead, Dissolved	ug/L	0.19J	40	40	39.8	39.8	99	99	70-130	0	20	
Manganese, Dissolved	ug/L	175	40	40	223	218	119	106	70-130	2	20	
Molybdenum, Dissolved	ug/L	14.4	40	40	58.3	58.0	110	109	70-130	1	20	
Nickel, Dissolved	ug/L	2.4	40	40	40.7	40.7	96	96	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	42.3	42.0	106	105	70-130	1	20	
Silver, Dissolved	ug/L	0.028J	20	20	19.5	19.5	97	97	70-130	0	20	
Thallium, Dissolved	ug/L	0.39J	40	40	38.5	38.4	95	95	70-130	0	20	
Vanadium, Dissolved	ug/L	0.26J	40	40	40.2	40.4	100	100	70-130	1	20	
Zinc, Dissolved	ug/L	870	100	100	1010	980	136	110	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: WET/40312 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60140767001, 60140767003

METHOD BLANK: 1157089 Matrix: Water
Associated Lab Samples: 60140767001, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	03/26/13 09:57	

LABORATORY CONTROL SAMPLE: 1157090

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	211	107	85-115	

SAMPLE DUPLICATE: 1157091

Parameter	Units	60140738002 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	2.3		17	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: WETA/23981 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60140767001, 60140767002, 60140767003

METHOD BLANK: 1158376 Matrix: Water
Associated Lab Samples: 60140767001, 60140767002, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	0.27J	1.0	03/23/13 02:51	

LABORATORY CONTROL SAMPLE: 1158377

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1158378 1158379

Parameter	Units	60140476006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	766	500	500	1200	1190	86	85	61-119	0	10	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

QC Batch: WETA/16733 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60140767001, 60140767003

METHOD BLANK: 763509 Matrix: Water
Associated Lab Samples: 60140767001, 60140767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	03/22/13 12:32	

LABORATORY CONTROL SAMPLE: 763510

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 763511 763512

Parameter	Units	60140767001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	0.10J	2.5	2.5	2.8	2.9	110	114	80-120	3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 763513 763514

Parameter	Units	60140767003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	10.9	37.5	37.5	51.7	52.4	109	111	80-120	1	20	

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60140767

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60140767001	**ROCK DRAIN IN 130319**	EPA 200.7	MPRP/21938	EPA 200.7	ICP/17538
60140767002	**ROCK DRAIN MP 130319**	EPA 200.7	MPRP/21938	EPA 200.7	ICP/17538
60140767003	**WETLAND OUT 130319**	EPA 200.7	MPRP/21938	EPA 200.7	ICP/17538
60140767001	**ROCK DRAIN IN 130319**	EPA 200.7	MPRP/21937	EPA 200.7	ICP/17537
60140767002	**ROCK DRAIN MP 130319**	EPA 200.7	MPRP/21937	EPA 200.7	ICP/17537
60140767003	**WETLAND OUT 130319**	EPA 200.7	MPRP/21937	EPA 200.7	ICP/17537
60140767001	**ROCK DRAIN IN 130319**	EPA 200.8	MPRP/21940	EPA 200.8	ICPM/2127
60140767002	**ROCK DRAIN MP 130319**	EPA 200.8	MPRP/21940	EPA 200.8	ICPM/2127
60140767003	**WETLAND OUT 130319**	EPA 200.8	MPRP/21940	EPA 200.8	ICPM/2127
60140767001	**ROCK DRAIN IN 130319**	EPA 200.8	MPRP/21939	EPA 200.8	ICPM/2126
60140767002	**ROCK DRAIN MP 130319**	EPA 200.8	MPRP/21939	EPA 200.8	ICPM/2126
60140767003	**WETLAND OUT 130319**	EPA 200.8	MPRP/21939	EPA 200.8	ICPM/2126
60140767001	**ROCK DRAIN IN 130319**	SM 5210B	WET/40312	SM 5210B	WET/40396
60140767003	**WETLAND OUT 130319**	SM 5210B	WET/40312	SM 5210B	WET/40396
60140767001	**ROCK DRAIN IN 130319**	EPA 300.0	WETA/23981		
60140767002	**ROCK DRAIN MP 130319**	EPA 300.0	WETA/23981		
60140767003	**WETLAND OUT 130319**	EPA 300.0	WETA/23981		
60140767001	**ROCK DRAIN IN 130319**	SM 5310C	WETA/16733		
60140767003	**WETLAND OUT 130319**	SM 5310C	WETA/16733		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60140767

60140767

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W8722 1005 6092 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: (T-112) / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 2.2

Date and initials of person examining contents: 3/20/13 BM

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, (TOC), O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: dmw Date: 3/20/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1100	Start:
End: 1105	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lam.. Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Lab Work Order Number: 60140767
Rush TAT: Yes X No X

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0001 (WR 256704)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor		Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	ROCKDRAININ130319	3/19/13	11:05		✓			5	2	1	2	1BP3N 1.5	1BP3F 1.5		✓	✓	✓	✓	✓	1BP1U	1AG3S	1BP2U			Dissolved metals are field filtered. 01
	ROCKDRAINMP130319	3/19/13	12:20		✓			3	2	0	1	↓	↓		X	X	X								02
	WETLANDOUT 130319	3/19/13	1305		✓			5	2	1	2	↓	↓		X	X	X	X	X	↓	↓	↓			Metals are: Ca, Fe, K, Na, Mg (E200.7); 03
																									Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn,
																									Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
																									* 5 DAY TURNAROUND

3/19/13

Sampler's Name:	ABBY CAZIER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	AMEC	[signature] / AMEC	3/19/13	1330	[signature]	3/19/13	13:30
Shipment Method:	UPS Ship Date: 3/19/13	[signature] / AECI	3/19/13	1400	[signature] Simpson / AMEC	3/19/13	14:00
Shipment Tracking No:	1Z 733 W87 2210056092	[signature] Simpson / AMEC	3/19/13	1415	[signature]	3/20/13	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Chain of Custody

4075262

Pace Analytical
www.pacelabs.com

EMHV

Workorder: 60140767 Workorder Name: WETLAND PILOT SCALE TEST Owner Received Date: 3/20/2013 Results Requested By: 3/27/2013

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: H2SO4	5310C TOC	LAB USE ONLY
1	ROCK DRAIN IN 130319 001	PS	3/19/2013 11:05	60140767001	Water	1	X	1-250mlag C
2	WETLAND OUT 130319 002	PS	3/19/2013 13:05	60140767003	Water	1	X	↓
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature]	3/20/13 1700		
2	FedEx	3/21/13 1150	E Helling Pace GB	3/21/13 1150
3				

Comments

Cooler Temperature on Receipt 2 °C Custody Seal Y or N Received on Ice Y or N Samples Intact Y or N

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Sample Condition Upon Receipt

Client Name: Pace KS Project # 4075262

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 5552 4796 1684

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other _____

Thermometer Used SR45 Type of Ice: (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 2 /Corr: 2 Biological Tissue is Frozen: ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 3/21/13
Initials: EMH

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, (TOC), TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: CW **Date:** 3/21/13

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

April 09, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on March 27, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60141237001	**ROCK DRAIN IN 130326**	Water	03/26/13 10:30	03/27/13 18:25
60141237002	**ROCK DRAIN MP 130326**	Water	03/26/13 11:40	03/27/13 18:25
60141237003	**WETLAND OUT 130326**	Water	03/26/13 10:50	03/27/13 18:25

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60141237001	**ROCK DRAIN IN 130326**	EPA 200.7	JGP	5
		EPA 200.7	JGP	4
		EPA 200.8	SMW	18
		EPA 200.8	SMW	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		SM 5310C	JML	1
60141237002	**ROCK DRAIN MP 130326**	EPA 200.7	JGP	5
		EPA 200.7	JGP	4
		EPA 200.8	SMW	18
		EPA 200.8	SMW	19
		EPA 300.0	OL	1
60141237003	**WETLAND OUT 130326**	EPA 200.7	JGP	5
		EPA 200.7	JGP	4
		EPA 200.8	SMW	18
		EPA 200.8	SMW	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		SM 5310C	JML	1

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: April 09, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22068

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141237001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1161017)
  - Calcium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: April 09, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22066

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141237001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1161006)
  - Calcium, Dissolved
- MSD (Lab ID: 1161007)
  - Calcium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: April 09, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22069

B: Analyte was detected in the associated method blank.

- BLANK for HBN 284663 [MPRP/220 (Lab ID: 1161019)
  - Antimony
  - Cobalt
  - Copper
  - Lead
  - Molybdenum
  - Nickel

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22069

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141237002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1161021)
  - Zinc
- MSD (Lab ID: 1161022)
  - Zinc

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: April 09, 2013

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: April 09, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22067

B: Analyte was detected in the associated method blank.

- BLANK for HBN 284660 [MPRP/220 (Lab ID: 1161008)
  - Antimony, Dissolved
  - Cadmium, Dissolved
  - Chromium, Dissolved
  - Cobalt, Dissolved
  - Copper, Dissolved
  - Iron, Dissolved
  - Lead, Dissolved
  - Molybdenum, Dissolved
  - Nickel, Dissolved
  - Vanadium, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

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Lenexa, KS 66219
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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: April 09, 2013

QC Batch: MPRP/22067

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141237002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1161010)
  - Manganese, Dissolved
  - Zinc, Dissolved
- MSD (Lab ID: 1161011)
  - Copper, Dissolved
  - Zinc, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/22067

1e: Post Digestion Spike Performed - 82.9% Recovery

- MSD (Lab ID: 1161011)
  - Copper, Dissolved

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: April 09, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: April 09, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: April 09, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: WETA/24104

B: Analyte was detected in the associated method blank.
- BLANK for HBN 285356 [WETA/241 (Lab ID: 1163718)
  - Total Organic Carbon

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: ROCK DRAIN IN 130326 **Lab ID: 60141237001** Collected: 03/26/13 10:30 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**240000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:13	7440-70-2	M1
Iron	**1850**	ug/L	50.0	11.6	1	03/28/13 14:30	04/02/13 09:13	7439-89-6	
Magnesium	**19900**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:13	7439-95-4	
Potassium	**5230**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:13	7440-09-7	
Sodium	**12000**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:13	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**250000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:32	7440-70-2	D9,M1
Magnesium, Dissolved	**20600**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:32	7439-95-4	D9
Potassium, Dissolved	**5340**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:32	7440-09-7	D9
Sodium, Dissolved	**12400**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:32	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**123**	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 19:20	7429-90-5	
Antimony	**0.35J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:20	7440-36-0	B
Arsenic	**0.36J**	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 19:20	7440-38-2	
Barium	**20.8**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:20	7440-39-3	
Beryllium	**0.20J**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:20	7440-41-7	
Cadmium	**11.1**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:20	7440-43-9	
Chromium	**0.65J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:20	7440-47-3	
Cobalt	**2.4**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:20	7440-48-4	
Copper	**27.7**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:20	7440-50-8	
Lead	**4.1**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:20	7439-92-1	
Manganese	**1560**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:20	7439-96-5	
Molybdenum	**16.0**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:20	7439-98-7	
Nickel	**3.6**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:20	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:20	7782-49-2	
Silver	**0.019J**	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 19:20	7440-22-4	
Thallium	**0.10J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 19:20	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 19:20	7440-62-2	
Zinc	**2120**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 19:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 18:14	7429-90-5	
Antimony, Dissolved	**0.34J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:14	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 18:14	7440-38-2	
Barium, Dissolved	**19.8**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:14	7440-39-3	
Beryllium, Dissolved	**0.050J**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:14	7440-41-7	
Cadmium, Dissolved	**9.9**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:14	7440-43-9	
Chromium, Dissolved	**0.32J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:14	7440-47-3	B
Cobalt, Dissolved	**2.4**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:14	7440-48-4	
Copper, Dissolved	**1.7**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:14	7440-50-8	B
Iron, Dissolved	ND	ug/L	50.0	3.0	1	03/28/13 14:30	04/05/13 18:14	7439-89-6	
Lead, Dissolved	**0.088J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:14	7439-92-1	B
Manganese, Dissolved	**1550**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:14	7439-96-5	
Molybdenum, Dissolved	**15.3**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:14	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: ROCK DRAIN IN 130326 **Lab ID: 60141237001** Collected: 03/26/13 10:30 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.7**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:14	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:14	7782-49-2	
Silver, Dissolved	**0.017J**	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 18:14	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 18:14	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 18:14	7440-62-2	
Zinc, Dissolved	**1830**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 18:14	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	03/28/13 09:49	04/02/13 09:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**623**	mg/L	100	10.0	100		04/01/13 00:00	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.63J**	mg/L	1.0	0.12	1		04/03/13 12:27	7440-44-0	B

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: ROCK DRAIN MP 130326 **Lab ID: 60141237002** Collected: 03/26/13 11:40 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**243000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:20	7440-70-2	
Iron	**685**	ug/L	50.0	11.6	1	03/28/13 14:30	04/02/13 09:20	7439-89-6	
Magnesium	**20000**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:20	7439-95-4	
Potassium	**5320**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:20	7440-09-7	
Sodium	**12100**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:20	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**255000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:39	7440-70-2	D9
Magnesium, Dissolved	**20400**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:39	7439-95-4	D9
Potassium, Dissolved	**5560**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:39	7440-09-7	D9
Sodium, Dissolved	**12700**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:39	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**40.5J**	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 19:25	7429-90-5	
Antimony	**0.32J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:25	7440-36-0	B
Arsenic	**0.20J**	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 19:25	7440-38-2	
Barium	**18.4**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:25	7440-39-3	
Beryllium	**0.094J**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:25	7440-41-7	
Cadmium	**7.1**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:25	7440-43-9	
Chromium	**0.87J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:25	7440-47-3	
Cobalt	**0.68J**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:25	7440-48-4	B
Copper	**9.9**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:25	7440-50-8	
Lead	**1.4**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:25	7439-92-1	
Manganese	**338**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:25	7439-96-5	
Molybdenum	**13.4**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:25	7439-98-7	
Nickel	**3.0**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:25	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:25	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 19:25	7440-22-4	
Thallium	**0.042J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 19:25	7440-28-0	
Vanadium	**0.28J**	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 19:25	7440-62-2	
Zinc	**1310**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 19:25	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 18:18	7429-90-5	
Antimony, Dissolved	**0.31J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:18	7440-36-0	B
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 18:18	7440-38-2	
Barium, Dissolved	**18.3**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:18	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:18	7440-41-7	
Cadmium, Dissolved	**6.7**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:18	7440-43-9	
Chromium, Dissolved	**0.71J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:18	7440-47-3	
Cobalt, Dissolved	**0.70J**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:18	7440-48-4	B
Copper, Dissolved	**6.1**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:18	7440-50-8	M1
Iron, Dissolved	ND	ug/L	50.0	3.0	1	03/28/13 14:30	04/05/13 18:18	7439-89-6	
Lead, Dissolved	**0.30J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:18	7439-92-1	B
Manganese, Dissolved	**368**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:18	7439-96-5	D9,M1
Molybdenum, Dissolved	**13.4**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:18	7439-98-7	D9

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: ROCK DRAIN MP 130326 **Lab ID: 60141237002** Collected: 03/26/13 11:40 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.2**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:18	7440-02-0	B,D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:18	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 18:18	7440-22-4	
Thallium, Dissolved	**0.044J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 18:18	7440-28-0	
Vanadium, Dissolved	**0.23J**	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 18:18	7440-62-2	B
Zinc, Dissolved	**1260**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 18:18	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**642**	mg/L	100	10.0	100		04/01/13 00:16	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: WETLAND OUT 130326 **Lab ID: 60141237003** Collected: 03/26/13 10:50 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**259000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:22	7440-70-2	
Iron	**42.6J**	ug/L	50.0	11.6	1	03/28/13 14:30	04/02/13 09:22	7439-89-6	
Magnesium	**20700**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:22	7439-95-4	
Potassium	**6010**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:22	7440-09-7	
Sodium	**12400**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:22	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**267000**	ug/L	100	10.4	1	03/28/13 14:30	04/02/13 09:41	7440-70-2	D9
Magnesium, Dissolved	**21000**	ug/L	50.0	6.5	1	03/28/13 14:30	04/02/13 09:41	7439-95-4	D9
Potassium, Dissolved	**6120**	ug/L	500	44.4	1	03/28/13 14:30	04/02/13 09:41	7440-09-7	D9
Sodium, Dissolved	**12800**	ug/L	500	21.7	1	03/28/13 14:30	04/02/13 09:41	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 19:41	7429-90-5	
Antimony	**0.29J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:41	7440-36-0	B
Arsenic	**0.64J**	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 19:41	7440-38-2	
Barium	**73.4**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:41	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:41	7440-41-7	
Cadmium	**1.2**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 19:41	7440-43-9	
Chromium	**0.48J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:41	7440-47-3	
Cobalt	**0.32J**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 19:41	7440-48-4	B
Copper	**0.48J**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:41	7440-50-8	B
Lead	**0.18J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 19:41	7439-92-1	B
Manganese	**697**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:41	7439-96-5	
Molybdenum	**0.76J**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 19:41	7439-98-7	B
Nickel	**0.14J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 19:41	7440-02-0	B
Selenium	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 19:41	7782-49-2	
Silver	**0.017J**	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 19:41	7440-22-4	
Thallium	**0.054J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 19:41	7440-28-0	
Vanadium	**0.57J**	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 19:41	7440-62-2	
Zinc	**316**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 19:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	03/28/13 14:30	04/05/13 18:35	7429-90-5	
Antimony, Dissolved	**0.25J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:35	7440-36-0	B
Arsenic, Dissolved	**0.13J**	ug/L	1.0	0.050	1	03/28/13 14:30	04/05/13 18:35	7440-38-2	
Barium, Dissolved	**70.3**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:35	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:35	7440-41-7	
Cadmium, Dissolved	**0.11J**	ug/L	0.50	0.050	1	03/28/13 14:30	04/05/13 18:35	7440-43-9	B
Chromium, Dissolved	**0.51J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:35	7440-47-3	B
Cobalt, Dissolved	**0.24J**	ug/L	1.0	0.080	1	03/28/13 14:30	04/05/13 18:35	7440-48-4	B
Copper, Dissolved	**1.2**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:35	7440-50-8	B,D9
Iron, Dissolved	**17.5J**	ug/L	50.0	3.0	1	03/28/13 14:30	04/05/13 18:35	7439-89-6	B
Lead, Dissolved	**0.14J**	ug/L	1.0	0.030	1	03/28/13 14:30	04/05/13 18:35	7439-92-1	B
Manganese, Dissolved	**664**	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:35	7439-96-5	
Molybdenum, Dissolved	**0.62J**	ug/L	1.0	0.12	1	03/28/13 14:30	04/05/13 18:35	7439-98-7	B

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Sample: WETLAND OUT 130326 **Lab ID: 60141237003** Collected: 03/26/13 10:50 Received: 03/27/13 18:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.074J**	ug/L	1.0	0.070	1	03/28/13 14:30	04/05/13 18:35	7440-02-0	B
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	03/28/13 14:30	04/05/13 18:35	7782-49-2	
Silver, Dissolved	**0.014J**	ug/L	0.50	0.010	1	03/28/13 14:30	04/05/13 18:35	7440-22-4	
Thallium, Dissolved	**0.043J**	ug/L	1.0	0.020	1	03/28/13 14:30	04/05/13 18:35	7440-28-0	
Vanadium, Dissolved	**0.38J**	ug/L	1.0	0.11	1	03/28/13 14:30	04/05/13 18:35	7440-62-2	B
Zinc, Dissolved	**1.2J**	ug/L	10.0	1.0	1	03/28/13 14:30	04/05/13 18:35	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**22.5**	mg/L	2.0	2.0	1	03/28/13 09:52	04/02/13 09:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**603**	mg/L	100	10.0	100		04/01/13 00:31	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**8.4**	mg/L	1.0	0.12	1		04/03/13 12:35	7440-44-0	B

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: MPRP/22068 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60141237001, 60141237002, 60141237003

METHOD BLANK: 1161015 Matrix: Water
Associated Lab Samples: 60141237001, 60141237002, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	04/02/13 09:09	
Iron	ug/L	ND	50.0	04/02/13 09:09	
Magnesium	ug/L	ND	50.0	04/02/13 09:09	
Potassium	ug/L	ND	500	04/02/13 09:09	
Sodium	ug/L	ND	500	04/02/13 09:09	

LABORATORY CONTROL SAMPLE: 1161016

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9480	95	85-115	
Iron	ug/L	10000	9570	96	85-115	
Magnesium	ug/L	10000	9570	96	85-115	
Potassium	ug/L	10000	9450	95	85-115	
Sodium	ug/L	10000	9860	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1161017 1161018

Parameter	Units	60141237001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	240000	10000	10000	256000	250000	160	92	70-130	3	9	M1
Iron	ug/L	1850	10000	10000	11900	11200	100	94	70-130	6	10	
Magnesium	ug/L	19900	10000	10000	29600	29400	97	95	70-130	1	9	
Potassium	ug/L	5230	10000	10000	15500	14700	103	95	70-130	5	7	
Sodium	ug/L	12000	10000	10000	22900	21900	110	99	70-130	5	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: MPRP/22066 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60141237001, 60141237002, 60141237003

METHOD BLANK: 1161004 Matrix: Water
Associated Lab Samples: 60141237001, 60141237002, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	04/02/13 09:28	
Magnesium, Dissolved	ug/L	ND	50.0	04/02/13 09:28	
Potassium, Dissolved	ug/L	ND	500	04/02/13 09:28	
Sodium, Dissolved	ug/L	ND	500	04/02/13 09:28	

LABORATORY CONTROL SAMPLE: 1161005

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9810	98	85-115	
Magnesium, Dissolved	ug/L	10000	9990	100	85-115	
Potassium, Dissolved	ug/L	10000	9550	95	85-115	
Sodium, Dissolved	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1161006 1161007

Parameter	Units	60141237001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	250000	10000	10000	249000	269000	-13	187	70-130	8	9	M1
Magnesium, Dissolved	ug/L	20600	10000	10000	28800	30600	81	99	70-130	6	9	
Potassium, Dissolved	ug/L	5340	10000	10000	14800	15800	94	105	70-130	7	7	
Sodium, Dissolved	ug/L	12400	10000	10000	22200	23800	99	114	70-130	7	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: MPRP/22069 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60141237001, 60141237002, 60141237003

METHOD BLANK: 1161019 Matrix: Water
Associated Lab Samples: 60141237001, 60141237002, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	04/05/13 19:12	
Antimony	ug/L	0.14J	1.0	04/05/13 19:12	
Arsenic	ug/L	ND	1.0	04/05/13 19:12	
Barium	ug/L	0.91J	1.0	04/05/13 19:12	
Beryllium	ug/L	ND	0.50	04/05/13 19:12	
Cadmium	ug/L	0.10J	0.50	04/05/13 19:12	
Chromium	ug/L	ND	1.0	04/05/13 19:12	
Cobalt	ug/L	0.20J	1.0	04/05/13 19:12	
Copper	ug/L	0.24J	1.0	04/05/13 19:12	
Lead	ug/L	0.077J	1.0	04/05/13 19:12	
Manganese	ug/L	0.35J	1.0	04/05/13 19:12	
Molybdenum	ug/L	0.27J	1.0	04/05/13 19:12	
Nickel	ug/L	0.14J	1.0	04/05/13 19:12	
Selenium	ug/L	ND	1.0	04/05/13 19:12	
Silver	ug/L	ND	0.50	04/05/13 19:12	
Thallium	ug/L	ND	1.0	04/05/13 19:12	
Vanadium	ug/L	ND	1.0	04/05/13 19:12	
Zinc	ug/L	ND	10.0	04/05/13 19:12	

LABORATORY CONTROL SAMPLE: 1161020

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	1010	101	85-115	
Antimony	ug/L	40	39.1	98	85-115	
Arsenic	ug/L	40	38.0	95	85-115	
Barium	ug/L	40	38.2	95	85-115	
Beryllium	ug/L	40	36.6	91	85-115	
Cadmium	ug/L	40	39.0	98	85-115	
Chromium	ug/L	40	38.3	96	85-115	
Cobalt	ug/L	40	37.5	94	85-115	
Copper	ug/L	40	37.5	94	85-115	
Lead	ug/L	40	37.4	94	85-115	
Manganese	ug/L	40	39.4	98	85-115	
Molybdenum	ug/L	40	39.7	99	85-115	
Nickel	ug/L	40	37.9	95	85-115	
Selenium	ug/L	40	38.3	96	85-115	
Silver	ug/L	20	19.4	97	85-115	
Thallium	ug/L	40	34.5	86	85-115	
Vanadium	ug/L	40	37.6	94	85-115	
Zinc	ug/L	100	100	100	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1161021 1161022

Parameter	Units	60141237002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	40.5J	1000	1000	960	956	92	92	70-130	0	20	
Antimony	ug/L	0.32J	40	40	38.5	38.2	96	95	70-130	1	20	
Arsenic	ug/L	0.20J	40	40	39.0	38.5	97	96	70-130	1	20	
Barium	ug/L	18.4	40	40	54.6	53.8	90	89	70-130	1	20	
Beryllium	ug/L	0.094J	40	40	31.6	31.7	79	79	70-130	0	20	
Cadmium	ug/L	7.1	40	40	43.5	43.0	91	90	70-130	1	20	
Chromium	ug/L	0.87J	40	40	37.0	36.5	90	89	70-130	1	20	
Cobalt	ug/L	0.68J	40	40	35.7	35.5	88	87	70-130	1	20	
Copper	ug/L	9.9	40	40	43.1	43.1	83	83	70-130	0	20	
Lead	ug/L	1.4	40	40	38.0	38.0	92	91	70-130	0	20	
Manganese	ug/L	338	40	40	369	376	77	94	70-130	2	20	
Molybdenum	ug/L	13.4	40	40	54.4	54.4	103	103	70-130	0	20	
Nickel	ug/L	3.0	40	40	37.1	37.1	85	85	70-130	0	20	
Selenium	ug/L	ND	40	40	39.7	38.6	99	97	70-130	3	20	
Silver	ug/L	ND	20	20	18.0	17.9	90	90	70-130	0	20	
Thallium	ug/L	0.042J	40	40	33.5	33.0	84	82	70-130	2	20	
Vanadium	ug/L	0.28J	40	40	37.1	37.0	92	92	70-130	0	20	
Zinc	ug/L	1310	100	100	1370	1370	62	56	70-130	0	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: MPRP/22067 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60141237001, 60141237002, 60141237003

METHOD BLANK: 1161008 Matrix: Water
Associated Lab Samples: 60141237001, 60141237002, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	04/05/13 18:06	
Antimony, Dissolved	ug/L	0.15J	1.0	04/05/13 18:06	
Arsenic, Dissolved	ug/L	ND	1.0	04/05/13 18:06	
Barium, Dissolved	ug/L	1.2	1.0	04/08/13 15:26	
Beryllium, Dissolved	ug/L	ND	0.50	04/05/13 18:06	
Cadmium, Dissolved	ug/L	0.11J	0.50	04/05/13 18:06	
Chromium, Dissolved	ug/L	0.070J	1.0	04/05/13 18:06	
Cobalt, Dissolved	ug/L	0.21J	1.0	04/05/13 18:06	
Copper, Dissolved	ug/L	0.34J	1.0	04/05/13 18:06	
Iron, Dissolved	ug/L	5.7J	50.0	04/05/13 18:06	
Lead, Dissolved	ug/L	0.12J	1.0	04/05/13 18:06	
Manganese, Dissolved	ug/L	0.22J	1.0	04/05/13 18:06	
Molybdenum, Dissolved	ug/L	0.29J	1.0	04/05/13 18:06	
Nickel, Dissolved	ug/L	0.33J	1.0	04/05/13 18:06	
Selenium, Dissolved	ug/L	ND	1.0	04/05/13 18:06	
Silver, Dissolved	ug/L	ND	0.50	04/05/13 18:06	
Thallium, Dissolved	ug/L	ND	1.0	04/05/13 18:06	
Vanadium, Dissolved	ug/L	0.30J	1.0	04/05/13 18:06	
Zinc, Dissolved	ug/L	ND	10.0	04/05/13 18:06	

LABORATORY CONTROL SAMPLE: 1161009

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	955	95	85-115	
Antimony, Dissolved	ug/L	40	38.5	96	85-115	
Arsenic, Dissolved	ug/L	40	37.0	92	85-115	
Barium, Dissolved	ug/L	40	38.9	97	85-115	
Beryllium, Dissolved	ug/L	40	35.1	88	85-115	
Cadmium, Dissolved	ug/L	40	37.5	94	85-115	
Chromium, Dissolved	ug/L	40	37.6	94	85-115	
Cobalt, Dissolved	ug/L	40	37.1	93	85-115	
Copper, Dissolved	ug/L	40	37.1	93	85-115	
Iron, Dissolved	ug/L	1000	980	98	85-115	
Lead, Dissolved	ug/L	40	36.9	92	85-115	
Manganese, Dissolved	ug/L	40	37.4	93	85-115	
Molybdenum, Dissolved	ug/L	40	39.5	99	85-115	
Nickel, Dissolved	ug/L	40	36.8	92	85-115	
Selenium, Dissolved	ug/L	40	37.4	94	85-115	
Silver, Dissolved	ug/L	20	19.1	96	85-115	
Thallium, Dissolved	ug/L	40	36.8	92	85-115	
Vanadium, Dissolved	ug/L	40	37.2	93	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

LABORATORY CONTROL SAMPLE: 1161009

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	95.8	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1161010 1161011

Parameter	Units	60141237002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	890	889	89	89	70-130	0	20	
Antimony, Dissolved	ug/L	0.31J	40	40	37.6	36.9	93	92	70-130	2	20	
Arsenic, Dissolved	ug/L	ND	40	40	38.3	37.2	96	93	70-130	3	20	
Barium, Dissolved	ug/L	18.3	40	40	52.9	52.6	86	86	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	31.5	31.0	79	77	70-130	2	20	
Cadmium, Dissolved	ug/L	6.7	40	40	42.4	41.6	89	87	70-130	2	20	
Chromium, Dissolved	ug/L	0.71J	40	40	35.7	35.3	87	86	70-130	1	20	
Cobalt, Dissolved	ug/L	0.70J	40	40	35.0	34.3	86	84	70-130	2	20	
Copper, Dissolved	ug/L	6.1	40	40	34.2	32.8	70	67	70-130	4	20	1e,M1
Iron, Dissolved	ug/L	ND	1000	1000	933	922	93	92	70-130	1	20	
Lead, Dissolved	ug/L	0.30J	40	40	35.6	35.2	88	87	70-130	1	20	
Manganese, Dissolved	ug/L	368	40	40	388	399	49	76	70-130	3	20	M1
Molybdenum, Dissolved	ug/L	13.4	40	40	53.2	52.6	99	98	70-130	1	20	
Nickel, Dissolved	ug/L	3.2	40	40	36.7	35.7	84	81	70-130	3	20	
Selenium, Dissolved	ug/L	ND	40	40	39.4	38.3	98	96	70-130	3	20	
Silver, Dissolved	ug/L	ND	20	20	17.6	17.0	88	85	70-130	3	20	
Thallium, Dissolved	ug/L	0.044J	40	40	35.6	34.9	89	87	70-130	2	20	
Vanadium, Dissolved	ug/L	0.23J	40	40	35.8	35.9	89	89	70-130	0	20	
Zinc, Dissolved	ug/L	1260	100	100	1290	1330	31	68	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: WET/40454 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60141237001, 60141237003

METHOD BLANK: 1160640 Matrix: Water
Associated Lab Samples: 60141237001, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	04/02/13 09:13	

LABORATORY CONTROL SAMPLE: 1160641

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	215	109	85-115	

SAMPLE DUPLICATE: 1160642

Parameter	Units	60141245001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	23.7	25.8	9	17	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: WETA/24068 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60141237001, 60141237002, 60141237003

METHOD BLANK: 1162596 Matrix: Water
Associated Lab Samples: 60141237001, 60141237002, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	0.32J	1.0	03/31/13 18:19	

LABORATORY CONTROL SAMPLE: 1162597

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1162598 1162599

Parameter	Units	60141035001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	518	500	500	953	963	87	89	61-119	1	10	

MATRIX SPIKE SAMPLE: 1162600

Parameter	Units	60140386001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	637	500	1070	86	61-119	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

QC Batch: WETA/24104 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60141237001, 60141237003

METHOD BLANK: 1163718 Matrix: Water
Associated Lab Samples: 60141237001, 60141237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.92J	1.0	04/03/13 10:19	

LABORATORY CONTROL SAMPLE: 1163719

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.0	101	80-120	

MATRIX SPIKE SAMPLE: 1163720

Parameter	Units	60141035001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	13.7	5	19.5	117	80-120	

SAMPLE DUPLICATE: 1163721

Parameter	Units	60141035002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	15.6	15.7	1	25	

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	Post Digestion Spike Performed - 82.9% Recovery
B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141237

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60141237001	**ROCK DRAIN IN 130326**	EPA 200.7	MPRP/22068	EPA 200.7	ICP/17611
60141237002	**ROCK DRAIN MP 130326**	EPA 200.7	MPRP/22068	EPA 200.7	ICP/17611
60141237003	**WETLAND OUT 130326**	EPA 200.7	MPRP/22068	EPA 200.7	ICP/17611
60141237001	**ROCK DRAIN IN 130326**	EPA 200.7	MPRP/22066	EPA 200.7	ICP/17610
60141237002	**ROCK DRAIN MP 130326**	EPA 200.7	MPRP/22066	EPA 200.7	ICP/17610
60141237003	**WETLAND OUT 130326**	EPA 200.7	MPRP/22066	EPA 200.7	ICP/17610
60141237001	**ROCK DRAIN IN 130326**	EPA 200.8	MPRP/22069	EPA 200.8	ICPM/2150
60141237002	**ROCK DRAIN MP 130326**	EPA 200.8	MPRP/22069	EPA 200.8	ICPM/2150
60141237003	**WETLAND OUT 130326**	EPA 200.8	MPRP/22069	EPA 200.8	ICPM/2150
60141237001	**ROCK DRAIN IN 130326**	EPA 200.8	MPRP/22067	EPA 200.8	ICPM/2149
60141237002	**ROCK DRAIN MP 130326**	EPA 200.8	MPRP/22067	EPA 200.8	ICPM/2149
60141237003	**WETLAND OUT 130326**	EPA 200.8	MPRP/22067	EPA 200.8	ICPM/2149
60141237001	**ROCK DRAIN IN 130326**	SM 5210B	WET/40454	SM 5210B	WET/40533
60141237003	**WETLAND OUT 130326**	SM 5210B	WET/40454	SM 5210B	WET/40533
60141237001	**ROCK DRAIN IN 130326**	EPA 300.0	WETA/24068		
60141237002	**ROCK DRAIN MP 130326**	EPA 300.0	WETA/24068		
60141237003	**WETLAND OUT 130326**	EPA 300.0	WETA/24068		
60141237001	**ROCK DRAIN IN 130326**	SM 5310C	WETA/24104		
60141237003	**WETLAND OUT 130326**	SM 5310C	WETA/24104		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60141237

60141237

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☑ VIA

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.0

Date and initials of person examining contents: 3/27/13 BA

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, (TOC) O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased): _____		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 2110	Start:
End: 2115	End:
Temp:	Temp:

Project Manager Review: _____ Date: 3/28/13

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program La... Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: 60741237

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage:	4-Execute Activity: Spend	Invoice To:	BP/ARC X Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix:	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)		* RUSH		MS/MSD	HOLD	Comments
	RockDrainIn130326	3/26/13	1030		X	1BP4		5	2	1	2	Ø	1BP3U	1AG3S	X	X	X	X	X		X	1BP3N-5	1BP3E-5		Dissolved metals are field filtered.
	RockDrainMP130326	3/26/13	1140		X			3	1	Ø	2	Ø			X	X	X				X				
	WetlandOut130326	3/26/13	1050		X	↓		5	2	1	2	Ø	↓	↓	X	X	X	X	X		X	↓	↓		Metals are: Ca, K, Na, Mg (E200.7);
																									Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
																									Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
																									* Rush 5-day TAT

Sampler's Name:	Hallie Bevan Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	AMEC	Hallie M.B. Simpson / AMEC	3/26/13	11:45	Ben Loomis / AECI	3/26/13	11:45
Shipment Method:	UPS Ship Date: 3/26/13	Ben Loomis / AECI	3/26/13	1300	Ben Loomis	3/27/13	1825
Shipment Tracking No:	1Z 733 W87 22 1005 8901						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Page 1 of 2

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

April 17, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on April 03, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60141680001	**ROCK DRAIN IN 130401**	Water	04/01/13 12:45	04/03/13 10:15
60141680002	**ROCK DRAIN MP 130401**	Water	04/01/13 12:15	04/03/13 10:15
60141680003	**WETLAND OUT130401**	Water	04/01/13 13:30	04/03/13 10:15

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60141680001	**ROCK DRAIN IN 130401**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	SMW	19
		EPA 200.8	SMW	19
		EPA 300.0	OL	1
		SM 5310C	JML	1
60141680002	**ROCK DRAIN MP 130401**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	SMW	19
		EPA 200.8	SMW	19
		EPA 300.0	OL	1
60141680003	**WETLAND OUT130401**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	SMW	19
		EPA 200.8	SMW	19
		EPA 300.0	OL	1
		SM 5310C	JML	1

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: April 17, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22173

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141680001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1164796)
  - Calcium
- MSD (Lab ID: 1164797)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: April 17, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22171

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141680001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1164788)
  - Calcium, Dissolved
- MSD (Lab ID: 1164789)
  - Calcium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: April 17, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22174

B: Analyte was detected in the associated method blank.

- BLANK for HBN 285590 [MPRP/221 (Lab ID: 1164798)
  - Copper
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22174

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141680002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1164800)
  - Zinc
- MSD (Lab ID: 1164801)
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: April 17, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22172

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60141680002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1164792)
  - Lead, Dissolved
  - Zinc, Dissolved
- MSD (Lab ID: 1164793)
  - Zinc, Dissolved

R1: RPD value was outside control limits.

- MSD (Lab ID: 1164793)
  - Lead, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: April 17, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: April 17, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: WETA/24275

B: Analyte was detected in the associated method blank.
- BLANK for HBN 287028 [WETA/242 (Lab ID: 1170690)
  - Total Organic Carbon

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: ROCK DRAIN IN 130401 **Lab ID: 60141680001** Collected: 04/01/13 12:45 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**261000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 12:01	7440-70-2	M1
Magnesium	**23400**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 12:01	7439-95-4	
Potassium	**5600**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 12:01	7440-09-7	
Sodium	**12800**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 12:01	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**245000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 11:28	7440-70-2	M1
Magnesium, Dissolved	**21600**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 11:28	7439-95-4	
Potassium, Dissolved	**5210**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 11:28	7440-09-7	
Sodium, Dissolved	**12000**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 11:28	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**126**	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 16:54	7429-90-5	
Antimony	**0.22J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 16:54	7440-36-0	
Arsenic	**0.36J**	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 16:54	7440-38-2	
Barium	**19.9**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 16:54	7440-39-3	
Beryllium	**0.18J**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 16:54	7440-41-7	
Cadmium	**11.0**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 16:54	7440-43-9	
Chromium	**0.40J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 16:54	7440-47-3	
Cobalt	**2.1**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 16:54	7440-48-4	
Copper	**23.5**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 16:54	7440-50-8	
Iron	**1590**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 16:54	7439-89-6	
Lead	**3.2**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 16:54	7439-92-1	
Manganese	**1500**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 16:54	7439-96-5	
Molybdenum	**15.5**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 16:54	7439-98-7	
Nickel	**3.6**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 16:54	7440-02-0	
Selenium	**0.16J**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 16:54	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 16:54	7440-22-4	
Thallium	**0.12J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 16:54	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 16:54	7440-62-2	
Zinc	**1920**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 16:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.4J**	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 17:36	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:36	7440-36-0	
Arsenic, Dissolved	**0.053J**	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 17:36	7440-38-2	
Barium, Dissolved	**19.8**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:36	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:36	7440-41-7	
Cadmium, Dissolved	**9.6**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:36	7440-43-9	
Chromium, Dissolved	**0.38J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:36	7440-47-3	
Cobalt, Dissolved	**2.1**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:36	7440-48-4	
Copper, Dissolved	**1.7**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:36	7440-50-8	
Iron, Dissolved	**9.0J**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 17:36	7439-89-6	
Lead, Dissolved	**0.043J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:36	7439-92-1	
Manganese, Dissolved	**1510**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:36	7439-96-5	D9
Molybdenum, Dissolved	**15.3**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:36	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: ROCK DRAIN IN 130401 **Lab ID: 60141680001** Collected: 04/01/13 12:45 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.6**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:36	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:36	7782-49-2	
Silver, Dissolved	**0.027J**	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 17:36	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 17:36	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 17:36	7440-62-2	
Zinc, Dissolved	**1620**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 17:36	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**599**	mg/L	100	5.9	100		04/13/13 19:27	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.4**	mg/L	1.0	0.12	1		04/17/13 11:33	7440-44-0	B

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: ROCK DRAIN MP 130401 **Lab ID: 60141680002** Collected: 04/01/13 12:15 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**274000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 12:09	7440-70-2	
Magnesium	**23000**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 12:09	7439-95-4	
Potassium	**6320**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 12:09	7440-09-7	
Sodium	**13400**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 12:09	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**261000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 11:36	7440-70-2	
Magnesium, Dissolved	**21700**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 11:36	7439-95-4	
Potassium, Dissolved	**6070**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 11:36	7440-09-7	
Sodium, Dissolved	**13000**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 11:36	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**38.9J**	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 16:59	7429-90-5	
Antimony	**0.20J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 16:59	7440-36-0	
Arsenic	**0.051J**	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 16:59	7440-38-2	
Barium	**19.2**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 16:59	7440-39-3	
Beryllium	**0.054J**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 16:59	7440-41-7	
Cadmium	**5.6**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 16:59	7440-43-9	
Chromium	**0.48J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 16:59	7440-47-3	
Cobalt	**0.15J**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 16:59	7440-48-4	
Copper	**5.8**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 16:59	7440-50-8	
Iron	**398**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 16:59	7439-89-6	
Lead	**0.90J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 16:59	7439-92-1	
Manganese	**105**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 16:59	7439-96-5	
Molybdenum	**13.9**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 16:59	7439-98-7	
Nickel	**2.2**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 16:59	7440-02-0	
Selenium	**0.17J**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 16:59	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 16:59	7440-22-4	
Thallium	**0.053J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 16:59	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 16:59	7440-62-2	
Zinc	**912**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 16:59	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 17:40	7429-90-5	
Antimony, Dissolved	**0.20J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:40	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 17:40	7440-38-2	
Barium, Dissolved	**19.1**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:40	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:40	7440-41-7	
Cadmium, Dissolved	**5.3**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:40	7440-43-9	
Chromium, Dissolved	**0.29J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:40	7440-47-3	
Cobalt, Dissolved	**0.17J**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:40	7440-48-4	
Copper, Dissolved	**0.80J**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:40	7440-50-8	
Iron, Dissolved	**5.8J**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 17:40	7439-89-6	
Lead, Dissolved	**0.35J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:40	7439-92-1	M1,R1
Manganese, Dissolved	**100**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:40	7439-96-5	
Molybdenum, Dissolved	**14.2**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:40	7439-98-7	D9

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: ROCK DRAIN MP 130401 **Lab ID: 60141680002** Collected: 04/01/13 12:15 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.1**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:40	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:40	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 17:40	7440-22-4	
Thallium, Dissolved	**0.054J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 17:40	7440-28-0	
Vanadium, Dissolved	**0.13J**	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 17:40	7440-62-2	
Zinc, Dissolved	**854**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 17:40	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**609**	mg/L	100	5.9	100		04/13/13 20:20	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: WETLAND OUT130401 **Lab ID: 60141680003** Collected: 04/01/13 13:30 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**275000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 12:11	7440-70-2	
Magnesium	**21200**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 12:11	7439-95-4	
Potassium	**6800**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 12:11	7440-09-7	
Sodium	**12600**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 12:11	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**272000**	ug/L	100	10.4	1	04/04/13 14:00	04/15/13 11:38	7440-70-2	
Magnesium, Dissolved	**21000**	ug/L	50.0	6.5	1	04/04/13 14:00	04/15/13 11:38	7439-95-4	
Potassium, Dissolved	**6720**	ug/L	500	44.4	1	04/04/13 14:00	04/15/13 11:38	7440-09-7	
Sodium, Dissolved	**12700**	ug/L	500	21.7	1	04/04/13 14:00	04/15/13 11:38	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**13.3J**	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 17:15	7429-90-5	
Antimony	**0.16J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:15	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 17:15	7440-38-2	
Barium	**82.0**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:15	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:15	7440-41-7	
Cadmium	**0.75**	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:15	7440-43-9	
Chromium	**1.3**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:15	7440-47-3	
Cobalt	**0.13J**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:15	7440-48-4	
Copper	**0.44J**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:15	7440-50-8	B
Iron	**53.4**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 17:15	7439-89-6	
Lead	**0.16J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:15	7439-92-1	B
Manganese	**668**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:15	7439-96-5	
Molybdenum	**0.46J**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:15	7439-98-7	
Nickel	**0.85J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:15	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:15	7782-49-2	
Silver	**0.031J**	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 17:15	7440-22-4	
Thallium	**0.066J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 17:15	7440-28-0	
Vanadium	**0.35J**	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 17:15	7440-62-2	
Zinc	**174**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 17:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.7J**	ug/L	50.0	6.4	1	04/04/13 14:00	04/10/13 17:57	7429-90-5	
Antimony, Dissolved	**0.13J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:57	7440-36-0	
Arsenic, Dissolved	**0.47J**	ug/L	1.0	0.050	1	04/04/13 14:00	04/10/13 17:57	7440-38-2	
Barium, Dissolved	**80.9**	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:57	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:57	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	04/04/13 14:00	04/10/13 17:57	7440-43-9	
Chromium, Dissolved	**0.39J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:57	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	04/04/13 14:00	04/10/13 17:57	7440-48-4	
Copper, Dissolved	**0.28J**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:57	7440-50-8	
Iron, Dissolved	**17.6J**	ug/L	50.0	3.0	1	04/04/13 14:00	04/10/13 17:57	7439-89-6	
Lead, Dissolved	**0.075J**	ug/L	1.0	0.030	1	04/04/13 14:00	04/10/13 17:57	7439-92-1	
Manganese, Dissolved	**660**	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:57	7439-96-5	
Molybdenum, Dissolved	**0.31J**	ug/L	1.0	0.12	1	04/04/13 14:00	04/10/13 17:57	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Sample: WETLAND OUT130401 **Lab ID: 60141680003** Collected: 04/01/13 13:30 Received: 04/03/13 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.28J**	ug/L	1.0	0.070	1	04/04/13 14:00	04/10/13 17:57	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/04/13 14:00	04/10/13 17:57	7782-49-2	
Silver, Dissolved	**0.034J**	ug/L	0.50	0.010	1	04/04/13 14:00	04/10/13 17:57	7440-22-4	
Thallium, Dissolved	**0.063J**	ug/L	1.0	0.020	1	04/04/13 14:00	04/10/13 17:57	7440-28-0	
Vanadium, Dissolved	**0.32J**	ug/L	1.0	0.11	1	04/04/13 14:00	04/10/13 17:57	7440-62-2	
Zinc, Dissolved	**1.6J**	ug/L	10.0	1.0	1	04/04/13 14:00	04/10/13 17:57	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**543**	mg/L	100	5.9	100		04/13/13 20:38	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**14.6**	mg/L	1.0	0.12	1		04/17/13 11:26	7440-44-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: MPRP/22173 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60141680001, 60141680002, 60141680003

METHOD BLANK: 1164794 Matrix: Water
Associated Lab Samples: 60141680001, 60141680002, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	04/15/13 12:00	
Magnesium	ug/L	ND	50.0	04/15/13 12:00	
Potassium	ug/L	ND	500	04/15/13 12:00	
Sodium	ug/L	55.8J	500	04/15/13 12:00	

LABORATORY CONTROL SAMPLE: 1164795

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10200	102	85-115	
Magnesium	ug/L	10000	10300	103	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1164796 1164797

Parameter	Units	60141680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	261000	10000	10000	280000	264000	189	37	70-130	6	9	M1
Magnesium	ug/L	23400	10000	10000	34100	31800	106	84	70-130	7	9	
Potassium	ug/L	5600	10000	10000	16500	15600	109	100	70-130	6	7	
Sodium	ug/L	12800	10000	10000	23900	22600	111	98	70-130	5	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: MPRP/22171 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60141680001, 60141680002, 60141680003

METHOD BLANK: 1164786 Matrix: Water
Associated Lab Samples: 60141680001, 60141680002, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	04/15/13 11:25	
Magnesium, Dissolved	ug/L	ND	50.0	04/15/13 11:25	
Potassium, Dissolved	ug/L	ND	500	04/15/13 11:25	
Sodium, Dissolved	ug/L	43.9J	500	04/15/13 11:25	

LABORATORY CONTROL SAMPLE: 1164787

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9480	95	85-115	
Magnesium, Dissolved	ug/L	10000	9770	98	85-115	
Potassium, Dissolved	ug/L	10000	9280	93	85-115	
Sodium, Dissolved	ug/L	10000	9740	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1164788 1164789

Parameter	Units	60141680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	245000	10000	10000	251000	264000	59	194	70-130	5	9	M1
Magnesium, Dissolved	ug/L	21600	10000	10000	30500	31600	89	100	70-130	4	9	
Potassium, Dissolved	ug/L	5210	10000	10000	15200	16000	100	108	70-130	5	7	
Sodium, Dissolved	ug/L	12000	10000	10000	22000	23100	99	111	70-130	5	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: MPRP/22174 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60141680001, 60141680002, 60141680003

METHOD BLANK: 1164798 Matrix: Water
Associated Lab Samples: 60141680001, 60141680002, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	04/10/13 16:46	
Antimony	ug/L	ND	1.0	04/10/13 16:46	
Arsenic	ug/L	ND	1.0	04/10/13 16:46	
Barium	ug/L	0.45J	1.0	04/10/13 16:46	
Beryllium	ug/L	ND	0.50	04/10/13 16:46	
Cadmium	ug/L	ND	0.50	04/10/13 16:46	
Chromium	ug/L	ND	1.0	04/10/13 16:46	
Cobalt	ug/L	ND	1.0	04/10/13 16:46	
Copper	ug/L	0.39J	1.0	04/10/13 16:46	
Iron	ug/L	ND	50.0	04/10/13 16:46	
Lead	ug/L	0.062J	1.0	04/10/13 16:46	
Manganese	ug/L	ND	1.0	04/10/13 16:46	
Molybdenum	ug/L	ND	1.0	04/10/13 16:46	
Nickel	ug/L	ND	1.0	04/10/13 16:46	
Selenium	ug/L	ND	1.0	04/10/13 16:46	
Silver	ug/L	ND	0.50	04/10/13 16:46	
Thallium	ug/L	ND	1.0	04/10/13 16:46	
Vanadium	ug/L	ND	1.0	04/10/13 16:46	
Zinc	ug/L	ND	10.0	04/10/13 16:46	

LABORATORY CONTROL SAMPLE: 1164799

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	969	97	85-115	
Antimony	ug/L	40	38.7	97	85-115	
Arsenic	ug/L	40	38.2	95	85-115	
Barium	ug/L	40	37.1	93	85-115	
Beryllium	ug/L	40	37.3	93	85-115	
Cadmium	ug/L	40	37.5	94	85-115	
Chromium	ug/L	40	37.3	93	85-115	
Cobalt	ug/L	40	36.9	92	85-115	
Copper	ug/L	40	37.2	93	85-115	
Iron	ug/L	1000	976	98	85-115	
Lead	ug/L	40	36.8	92	85-115	
Manganese	ug/L	40	37.2	93	85-115	
Molybdenum	ug/L	40	38.7	97	85-115	
Nickel	ug/L	40	36.9	92	85-115	
Selenium	ug/L	40	38.6	97	85-115	
Silver	ug/L	20	18.9	94	85-115	
Thallium	ug/L	40	34.3	86	85-115	
Vanadium	ug/L	40	37.1	93	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

LABORATORY CONTROL SAMPLE: 1164799

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	99.2	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1164800 1164801

Parameter	Units	60141680002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	38.9J	1000	1000	981	962	94	92	70-130	2	20	
Antimony	ug/L	0.20J	40	40	38.7	39.0	96	97	70-130	1	20	
Arsenic	ug/L	0.051J	40	40	38.8	39.3	97	98	70-130	1	20	
Barium	ug/L	19.2	40	40	55.0	54.8	89	89	70-130	0	20	
Beryllium	ug/L	0.054J	40	40	34.6	35.0	86	87	70-130	1	20	
Cadmium	ug/L	5.6	40	40	41.8	42.0	91	91	70-130	0	20	
Chromium	ug/L	0.48J	40	40	36.8	36.8	91	91	70-130	0	20	
Cobalt	ug/L	0.15J	40	40	35.2	35.5	88	88	70-130	1	20	
Copper	ug/L	5.8	40	40	39.4	39.4	84	84	70-130	0	20	
Iron	ug/L	398	1000	1000	1340	1320	95	92	70-130	2	20	
Lead	ug/L	0.90J	40	40	38.2	38.1	93	93	70-130	0	20	
Manganese	ug/L	105	40	40	140	137	87	80	70-130	2	20	
Molybdenum	ug/L	13.9	40	40	53.7	53.3	100	98	70-130	1	20	
Nickel	ug/L	2.2	40	40	36.7	36.6	86	86	70-130	0	20	
Selenium	ug/L	0.17J	40	40	38.5	39.7	96	99	70-130	3	20	
Silver	ug/L	ND	20	20	17.7	17.8	88	89	70-130	0	20	
Thallium	ug/L	0.053J	40	40	35.2	35.3	88	88	70-130	0	20	
Vanadium	ug/L	ND	40	40	38.0	37.8	95	94	70-130	1	20	
Zinc	ug/L	912	100	100	968	954	55	42	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: MPRP/22172 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60141680001, 60141680002, 60141680003

METHOD BLANK: 1164790 Matrix: Water
Associated Lab Samples: 60141680001, 60141680002, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	04/10/13 17:28	
Antimony, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Arsenic, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Barium, Dissolved	ug/L	0.31J	1.0	04/10/13 17:28	
Beryllium, Dissolved	ug/L	ND	0.50	04/10/13 17:28	
Cadmium, Dissolved	ug/L	ND	0.50	04/10/13 17:28	
Chromium, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Cobalt, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Copper, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Iron, Dissolved	ug/L	ND	50.0	04/10/13 17:28	
Lead, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Manganese, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Molybdenum, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Nickel, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Selenium, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Silver, Dissolved	ug/L	ND	0.50	04/10/13 17:28	
Thallium, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Vanadium, Dissolved	ug/L	ND	1.0	04/10/13 17:28	
Zinc, Dissolved	ug/L	ND	10.0	04/10/13 17:28	

LABORATORY CONTROL SAMPLE: 1164791

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	986	99	85-115	
Antimony, Dissolved	ug/L	40	39.6	99	85-115	
Arsenic, Dissolved	ug/L	40	38.1	95	85-115	
Barium, Dissolved	ug/L	40	38.0	95	85-115	
Beryllium, Dissolved	ug/L	40	38.9	97	85-115	
Cadmium, Dissolved	ug/L	40	37.9	95	85-115	
Chromium, Dissolved	ug/L	40	37.8	94	85-115	
Cobalt, Dissolved	ug/L	40	36.8	92	85-115	
Copper, Dissolved	ug/L	40	37.3	93	85-115	
Iron, Dissolved	ug/L	1000	991	99	85-115	
Lead, Dissolved	ug/L	40	37.6	94	85-115	
Manganese, Dissolved	ug/L	40	37.8	95	85-115	
Molybdenum, Dissolved	ug/L	40	39.0	98	85-115	
Nickel, Dissolved	ug/L	40	36.9	92	85-115	
Selenium, Dissolved	ug/L	40	39.0	98	85-115	
Silver, Dissolved	ug/L	20	19.0	95	85-115	
Thallium, Dissolved	ug/L	40	34.9	87	85-115	
Vanadium, Dissolved	ug/L	40	37.7	94	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

LABORATORY CONTROL SAMPLE: 1164791

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	98.1	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1164792 1164793

Parameter	Units	60141680002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	938	935	93	93	70-130	0	20	
Antimony, Dissolved	ug/L	0.20J	40	40	39.0	39.5	97	98	70-130	1	20	
Arsenic, Dissolved	ug/L	ND	40	40	39.1	39.0	98	98	70-130	0	20	
Barium, Dissolved	ug/L	19.1	40	40	55.0	55.2	90	90	70-130	0	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.2	36.1	88	90	70-130	3	20	
Cadmium, Dissolved	ug/L	5.3	40	40	41.7	41.8	91	91	70-130	0	20	
Chromium, Dissolved	ug/L	0.29J	40	40	36.1	36.5	90	90	70-130	1	20	
Cobalt, Dissolved	ug/L	0.17J	40	40	35.4	35.2	88	88	70-130	1	20	
Copper, Dissolved	ug/L	0.80J	40	40	34.5	34.4	84	84	70-130	0	20	
Iron, Dissolved	ug/L	5.8J	1000	1000	951	952	95	95	70-130	0	20	
Lead, Dissolved	ug/L	0.35J	40	40	54.5	37.5	135	93	70-130	37	20	M1,R1
Manganese, Dissolved	ug/L	100	40	40	133	132	82	78	70-130	1	20	
Molybdenum, Dissolved	ug/L	14.2	40	40	52.8	53.6	97	98	70-130	1	20	
Nickel, Dissolved	ug/L	2.1	40	40	36.4	36.0	86	85	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	39.8	40.5	99	101	70-130	2	20	
Silver, Dissolved	ug/L	ND	20	20	17.7	17.9	88	90	70-130	1	20	
Thallium, Dissolved	ug/L	0.054J	40	40	35.3	35.4	88	88	70-130	0	20	
Vanadium, Dissolved	ug/L	0.13J	40	40	37.9	37.6	94	94	70-130	1	20	
Zinc, Dissolved	ug/L	854	100	100	904	894	50	40	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: WETA/24230 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60141680001, 60141680002, 60141680003

METHOD BLANK: 1169562 Matrix: Water
Associated Lab Samples: 60141680001, 60141680002, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	04/13/13 17:59	

LABORATORY CONTROL SAMPLE: 1169563

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.7	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1169564 1169565

Parameter	Units	60141680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	599	500	500	995	936	79	68	61-119	6	10	

MATRIX SPIKE SAMPLE: 1169566

Parameter	Units	60142180001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	32.9	10	42.0	91	61-119	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

QC Batch: WETA/24275 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60141680001, 60141680003

METHOD BLANK: 1170690 Matrix: Water
Associated Lab Samples: 60141680001, 60141680003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.30J	1.0	04/17/13 08:57	

LABORATORY CONTROL SAMPLE: 1170691

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.6	112	80-120	

MATRIX SPIKE SAMPLE: 1170692

Parameter	Units	60141848003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	10.8	5	16.4	111	80-120	

SAMPLE DUPLICATE: 1170693

Parameter	Units	60141848004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	3.1	2.9	7	25	

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60141680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60141680001	**ROCK DRAIN IN 130401**	EPA 200.7	MPRP/22173	EPA 200.7	ICP/17681
60141680002	**ROCK DRAIN MP 130401**	EPA 200.7	MPRP/22173	EPA 200.7	ICP/17681
60141680003	**WETLAND OUT130401**	EPA 200.7	MPRP/22173	EPA 200.7	ICP/17681
60141680001	**ROCK DRAIN IN 130401**	EPA 200.7	MPRP/22171	EPA 200.7	ICP/17680
60141680002	**ROCK DRAIN MP 130401**	EPA 200.7	MPRP/22171	EPA 200.7	ICP/17680
60141680003	**WETLAND OUT130401**	EPA 200.7	MPRP/22171	EPA 200.7	ICP/17680
60141680001	**ROCK DRAIN IN 130401**	EPA 200.8	MPRP/22174	EPA 200.8	ICPM/2163
60141680002	**ROCK DRAIN MP 130401**	EPA 200.8	MPRP/22174	EPA 200.8	ICPM/2163
60141680003	**WETLAND OUT130401**	EPA 200.8	MPRP/22174	EPA 200.8	ICPM/2163
60141680001	**ROCK DRAIN IN 130401**	EPA 200.8	MPRP/22172	EPA 200.8	ICPM/2162
60141680002	**ROCK DRAIN MP 130401**	EPA 200.8	MPRP/22172	EPA 200.8	ICPM/2162
60141680003	**WETLAND OUT130401**	EPA 200.8	MPRP/22172	EPA 200.8	ICPM/2162
60141680001	**ROCK DRAIN IN 130401**	EPA 300.0	WETA/24230		
60141680002	**ROCK DRAIN MP 130401**	EPA 300.0	WETA/24230		
60141680003	**WETLAND OUT130401**	EPA 300.0	WETA/24230		
60141680001	**ROCK DRAIN IN 130401**	SM 5310C	WETA/24275		
60141680003	**WETLAND OUT130401**	SM 5310C	WETA/24275		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60141680

60141680

Client Name: BP AMEC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 6298 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZIP C

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 4.2

Date and initials of person examining contents: JV 4-3-13

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12. JV 4-3-13
Sample labels match COC:	☐Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: Lynda Lombardi Date/Time: 4/3/13

Comments/ Resolution: Email- 10 day or 5 day TAT? 4/3/13 dmw

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 1145	Start:
End: 1120	End:
Temp:	Temp:

Project Manager Review: dmw Date: 4/3/13

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program La... Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
BP/ARC Facility No:
Lab Work Order Number: 60141680

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level
Standard X
Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor		Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	ROCK DRAIN IN 130401	4/1/13	1245		X			4	1	1	2	1AG3S			X	X	X	X	1BP2U	1BP3N	1.5	1BP3F	1.5		Dissolved metals are field filtered. W1
	ROCK DRAIN MP 130401	4/1/13	1215		X			3	1	Ø	2				X	X	X		1BP3U	↓		↓			W2
	WETLAND OUT 130401	4/1/13	1330		X			4	1	1	2		↓		X	X	X	X		↓		↓		↓	Metals are: Ca, K, Na, Mg (E200.7); W3
																									Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
																									Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

Matrix / No. Containers / Preservative / Requested Analyses

4/1/13

Sampler's Name: ABBY CAZIER
Sampler's Company: AMEC
Shipment Method: UPS Ship Date: 4/1/13
Shipment Tracking No: 1Z 733W87 22 100X 6298

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / AMEC	4/1/13	1400	[signature]	4/1/13	1400
[signature]	4/2/13		[signature]	4/3/13	1015

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4-2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
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(913)599-5665

April 19, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on April 12, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield for
Heather Wilson
heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60142364001	**ROCKDRAININ 130411**	Water	04/11/13 10:35	04/12/13 10:30
60142364002	**ROCKDRAINMP 130411**	Water	04/11/13 12:08	04/12/13 10:30
60142364003	**WETLANDOUT 130411**	Water	04/11/13 12:35	04/12/13 10:30

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SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60142364001	**ROCKDRAININ 130411**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		SM 5310C	JML	1
60142364002	**ROCKDRAINMP 130411**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		EPA 300.0	OL	1
60142364003	**WETLANDOUT 130411**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		SM 5310C	JML	1

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: April 19, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22279

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60142364001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1170282)
  - Calcium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: April 19, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22281

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60142364001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1170290)
  - Calcium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: April 19, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22284

B: Analyte was detected in the associated method blank.

- BLANK for HBN 286894 [MPRP/222 (Lab ID: 1170302)
  - Copper
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: April 19, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22283

B: Analyte was detected in the associated method blank.

- BLANK for HBN 286893 [MPRP/222 (Lab ID: 1170298)
  - Iron, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22283

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60142364002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1170301)
  - Zinc, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: April 19, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: April 19, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: April 19, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: ROCKDRAININ 130411 **Lab ID: 60142364001** Collected: 04/11/13 10:35 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**238000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 11:30	7440-70-2	M1
Magnesium	**20700**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 11:30	7439-95-4	
Potassium	**5050**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 11:30	7440-09-7	
Sodium	**11500**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 11:30	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**248000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 10:49	7440-70-2	D9,M1
Magnesium, Dissolved	**21100**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 10:49	7439-95-4	D9
Potassium, Dissolved	**5220**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 10:49	7440-09-7	D9
Sodium, Dissolved	**12000**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 10:49	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**202**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 14:39	7429-90-5	
Antimony	**0.21J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:39	7440-36-0	
Arsenic	**0.49J**	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 14:39	7440-38-2	
Barium	**20.6**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:39	7440-39-3	
Beryllium	**0.28J**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:39	7440-41-7	
Cadmium	**15.0**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:39	7440-43-9	
Chromium	**0.48J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:39	7440-47-3	
Cobalt	**2.2**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:39	7440-48-4	
Copper	**36.2**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:39	7440-50-8	
Iron	**2580**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 14:39	7439-89-6	
Lead	**5.1**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:39	7439-92-1	
Manganese	**1650**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:39	7439-96-5	
Molybdenum	**14.9**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:39	7439-98-7	
Nickel	**3.9**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:39	7440-02-0	
Selenium	**0.16J**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:39	7782-49-2	
Silver	**0.030J**	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 14:39	7440-22-4	
Thallium	**0.11J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 14:39	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 14:39	7440-62-2	
Zinc	**2900**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 14:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**6.8J**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 15:20	7429-90-5	
Antimony, Dissolved	**0.19J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:20	7440-36-0	
Arsenic, Dissolved	**0.080J**	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 15:20	7440-38-2	
Barium, Dissolved	**20.5**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:20	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:20	7440-41-7	
Cadmium, Dissolved	**13.0**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:20	7440-43-9	
Chromium, Dissolved	**0.47J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:20	7440-47-3	
Cobalt, Dissolved	**2.2**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:20	7440-48-4	
Copper, Dissolved	**1.6**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:20	7440-50-8	
Iron, Dissolved	**7.0J**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 15:20	7439-89-6	B
Lead, Dissolved	**0.073J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:20	7439-92-1	
Manganese, Dissolved	**1660**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:20	7439-96-5	D9
Molybdenum, Dissolved	**14.9**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:20	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: ROCKDRAININ 130411 **Lab ID: 60142364001** Collected: 04/11/13 10:35 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.8**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:20	7440-02-0	
Selenium, Dissolved	**0.15J**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:20	7782-49-2	
Silver, Dissolved	**0.027J**	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 15:20	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 15:20	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 15:20	7440-62-2	
Zinc, Dissolved	**2450**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 15:20	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	04/12/13 16:56	04/17/13 17:22		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**610**	mg/L	100	5.9	100		04/15/13 10:03	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.1**	mg/L	1.0	0.12	1		04/18/13 19:30	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: ROCKDRAINMP 130411 **Lab ID: 60142364002** Collected: 04/11/13 12:08 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**252000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 11:37	7440-70-2	
Magnesium	**21700**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 11:37	7439-95-4	
Potassium	**5500**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 11:37	7440-09-7	
Sodium	**12500**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 11:37	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**251000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 10:57	7440-70-2	
Magnesium, Dissolved	**22200**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 10:57	7439-95-4	D9
Potassium, Dissolved	**5360**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 10:57	7440-09-7	
Sodium, Dissolved	**12200**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 10:57	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**66.3**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 14:43	7429-90-5	
Antimony	**0.18J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:43	7440-36-0	
Arsenic	**0.19J**	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 14:43	7440-38-2	
Barium	**19.1**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:43	7440-39-3	
Beryllium	**0.095J**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:43	7440-41-7	
Cadmium	**9.3**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:43	7440-43-9	
Chromium	**0.84J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:43	7440-47-3	
Cobalt	**0.36J**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:43	7440-48-4	
Copper	**11.8**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:43	7440-50-8	
Iron	**872**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 14:43	7439-89-6	
Lead	**1.7**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:43	7439-92-1	
Manganese	**258**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:43	7439-96-5	
Molybdenum	**12.8**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:43	7439-98-7	
Nickel	**3.1**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:43	7440-02-0	
Selenium	**0.17J**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:43	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 14:43	7440-22-4	
Thallium	**0.043J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 14:43	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 14:43	7440-62-2	
Zinc	**1690**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 14:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.3J**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 15:24	7429-90-5	
Antimony, Dissolved	**0.17J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:24	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 15:24	7440-38-2	
Barium, Dissolved	**18.7**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:24	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:24	7440-41-7	
Cadmium, Dissolved	**8.3**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:24	7440-43-9	
Chromium, Dissolved	**0.51J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:24	7440-47-3	
Cobalt, Dissolved	**0.34J**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:24	7440-48-4	
Copper, Dissolved	**1.2**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:24	7440-50-8	
Iron, Dissolved	**9.9J**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 15:24	7439-89-6	B
Lead, Dissolved	**0.042J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:24	7439-92-1	
Manganese, Dissolved	**248**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:24	7439-96-5	
Molybdenum, Dissolved	**12.4**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:24	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: ROCKDRAINMP 130411 **Lab ID: 60142364002** Collected: 04/11/13 12:08 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.9**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:24	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:24	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 15:24	7440-22-4	
Thallium, Dissolved	**0.042J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 15:24	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 15:24	7440-62-2	
Zinc, Dissolved	**1480**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 15:24	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**75.1**	mg/L	10.0	1.8	10		04/13/13 23:55	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: WETLANDOUT 130411 **Lab ID: 60142364003** Collected: 04/11/13 12:35 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**248000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 11:39	7440-70-2	
Magnesium	**22200**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 11:39	7439-95-4	
Potassium	**6040**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 11:39	7440-09-7	
Sodium	**11900**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 11:39	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**262000**	ug/L	100	10.4	1	04/15/13 15:15	04/18/13 10:59	7440-70-2	D9
Magnesium, Dissolved	**24000**	ug/L	50.0	6.5	1	04/15/13 15:15	04/18/13 10:59	7439-95-4	D9
Potassium, Dissolved	**6150**	ug/L	500	44.4	1	04/15/13 15:15	04/18/13 10:59	7440-09-7	D9
Sodium, Dissolved	**12200**	ug/L	500	21.7	1	04/15/13 15:15	04/18/13 10:59	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**14.0J**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 14:59	7429-90-5	
Antimony	**0.12J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:59	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 14:59	7440-38-2	
Barium	**77.4**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:59	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:59	7440-41-7	
Cadmium	**0.95**	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 14:59	7440-43-9	
Chromium	**0.37J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:59	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 14:59	7440-48-4	
Copper	**0.50J**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:59	7440-50-8	B
Iron	**45.8J**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 14:59	7439-89-6	
Lead	**0.11J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 14:59	7439-92-1	B
Manganese	**627**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:59	7439-96-5	
Molybdenum	**0.45J**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 14:59	7439-98-7	
Nickel	**0.18J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 14:59	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 14:59	7782-49-2	
Silver	**0.026J**	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 14:59	7440-22-4	
Thallium	**0.059J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 14:59	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 14:59	7440-62-2	
Zinc	**226**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 14:59	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.2J**	ug/L	50.0	6.4	1	04/15/13 15:15	04/18/13 15:41	7429-90-5	
Antimony, Dissolved	**0.078J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:41	7440-36-0	
Arsenic, Dissolved	**0.42J**	ug/L	1.0	0.050	1	04/15/13 15:15	04/18/13 15:41	7440-38-2	
Barium, Dissolved	**77.4**	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:41	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:41	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	04/15/13 15:15	04/18/13 15:41	7440-43-9	
Chromium, Dissolved	**0.46J**	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:41	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	04/15/13 15:15	04/18/13 15:41	7440-48-4	
Copper, Dissolved	**0.16J**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:41	7440-50-8	
Iron, Dissolved	**15.1J**	ug/L	50.0	3.0	1	04/15/13 15:15	04/18/13 15:41	7439-89-6	B
Lead, Dissolved	**0.033J**	ug/L	1.0	0.030	1	04/15/13 15:15	04/18/13 15:41	7439-92-1	
Manganese, Dissolved	**632**	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:41	7439-96-5	D9
Molybdenum, Dissolved	**0.33J**	ug/L	1.0	0.12	1	04/15/13 15:15	04/18/13 15:41	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Sample: WETLANDOUT 130411 **Lab ID: 60142364003** Collected: 04/11/13 12:35 Received: 04/12/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	04/15/13 15:15	04/18/13 15:41	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/15/13 15:15	04/18/13 15:41	7782-49-2	
Silver, Dissolved	**0.021J**	ug/L	0.50	0.010	1	04/15/13 15:15	04/18/13 15:41	7440-22-4	
Thallium, Dissolved	**0.057J**	ug/L	1.0	0.020	1	04/15/13 15:15	04/18/13 15:41	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/15/13 15:15	04/18/13 15:41	7440-62-2	
Zinc, Dissolved	**1.2J**	ug/L	10.0	1.0	1	04/15/13 15:15	04/18/13 15:41	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**54.9**	mg/L	2.0	2.0	1	04/13/13 10:06	04/18/13 14:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**681**	mg/L	50.0	3.0	50		04/15/13 10:21	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**13.3**	mg/L	2.0	0.24	2		04/18/13 19:47	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: MPRP/22279 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60142364001, 60142364002, 60142364003

METHOD BLANK: 1170280 Matrix: Water
Associated Lab Samples: 60142364001, 60142364002, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	04/18/13 11:26	
Magnesium	ug/L	ND	50.0	04/18/13 11:26	
Potassium	ug/L	ND	500	04/18/13 11:26	
Sodium	ug/L	ND	500	04/18/13 11:26	

LABORATORY CONTROL SAMPLE: 1170281

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9240	92	85-115	
Magnesium	ug/L	10000	9580	96	85-115	
Potassium	ug/L	10000	8900	89	85-115	
Sodium	ug/L	10000	9440	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1170282 1170283

Parameter	Units	60142364001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	238000	10000	10000	252000	249000	134	107	70-130	1	9	M1
Magnesium	ug/L	20700	10000	10000	30400	30600	97	100	70-130	1	9	
Potassium	ug/L	5050	10000	10000	15200	15000	102	99	70-130	1	7	
Sodium	ug/L	11500	10000	10000	22500	22000	110	105	70-130	2	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: MPRP/22281 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60142364001, 60142364002, 60142364003

METHOD BLANK: 1170288 Matrix: Water
Associated Lab Samples: 60142364001, 60142364002, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	04/18/13 10:46	
Magnesium, Dissolved	ug/L	7.3J	50.0	04/18/13 10:46	
Potassium, Dissolved	ug/L	ND	500	04/18/13 10:46	
Sodium, Dissolved	ug/L	ND	500	04/18/13 10:46	

LABORATORY CONTROL SAMPLE: 1170289

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9740	97	85-115	
Magnesium, Dissolved	ug/L	10000	9700	97	85-115	
Potassium, Dissolved	ug/L	10000	9270	93	85-115	
Sodium, Dissolved	ug/L	10000	9820	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1170290 1170291

Parameter	Units	60142364001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	248000	10000	10000	262000	258000	140	97	70-130	2	9	M1
Magnesium, Dissolved	ug/L	21100	10000	10000	31100	30800	99	96	70-130	1	9	
Potassium, Dissolved	ug/L	5220	10000	10000	15000	14900	98	97	70-130	0	7	
Sodium, Dissolved	ug/L	12000	10000	10000	22200	22100	102	101	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: MPRP/22284 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60142364001, 60142364002, 60142364003

METHOD BLANK: 1170302 Matrix: Water
Associated Lab Samples: 60142364001, 60142364002, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	04/18/13 14:30	
Antimony	ug/L	ND	1.0	04/18/13 14:30	
Arsenic	ug/L	ND	1.0	04/18/13 14:30	
Barium	ug/L	0.37J	1.0	04/18/13 14:30	
Beryllium	ug/L	ND	0.50	04/18/13 14:30	
Cadmium	ug/L	ND	0.50	04/18/13 14:30	
Chromium	ug/L	ND	1.0	04/18/13 14:30	
Cobalt	ug/L	ND	1.0	04/18/13 14:30	
Copper	ug/L	0.23J	1.0	04/18/13 14:30	
Iron	ug/L	ND	50.0	04/18/13 14:30	
Lead	ug/L	0.053J	1.0	04/18/13 14:30	
Manganese	ug/L	ND	1.0	04/18/13 14:30	
Molybdenum	ug/L	ND	1.0	04/18/13 14:30	
Nickel	ug/L	ND	1.0	04/18/13 14:30	
Selenium	ug/L	ND	1.0	04/18/13 14:30	
Silver	ug/L	ND	0.50	04/18/13 14:30	
Thallium	ug/L	ND	1.0	04/18/13 14:30	
Vanadium	ug/L	ND	1.0	04/18/13 14:30	
Zinc	ug/L	1.7J	10.0	04/18/13 14:30	

LABORATORY CONTROL SAMPLE: 1170303

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	984	98	85-115	
Antimony	ug/L	40	40.7	102	85-115	
Arsenic	ug/L	40	41.0	102	85-115	
Barium	ug/L	40	40.8	102	85-115	
Beryllium	ug/L	40	38.4	96	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	40.6	101	85-115	
Cobalt	ug/L	40	40.0	100	85-115	
Copper	ug/L	40	40.6	102	85-115	
Iron	ug/L	1000	994	99	85-115	
Lead	ug/L	40	37.8	94	85-115	
Manganese	ug/L	40	40.5	101	85-115	
Molybdenum	ug/L	40	41.2	103	85-115	
Nickel	ug/L	40	40.6	102	85-115	
Selenium	ug/L	40	40.5	101	85-115	
Silver	ug/L	20	20.0	100	85-115	
Thallium	ug/L	40	39.7	99	85-115	
Vanadium	ug/L	40	40.1	100	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

LABORATORY CONTROL SAMPLE: 1170303

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	103	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1170304 1170305

Parameter	Units	60142364002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	66.3	1000	1000	975	971	91	90	70-130	0	20	
Antimony	ug/L	0.18J	40	40	40.1	40.5	100	101	70-130	1	20	
Arsenic	ug/L	0.19J	40	40	42.3	42.0	105	104	70-130	1	20	
Barium	ug/L	19.1	40	40	57.1	58.7	95	99	70-130	3	20	
Beryllium	ug/L	0.095J	40	40	35.2	35.2	88	88	70-130	0	20	
Cadmium	ug/L	9.3	40	40	47.7	48.5	96	98	70-130	2	20	
Chromium	ug/L	0.84J	40	40	39.5	39.9	97	98	70-130	1	20	
Cobalt	ug/L	0.36J	40	40	37.8	38.2	94	95	70-130	1	20	
Copper	ug/L	11.8	40	40	48.3	48.6	91	92	70-130	1	20	
Iron	ug/L	872	1000	1000	1800	1850	93	98	70-130	2	20	
Lead	ug/L	1.7	40	40	39.0	39.6	93	95	70-130	2	20	
Manganese	ug/L	258	40	40	291	304	82	115	70-130	4	20	
Molybdenum	ug/L	12.8	40	40	54.2	55.4	104	106	70-130	2	20	
Nickel	ug/L	3.1	40	40	40.4	40.6	93	94	70-130	0	20	
Selenium	ug/L	0.17J	40	40	41.6	41.9	104	104	70-130	1	20	
Silver	ug/L	ND	20	20	18.8	18.9	94	95	70-130	1	20	
Thallium	ug/L	0.043J	40	40	39.7	40.2	99	100	70-130	1	20	
Vanadium	ug/L	ND	40	40	40.2	40.4	100	101	70-130	1	20	
Zinc	ug/L	1690	100	100	1770	1800	79	109	70-130	2	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: MPRP/22283 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60142364001, 60142364002, 60142364003

METHOD BLANK: 1170298 Matrix: Water
Associated Lab Samples: 60142364001, 60142364002, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	04/18/13 15:12	
Antimony, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Arsenic, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Barium, Dissolved	ug/L	0.24J	1.0	04/18/13 15:12	
Beryllium, Dissolved	ug/L	ND	0.50	04/18/13 15:12	
Cadmium, Dissolved	ug/L	ND	0.50	04/18/13 15:12	
Chromium, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Cobalt, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Copper, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Iron, Dissolved	ug/L	3.9J	50.0	04/18/13 15:12	
Lead, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Manganese, Dissolved	ug/L	0.14J	1.0	04/18/13 15:12	
Molybdenum, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Nickel, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Selenium, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Silver, Dissolved	ug/L	ND	0.50	04/18/13 15:12	
Thallium, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Vanadium, Dissolved	ug/L	ND	1.0	04/18/13 15:12	
Zinc, Dissolved	ug/L	ND	10.0	04/18/13 15:12	

LABORATORY CONTROL SAMPLE: 1170299

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	954	95	85-115	
Antimony, Dissolved	ug/L	40	39.9	100	85-115	
Arsenic, Dissolved	ug/L	40	39.9	100	85-115	
Barium, Dissolved	ug/L	40	38.7	97	85-115	
Beryllium, Dissolved	ug/L	40	37.9	95	85-115	
Cadmium, Dissolved	ug/L	40	39.8	99	85-115	
Chromium, Dissolved	ug/L	40	40.1	100	85-115	
Cobalt, Dissolved	ug/L	40	39.0	97	85-115	
Copper, Dissolved	ug/L	40	39.4	98	85-115	
Iron, Dissolved	ug/L	1000	990	99	85-115	
Lead, Dissolved	ug/L	40	37.0	92	85-115	
Manganese, Dissolved	ug/L	40	39.6	99	85-115	
Molybdenum, Dissolved	ug/L	40	40.7	102	85-115	
Nickel, Dissolved	ug/L	40	39.5	99	85-115	
Selenium, Dissolved	ug/L	40	40.1	100	85-115	
Silver, Dissolved	ug/L	20	19.7	99	85-115	
Thallium, Dissolved	ug/L	40	39.0	98	85-115	
Vanadium, Dissolved	ug/L	40	39.3	98	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

LABORATORY CONTROL SAMPLE: 1170299

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	103	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1170300 1170301

Parameter	Units	60142364002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	7.3J	1000	1000	920	916	91	91	70-130	0	20	
Antimony, Dissolved	ug/L	0.17J	40	40	40.3	40.4	100	101	70-130	0	20	
Arsenic, Dissolved	ug/L	ND	40	40	41.6	41.6	104	104	70-130	0	20	
Barium, Dissolved	ug/L	18.7	40	40	57.6	58.0	97	98	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	35.3	35.0	88	88	70-130	1	20	
Cadmium, Dissolved	ug/L	8.3	40	40	47.7	47.9	98	99	70-130	0	20	
Chromium, Dissolved	ug/L	0.51J	40	40	39.6	39.5	98	97	70-130	0	20	
Cobalt, Dissolved	ug/L	0.34J	40	40	37.8	37.9	94	94	70-130	0	20	
Copper, Dissolved	ug/L	1.2	40	40	37.4	37.7	91	91	70-130	1	20	
Iron, Dissolved	ug/L	9.9J	1000	1000	963	966	95	96	70-130	0	20	
Lead, Dissolved	ug/L	0.042J	40	40	37.8	37.4	94	93	70-130	1	20	
Manganese, Dissolved	ug/L	248	40	40	289	295	102	116	70-130	2	20	
Molybdenum, Dissolved	ug/L	12.4	40	40	54.4	54.6	105	105	70-130	0	20	
Nickel, Dissolved	ug/L	2.9	40	40	40.0	40.2	93	93	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	41.8	41.7	104	104	70-130	0	20	
Silver, Dissolved	ug/L	ND	20	20	18.7	18.8	93	94	70-130	0	20	
Thallium, Dissolved	ug/L	0.042J	40	40	39.3	39.9	98	100	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	39.8	39.9	100	100	70-130	0	20	
Zinc, Dissolved	ug/L	1480	100	100	1600	1630	117	143	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: WET/40726 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60142364001

METHOD BLANK: 1169170 Matrix: Water
Associated Lab Samples: 60142364001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	04/17/13 16:36	

LABORATORY CONTROL SAMPLE: 1169171

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	219	111	85-115	

SAMPLE DUPLICATE: 1169172

Parameter	Units	60142244001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	62.6	68.2	8	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: WET/40736 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60142364003

METHOD BLANK: 1169468 Matrix: Water
Associated Lab Samples: 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	04/18/13 14:18	

LABORATORY CONTROL SAMPLE: 1169469

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	215	109	85-115	

SAMPLE DUPLICATE: 1169470

Parameter	Units	60142313003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	45.2	42.6	6	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: WETA/24232 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60142364002

METHOD BLANK: 1169573 Matrix: Water
Associated Lab Samples: 60142364002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	0.21J	1.0	04/13/13 17:14	

LABORATORY CONTROL SAMPLE: 1169574

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1169575 1169576

Parameter	Units	60141914003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	23.4	10	10	33.0	32.9	97	96	61-119	0	10	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: WETA/24237 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60142364001, 60142364003

METHOD BLANK: 1169990 Matrix: Water
Associated Lab Samples: 60142364001, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	04/15/13 09:10	

LABORATORY CONTROL SAMPLE: 1169991

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1169926 1169927

Parameter	Units	60141942010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	949	500	500	1400	1420	90	95	61-119	2	10	

MATRIX SPIKE SAMPLE: 1169928

Parameter	Units	60141898001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	57.3	25	83.9	106	61-119	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

QC Batch: WETA/24320 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60142364001, 60142364003

METHOD BLANK: 1172761 Matrix: Water
Associated Lab Samples: 60142364001, 60142364003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.20J	1.0	04/18/13 17:42	

LABORATORY CONTROL SAMPLE: 1172762

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.2	103	80-120	

MATRIX SPIKE SAMPLE: 1172764

Parameter	Units	60142364001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.1	5	7.5	108	80-120	

SAMPLE DUPLICATE: 1172763

Parameter	Units	60141882002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	1.7	1.8	7	25	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60142364

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60142364001	**ROCKDRAININ 130411**	EPA 200.7	MPRP/22279	EPA 200.7	ICP/17744
60142364002	**ROCKDRAINMP 130411**	EPA 200.7	MPRP/22279	EPA 200.7	ICP/17744
60142364003	**WETLANDOUT 130411**	EPA 200.7	MPRP/22279	EPA 200.7	ICP/17744
60142364001	**ROCKDRAININ 130411**	EPA 200.7	MPRP/22281	EPA 200.7	ICP/17745
60142364002	**ROCKDRAINMP 130411**	EPA 200.7	MPRP/22281	EPA 200.7	ICP/17745
60142364003	**WETLANDOUT 130411**	EPA 200.7	MPRP/22281	EPA 200.7	ICP/17745
60142364001	**ROCKDRAININ 130411**	EPA 200.8	MPRP/22284	EPA 200.8	ICPM/2182
60142364002	**ROCKDRAINMP 130411**	EPA 200.8	MPRP/22284	EPA 200.8	ICPM/2182
60142364003	**WETLANDOUT 130411**	EPA 200.8	MPRP/22284	EPA 200.8	ICPM/2182
60142364001	**ROCKDRAININ 130411**	EPA 200.8	MPRP/22283	EPA 200.8	ICPM/2183
60142364002	**ROCKDRAINMP 130411**	EPA 200.8	MPRP/22283	EPA 200.8	ICPM/2183
60142364003	**WETLANDOUT 130411**	EPA 200.8	MPRP/22283	EPA 200.8	ICPM/2183
60142364001	**ROCKDRAININ 130411**	SM 5210B	WET/40726	SM 5210B	WET/40824
60142364003	**WETLANDOUT 130411**	SM 5210B	WET/40736	SM 5210B	WET/40845
60142364001	**ROCKDRAININ 130411**	EPA 300.0	WETA/24237		
60142364002	**ROCKDRAINMP 130411**	EPA 300.0	WETA/24232		
60142364003	**WETLANDOUT 130411**	EPA 300.0	WETA/24237		
60142364001	**ROCKDRAININ 130411**	SM 5310C	WETA/24320		
60142364003	**WETLANDOUT 130411**	SM 5310C	WETA/24320		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60142364

60142364

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W872210060309 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None (circle one) ☐ Samples received on ice, cooling process has begun.

Cooler Temperature: 5-2

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 4/12/13

Chain of Custody present:	☑Yes	☐No	☐N/A	1.
Chain of Custody filled out:	☑Yes	☐No	☐N/A	2.
Chain of Custody relinquished:	☑Yes	☐No	☐N/A	3.
Sampler name & signature on COC:	☑Yes	☐No	☐N/A	4.
Samples arrived within holding time:	☑Yes	☐No	☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes	☐No	☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes	☑No	☐N/A	7.
Sufficient volume:	☑Yes	☐No	☐N/A	8.
Correct containers used:	☑Yes	☐No	☐N/A	
Pace containers used:	☑Yes	☐No	☐N/A	9.
Containers intact:	☑Yes	☐No	☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes	☐No	☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes	☐No	☑N/A	12.
Sample labels match COC:	☑Yes	☐No	☐N/A	
Includes date/time/ID/analyses Matrix: WT				13.
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes	☑No		Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes	☐No	☑N/A	
Pace Trip Blank lot # (if purchased):				15.
Headspace in VOA vials (>6mm):	☐Yes	☐No	☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes	☐No	☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 4/12/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1140	Start:
End: 1148	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site | **Req Due Date (mm/dd/yy):** | **Rush TAT:** Yes ___ No X

BP/ARC Facility No: | **Lab Work Order Number:**

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161302.200A
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Acct: UPS # 733W87	Enfos Proposal No: D00ML-0003 (WR 262026)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix:	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)		* RUSH		MS/MSD	HOLD
	ROCKDRAIN IN 130411	4/11/13	1035		X			5	2	1	2	Ø			X	X	X	X	X		X			
	ROCKDRAIN MP 130411	4/11/13	1208		X			3	1	Ø	2	Ø			X	X	X				X			
	WETLANDOUT 130411	4/11/13	1235		X			5	2	1	2	Ø			X	X	X	X	X		X			

Report Type & QC Level: Standard X; Full Data Package ___

60142364

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Dissolved metals are field filtered.

Metals are: Ca, K, Na, Mg (E200.7);
Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

* RUSH 5-DAY TAT

Sampler's Name: DANIEL MOSS	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	DANIEL MOSS / AMEC	4/11/13	1340	F Brackett	4/12	1030
Shipment Method: UPS Ship Date: 4/11/13						
Shipment Tracking No: 1Z 733 W8722 1006 0309						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5-2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

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April 26, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on April 19, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60142915001	**ROCK DRAIN IN 130418**	Water	04/18/13 10:35	04/19/13 10:40
60142915002	**ROCK DRAIN MP 130418**	Water	04/18/13 11:25	04/19/13 10:40
60142915003	**WETLAND OUT 130418**	Water	04/18/13 11:50	04/19/13 10:40
60142915004	**WETLAND MP 130418**	Water	04/18/13 12:35	04/19/13 10:40

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60142915001	**ROCK DRAIN IN 130418**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		EPA 350.1	AJM	1
		EPA 353.2	DJR	1
		EPA 365.4	AJM	1
		SM 5310C	JML	1
60142915002	**ROCK DRAIN MP 130418**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		EPA 300.0	OL	1
		EPA 350.1	AJM	1
		EPA 353.2	DJR	1
		EPA 365.4	AJM	1
60142915003	**WETLAND OUT 130418**	EPA 200.7	SMW	4
		EPA 200.7	SMW	4
		EPA 200.8	JGP	19
		EPA 200.8	JGP	19
		SM 5210B	NDL	1
		EPA 300.0	OL	1
		EPA 350.1	AJM	1
		EPA 353.2	DJR	1
		EPA 365.4	AJM	1
		SM 5310C	JML	1
60142915004	**WETLAND MP 130418**	EPA 350.1	AJM	1
		EPA 353.2	DJR	1
		EPA 365.4	AJM	1

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: April 26, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: April 26, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: April 26, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22397

B: Analyte was detected in the associated method blank.

- BLANK for HBN 288035 [MPRP/223 (Lab ID: 1174758)
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: April 26, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: April 26, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/40871

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1173516)
  - BOD, 5 day

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: April 26, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 350.1**
Description: 350.1 Ammonia
Client: BP AMEC
Date: April 26, 2013

General Information:
4 samples were analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/24377

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60142864002,60142868001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1174620)
  - Nitrogen, Ammonia

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3 pres.
Client: BP AMEC
Date: April 26, 2013

General Information:
4 samples were analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: WETA/24415

B: Analyte was detected in the associated method blank.
- BLANK for HBN 288410 [WETA/244 (Lab ID: 1176003)
  - Nitrogen, NO2 plus NO3

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **EPA 365.4**
Description: 365.4 Total Phosphorus
Client: BP AMEC
Date: April 26, 2013

General Information:
4 samples were analyzed for EPA 365.4. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: April 26, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: WETA/24425

B: Analyte was detected in the associated method blank.
- BLANK for HBN 288475 [WETA/244 (Lab ID: 1176254)
  - Total Organic Carbon

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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(913)599-5665

ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: ROCK DRAIN IN 130418 **Lab ID: 60142915001** Collected: 04/18/13 10:35 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**254000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 14:52	7440-70-2	
Magnesium	**21400**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 14:52	7439-95-4	
Potassium	**6460**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 14:52	7440-09-7	
Sodium	**13800**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 14:52	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**257000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 14:17	7440-70-2	D9
Magnesium, Dissolved	**21500**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 14:17	7439-95-4	D9
Potassium, Dissolved	**6340**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 14:17	7440-09-7	
Sodium, Dissolved	**13500**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 14:17	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**207**	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 10:46	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 10:46	7440-36-0	
Arsenic	**0.49J**	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 10:46	7440-38-2	
Barium	**21.0**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 10:46	7440-39-3	
Beryllium	**0.27J**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 10:46	7440-41-7	
Cadmium	**15.0**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 10:46	7440-43-9	
Chromium	**0.54J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 10:46	7440-47-3	
Cobalt	**2.1**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 10:46	7440-48-4	
Copper	**36.0**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 10:46	7440-50-8	
Iron	**2610**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 10:46	7439-89-6	
Lead	**6.1**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 10:46	7439-92-1	
Manganese	**1560**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 10:46	7439-96-5	
Molybdenum	**15.4**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 10:46	7439-98-7	
Nickel	**3.7**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 10:46	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 10:46	7782-49-2	
Silver	**0.040J**	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 10:46	7440-22-4	
Thallium	**0.026J**	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 10:46	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 10:46	7440-62-2	
Zinc	**2730**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 10:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 11:27	7429-90-5	
Antimony, Dissolved	**0.22J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:27	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 11:27	7440-38-2	
Barium, Dissolved	**20.2**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:27	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:27	7440-41-7	
Cadmium, Dissolved	**12.5**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:27	7440-43-9	
Chromium, Dissolved	**0.33J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:27	7440-47-3	
Cobalt, Dissolved	**2.0**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:27	7440-48-4	
Copper, Dissolved	**1.6**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:27	7440-50-8	
Iron, Dissolved	**7.8J**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 11:27	7439-89-6	
Lead, Dissolved	**0.047J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:27	7439-92-1	
Manganese, Dissolved	**1550**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:27	7439-96-5	
Molybdenum, Dissolved	**15.3**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:27	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: ROCK DRAIN IN 130418 **Lab ID: 60142915001** Collected: 04/18/13 10:35 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.5**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:27	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:27	7782-49-2	
Silver, Dissolved	**0.024J**	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 11:27	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 11:27	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 11:27	7440-62-2	
Zinc, Dissolved	**2240**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 11:27	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	04/19/13 16:35	04/24/13 15:49		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**700**	mg/L	50.0	3.0	50		04/24/13 12:42	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	ND	mg/L	0.10	0.034	1		04/23/13 10:57	7664-41-7	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.012	1		04/25/13 16:08		
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	ND	mg/L	0.10	0.015	1		04/22/13 13:24	7723-14-0	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.57J**	mg/L	1.0	0.12	1		04/25/13 17:24	7440-44-0	B

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: ROCK DRAIN MP 130418 **Lab ID: 60142915002** Collected: 04/18/13 11:25 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**253000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 15:00	7440-70-2	
Magnesium	**21000**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 15:00	7439-95-4	
Potassium	**6090**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 15:00	7440-09-7	
Sodium	**13400**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 15:00	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**254000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 14:25	7440-70-2	D9
Magnesium, Dissolved	**21400**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 14:25	7439-95-4	D9
Potassium, Dissolved	**6200**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 14:25	7440-09-7	D9
Sodium, Dissolved	**13600**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 14:25	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**77.8**	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 10:50	7429-90-5	
Antimony	**0.20J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 10:50	7440-36-0	
Arsenic	**0.21J**	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 10:50	7440-38-2	
Barium	**18.4**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 10:50	7440-39-3	
Beryllium	**0.12J**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 10:50	7440-41-7	
Cadmium	**9.0**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 10:50	7440-43-9	
Chromium	**0.70J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 10:50	7440-47-3	
Cobalt	**0.53J**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 10:50	7440-48-4	
Copper	**13.6**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 10:50	7440-50-8	
Iron	**969**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 10:50	7439-89-6	
Lead	**2.2**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 10:50	7439-92-1	
Manganese	**376**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 10:50	7439-96-5	
Molybdenum	**13.8**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 10:50	7439-98-7	
Nickel	**3.0**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 10:50	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 10:50	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 10:50	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 10:50	7440-28-0	
Vanadium	**0.17J**	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 10:50	7440-62-2	
Zinc	**1600**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 10:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 11:32	7429-90-5	
Antimony, Dissolved	**0.18J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:32	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 11:32	7440-38-2	
Barium, Dissolved	**18.8**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:32	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:32	7440-41-7	
Cadmium, Dissolved	**8.3**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:32	7440-43-9	
Chromium, Dissolved	**0.67J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:32	7440-47-3	
Cobalt, Dissolved	**0.46J**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:32	7440-48-4	
Copper, Dissolved	**1.1**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:32	7440-50-8	
Iron, Dissolved	**7.6J**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 11:32	7439-89-6	
Lead, Dissolved	**0.073J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:32	7439-92-1	
Manganese, Dissolved	**352**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:32	7439-96-5	
Molybdenum, Dissolved	**13.8**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:32	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: ROCK DRAIN MP 130418 **Lab ID: 60142915002** Collected: 04/18/13 11:25 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.8**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:32	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:32	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 11:32	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 11:32	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 11:32	7440-62-2	
Zinc, Dissolved	**1420**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 11:32	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**702**	mg/L	50.0	3.0	50		04/24/13 13:00	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	ND	mg/L	0.10	0.034	1		04/23/13 10:58	7664-41-7	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.050J**	mg/L	0.10	0.012	1		04/25/13 16:09		B
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	ND	mg/L	0.10	0.015	1		04/22/13 13:26	7723-14-0	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: WETLAND OUT 130418 **Lab ID: 60142915003** Collected: 04/18/13 11:50 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**251000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 15:02	7440-70-2	
Magnesium	**22300**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 15:02	7439-95-4	
Potassium	**6800**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 15:02	7440-09-7	
Sodium	**13200**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 15:02	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**249000**	ug/L	100	10.4	1	04/23/13 10:20	04/24/13 14:27	7440-70-2	
Magnesium, Dissolved	**22500**	ug/L	50.0	6.5	1	04/23/13 10:20	04/24/13 14:27	7439-95-4	D9
Potassium, Dissolved	**6900**	ug/L	500	44.4	1	04/23/13 10:20	04/24/13 14:27	7440-09-7	D9
Sodium, Dissolved	**13400**	ug/L	500	21.7	1	04/23/13 10:20	04/24/13 14:27	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**13.3J**	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 11:07	7429-90-5	
Antimony	**0.14J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:07	7440-36-0	
Arsenic	**1.5**	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 11:07	7440-38-2	
Barium	**81.0**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:07	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:07	7440-41-7	
Cadmium	**0.74**	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:07	7440-43-9	
Chromium	**0.65J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:07	7440-47-3	
Cobalt	**0.12J**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:07	7440-48-4	
Copper	**0.53J**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:07	7440-50-8	
Iron	**43.2J**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 11:07	7439-89-6	
Lead	**0.15J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:07	7439-92-1	B
Manganese	**610**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:07	7439-96-5	
Molybdenum	**0.41J**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:07	7439-98-7	
Nickel	**0.15J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:07	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:07	7782-49-2	
Silver	**0.030J**	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 11:07	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 11:07	7440-28-0	
Vanadium	**0.41J**	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 11:07	7440-62-2	
Zinc	**182**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 11:07	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.6J**	ug/L	50.0	6.4	1	04/23/13 10:20	04/24/13 11:48	7429-90-5	
Antimony, Dissolved	**0.11J**	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:48	7440-36-0	
Arsenic, Dissolved	**0.47J**	ug/L	1.0	0.050	1	04/23/13 10:20	04/24/13 11:48	7440-38-2	
Barium, Dissolved	**80.7**	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:48	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:48	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	04/23/13 10:20	04/24/13 11:48	7440-43-9	
Chromium, Dissolved	**0.36J**	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:48	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	04/23/13 10:20	04/24/13 11:48	7440-48-4	
Copper, Dissolved	**0.22J**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:48	7440-50-8	
Iron, Dissolved	**12.5J**	ug/L	50.0	3.0	1	04/23/13 10:20	04/24/13 11:48	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	04/23/13 10:20	04/24/13 11:48	7439-92-1	
Manganese, Dissolved	**599**	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:48	7439-96-5	
Molybdenum, Dissolved	**0.30J**	ug/L	1.0	0.12	1	04/23/13 10:20	04/24/13 11:48	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: WETLAND OUT 130418 **Lab ID: 60142915003** Collected: 04/18/13 11:50 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	04/23/13 10:20	04/24/13 11:48	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	04/23/13 10:20	04/24/13 11:48	7782-49-2	
Silver, Dissolved	**0.027J**	ug/L	0.50	0.010	1	04/23/13 10:20	04/24/13 11:48	7440-22-4	
Thallium, Dissolved	**0.021J**	ug/L	1.0	0.020	1	04/23/13 10:20	04/24/13 11:48	7440-28-0	
Vanadium, Dissolved	**0.31J**	ug/L	1.0	0.11	1	04/23/13 10:20	04/24/13 11:48	7440-62-2	
Zinc, Dissolved	**1.8J**	ug/L	10.0	1.0	1	04/23/13 10:20	04/24/13 11:48	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**60.3**	mg/L	2.0	2.0	1	04/19/13 16:41	04/24/13 15:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**565**	mg/L	50.0	3.0	50		04/24/13 13:18	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.15**	mg/L	0.10	0.034	1		04/23/13 10:59	7664-41-7	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.041J**	mg/L	0.10	0.012	1		04/25/13 16:10		B
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.29**	mg/L	0.10	0.015	1		04/22/13 13:28	7723-14-0	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**12.8**	mg/L	2.0	0.24	2		04/25/13 17:41	7440-44-0	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Sample: WETLAND MP 130418 **Lab ID: 60142915004** Collected: 04/18/13 12:35 Received: 04/19/13 10:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	ND	mg/L	0.10	0.034	1		04/23/13 11:00	7664-41-7	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.046J**	mg/L	0.10	0.012	1		04/25/13 16:12		B
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	ND	mg/L	0.10	0.015	1		04/22/13 13:29	7723-14-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: MPRP/22398 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60142915001, 60142915002, 60142915003

METHOD BLANK: 1174762 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	04/24/13 14:48	
Magnesium	ug/L	ND	50.0	04/24/13 14:48	
Potassium	ug/L	57.9J	500	04/24/13 14:48	
Sodium	ug/L	ND	500	04/24/13 14:48	

LABORATORY CONTROL SAMPLE: 1174763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9240	92	85-115	
Magnesium	ug/L	10000	9920	99	85-115	
Potassium	ug/L	10000	10800	108	85-115	
Sodium	ug/L	10000	10700	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1174764 1174765

Parameter	Units	60142915001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	254000	10000	10000	263000	263000	90	88	70-130	0	9	
Magnesium	ug/L	21400	10000	10000	30900	30900	94	95	70-130	0	9	
Potassium	ug/L	6460	10000	10000	17600	17600	112	112	70-130	0	7	
Sodium	ug/L	13800	10000	10000	25000	25000	112	113	70-130	0	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: MPRP/22395 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60142915001, 60142915002, 60142915003

METHOD BLANK: 1174748 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	04/24/13 14:12	
Magnesium, Dissolved	ug/L	ND	50.0	04/24/13 14:12	
Potassium, Dissolved	ug/L	53.3J	500	04/24/13 14:12	
Sodium, Dissolved	ug/L	30.3J	500	04/24/13 14:12	

LABORATORY CONTROL SAMPLE: 1174749

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9420	94	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	10700	107	85-115	
Sodium, Dissolved	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1174750 1174751

Parameter	Units	60142915001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	257000	10000	10000	265000	266000	77	88	70-130	0	9	
Magnesium, Dissolved	ug/L	21500	10000	10000	31300	30900	99	94	70-130	1	9	
Potassium, Dissolved	ug/L	6340	10000	10000	17700	17800	114	114	70-130	0	7	
Sodium, Dissolved	ug/L	13500	10000	10000	25100	25300	116	117	70-130	1	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: MPRP/22397 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60142915001, 60142915002, 60142915003

METHOD BLANK: 1174758 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	04/24/13 10:38	
Antimony	ug/L	ND	1.0	04/24/13 10:38	
Arsenic	ug/L	ND	1.0	04/24/13 10:38	
Barium	ug/L	0.085J	1.0	04/24/13 10:38	
Beryllium	ug/L	ND	0.50	04/24/13 10:38	
Cadmium	ug/L	ND	0.50	04/24/13 10:38	
Chromium	ug/L	ND	1.0	04/24/13 10:38	
Cobalt	ug/L	ND	1.0	04/24/13 10:38	
Copper	ug/L	ND	1.0	04/24/13 10:38	
Iron	ug/L	ND	50.0	04/24/13 10:38	
Lead	ug/L	0.035J	1.0	04/24/13 10:38	
Manganese	ug/L	ND	1.0	04/24/13 10:38	
Molybdenum	ug/L	ND	1.0	04/24/13 10:38	
Nickel	ug/L	ND	1.0	04/24/13 10:38	
Selenium	ug/L	ND	1.0	04/24/13 10:38	
Silver	ug/L	ND	0.50	04/24/13 10:38	
Thallium	ug/L	ND	1.0	04/24/13 10:38	
Vanadium	ug/L	ND	1.0	04/24/13 10:38	
Zinc	ug/L	ND	10.0	04/24/13 10:38	

LABORATORY CONTROL SAMPLE: 1174759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	1000	100	85-115	
Antimony	ug/L	40	41.3	103	85-115	
Arsenic	ug/L	40	41.5	104	85-115	
Barium	ug/L	40	40.8	102	85-115	
Beryllium	ug/L	40	40.1	100	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	41.6	104	85-115	
Cobalt	ug/L	40	40.8	102	85-115	
Copper	ug/L	40	41.2	103	85-115	
Iron	ug/L	1000	1010	101	85-115	
Lead	ug/L	40	39.2	98	85-115	
Manganese	ug/L	40	41.2	103	85-115	
Molybdenum	ug/L	40	40.9	102	85-115	
Nickel	ug/L	40	41.7	104	85-115	
Selenium	ug/L	40	41.3	103	85-115	
Silver	ug/L	20	20.1	100	85-115	
Thallium	ug/L	40	39.4	99	85-115	
Vanadium	ug/L	40	41.9	105	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

LABORATORY CONTROL SAMPLE: 1174759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	106	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1174760 1174761

Parameter	Units	60142915002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	77.8	1000	1000	983	1010	90	93	70-130	2	20	
Antimony	ug/L	0.20J	40	40	40.7	41.2	101	102	70-130	1	20	
Arsenic	ug/L	0.21J	40	40	41.9	42.2	104	105	70-130	1	20	
Barium	ug/L	18.4	40	40	57.6	58.4	98	100	70-130	1	20	
Beryllium	ug/L	0.12J	40	40	36.0	36.0	90	90	70-130	0	20	
Cadmium	ug/L	9.0	40	40	48.2	48.8	98	100	70-130	1	20	
Chromium	ug/L	0.70J	40	40	40.1	40.1	98	99	70-130	0	20	
Cobalt	ug/L	0.53J	40	40	38.6	38.6	95	95	70-130	0	20	
Copper	ug/L	13.6	40	40	50.0	50.6	91	93	70-130	1	20	
Iron	ug/L	969	1000	1000	1920	1930	95	97	70-130	1	20	
Lead	ug/L	2.2	40	40	41.7	41.9	99	99	70-130	0	20	
Manganese	ug/L	376	40	40	415	417	96	103	70-130	1	20	
Molybdenum	ug/L	13.8	40	40	54.8	55.8	102	105	70-130	2	20	
Nickel	ug/L	3.0	40	40	40.7	40.5	94	94	70-130	1	20	
Selenium	ug/L	ND	40	40	42.1	42.3	105	106	70-130	1	20	
Silver	ug/L	ND	20	20	18.6	18.8	93	94	70-130	1	20	
Thallium	ug/L	ND	40	40	40.6	40.9	101	102	70-130	1	20	
Vanadium	ug/L	0.17J	40	40	40.9	41.1	102	102	70-130	0	20	
Zinc	ug/L	1600	100	100	1690	1710	91	106	70-130	1	20	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: MPRP/22396 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60142915001, 60142915002, 60142915003

METHOD BLANK: 1174752 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	04/24/13 11:19	
Antimony, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Arsenic, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Barium, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Beryllium, Dissolved	ug/L	ND	0.50	04/24/13 11:19	
Cadmium, Dissolved	ug/L	ND	0.50	04/24/13 11:19	
Chromium, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Cobalt, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Copper, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Iron, Dissolved	ug/L	ND	50.0	04/24/13 11:19	
Lead, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Manganese, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Molybdenum, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Nickel, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Selenium, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Silver, Dissolved	ug/L	ND	0.50	04/24/13 11:19	
Thallium, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Vanadium, Dissolved	ug/L	ND	1.0	04/24/13 11:19	
Zinc, Dissolved	ug/L	ND	10.0	04/24/13 11:19	

LABORATORY CONTROL SAMPLE: 1174753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	986	99	85-115	
Antimony, Dissolved	ug/L	40	40.5	101	85-115	
Arsenic, Dissolved	ug/L	40	40.7	102	85-115	
Barium, Dissolved	ug/L	40	39.9	100	85-115	
Beryllium, Dissolved	ug/L	40	40.2	101	85-115	
Cadmium, Dissolved	ug/L	40	40.4	101	85-115	
Chromium, Dissolved	ug/L	40	40.8	102	85-115	
Cobalt, Dissolved	ug/L	40	39.8	100	85-115	
Copper, Dissolved	ug/L	40	39.8	99	85-115	
Iron, Dissolved	ug/L	1000	1000	100	85-115	
Lead, Dissolved	ug/L	40	38.7	97	85-115	
Manganese, Dissolved	ug/L	40	40.5	101	85-115	
Molybdenum, Dissolved	ug/L	40	40.6	102	85-115	
Nickel, Dissolved	ug/L	40	40.1	100	85-115	
Selenium, Dissolved	ug/L	40	41.0	103	85-115	
Silver, Dissolved	ug/L	20	19.9	99	85-115	
Thallium, Dissolved	ug/L	40	38.6	97	85-115	
Vanadium, Dissolved	ug/L	40	41.1	103	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

LABORATORY CONTROL SAMPLE: 1174753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	105	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1174754 1174755

Parameter	Units	60142915002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	921	912	92	91	70-130	1	20	
Antimony, Dissolved	ug/L	0.18J	40	40	40.6	40.7	101	101	70-130	0	20	
Arsenic, Dissolved	ug/L	ND	40	40	41.4	41.6	103	104	70-130	1	20	
Barium, Dissolved	ug/L	18.8	40	40	58.2	57.7	98	97	70-130	1	20	
Beryllium, Dissolved	ug/L	ND	40	40	36.9	36.4	92	91	70-130	1	20	
Cadmium, Dissolved	ug/L	8.3	40	40	47.7	47.8	99	99	70-130	0	20	
Chromium, Dissolved	ug/L	0.67J	40	40	40.1	40.0	98	98	70-130	0	20	
Cobalt, Dissolved	ug/L	0.46J	40	40	38.4	38.2	95	94	70-130	1	20	
Copper, Dissolved	ug/L	1.1	40	40	37.4	37.4	91	91	70-130	0	20	
Iron, Dissolved	ug/L	7.6J	1000	1000	968	962	96	95	70-130	1	20	
Lead, Dissolved	ug/L	0.073J	40	40	39.6	39.4	99	98	70-130	0	20	
Manganese, Dissolved	ug/L	352	40	40	394	392	103	98	70-130	0	20	
Molybdenum, Dissolved	ug/L	13.8	40	40	55.2	55.4	103	104	70-130	0	20	
Nickel, Dissolved	ug/L	2.8	40	40	40.5	40.2	94	93	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	42.8	42.0	107	105	70-130	2	20	
Silver, Dissolved	ug/L	ND	20	20	18.6	18.5	93	92	70-130	1	20	
Thallium, Dissolved	ug/L	ND	40	40	40.5	40.5	101	101	70-130	0	20	
Vanadium, Dissolved	ug/L	ND	40	40	41.0	40.5	102	101	70-130	1	20	
Zinc, Dissolved	ug/L	1420	100	100	1510	1510	93	93	70-130	0	20	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WET/40871 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60142915001, 60142915003

METHOD BLANK: 1173514 Matrix: Water
Associated Lab Samples: 60142915001, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	04/24/13 15:02	

LABORATORY CONTROL SAMPLE: 1173515

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	204	103	85-115	

SAMPLE DUPLICATE: 1173516

Parameter	Units	60142895002 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	24.4	32.7	29	17	D6

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WETA/24401 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60142915001, 60142915002, 60142915003

METHOD BLANK: 1175333 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	04/24/13 09:10	

LABORATORY CONTROL SAMPLE: 1175334

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1175335 1175336

Parameter	Units	5078973006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	107	50	50	148	154	81	93	61-119	4	10	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WETA/24377 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

METHOD BLANK: 1174618 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.10	04/23/13 10:28	

LABORATORY CONTROL SAMPLE: 1174619

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	2	2.1	105	90-110	

MATRIX SPIKE SAMPLE: 1174620

Parameter	Units	60142864002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	ND	2	1.8	89	90-110	M1

MATRIX SPIKE SAMPLE: 1174621

Parameter	Units	60142868001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	ND	2	1.9	95	90-110	

SAMPLE DUPLICATE: 1174622

Parameter	Units	60142870001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/L	ND	ND		18	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WETA/24415 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

METHOD BLANK: 1176003 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	0.015J	0.10	04/25/13 15:53	

LABORATORY CONTROL SAMPLE: 1176004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2	2.1	107	90-110	

MATRIX SPIKE SAMPLE: 1176005

Parameter	Units	60142499004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	10.1	10	20.1	100	90-110	

MATRIX SPIKE SAMPLE: 1176007

Parameter	Units	60142499006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	20.1	20	39.5	97	90-110	

SAMPLE DUPLICATE: 1176006

Parameter	Units	60142499005 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	1.5	1.5	1	13	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WETA/24359 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

METHOD BLANK: 1174184 Matrix: Water
Associated Lab Samples: 60142915001, 60142915002, 60142915003, 60142915004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.10	04/22/13 13:16	

LABORATORY CONTROL SAMPLE: 1174185

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.1	105	90-110	

MATRIX SPIKE SAMPLE: 1174186

Parameter	Units	60142655003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.021J	2	2.2	110	90-110	

MATRIX SPIKE SAMPLE: 1174187

Parameter	Units	60142915001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	ND	2	2.0	100	90-110	

SAMPLE DUPLICATE: 1174188

Parameter	Units	60142599001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.37	0.35	7	10	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

QC Batch: WETA/24425 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60142915001, 60142915003

METHOD BLANK: 1176254 Matrix: Water
Associated Lab Samples: 60142915001, 60142915003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.21J	1.0	04/25/13 17:10	

LABORATORY CONTROL SAMPLE: 1176255

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.3	106	80-120	

MATRIX SPIKE SAMPLE: 1176623

Parameter	Units	60142915001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	0.57J	5	5.5	99	80-120	

SAMPLE DUPLICATE: 1176624

Parameter	Units	60143070001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	4.4	4.0	8	25	

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60142915

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60142915001	**ROCK DRAIN IN 130418**	EPA 200.7	MPRP/22398	EPA 200.7	ICP/17808
60142915002	**ROCK DRAIN MP 130418**	EPA 200.7	MPRP/22398	EPA 200.7	ICP/17808
60142915003	**WETLAND OUT 130418**	EPA 200.7	MPRP/22398	EPA 200.7	ICP/17808
60142915001	**ROCK DRAIN IN 130418**	EPA 200.7	MPRP/22395	EPA 200.7	ICP/17809
60142915002	**ROCK DRAIN MP 130418**	EPA 200.7	MPRP/22395	EPA 200.7	ICP/17809
60142915003	**WETLAND OUT 130418**	EPA 200.7	MPRP/22395	EPA 200.7	ICP/17809
60142915001	**ROCK DRAIN IN 130418**	EPA 200.8	MPRP/22397	EPA 200.8	ICPM/2209
60142915002	**ROCK DRAIN MP 130418**	EPA 200.8	MPRP/22397	EPA 200.8	ICPM/2209
60142915003	**WETLAND OUT 130418**	EPA 200.8	MPRP/22397	EPA 200.8	ICPM/2209
60142915001	**ROCK DRAIN IN 130418**	EPA 200.8	MPRP/22396	EPA 200.8	ICPM/2210
60142915002	**ROCK DRAIN MP 130418**	EPA 200.8	MPRP/22396	EPA 200.8	ICPM/2210
60142915003	**WETLAND OUT 130418**	EPA 200.8	MPRP/22396	EPA 200.8	ICPM/2210
60142915001	**ROCK DRAIN IN 130418**	SM 5210B	WET/40871	SM 5210B	WET/40963
60142915003	**WETLAND OUT 130418**	SM 5210B	WET/40871	SM 5210B	WET/40963
60142915001	**ROCK DRAIN IN 130418**	EPA 300.0	WETA/24401		
60142915002	**ROCK DRAIN MP 130418**	EPA 300.0	WETA/24401		
60142915003	**WETLAND OUT 130418**	EPA 300.0	WETA/24401		
60142915001	**ROCK DRAIN IN 130418**	EPA 350.1	WETA/24377		
60142915002	**ROCK DRAIN MP 130418**	EPA 350.1	WETA/24377		
60142915003	**WETLAND OUT 130418**	EPA 350.1	WETA/24377		
60142915004	**WETLAND MP 130418**	EPA 350.1	WETA/24377		
60142915001	**ROCK DRAIN IN 130418**	EPA 353.2	WETA/24415		
60142915002	**ROCK DRAIN MP 130418**	EPA 353.2	WETA/24415		
60142915003	**WETLAND OUT 130418**	EPA 353.2	WETA/24415		
60142915004	**WETLAND MP 130418**	EPA 353.2	WETA/24415		
60142915001	**ROCK DRAIN IN 130418**	EPA 365.4	WETA/24359		
60142915002	**ROCK DRAIN MP 130418**	EPA 365.4	WETA/24359		
60142915003	**WETLAND OUT 130418**	EPA 365.4	WETA/24359		
60142915004	**WETLAND MP 130418**	EPA 365.4	WETA/24359		
60142915001	**ROCK DRAIN IN 130418**	SM 5310C	WETA/24425		
60142915003	**WETLAND OUT 130418**	SM 5310C	WETA/24425		

REPORT OF LABORATORY ANALYSIS

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60142915

60142915

Client Name: BP AMEC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1006 0318 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZIP/C

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 3.2

Date and initials of person examining contents: PM 4-19-13

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD 4/19/13
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: MW for AMW Date: 4/19/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1110	Start:
End: 1117	End:
Temp:	Temp:

WETLAND PS

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program La... Chain of Custody Record

Pag 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes X No X
Lab Work Order Number: 60114915

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage:	4-Execute Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Matrix: Soil / Solid; Water / Liquid; Air / Vapor
No. Containers / Preservative: Total Number of Containers; Unpreserved; H_2SO_4; HNO_3; HCl
Requested Analyses: Tot Metals-see notes (E200.7/200.8); Dis Metals-see notes (E200.7/200.8); Sulfate (E300.0); TOC (SM5310B); BOD (SM5210B); TOTAL PHOSPHORUS 365.4 (1); NITRATE-NITRITE (NO3/NO2) EPA 353.2 (1); NH_3 as N EPA 350.1 (1); MS/MSD; HOLD RUSH X

Lab No.	Sample Description	Date	Time	Soil	Water	Air		Total Containers	Unpreserved	H_2SO_4	HNO_3	HCl		Tot Metals	Dis Metals	Sulfate	TOC	BOD	Total P	Nitrate-Nitrite	NH_3	MS/MSD	HOLD	Report Type & QC Level / Comments
1835	ROCKDRAININ130418	4/18/13	1035	X			F	8	2	4	2	4		X	X	X	X	X	X	X	X			Standard X; Full Data Package ___; Dissolved metals are field filtered. (1)
↓	ROCKDRAINMP130418	4/18/13	1125		X			6	1	3	2	0		X	X	X			X	X	X			(2)
1836	WETLANDOUT130418	4/18/13	1150		X			8	2	4	2	0		X	X	X	X	X	X	X	X			Metals are: Ca, K, Na, Mg (E200.7); (3)
↓	WETLANDMP113 0418	4/18/13	1235		X			3	0	3	0	0							X	X	X			Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe (4)
																								Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
																								+5 DAY TURN-AROUND

Sampler's Name:	ASHLEY CAZIER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date / Time
Sampler's Company:	AMEC	[signature] / AMEC	4/19/13	1400	[signature]	4/19 1040
Shipment Method:	~~FedEx~~ UPS	Ship Date: 4/18/13				
Shipment Tracking No:	1Z733W87 22 1026 0313					

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical Services, Inc.
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May 21, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on May 04, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60143945001	NERD2A130502	Water	05/02/13 13:20	05/04/13 09:05
60143945002	SWRD1C130502	Water	05/02/13 13:15	05/04/13 09:05
60143945003	MIDRD130502	Water	05/02/13 13:30	05/04/13 09:05
60143945004	P9W1A130503	Water	05/03/13 10:30	05/04/13 09:05
60143945005	P9W2A130503	Water	05/03/13 11:00	05/04/13 09:05
60143945006	P9W3A130503	Water	05/03/13 11:10	05/04/13 09:05
60143945007	P9W1B130503	Water	05/03/13 11:20	05/04/13 09:05
60143945008	P9W2B130503	Water	05/03/13 11:25	05/04/13 09:05
60143945009	P9W3B130503	Water	05/03/13 11:30	05/04/13 09:05
60143945010	P9W1C130503	Water	05/03/13 11:35	05/04/13 09:05
60143945011	P9W2C130503	Water	05/03/13 11:40	05/04/13 09:05
60143945012	P9W3C130503	Water	05/03/13 11:45	05/04/13 09:05
60143945013	P9W1D130503	Water	05/03/13 11:55	05/04/13 09:05
60143945014	P9W2D130503	Water	05/03/13 12:00	05/04/13 09:05
60143945015	P9W3D130503	Water	05/03/13 12:05	05/04/13 09:05
60143945016	NERD2A130502 LEACHATE	Water	05/02/13 13:20	05/04/13 09:05
60143945017	SWRD1C130502 LEACHATE	Water	05/02/13 13:15	05/04/13 09:05
60143945018	MIDRD130502 LEACHATE	Water	05/02/13 13:15	05/04/13 09:05
60143945019	P9W1A130503 LEACHATE	Water	05/03/13 10:30	05/04/13 09:05
60143945020	P9W2A130503 LEACHATE	Water	05/03/13 11:00	05/04/13 09:05
60143945021	P9W3A130503 LEACHATE	Water	05/03/13 11:10	05/04/13 09:05
60143945022	P9W1B130503 LEACHATE	Water	05/03/13 11:20	05/04/13 09:05
60143945023	P9W2B130503 LEACHATE	Water	05/03/13 11:25	05/04/13 09:05
60143945024	P9W3B130503 LEACHATE	Water	05/03/13 11:30	05/04/13 09:05
60143945025	P9W1C130503 LEACHATE	Water	05/03/13 11:35	05/04/13 09:05
60143945026	P9W2C130503 LEACHATE	Water	05/03/13 11:40	05/04/13 09:05
60143945027	P9W3C130503 LEACHATE	Water	05/03/13 11:45	05/04/13 09:05
60143945028	P9W2D130503 LEACHATE	Water	05/03/13 12:00	05/04/13 09:05
60143945029	P9W3D130503 LEACHATE	Water	05/03/13 12:05	05/04/13 09:05
60143945030	P9W1D130503 LEACHATE	Water	05/03/13 11:55	05/04/13 09:05

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60143945016	**NERD2A130502 LEACHATE**	EPA 6010	NDJ	19
60143945017	**SWRD1C130502 LEACHATE**	EPA 6010	NDJ	19
60143945018	**MIDRD130502 LEACHATE**	EPA 6010	NDJ	19
60143945019	**P9W1A130503 LEACHATE**	EPA 6010	JGP	19
60143945020	**P9W2A130503 LEACHATE**	EPA 6010	JGP	19
60143945021	**P9W3A130503 LEACHATE**	EPA 6010	JGP	19
60143945022	**P9W1B130503 LEACHATE**	EPA 6010	JGP	19
60143945023	**P9W2B130503 LEACHATE**	EPA 6010	JGP	19
60143945024	**P9W3B130503 LEACHATE**	EPA 6010	JGP	19
60143945025	**P9W1C130503 LEACHATE**	EPA 6010	JGP	19
60143945026	**P9W2C130503 LEACHATE**	EPA 6010	JGP	19
60143945027	**P9W3C130503 LEACHATE**	EPA 6010	JGP	19
60143945028	**P9W2D130503 LEACHATE**	EPA 6010	JGP	19
60143945029	**P9W3D130503 LEACHATE**	EPA 6010	JGP	19
60143945030	**P9W1D130503 LEACHATE**	EPA 6010	JGP	19

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: May 21, 2013

General Information:
15 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/22623

B: Analyte was detected in the associated method blank.

- BLANK for HBN 290241 [MPRP/226 (Lab ID: 1184804)
  - Chromium

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/22681

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60143945019

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1187454)
  - Molybdenum
  - Thallium
- MSD (Lab ID: 1187455)
  - Thallium

QC Batch: MPRP/22623

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60143945016

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1184807)
  - Copper

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Method: **EPA 6010**
Description: 6010 MET ICP
Client: BP AMEC
Date: May 21, 2013

Additional Comments:

Analyte Comments:

QC Batch: MPRP/22623

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- MIDRD130502 LEACHATE (Lab ID: 60143945018)
  - Antimony
  - Selenium
- NERD2A130502 LEACHATE (Lab ID: 60143945016)
  - Antimony
  - Selenium
- SWRD1C130502 LEACHATE (Lab ID: 60143945017)
  - Antimony
  - Selenium
  - Thallium

QC Batch: MPRP/22681

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- P9W1A130503 LEACHATE (Lab ID: 60143945019)
  - Selenium
- P9W1B130503 LEACHATE (Lab ID: 60143945022)
  - Selenium
- P9W1C130503 LEACHATE (Lab ID: 60143945025)
  - Selenium
- P9W1D130503 LEACHATE (Lab ID: 60143945030)
  - Selenium
- P9W2A130503 LEACHATE (Lab ID: 60143945020)
  - Selenium
- P9W2B130503 LEACHATE (Lab ID: 60143945023)
  - Selenium
- P9W2C130503 LEACHATE (Lab ID: 60143945026)
  - Selenium
- P9W2D130503 LEACHATE (Lab ID: 60143945028)
  - Selenium
- P9W3A130503 LEACHATE (Lab ID: 60143945021)
  - Selenium
- P9W3B130503 LEACHATE (Lab ID: 60143945024)
  - Selenium
- P9W3C130503 LEACHATE (Lab ID: 60143945027)
  - Selenium
- P9W3D130503 LEACHATE (Lab ID: 60143945029)
  - Selenium

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: NERD2A130502 LEACHATE **Lab ID: 60143945016** Collected: 05/02/13 13:20 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**18300**	ug/L	750	166	10	05/16/13 16:45	05/17/13 11:26	7429-90-5	M6
Antimony	ND	ug/L	20.0	9.2	2	05/16/13 16:45	05/17/13 13:28	7440-36-0	D3
Arsenic	**54.0**	ug/L	20.0	9.2	2	05/16/13 16:45	05/17/13 13:28	7440-38-2	
Barium	**4840**	ug/L	100	4.0	10	05/16/13 16:45	05/17/13 11:26	7440-39-3	
Beryllium	**7.0**	ug/L	1.0	0.13	1	05/16/13 16:45	05/21/13 10:04	7440-41-7	
Cadmium	**602**	ug/L	50.0	25.0	10	05/16/13 16:45	05/17/13 11:26	7440-43-9	
Chromium	**60.0J**	ug/L	100	12.4	20	05/16/13 16:45	05/17/13 12:02	7440-47-3	B
Cobalt	**478**	ug/L	50.0	5.4	10	05/16/13 16:45	05/17/13 11:26	7440-48-4	
Copper	**1940**	ug/L	10.0	2.7	1	05/16/13 16:45	05/21/13 10:04	7440-50-8	M1
Iron	**80800**	ug/L	500	116	10	05/16/13 16:45	05/17/13 11:26	7439-89-6	M6
Lead	**1480**	ug/L	50.0	24.5	10	05/16/13 16:45	05/17/13 11:26	7439-92-1	
Manganese	**276000**	ug/L	100	9.8	20	05/16/13 16:45	05/17/13 12:02	7439-96-5	M6
Molybdenum	**165**	ug/L	40.0	3.4	2	05/16/13 16:45	05/17/13 13:28	7439-98-7	
Nickel	**567**	ug/L	50.0	7.1	10	05/16/13 16:45	05/17/13 11:26	7440-02-0	
Selenium	ND	ug/L	300	84.8	20	05/16/13 16:45	05/17/13 12:02	7782-49-2	D3,M6
Silver	**35.1**	ug/L	7.0	1.1	1	05/16/13 16:45	05/21/13 10:04	7440-22-4	
Thallium	**298**	ug/L	40.0	8.3	2	05/16/13 16:45	05/17/13 13:28	7440-28-0	
Vanadium	**789**	ug/L	200	22.6	20	05/16/13 16:45	05/17/13 12:02	7440-62-2	
Zinc	**95300**	ug/L	500	33.3	10	05/16/13 16:45	05/17/13 11:26	7440-66-6	M6

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: SWRD1C130502 LEACHATE **Lab ID: 60143945017** Collected: 05/02/13 13:15 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**11500**	ug/L	750	166	10	05/16/13 16:45	05/17/13 11:39	7429-90-5	
Antimony	ND	ug/L	100	46.2	10	05/16/13 16:45	05/17/13 11:39	7440-36-0	D3
Arsenic	**18.9J**	ug/L	20.0	9.2	2	05/16/13 16:45	05/17/13 13:40	7440-38-2	
Barium	**1030**	ug/L	100	4.0	10	05/16/13 16:45	05/17/13 11:39	7440-39-3	
Beryllium	**3.9J**	ug/L	5.0	0.65	5	05/16/13 16:45	05/17/13 16:11	7440-41-7	
Cadmium	**176**	ug/L	50.0	25.0	10	05/16/13 16:45	05/17/13 11:39	7440-43-9	
Chromium	**20.2J**	ug/L	50.0	6.2	10	05/16/13 16:45	05/17/13 11:39	7440-47-3	B
Cobalt	**139**	ug/L	50.0	5.4	10	05/16/13 16:45	05/17/13 11:39	7440-48-4	
Copper	**456**	ug/L	50.0	13.4	5	05/16/13 16:45	05/17/13 16:11	7440-50-8	
Iron	**28900**	ug/L	500	116	10	05/16/13 16:45	05/17/13 11:39	7439-89-6	
Lead	**211**	ug/L	50.0	24.5	10	05/16/13 16:45	05/17/13 11:39	7439-92-1	
Manganese	**60800**	ug/L	50.0	4.9	10	05/16/13 16:45	05/17/13 11:39	7439-96-5	
Molybdenum	**68.8**	ug/L	40.0	3.4	2	05/16/13 16:45	05/17/13 13:40	7439-98-7	
Nickel	**131**	ug/L	50.0	7.1	10	05/16/13 16:45	05/17/13 11:39	7440-02-0	
Selenium	ND	ug/L	150	42.4	10	05/16/13 16:45	05/17/13 11:39	7782-49-2	D3
Silver	**7.0J**	ug/L	14.0	2.1	2	05/16/13 16:45	05/17/13 13:40	7440-22-4	
Thallium	ND	ug/L	40.0	8.3	2	05/16/13 16:45	05/17/13 13:40	7440-28-0	D3
Vanadium	**76.9J**	ug/L	100	11.3	10	05/16/13 16:45	05/17/13 11:39	7440-62-2	
Zinc	**31100**	ug/L	500	33.3	10	05/16/13 16:45	05/17/13 11:39	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: MIDRD130502 LEACHATE **Lab ID: 60143945018** Collected: 05/02/13 13:15 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**13400**	ug/L	750	166	10	05/16/13 16:45	05/17/13 11:42	7429-90-5	
Antimony	ND	ug/L	100	46.2	10	05/16/13 16:45	05/17/13 11:42	7440-36-0	D3
Arsenic	**14.0J**	ug/L	20.0	9.2	2	05/16/13 16:45	05/17/13 13:44	7440-38-2	
Barium	**1510**	ug/L	100	4.0	10	05/16/13 16:45	05/17/13 11:42	7440-39-3	
Beryllium	**17.8**	ug/L	5.0	0.65	5	05/16/13 16:45	05/17/13 16:14	7440-41-7	
Cadmium	**538**	ug/L	50.0	25.0	10	05/16/13 16:45	05/17/13 11:42	7440-43-9	
Chromium	**16.6J**	ug/L	50.0	6.2	10	05/16/13 16:45	05/17/13 11:42	7440-47-3	B
Cobalt	**424**	ug/L	50.0	5.4	10	05/16/13 16:45	05/17/13 11:42	7440-48-4	
Copper	**3000**	ug/L	50.0	13.4	5	05/16/13 16:45	05/17/13 16:14	7440-50-8	
Iron	**157000**	ug/L	500	116	10	05/16/13 16:45	05/17/13 11:42	7439-89-6	
Lead	**1630**	ug/L	50.0	24.5	10	05/16/13 16:45	05/17/13 11:42	7439-92-1	
Manganese	**182000**	ug/L	50.0	4.9	10	05/16/13 16:45	05/17/13 11:42	7439-96-5	
Molybdenum	**148**	ug/L	40.0	3.4	2	05/16/13 16:45	05/17/13 13:44	7439-98-7	
Nickel	**181**	ug/L	50.0	7.1	10	05/16/13 16:45	05/17/13 11:42	7440-02-0	
Selenium	ND	ug/L	150	42.4	10	05/16/13 16:45	05/17/13 11:42	7782-49-2	D3
Silver	**36.4**	ug/L	14.0	2.1	2	05/16/13 16:45	05/17/13 13:44	7440-22-4	
Thallium	**32.2J**	ug/L	40.0	8.3	2	05/16/13 16:45	05/17/13 13:44	7440-28-0	
Vanadium	**170**	ug/L	100	11.3	10	05/16/13 16:45	05/17/13 11:42	7440-62-2	
Zinc	**106000**	ug/L	500	33.3	10	05/16/13 16:45	05/17/13 11:42	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W1A130503 LEACHATE **Lab ID: 60143945019** Collected: 05/03/13 10:30 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**255000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 11:44	7429-90-5	M6
Antimony	**66.7**	ug/L	30.0	13.9	3	05/15/13 17:50	05/16/13 13:34	7440-36-0	
Arsenic	**90.4**	ug/L	30.0	13.7	3	05/15/13 17:50	05/16/13 13:34	7440-38-2	
Barium	**7080**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 11:44	7440-39-3	
Beryllium	**52.3**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 11:44	7440-41-7	
Cadmium	**449**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 11:44	7440-43-9	
Chromium	**300**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 11:44	7440-47-3	
Cobalt	**414**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 11:44	7440-48-4	
Copper	**4170**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 11:44	7440-50-8	
Iron	**1440000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 11:44	7439-89-6	M6
Lead	**23700**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 11:44	7439-92-1	
Manganese	**42900**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 11:44	7439-96-5	M6
Molybdenum	**49.7J**	ug/L	60.0	5.1	3	05/15/13 17:50	05/16/13 13:34	7439-98-7	M1
Nickel	**775**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 11:44	7440-02-0	
Selenium	ND	ug/L	45.0	12.7	3	05/15/13 17:50	05/16/13 13:34	7782-49-2	D3
Silver	**151**	ug/L	21.0	3.2	3	05/15/13 17:50	05/16/13 13:34	7440-22-4	
Thallium	**22.1J**	ug/L	60.0	12.4	3	05/15/13 17:50	05/16/13 13:34	7440-28-0	M1
Vanadium	**935**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 11:44	7440-62-2	
Zinc	**58100**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 11:44	7440-66-6	M6

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W2A130503 LEACHATE **Lab ID: 60143945020** Collected: 05/03/13 11:00 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**151000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 11:53	7429-90-5	
Antimony	**25.1**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:02	7440-36-0	
Arsenic	**41.0**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:02	7440-38-2	
Barium	**5680**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 11:53	7440-39-3	
Beryllium	**20.7**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 11:53	7440-41-7	
Cadmium	**132**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 11:53	7440-43-9	
Chromium	**194**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 11:53	7440-47-3	
Cobalt	**226**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 11:53	7440-48-4	
Copper	**1840**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 11:53	7440-50-8	
Iron	**668000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 11:53	7439-89-6	
Lead	**3010**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 11:53	7439-92-1	
Manganese	**13600**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 11:53	7439-96-5	
Molybdenum	**148**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:02	7439-98-7	
Nickel	**510**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 11:53	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:02	7782-49-2	D3
Silver	**24.4**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:02	7440-22-4	
Thallium	**17.2J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:02	7440-28-0	
Vanadium	**892**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 11:53	7440-62-2	
Zinc	**22000**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 11:53	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W3A130503 LEACHATE **Lab ID: 60143945021** Collected: 05/03/13 11:10 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**147000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 11:55	7429-90-5	
Antimony	**25.6**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:04	7440-36-0	
Arsenic	**53.7**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:04	7440-38-2	
Barium	**6220**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 11:55	7440-39-3	
Beryllium	**19.4**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 11:55	7440-41-7	
Cadmium	**102**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 11:55	7440-43-9	
Chromium	**313**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 11:55	7440-47-3	
Cobalt	**203**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 11:55	7440-48-4	
Copper	**1710**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 11:55	7440-50-8	
Iron	**611000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 11:55	7439-89-6	
Lead	**2100**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 11:55	7439-92-1	
Manganese	**12000**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 11:55	7439-96-5	
Molybdenum	**69.8**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:04	7439-98-7	
Nickel	**487**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 11:55	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:04	7782-49-2	D3
Silver	**18.3**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:04	7440-22-4	
Thallium	**15.0J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:04	7440-28-0	
Vanadium	**864**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 11:55	7440-62-2	
Zinc	**15400**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 11:55	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W1B130503 LEACHATE **Lab ID: 60143945022** Collected: 05/03/13 11:20 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**170000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 11:57	7429-90-5	
Antimony	**20.5**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:06	7440-36-0	
Arsenic	**76.3**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:06	7440-38-2	
Barium	**5410**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 11:57	7440-39-3	
Beryllium	**23.6**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 11:57	7440-41-7	
Cadmium	**154**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 11:57	7440-43-9	
Chromium	**269**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 11:57	7440-47-3	
Cobalt	**239**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 11:57	7440-48-4	
Copper	**1890**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 11:57	7440-50-8	
Iron	**725000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 11:57	7439-89-6	
Lead	**2570**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 11:57	7439-92-1	
Manganese	**13400**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 11:57	7439-96-5	
Molybdenum	**302**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:06	7439-98-7	
Nickel	**546**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 11:57	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:06	7782-49-2	D3
Silver	**27.3**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:06	7440-22-4	
Thallium	**20.2J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:06	7440-28-0	
Vanadium	**834**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 11:57	7440-62-2	
Zinc	**27500**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 11:57	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W2B130503 LEACHATE **Lab ID: 60143945023** Collected: 05/03/13 11:25 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**176000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:00	7429-90-5	
Antimony	**37.6**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:09	7440-36-0	
Arsenic	**57.2**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:09	7440-38-2	
Barium	**6220**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:00	7440-39-3	
Beryllium	**25.1**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:00	7440-41-7	
Cadmium	**162**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:00	7440-43-9	
Chromium	**234**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:00	7440-47-3	
Cobalt	**248**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:00	7440-48-4	
Copper	**2070**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:00	7440-50-8	
Iron	**740000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:00	7439-89-6	
Lead	**2340**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:00	7439-92-1	
Manganese	**14400**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:00	7439-96-5	
Molybdenum	**189**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:09	7439-98-7	
Nickel	**571**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:00	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:09	7782-49-2	D3
Silver	**18.3**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:09	7440-22-4	
Thallium	**22.7J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:09	7440-28-0	
Vanadium	**868**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:00	7440-62-2	
Zinc	**26500**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:00	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W3B130503 LEACHATE **Lab ID: 60143945024** Collected: 05/03/13 11:30 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**161000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:06	7429-90-5	
Antimony	**16.9J**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:17	7440-36-0	
Arsenic	**37.1**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:17	7440-38-2	
Barium	**6110**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:06	7440-39-3	
Beryllium	**23.6**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:06	7440-41-7	
Cadmium	**192**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:06	7440-43-9	
Chromium	**199**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:06	7440-47-3	
Cobalt	**247**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:06	7440-48-4	
Copper	**1520**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:06	7440-50-8	
Iron	**657000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:06	7439-89-6	
Lead	**2290**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:06	7439-92-1	
Manganese	**11300**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:06	7439-96-5	
Molybdenum	**182**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:17	7439-98-7	
Nickel	**557**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:06	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:17	7782-49-2	D3
Silver	**13.5J**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:17	7440-22-4	
Thallium	**19.4J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:17	7440-28-0	
Vanadium	**813**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:06	7440-62-2	
Zinc	**35100**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:06	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W1C130503 LEACHATE **Lab ID: 60143945025** Collected: 05/03/13 11:35 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**159000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:09	7429-90-5	
Antimony	**30.5**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:20	7440-36-0	
Arsenic	**54.3**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:20	7440-38-2	
Barium	**6240**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:09	7440-39-3	
Beryllium	**21.2**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:09	7440-41-7	
Cadmium	**121**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:09	7440-43-9	
Chromium	**293**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:09	7440-47-3	
Cobalt	**233**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:09	7440-48-4	
Copper	**1920**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:09	7440-50-8	
Iron	**813000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:09	7439-89-6	
Lead	**2800**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:09	7439-92-1	
Manganese	**15600**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:09	7439-96-5	
Molybdenum	**79.5**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:20	7439-98-7	
Nickel	**509**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:09	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:20	7782-49-2	D3
Silver	**32.7**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:20	7440-22-4	
Thallium	**23.3J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:20	7440-28-0	
Vanadium	**842**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:09	7440-62-2	
Zinc	**21600**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:09	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W2C130503 LEACHATE **Lab ID: 60143945026** Collected: 05/03/13 11:40 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**177000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:11	7429-90-5	
Antimony	**20.8**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:22	7440-36-0	
Arsenic	**51.6**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:22	7440-38-2	
Barium	**6890**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:11	7440-39-3	
Beryllium	**27.8**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:11	7440-41-7	
Cadmium	**131**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:11	7440-43-9	
Chromium	**208**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:11	7440-47-3	
Cobalt	**251**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:11	7440-48-4	
Copper	**1610**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:11	7440-50-8	
Iron	**882000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:11	7439-89-6	
Lead	**3490**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:11	7439-92-1	
Manganese	**14800**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:11	7439-96-5	
Molybdenum	**54.5**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:22	7439-98-7	
Nickel	**563**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:11	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:22	7782-49-2	D3
Silver	**31.9**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:22	7440-22-4	
Thallium	**26.8J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:22	7440-28-0	
Vanadium	**919**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:11	7440-62-2	
Zinc	**23600**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:11	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W3C130503 LEACHATE **Lab ID: 60143945027** Collected: 05/03/13 11:45 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**182000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:13	7429-90-5	
Antimony	**12.9J**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:24	7440-36-0	
Arsenic	**67.4**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:24	7440-38-2	
Barium	**6340**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:13	7440-39-3	
Beryllium	**24.0**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:13	7440-41-7	
Cadmium	**148**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:13	7440-43-9	
Chromium	**288**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:13	7440-47-3	
Cobalt	**256**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:13	7440-48-4	
Copper	**2220**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:13	7440-50-8	
Iron	**809000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:13	7439-89-6	
Lead	**3350**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:13	7439-92-1	
Manganese	**13800**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:13	7439-96-5	
Molybdenum	**242**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:24	7439-98-7	
Nickel	**589**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:13	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:24	7782-49-2	D3
Silver	**24.0**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:24	7440-22-4	
Thallium	**17.5J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:24	7440-28-0	
Vanadium	**914**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:13	7440-62-2	
Zinc	**27000**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:13	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W2D130503 LEACHATE **Lab ID: 60143945028** Collected: 05/03/13 12:00 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**208000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:15	7429-90-5	
Antimony	**28.1**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:27	7440-36-0	
Arsenic	**71.1**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:27	7440-38-2	
Barium	**8820**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:15	7440-39-3	
Beryllium	**27.2**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:15	7440-41-7	
Cadmium	**136**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:15	7440-43-9	
Chromium	**250**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:15	7440-47-3	
Cobalt	**294**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:15	7440-48-4	
Copper	**2280**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:15	7440-50-8	
Iron	**963000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:15	7439-89-6	
Lead	**3610**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:15	7439-92-1	
Manganese	**25000**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:15	7439-96-5	
Molybdenum	**49.1**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:27	7439-98-7	
Nickel	**641**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:15	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:27	7782-49-2	D3
Silver	**32.4**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:27	7440-22-4	
Thallium	**23.5J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:27	7440-28-0	
Vanadium	**1090**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:15	7440-62-2	
Zinc	**19100**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:15	7440-66-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W3D130503 LEACHATE **Lab ID: 60143945029** Collected: 05/03/13 12:05 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**159000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:17	7429-90-5	
Antimony	**27.3**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:29	7440-36-0	
Arsenic	**44.8**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:29	7440-38-2	
Barium	**6280**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:17	7440-39-3	
Beryllium	**24.5**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:17	7440-41-7	
Cadmium	**134**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:17	7440-43-9	
Chromium	**396**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:17	7440-47-3	
Cobalt	**286**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:17	7440-48-4	
Copper	**1890**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:17	7440-50-8	
Iron	**966000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:17	7439-89-6	
Lead	**3000**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:17	7439-92-1	
Manganese	**15600**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:17	7439-96-5	
Molybdenum	**42.0**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:29	7439-98-7	
Nickel	**546**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:17	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:29	7782-49-2	D3
Silver	**30.1**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:29	7440-22-4	
Thallium	**30.8J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:29	7440-28-0	
Vanadium	**1020**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:17	7440-62-2	
Zinc	**21600**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:17	7440-66-6	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Sample: P9W1D130503 LEACHATE **Lab ID: 60143945030** Collected: 05/03/13 11:55 Received: 05/04/13 09:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Aluminum	**216000**	ug/L	750	166	10	05/15/13 17:50	05/16/13 12:20	7429-90-5	
Antimony	**40.0**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:31	7440-36-0	
Arsenic	**45.3**	ug/L	20.0	9.2	2	05/15/13 17:50	05/16/13 13:31	7440-38-2	
Barium	**7210**	ug/L	100	4.0	10	05/15/13 17:50	05/16/13 12:20	7440-39-3	
Beryllium	**27.2**	ug/L	10.0	1.3	10	05/15/13 17:50	05/16/13 12:20	7440-41-7	
Cadmium	**137**	ug/L	50.0	25.0	10	05/15/13 17:50	05/16/13 12:20	7440-43-9	
Chromium	**304**	ug/L	50.0	6.2	10	05/15/13 17:50	05/16/13 12:20	7440-47-3	
Cobalt	**268**	ug/L	50.0	5.4	10	05/15/13 17:50	05/16/13 12:20	7440-48-4	
Copper	**1980**	ug/L	100	26.7	10	05/15/13 17:50	05/16/13 12:20	7440-50-8	
Iron	**1170000**	ug/L	500	116	10	05/15/13 17:50	05/16/13 12:20	7439-89-6	
Lead	**3810**	ug/L	50.0	24.5	10	05/15/13 17:50	05/16/13 12:20	7439-92-1	
Manganese	**19100**	ug/L	50.0	4.9	10	05/15/13 17:50	05/16/13 12:20	7439-96-5	
Molybdenum	**25.0J**	ug/L	40.0	3.4	2	05/15/13 17:50	05/16/13 13:31	7439-98-7	
Nickel	**568**	ug/L	50.0	7.1	10	05/15/13 17:50	05/16/13 12:20	7440-02-0	
Selenium	ND	ug/L	30.0	8.5	2	05/15/13 17:50	05/16/13 13:31	7782-49-2	D3
Silver	**31.9**	ug/L	14.0	2.1	2	05/15/13 17:50	05/16/13 13:31	7440-22-4	
Thallium	**31.7J**	ug/L	40.0	8.3	2	05/15/13 17:50	05/16/13 13:31	7440-28-0	
Vanadium	**1150**	ug/L	100	11.3	10	05/15/13 17:50	05/16/13 12:20	7440-62-2	
Zinc	**22200**	ug/L	500	33.3	10	05/15/13 17:50	05/16/13 12:20	7440-66-6	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

QC Batch: MPRP/22623 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60143945016, 60143945017, 60143945018

METHOD BLANK: 1184804 Matrix: Water
Associated Lab Samples: 60143945016, 60143945017, 60143945018

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	75.0	05/17/13 11:23	
Antimony	ug/L	ND	10.0	05/17/13 11:23	
Arsenic	ug/L	ND	10.0	05/17/13 11:23	
Barium	ug/L	ND	10.0	05/17/13 11:23	
Beryllium	ug/L	ND	1.0	05/21/13 09:58	
Cadmium	ug/L	ND	5.0	05/17/13 11:23	
Chromium	ug/L	0.63J	5.0	05/17/13 11:23	
Cobalt	ug/L	ND	5.0	05/17/13 11:23	
Copper	ug/L	ND	10.0	05/21/13 09:58	
Iron	ug/L	ND	50.0	05/17/13 11:23	
Lead	ug/L	ND	5.0	05/17/13 11:23	
Manganese	ug/L	ND	5.0	05/17/13 11:23	
Molybdenum	ug/L	ND	20.0	05/17/13 11:23	
Nickel	ug/L	ND	5.0	05/17/13 11:23	
Selenium	ug/L	ND	15.0	05/17/13 11:23	
Silver	ug/L	ND	7.0	05/21/13 09:58	
Thallium	ug/L	ND	20.0	05/17/13 11:23	
Vanadium	ug/L	ND	10.0	05/17/13 11:23	
Zinc	ug/L	ND	50.0	05/17/13 11:23	

LABORATORY CONTROL SAMPLE: 1184805

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9200	92	80-120	
Antimony	ug/L	1000	864	86	80-120	
Arsenic	ug/L	1000	858	86	80-120	
Barium	ug/L	1000	866	87	80-120	
Beryllium	ug/L	1000	992	99	80-120	
Cadmium	ug/L	1000	873	87	80-120	
Chromium	ug/L	1000	918	92	80-120	
Cobalt	ug/L	1000	894	89	80-120	
Copper	ug/L	1000	963	96	80-120	
Iron	ug/L	10000	8930	89	80-120	
Lead	ug/L	1000	915	92	80-120	
Manganese	ug/L	1000	914	91	80-120	
Molybdenum	ug/L	1000	890	89	80-120	
Nickel	ug/L	1000	913	91	80-120	
Selenium	ug/L	1000	864	86	80-120	
Silver	ug/L	500	470	94	80-120	
Thallium	ug/L	1000	911	91	80-120	
Vanadium	ug/L	1000	895	89	80-120	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

LABORATORY CONTROL SAMPLE: 1184805

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	1000	935	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1184806 1184807

Parameter	Units	60143945016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	18300	10000	10000	31800	33400	134	150	75-125	5	20	M6
Antimony	ug/L	ND	1000	1000	766	756	77	76	75-125	1	20	
Arsenic	ug/L	54.0	1000	1000	1070	1100	102	104	75-125	2	20	
Barium	ug/L	4840	1000	1000	5740	5770	90	93	75-125	0	20	
Beryllium	ug/L	7.0	1000	1000	962	946	95	94	75-125	2	20	
Cadmium	ug/L	602	1000	1000	1470	1490	87	88	75-125	1	20	
Chromium	ug/L	60.0J	1000	1000	965	966	90	91	75-125	0	20	
Cobalt	ug/L	478	1000	1000	1340	1360	87	89	75-125	1	20	
Copper	ug/L	1940	1000	1000	3120	3220	119	129	75-125	3	20	M1
Iron	ug/L	80800	10000	10000	87300	91300	65	105	75-125	4	20	M6
Lead	ug/L	1480	1000	1000	2330	2370	86	89	75-125	1	20	
Manganese	ug/L	276000	1000	1000	277000	276000	60	0	75-125	0	20	M6
Molybdenum	ug/L	165	1000	1000	1170	1200	100	103	75-125	2	20	
Nickel	ug/L	567	1000	1000	1440	1470	88	90	75-125	2	20	
Selenium	ug/L	ND	1000	1000	301	258J	30	25	75-125		20	M6
Silver	ug/L	35.1	500	500	521	552	97	103	75-125	6	20	
Thallium	ug/L	298	1000	1000	1120	1220	82	92	75-125	9	20	
Vanadium	ug/L	789	1000	1000	1660	1670	88	88	75-125	0	20	
Zinc	ug/L	95300	1000	1000	95400	96000	9	72	75-125	1	20	M6

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

QC Batch: MPRP/22681 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60143945019, 60143945020, 60143945021, 60143945022, 60143945023, 60143945024, 60143945025, 60143945026, 60143945027, 60143945028, 60143945029, 60143945030

METHOD BLANK: 1187452 Matrix: Water
Associated Lab Samples: 60143945019, 60143945020, 60143945021, 60143945022, 60143945023, 60143945024, 60143945025, 60143945026, 60143945027, 60143945028, 60143945029, 60143945030

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	75.0	05/16/13 11:40	
Antimony	ug/L	ND	10.0	05/16/13 11:40	
Arsenic	ug/L	ND	10.0	05/16/13 11:40	
Barium	ug/L	ND	10.0	05/16/13 11:40	
Beryllium	ug/L	ND	1.0	05/16/13 11:40	
Cadmium	ug/L	ND	5.0	05/16/13 11:40	
Chromium	ug/L	ND	5.0	05/16/13 11:40	
Cobalt	ug/L	ND	5.0	05/16/13 11:40	
Copper	ug/L	ND	10.0	05/16/13 11:40	
Iron	ug/L	ND	50.0	05/16/13 11:40	
Lead	ug/L	3.0J	5.0	05/16/13 11:40	
Manganese	ug/L	ND	5.0	05/16/13 11:40	
Molybdenum	ug/L	ND	20.0	05/16/13 11:40	
Nickel	ug/L	0.95J	5.0	05/16/13 11:40	
Selenium	ug/L	ND	15.0	05/16/13 11:40	
Silver	ug/L	ND	7.0	05/16/13 11:40	
Thallium	ug/L	ND	20.0	05/16/13 11:40	
Vanadium	ug/L	ND	10.0	05/16/13 11:40	
Zinc	ug/L	ND	50.0	05/16/13 11:40	

LABORATORY CONTROL SAMPLE: 1187453

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	10300	103	80-120	
Antimony	ug/L	1000	1020	102	80-120	
Arsenic	ug/L	1000	986	99	80-120	
Barium	ug/L	1000	983	98	80-120	
Beryllium	ug/L	1000	1010	101	80-120	
Cadmium	ug/L	1000	997	100	80-120	
Chromium	ug/L	1000	1010	101	80-120	
Cobalt	ug/L	1000	1020	102	80-120	
Copper	ug/L	1000	983	98	80-120	
Iron	ug/L	10000	10000	100	80-120	
Lead	ug/L	1000	1030	103	80-120	
Manganese	ug/L	1000	1020	102	80-120	
Molybdenum	ug/L	1000	1020	102	80-120	
Nickel	ug/L	1000	1040	104	80-120	
Selenium	ug/L	1000	1020	102	80-120	
Silver	ug/L	500	498	100	80-120	
Thallium	ug/L	1000	1040	104	80-120	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

LABORATORY CONTROL SAMPLE: 1187453

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Vanadium	ug/L	1000	1000	100	80-120	
Zinc	ug/L	1000	1040	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1187454 1187455

Parameter	Units	60143945019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	255000	10000	10000	278000	280000	230	249	75-125	1	20	M6
Antimony	ug/L	66.7	1000	1000	850	880	78	81	75-125	3	20	
Arsenic	ug/L	90.4	1000	1000	879	889	79	80	75-125	1	20	
Barium	ug/L	7080	1000	1000	8090	8120	101	104	75-125	0	20	
Beryllium	ug/L	52.3	1000	1000	997	994	94	94	75-125	0	20	
Cadmium	ug/L	449	1000	1000	1360	1370	91	92	75-125	1	20	
Chromium	ug/L	300	1000	1000	1210	1230	91	93	75-125	1	20	
Cobalt	ug/L	414	1000	1000	1330	1320	91	91	75-125	0	20	
Copper	ug/L	4170	1000	1000	5090	5120	92	95	75-125	1	20	
Iron	ug/L	1440000	10000	10000	1490000	1480000	530	420	75-125	1	20	M6
Lead	ug/L	23700	1000	1000	24500	24600	77	93	75-125	1	20	
Manganese	ug/L	42900	1000	1000	43800	44200	88	138	75-125	1	20	M6
Molybdenum	ug/L	49.7J	1000	1000	795	808	74	76	75-125	2	20	M1
Nickel	ug/L	775	1000	1000	1700	1710	92	94	75-125	1	20	
Selenium	ug/L	ND	1000	1000	756	800	76	80	75-125	6	20	
Silver	ug/L	151	500	500	546	550	79	80	75-125	1	20	
Thallium	ug/L	22.1J	1000	1000	690	702	67	68	75-125	2	20	M1
Vanadium	ug/L	935	1000	1000	1850	1860	91	93	75-125	1	20	
Zinc	ug/L	58100	1000	1000	59200	59700	116	160	75-125	1	20	M6

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60143945

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60143945016	**NERD2A130502 LEACHATE**	EPA 3010	MPRP/22623	EPA 6010	ICP/17979
60143945017	**SWRD1C130502 LEACHATE**	EPA 3010	MPRP/22623	EPA 6010	ICP/17979
60143945018	**MIDRD130502 LEACHATE**	EPA 3010	MPRP/22623	EPA 6010	ICP/17979
60143945019	**P9W1A130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945020	**P9W2A130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945021	**P9W3A130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945022	**P9W1B130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945023	**P9W2B130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945024	**P9W3B130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945025	**P9W1C130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945026	**P9W2C130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945027	**P9W3C130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945028	**P9W2D130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945029	**P9W3D130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969
60143945030	**P9W1D130503 LEACHATE**	EPA 3010	MPRP/22681	EPA 6010	ICP/17969

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AMEC Leaching Log

Analyst: TDS ☐ AMEC SOP 7.0, Revision 0: Rock Drain Matrix

Date: 5/15/13 ☑ AMEC SOP 8.0, Revision 0: Wetland Organic Matrix

Batch: 22681

Hydroxylamine ID: NA — Acetic acid ID: NA

6M HCl ID: 12573-1-4 — Filter Paper ID: 6810611A

Theremometer ID: T- NA — Correction Factor: NA °C

Temp. As-Read: ↓ °C — Corrected Temp. ↓ °C

Time On: 3:10 — Time Off: 4:10

Sample ID	Weight of beaker	Weight of sample +beaker	Weight of sample (g)	Final Volume (ml)
60143945.004	*	*	101.18	200
-005			100.07	200
-006			100.49	200
007			100.70	200
008			100.45	200
009			100.06	200
010			100.67	200
011			100.40	200
012			100.42	200
013 ~~014~~	JPK 5/21/13		100.39	200
-014			100.11	200
-015			100.06	200
	* samples were weighted directly.			

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219

Phone: 913.599.5665
Fax: 913.599.1759

AMEC Leaching Log

Analyst: TDS ☑ AMEC SOP 7.0, Revision 0: Rock Drain Matrix

Date: 5/16/13 ☐ AMEC SOP 8.0, Revision 0: Wetland Organic Matrix

Batch: 22623

Hydroxylamine ID: 6801 Acetic acid ID: 6929

6M HCl ID: NA Filter Paper ID: NA

Theremometer ID: T-175 Correction Factor: 0 °C

Temp. As-Read: 85 °C Corrected Temp. 85 °C

Time On: 7:55 Time Off: 11:55

Sample ID	Weight of beaker	Weight of sample +beaker	(g) Weight of sample	Final Volume (ml)
60143945-001	*	*	200.55	150
60143945-002	"	"	202.44	150
60143945-003	"	"	202.95	150
* Samples were weighed directly				

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60143945

60143945

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 6449
1Z 733 W87 22 1005 6458

Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☑ Other ☐

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 2.8/3.2

Date and initials of person examining contents: DLS-4/3

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix: SL	☑Yes ☐No ☐N/A	13.
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased):	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☑No ☐N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: dmw Date: 5/7/13

Temp Log: Record start and finish times when unpacking cooler. if >20 min, recheck sample temps.

Start: 955	Start:
End: 1000	End:
Temp:	Temp:

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Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 2

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number: 60143945

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161314.400B
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Acid Extractable Metals-see notes (SW3010/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)	MS/MSD	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)	
	NERD2A130502	5/2/13	1320	X			1	X				X	X	X	10THR	Leachate according to project specific	001
	SWRD1C130502	5/2/13	1315	X			1	X				X	X	X		SOPs provided. Following leachate, total	002
	MIDRD130502	5/2/13	1330	X			1	X				X	X	X		metals are: Ag, Al, As, Ba, Be, Cd, Co,	003
	P9W1A130503	5/3/13	1030	X			1	X				X	X	X		Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Tl,	004
	P9W2A130503	5/3/13	1100	X			1	X				X	X	X		V, Zn	005
	P9W3A130503	5/3/13	1110	X			1	X				X	X	X			006
	P9W1B130503	5/3/13	1120	X			1	X				X	X	X			007
	P9W2B130503	5/3/13	1125	X			1	X				X	X	X			008
	P9W3B130503	5/3/13	1130	X			1	X				X	X	X			009

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: ABBY CAZIER						
Sampler's Company: AMEC	[signature] / AMEC	5/3/13	1400	[signature]	5/4/13	0905
Shipment Method: UPS Ship Date: 5/3/13						
Shipment Tracking No: 1Z733W87 22 1005 6449 / 1Z733W87 22 1005 6448						

Special Instructions: SEE ATTACHED SOPS

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.8/3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Atlantic Richfield Company
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Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number: 60143945

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161314.400B
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage:	4-Execute Activity: Spend	Invoice To:	BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Acid Extractable Metals-see notes (SW3010/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)	MS/MSD	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)	
	P9W1C130503	5/3/13	1135	X			1	X				X	X	X	10THR	Leachate according to project specific	010
	P9W2C130503	5/3/13	1140	X			1	X				X	X	X		SOPs provided. Following leachate, total	011
	P9W3C130503	5/3/13	1145	X			1	X				X	X	X		metals are: Ag, Al, As, Ba, Be, Cd, Co,	012
	P9W1D130503	5/3/13	1155	X			1	X				X	X	X		Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Tl,	013
	P9W2D130503	5/3/13	1200	X			1	X				X	X	X		V, Zn	014
	P9W3D130503	5/3/13	1205	X			1	X				X	X	X			015

AC 5/3/13

Sampler's Name: Abby Cazier
Sampler's Company: AMEC
Shipment Method: UPS Ship Date: 5/3/13
Shipment Tracking No: See pg 1
Special Instructions: See SOPs

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / AMEC	5/3/13	1400	[signature]	5/4/13	0905

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.8/3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Revised

Atlantic Richfield Company
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Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number:

Lab Name: Pace Analytical Laboratories, Inc.	BP/ARC Facility Address: Rico-Argentine Mine	Consultant/Contractor: AMEC E&I, Inc.
Lab Address: 9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code: Rico, Colorado 81332	Consultant/Contractor Project No: SA11161314.400B
Lab PM: Heather Wilson	Lead Regulatory Agency: U.S. EPA Region 8	Address: 10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone: (913) 563-1407	California Global ID No.: NA	Consultant/Contractor PM: Marc Lombardi
Lab Shipping Accnt: UPS # 733W87	Enfos Proposal No: D00ML-0003 (WR 262026)	Phone: 916-636-3200
Lab Bottle Order No: NA	Accounting Mode: Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To: lynda.lombardi@amec.com
Other Info: Wetland Pilot Scale Test	Stage: 4-Execute Activity: Spend	Invoice To: BP/ARC x Contractor ___
BP/ARC EBM: Anthony Brown		
EBM Phone: 714-228-6770		
EBM Email: anthony.brown@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor		No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Acid Extractable Metals-see notes (SW3010/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)					MS/MSD		Report Type & QC Level / Comments
	NERD2A130502	5/2/13	1320	X				1	X						X	X	~~X~~							Standard X Full Data Package ___ Comments Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description. Leachate according to project specific
	SINRD1C130502	5/2/13	1315	X				1	X						X	X	~~X~~							SOPs provided. Following leachate, total
	MIDRD130502	5/2/13	1330	X				1	X						X	X	~~X~~							metals are: Ag, Al, As, Ba, Be, Cd, Co,
	PQW1A130503	5/3/13	1030	X				1	X						X	~~X~~	X							Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Tl,
	PQW2A130503	5/3/13	1100	X				1	X						X	~~X~~	X							V, Zn
	PQW3A130503	5/3/13	1110	X				1	X						X	~~X~~	X							
	PQW1B130503	5/3/13	1120	X				1	X						X	~~X~~	X							Revised COC 5/3/13
	PQW2B130503	5/3/13	1125	X				1	X						X	~~X~~	X							• SOP7 for rock matrix
	PQW3B130503	5/3/13	1130	X				1	X						X	~~X~~	X							• SOP8 for organic matrix

Sampler's Name: ABBY PAZLER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	[signature] / AMEC	5/3/13	1400			
Shipment Method: UPS Ship Date: 5/3/13						
Shipment Tracking No: 1Z733W8722 1005 6449 1Z733W8722 1005 6450						

Special Instructions: SEE ATTACHED SOPs

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Revised

Atlantic Richfield Company
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Laboratory Management Program LaMP Chain of Custody Record

Page 2 of 2

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number:

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161314.400B
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Requested Analyses: Acid Extractable Metals-see notes (SW3010/6010B)	Leachate SOP 7.0 (Rock matrix)	Leachate SOP 8.0 (Org matrix)	MS/MSD	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	P9W1C130503	5/3/13	1135	X			1	X				X	~~X~~	X		Leachate according to project specific
	P9W2C130503	5/3/13	1140	X			1	X				X	~~X~~	X		SOPs provided. Following leachate, total
	P9W3C130503	5/3/13	1145	X			1	X				X	~~X~~	X		metals are: Ag, Al, As, Ba, Be, Cd, Co,
	P9W1D130503	5/3/13	1155	X			1	X				X	~~X~~	X		Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Tl,
	P9W2D130503	5/3/13	1200	X			1	X				X	~~X~~	X		V, Zn
	P9W3D130503	5/3/13	1205	X			1	X				X	~~X~~	X		
																Revised COC 5/13/13
																SOP8 for organic matrix

AC 5/3/13

Sampler's Name:	HIBBY CAZIER	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	AMEC	[signature] / AMEC	5/3/13	1400			
Shipment Method:	UPS Ship Date: 5/3/13						
Shipment Tracking No:	SEE pg 1						
Special Instructions:	SEE SOPS						

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

July 22, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on June 19, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60147163001	**ROCK DRAIN IN 130618**	Water	06/18/13 12:30	06/19/13 10:30
60147163002	**ROCK DRAIN MP 130618**	Water	06/18/13 13:20	06/19/13 10:30
60147163003	**WETLAND OUT 130618**	Water	06/18/13 13:45	06/19/13 10:30

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(913)599-5665

SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP, SMW	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60147163003	**WETLAND OUT 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP, SMW	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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Lenexa, KS 66219
(913)599-5665

PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23144

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60147163001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1207309)
  - Calcium, Dissolved
- MSD (Lab ID: 1207310)
  - Calcium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23143

B: Analyte was detected in the associated method blank.
- BLANK for HBN 295498 [MPRP/231 (Lab ID: 1207303)
  - Chromium
  - Iron

QC Batch: MPRP/23225

B: Analyte was detected in the associated method blank.
- BLANK for HBN 296308 [MPRP/232 (Lab ID: 1210591)
  - Copper

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23145

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60147163002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1207314)
  - Zinc, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: July 22, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: July 22, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN IN 130618 **Lab ID: 60147163001** Collected: 06/18/13 12:30 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**246000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 11:59	7440-70-2	
Magnesium	**21600**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 11:59	7439-95-4	
Potassium	**4240**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 11:59	7440-09-7	
Sodium	**12900**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 11:59	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**256000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 09:55	7440-70-2	D9,M1
Magnesium, Dissolved	**21800**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 15:50	7439-95-4	D9
Potassium, Dissolved	**4050**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 09:55	7440-09-7	
Sodium, Dissolved	**12400**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 09:55	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**90.0**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:17	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:17	7440-36-0	
Arsenic	**0.18J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-38-2	
Barium	**20.2**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:17	7440-39-3	
Beryllium	**0.14J**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-41-7	
Cadmium	**15.3**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-43-9	
Chromium	**0.71J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:17	7440-47-3	B
Cobalt	**2.5**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:17	7440-48-4	
Copper	**20.8**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:17	7440-50-8	
Iron	**843**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:17	7439-89-6	
Lead	**1.6**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:17	7439-92-1	
Manganese	**1770**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:17	7439-96-5	
Molybdenum	**15.3**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:17	7439-98-7	
Nickel	**2.7**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:17	7440-02-0	
Selenium	**0.15J**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:17	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:17	7440-22-4	
Thallium	**0.12J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:17	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:17	7440-62-2	
Zinc	**2450**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**12.5J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 17:51	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:51	7440-36-0	
Arsenic, Dissolved	**0.094J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-38-2	
Barium, Dissolved	**19.3**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:51	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-41-7	
Cadmium, Dissolved	**13.8**	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-43-9	
Chromium, Dissolved	**0.79J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:51	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:51	7440-48-4	
Copper, Dissolved	**2.7**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:51	7440-50-8	
Iron, Dissolved	**6.0J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 17:51	7439-89-6	
Lead, Dissolved	**0.037J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:51	7439-92-1	
Manganese, Dissolved	**1720**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:51	7439-96-5	
Molybdenum, Dissolved	**14.0**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:51	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN IN 130618 **Lab ID: 60147163001** Collected: 06/18/13 12:30 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.9**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:51	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:51	7782-49-2	
Silver, Dissolved	**0.025J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 17:51	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 17:51	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 17:51	7440-62-2	
Zinc, Dissolved	**2070**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 17:51	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	06/20/13 11:07	06/25/13 10:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**644**	mg/L	100	16.0	100		06/29/13 18:39	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.13J**	mg/L	0.50	0.041	1		07/03/13 18:30	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN MP 130618 **Lab ID: 60147163002** Collected: 06/18/13 13:20 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**246000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 12:07	7440-70-2	
Magnesium	**21600**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 12:07	7439-95-4	
Potassium	**4500**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 12:07	7440-09-7	
Sodium	**13000**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 12:07	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**247000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 10:04	7440-70-2	D9
Magnesium, Dissolved	**21800**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 16:04	7439-95-4	D9
Potassium, Dissolved	**4290**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 10:04	7440-09-7	
Sodium, Dissolved	**12500**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 10:04	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**13.6J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:21	7429-90-5	
Antimony	**0.18J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:21	7440-36-0	
Arsenic	**0.12J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-38-2	
Barium	**17.7**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:21	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-41-7	
Cadmium	**3.7**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-43-9	
Chromium	**0.55J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:21	7440-47-3	B
Cobalt	**0.12J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:21	7440-48-4	
Copper	**2.2**	ug/L	1.0	0.12	1	06/25/13 13:45	07/02/13 12:30	7440-50-8	B
Iron	**87.8**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:21	7439-89-6	
Lead	**0.32J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:21	7439-92-1	
Manganese	**76.5**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:21	7439-96-5	
Molybdenum	**12.9**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:21	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:21	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:21	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:21	7440-22-4	
Thallium	**0.035J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:21	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:21	7440-62-2	
Zinc	**688**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 17:55	7429-90-5	
Antimony, Dissolved	**0.20J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:55	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-38-2	
Barium, Dissolved	**17.7**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:55	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-41-7	
Cadmium, Dissolved	**3.7**	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-43-9	
Chromium, Dissolved	**0.35J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:55	7440-47-3	
Cobalt, Dissolved	**0.11J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:55	7440-48-4	
Copper, Dissolved	**0.97J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:55	7440-50-8	
Iron, Dissolved	**5.7J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 17:55	7439-89-6	
Lead, Dissolved	**0.080J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:55	7439-92-1	
Manganese, Dissolved	**69.0**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:55	7439-96-5	
Molybdenum, Dissolved	**12.7**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:55	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN MP 130618 **Lab ID: 60147163002** Collected: 06/18/13 13:20 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:55	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:55	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 17:55	7440-22-4	
Thallium, Dissolved	**0.038J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 17:55	7440-28-0	
Vanadium, Dissolved	**0.50J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 17:55	7440-62-2	
Zinc, Dissolved	**682**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 17:55	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**625**	mg/L	100	16.0	100		06/29/13 18:55	14808-79-8	

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(913)599-5665

ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: WETLAND OUT 130618 **Lab ID: 60147163003** Collected: 06/18/13 13:45 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**241000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 12:10	7440-70-2	
Magnesium	**21700**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 12:10	7439-95-4	
Potassium	**6380**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 12:10	7440-09-7	
Sodium	**14200**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 12:10	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**251000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 10:06	7440-70-2	D9
Magnesium, Dissolved	**22400**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 16:06	7439-95-4	D9
Potassium, Dissolved	**6090**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 10:06	7440-09-7	
Sodium, Dissolved	**13500**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 10:06	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**21.1J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:37	7429-90-5	
Antimony	**0.16J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:37	7440-36-0	
Arsenic	**3.4**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-38-2	
Barium	**106**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:37	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-41-7	
Cadmium	**0.15J**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-43-9	
Chromium	**0.46J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:37	7440-47-3	B
Cobalt	**0.13J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:37	7440-48-4	
Copper	ND	ug/L	1.0	0.12	1	06/25/13 13:45	07/02/13 12:34	7440-50-8	
Iron	**26.7J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:37	7439-89-6	B
Lead	**0.12J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:37	7439-92-1	
Manganese	**542**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:37	7439-96-5	
Molybdenum	**0.57J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:37	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:37	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:37	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:37	7440-22-4	
Thallium	**0.060J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:37	7440-28-0	
Vanadium	**0.42J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:37	7440-62-2	
Zinc	**50.2**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**13.5J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 18:12	7429-90-5	
Antimony, Dissolved	**0.15J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 18:12	7440-36-0	
Arsenic, Dissolved	**3.0**	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-38-2	
Barium, Dissolved	**110**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 18:12	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-43-9	
Chromium, Dissolved	**1.1**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 18:12	7440-47-3	D9
Cobalt, Dissolved	**0.11J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 18:12	7440-48-4	
Copper, Dissolved	**0.30J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 18:12	7440-50-8	
Iron, Dissolved	**11.6J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 18:12	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 18:12	7439-92-1	
Manganese, Dissolved	**560**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 18:12	7439-96-5	D9
Molybdenum, Dissolved	**0.33J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 18:12	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: WETLAND OUT 130618 **Lab ID: 60147163003** Collected: 06/18/13 13:45 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 18:12	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 18:12	7782-49-2	
Silver, Dissolved	**0.028J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 18:12	7440-22-4	
Thallium, Dissolved	**0.070J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 18:12	7440-28-0	
Vanadium, Dissolved	**0.77J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 18:12	7440-62-2	
Zinc, Dissolved	**1.4J**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 18:12	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**39.8**	mg/L	2.0	2.0	1	06/20/13 11:28	06/25/13 10:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**423**	mg/L	100	16.0	100		06/29/13 19:10	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**40.6**	mg/L	15.0	1.2	30		07/03/13 18:49	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23142 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207296 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	06/27/13 11:54	
Magnesium	ug/L	ND	50.0	06/27/13 11:54	
Potassium	ug/L	ND	500	06/27/13 11:54	
Sodium	ug/L	23.4J	500	06/27/13 11:54	

LABORATORY CONTROL SAMPLE: 1207297

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	8930	89	85-115	
Magnesium	ug/L	10000	9670	97	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207298 1207299

Parameter	Units	60147163001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	246000	10000	10000	254000	255000	77	88	70-130	0	9	
Magnesium	ug/L	21600	10000	10000	30600	30900	90	94	70-130	1	9	
Potassium	ug/L	4240	10000	10000	14800	14800	105	105	70-130	0	7	
Sodium	ug/L	12900	10000	10000	23500	23600	106	106	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23144 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207307 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	11.6J	100	07/01/13 15:46	
Magnesium, Dissolved	ug/L	12.9J	50.0	07/01/13 15:46	
Potassium, Dissolved	ug/L	ND	500	07/01/13 15:46	
Sodium, Dissolved	ug/L	ND	500	07/01/13 15:46	

LABORATORY CONTROL SAMPLE: 1207308

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9730	97	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	10300	103	85-115	
Sodium, Dissolved	ug/L	10000	9980	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207309 1207310

Parameter	Units	60147163001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	256000	10000	10000	254000	256000	-21	3	70-130	1	9	M1
Magnesium, Dissolved	ug/L	21800	10000	10000	31600	31800	98	100	70-130	1	9	
Potassium, Dissolved	ug/L	4050	10000	10000	15100	14400	111	103	70-130	5	7	
Sodium, Dissolved	ug/L	12400	10000	10000	24200	22800	119	105	70-130	6	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23143 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207303 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	06/24/13 16:08	
Antimony	ug/L	ND	1.0	06/24/13 16:08	
Arsenic	ug/L	ND	1.0	06/24/13 16:08	
Barium	ug/L	0.25J	1.0	06/24/13 16:08	
Beryllium	ug/L	ND	0.50	06/24/13 16:08	
Cadmium	ug/L	ND	0.50	06/24/13 16:08	
Chromium	ug/L	0.32J	1.0	06/24/13 16:08	
Cobalt	ug/L	ND	1.0	06/24/13 16:08	
Copper	ug/L	0.66J	1.0	06/25/13 10:34	
Iron	ug/L	3.3J	50.0	06/24/13 16:08	
Lead	ug/L	ND	1.0	06/24/13 16:08	
Manganese	ug/L	0.20J	1.0	06/24/13 16:08	
Molybdenum	ug/L	ND	1.0	06/24/13 16:08	
Nickel	ug/L	ND	1.0	06/24/13 16:08	
Selenium	ug/L	ND	1.0	06/24/13 16:08	
Silver	ug/L	ND	0.50	06/24/13 16:08	
Thallium	ug/L	ND	1.0	06/24/13 16:08	
Vanadium	ug/L	ND	1.0	06/24/13 16:08	
Zinc	ug/L	1.8J	10.0	06/24/13 16:08	

LABORATORY CONTROL SAMPLE: 1207304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	907	91	85-115	
Antimony	ug/L	40	36.1	90	85-115	
Arsenic	ug/L	40	37.1	93	85-115	
Barium	ug/L	40	36.4	91	85-115	
Beryllium	ug/L	40	36.7	92	85-115	
Cadmium	ug/L	40	36.2	90	85-115	
Chromium	ug/L	40	36.4	91	85-115	
Cobalt	ug/L	40	36.3	91	85-115	
Copper	ug/L	40	37.0	93	85-115	
Iron	ug/L	1000	922	92	85-115	
Lead	ug/L	40	36.1	90	85-115	
Manganese	ug/L	40	37.3	93	85-115	
Molybdenum	ug/L	40	36.4	91	85-115	
Nickel	ug/L	40	37.1	93	85-115	
Selenium	ug/L	40	36.5	91	85-115	
Silver	ug/L	20	17.8	89	85-115	
Thallium	ug/L	40	34.6	87	85-115	
Vanadium	ug/L	40	36.8	92	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

LABORATORY CONTROL SAMPLE: 1207304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	95.1	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207305 1207306

Parameter	Units	60147163002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	13.6J	1000	1000	906	917	89	90	70-130	1	20	
Antimony	ug/L	0.18J	40	40	39.1	38.8	97	97	70-130	1	20	
Arsenic	ug/L	0.12J	40	40	40.6	40.6	101	101	70-130	0	20	
Barium	ug/L	17.7	40	40	55.3	54.1	94	91	70-130	2	20	
Beryllium	ug/L	ND	40	40	35.2	34.9	88	87	70-130	1	20	
Cadmium	ug/L	3.7	40	40	41.2	41.0	94	93	70-130	1	20	
Chromium	ug/L	0.55J	40	40	38.8	38.8	96	96	70-130	0	20	
Cobalt	ug/L	0.12J	40	40	37.6	37.4	94	93	70-130	1	20	
Iron	ug/L	87.8	1000	1000	1030	1020	94	93	70-130	1	20	
Lead	ug/L	0.32J	40	40	38.3	38.2	95	95	70-130	0	20	
Manganese	ug/L	76.5	40	40	112	112	90	88	70-130	1	20	
Molybdenum	ug/L	12.9	40	40	53.3	53.2	101	101	70-130	0	20	
Nickel	ug/L	ND	40	40	37.3	37.2	93	93	70-130	0	20	
Selenium	ug/L	ND	40	40	40.6	39.3	101	98	70-130	3	20	
Silver	ug/L	ND	20	20	18.3	18.1	91	90	70-130	1	20	
Thallium	ug/L	0.035J	40	40	37.4	36.9	93	92	70-130	1	20	
Vanadium	ug/L	ND	40	40	39.4	39.1	98	98	70-130	1	20	
Zinc	ug/L	688	100	100	761	758	73	70	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23225 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60147163002, 60147163003

METHOD BLANK: 1210591 Matrix: Water
Associated Lab Samples: 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Copper	ug/L	0.41J	1.0	07/02/13 12:22	

LABORATORY CONTROL SAMPLE: 1210592

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Copper	ug/L	40	40.1	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1210593 1210594

Parameter	Units	60147163003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Copper	ug/L	ND	40	40	37.4	37.6	94	94	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23145 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207311 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	06/27/13 17:43	
Antimony, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Arsenic, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Barium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Beryllium, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Cadmium, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Chromium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Cobalt, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Copper, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Iron, Dissolved	ug/L	ND	50.0	06/27/13 17:43	
Lead, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Manganese, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Molybdenum, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Nickel, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Selenium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Silver, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Thallium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Vanadium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Zinc, Dissolved	ug/L	ND	10.0	06/27/13 17:43	

LABORATORY CONTROL SAMPLE: 1207312

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	992	99	85-115	
Antimony, Dissolved	ug/L	40	40.2	101	85-115	
Arsenic, Dissolved	ug/L	40	39.8	100	85-115	
Barium, Dissolved	ug/L	40	39.5	99	85-115	
Beryllium, Dissolved	ug/L	40	41.1	103	85-115	
Cadmium, Dissolved	ug/L	40	40.2	100	85-115	
Chromium, Dissolved	ug/L	40	40.0	100	85-115	
Cobalt, Dissolved	ug/L	40	39.5	99	85-115	
Copper, Dissolved	ug/L	40	39.6	99	85-115	
Iron, Dissolved	ug/L	1000	990	99	85-115	
Lead, Dissolved	ug/L	40	39.5	99	85-115	
Manganese, Dissolved	ug/L	40	40.2	100	85-115	
Molybdenum, Dissolved	ug/L	40	39.9	100	85-115	
Nickel, Dissolved	ug/L	40	40.0	100	85-115	
Selenium, Dissolved	ug/L	40	40.2	100	85-115	
Silver, Dissolved	ug/L	20	19.3	96	85-115	
Thallium, Dissolved	ug/L	40	37.4	94	85-115	
Vanadium, Dissolved	ug/L	40	39.8	100	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

LABORATORY CONTROL SAMPLE: 1207312

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	103	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207313 1207314

Parameter	Units	60147163002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	928	919	92	91	70-130	1	20	
Antimony, Dissolved	ug/L	0.20J	40	40	39.7	39.4	99	98	70-130	1	20	
Arsenic, Dissolved	ug/L	ND	40	40	40.7	40.2	102	100	70-130	1	20	
Barium, Dissolved	ug/L	17.7	40	40	56.2	55.1	96	93	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	36.3	36.1	91	90	70-130	1	20	
Cadmium, Dissolved	ug/L	3.7	40	40	41.9	41.7	96	95	70-130	1	20	
Chromium, Dissolved	ug/L	0.35J	40	40	39.3	38.8	97	96	70-130	1	20	
Cobalt, Dissolved	ug/L	0.11J	40	40	38.3	38.0	96	95	70-130	1	20	
Copper, Dissolved	ug/L	0.97J	40	40	37.9	37.2	92	90	70-130	2	20	
Iron, Dissolved	ug/L	5.7J	1000	1000	968	964	96	96	70-130	0	20	
Lead, Dissolved	ug/L	0.080J	40	40	39.3	38.7	98	96	70-130	2	20	
Manganese, Dissolved	ug/L	69.0	40	40	107	104	96	87	70-130	3	20	
Molybdenum, Dissolved	ug/L	12.7	40	40	52.6	51.5	100	97	70-130	2	20	
Nickel, Dissolved	ug/L	ND	40	40	37.6	37.5	94	94	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	39.6	38.5	99	96	70-130	3	20	
Silver, Dissolved	ug/L	ND	20	20	18.0	18.0	90	90	70-130	0	20	
Thallium, Dissolved	ug/L	0.038J	40	40	37.6	37.2	94	93	70-130	1	20	
Vanadium, Dissolved	ug/L	0.50J	40	40	40.3	40.0	100	99	70-130	1	20	
Zinc, Dissolved	ug/L	682	100	100	770	744	89	62	70-130	4	20	M1

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WET/41952 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60147163001, 60147163003

METHOD BLANK: 1207805 Matrix: Water
Associated Lab Samples: 60147163001, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	06/25/13 10:10	

LABORATORY CONTROL SAMPLE: 1207806

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	186	94	85-115	

SAMPLE DUPLICATE: 1207807

Parameter	Units	60147249001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	5.1	6.1	17	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WETA/25291 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1213568 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	06/29/13 13:31	

LABORATORY CONTROL SAMPLE: 1213569

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1213570 1213571

Parameter	Units	60147372006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	16.7	10	10	27.2	26.9	105	101	61-119	1	10	

MATRIX SPIKE SAMPLE: 1213572

Parameter	Units	60147260001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	144	100	232	89	61-119	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WETA/18399
QC Batch Method: SM 5310C
Analysis Method: SM 5310C
Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60147163001, 60147163003

METHOD BLANK: 817883 Matrix: Water
Associated Lab Samples: 60147163001, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	07/03/13 10:55	

LABORATORY CONTROL SAMPLE: 817884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 817885 817886

Parameter	Units	60147978001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	1.4	2.5	2.5	3.6	3.7	90	91	80-120	1	20	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163003	**WETLAND OUT 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163003	**WETLAND OUT 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163001	**ROCK DRAIN IN 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23225	EPA 200.8	ICPM/2351
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23225	EPA 200.8	ICPM/2351
60147163001	**ROCK DRAIN IN 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163001	**ROCK DRAIN IN 130618**	SM 5210B	WET/41952	SM 5210B	WET/42026
60147163003	**WETLAND OUT 130618**	SM 5210B	WET/41952	SM 5210B	WET/42026
60147163001	**ROCK DRAIN IN 130618**	EPA 300.0	WETA/25291		
60147163002	**ROCK DRAIN MP 130618**	EPA 300.0	WETA/25291		
60147163003	**WETLAND OUT 130618**	EPA 300.0	WETA/25291		
60147163001	**ROCK DRAIN IN 130618**	SM 5310C	WETA/18399		
60147163003	**WETLAND OUT 130618**	SM 5310C	WETA/18399		

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www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60147163

60147163

Client Name: BP AMSC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W870221005654 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 3.2

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 6/19/13

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☑No ☐N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 6/19/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1132	Start:
End: 1144	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision x OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level
Standard X
Full Data Package ___

60147163

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	RockDrainIn130618	6/18/13	12:30		X		5	2	1	2	Ø	X	X	X	X	X	BPW	BP2W	BP3W 1.5	BP3E 1.5		Dissolved metals are field filtered. 001
*	RockDrainMP130618	6/18/13	13:20		X		3	1	Ø	2	Ø	X	X	X				↓	↓	↓		002
*	WetlandOut130618	6/18/13	13:45		X		5	2	1	2	Ø	X	X	X	X	X	BPW	↓	↓	↓		Metals are: Ca, K, Na, Mg (E200.7); 003
																						Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
*	13:20 RockDrainMP																					Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
*	13:45 Wetland Out																					

Sampler's Name: Hallie Bevan Simpson
Sampler's Company: AMEC
Shipment Method: UPS Ship Date: 6/18/13
Shipment Tracking No: 1Z 733 W87 2210056654

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Hallie Simpson / AMEC	6/18/13	16:15	[signature] PASI	6/19	1030

Special Instructions:

THIS LINE LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Chain of Custody

4086599
JBK

Pace Analytical
www.pacelabs.com

Workorder: 60147163 **Workorder Name:** RICO-ARGENTINE MINE SITE **Owner Received Date:** 6/19/2013 **Results Requested By:** 7/3/2013

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: H2SO4	5310C TOC	LAB USE ONLY
1	ROCK DRAIN IN 130618 001	PS	6/18/2013 12:30	60147163001	Water	1	X	1-250mbpg c
2	ROCK DRAIN OUT 130618 002	PS	6/18/2013 13:45	60147163003	Water	1	X	↓
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] / Pace	7/2/13 1700		
2	Fed EX	7/3/13 1005	[signature] / Pace GB	7/3/13 1005
3				

Comments

Cooler Temperature on Receipt 2 °C **Custody Seal** Y or N **Received on Ice** Y or N **Samples Intact** Y or N

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical

Sample Condition Upon Receipt

Client Name: Pace-KS Project # 40266599

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other
Tracking #: 5689 1277 8998
Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no
Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no
Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other
Thermometer Used SR-45 Type of Ice: (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun
Cooler Temperature Uncorr: 2 /Corr: 2 °C Biological Tissue is Frozen: ☐ yes ☐ no
Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 7/3/13
Initials: BF

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4. SUB work. 7/3/13 BF
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7. requested due date 7/3/13, samples received 7/3/13. 7/3/13 BF
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	7/3/13 BF ☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10. 002 received with broken cap. 7/3/13 BK
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
Exceptions: VOA, coliform (TOC) TOX, TOH, HG, WIDROW, Phenolics, OTHER:	☐Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐
Person Contacted: Date/Time:
Comments/ Resolution:

Project Manager Review: Date: 7/3/13

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

July 22, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Revised Report 7/22/13_rev.1
Corrected ID on 60147163003 to WETLAND OUT 130618 from ROCK DRAIN OUT 130618

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on June 19, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60147163001	**ROCK DRAIN IN 130618**	Water	06/18/13 12:30	06/19/13 10:30
60147163002	**ROCK DRAIN MP 130618**	Water	06/18/13 13:20	06/19/13 10:30
60147163003	**WETLAND OUT 130618**	Water	06/18/13 13:45	06/19/13 10:30

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP, SMW	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60147163003	**WETLAND OUT 130618**	EPA 200.7	TJT	4	PASI-K
		EPA 200.7	TJT	4	PASI-K
		EPA 200.8	JGP, SMW	19	PASI-K
		EPA 200.8	JGP	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23144

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60147163001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1207309)
  - Calcium, Dissolved
- MSD (Lab ID: 1207310)
  - Calcium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23143

B: Analyte was detected in the associated method blank.
- BLANK for HBN 295498 [MPRP/231 (Lab ID: 1207303)
  - Chromium
  - Iron

QC Batch: MPRP/23225

B: Analyte was detected in the associated method blank.
- BLANK for HBN 296308 [MPRP/232 (Lab ID: 1210591)
  - Copper

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23145

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60147163002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1207314)
  - Zinc, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: July 22, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: July 22, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: July 22, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN IN 130618 **Lab ID: 60147163001** Collected: 06/18/13 12:30 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**246000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 11:59	7440-70-2	
Magnesium	**21600**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 11:59	7439-95-4	
Potassium	**4240**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 11:59	7440-09-7	
Sodium	**12900**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 11:59	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**256000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 09:55	7440-70-2	D9,M1
Magnesium, Dissolved	**21800**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 15:50	7439-95-4	D9
Potassium, Dissolved	**4050**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 09:55	7440-09-7	
Sodium, Dissolved	**12400**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 09:55	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**90.0**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:17	7429-90-5	
Antimony	**0.23J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:17	7440-36-0	
Arsenic	**0.18J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-38-2	
Barium	**20.2**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:17	7440-39-3	
Beryllium	**0.14J**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-41-7	
Cadmium	**15.3**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:17	7440-43-9	
Chromium	**0.71J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:17	7440-47-3	B
Cobalt	**2.5**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:17	7440-48-4	
Copper	**20.8**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:17	7440-50-8	
Iron	**843**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:17	7439-89-6	
Lead	**1.6**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:17	7439-92-1	
Manganese	**1770**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:17	7439-96-5	
Molybdenum	**15.3**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:17	7439-98-7	
Nickel	**2.7**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:17	7440-02-0	
Selenium	**0.15J**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:17	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:17	7440-22-4	
Thallium	**0.12J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:17	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:17	7440-62-2	
Zinc	**2450**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**12.5J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 17:51	7429-90-5	
Antimony, Dissolved	**0.21J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:51	7440-36-0	
Arsenic, Dissolved	**0.094J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-38-2	
Barium, Dissolved	**19.3**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:51	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-41-7	
Cadmium, Dissolved	**13.8**	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:51	7440-43-9	
Chromium, Dissolved	**0.79J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:51	7440-47-3	
Cobalt, Dissolved	**2.3**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:51	7440-48-4	
Copper, Dissolved	**2.7**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:51	7440-50-8	
Iron, Dissolved	**6.0J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 17:51	7439-89-6	
Lead, Dissolved	**0.037J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:51	7439-92-1	
Manganese, Dissolved	**1720**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:51	7439-96-5	
Molybdenum, Dissolved	**14.0**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:51	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN IN 130618 **Lab ID: 60147163001** Collected: 06/18/13 12:30 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**2.9**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:51	7440-02-0	D9
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:51	7782-49-2	
Silver, Dissolved	**0.025J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 17:51	7440-22-4	
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 17:51	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 17:51	7440-62-2	
Zinc, Dissolved	**2070**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 17:51	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	06/20/13 11:07	06/25/13 10:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**644**	mg/L	100	16.0	100		06/29/13 18:39	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.13J**	mg/L	0.50	0.041	1		07/03/13 18:30	7440-44-0	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN MP 130618 **Lab ID: 60147163002** Collected: 06/18/13 13:20 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**246000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 12:07	7440-70-2	
Magnesium	**21600**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 12:07	7439-95-4	
Potassium	**4500**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 12:07	7440-09-7	
Sodium	**13000**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 12:07	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**247000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 10:04	7440-70-2	D9
Magnesium, Dissolved	**21800**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 16:04	7439-95-4	D9
Potassium, Dissolved	**4290**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 10:04	7440-09-7	
Sodium, Dissolved	**12500**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 10:04	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**13.6J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:21	7429-90-5	
Antimony	**0.18J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:21	7440-36-0	
Arsenic	**0.12J**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-38-2	
Barium	**17.7**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:21	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-41-7	
Cadmium	**3.7**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:21	7440-43-9	
Chromium	**0.55J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:21	7440-47-3	B
Cobalt	**0.12J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:21	7440-48-4	
Copper	**2.2**	ug/L	1.0	0.12	1	06/25/13 13:45	07/02/13 12:30	7440-50-8	B
Iron	**87.8**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:21	7439-89-6	
Lead	**0.32J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:21	7439-92-1	
Manganese	**76.5**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:21	7439-96-5	
Molybdenum	**12.9**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:21	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:21	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:21	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:21	7440-22-4	
Thallium	**0.035J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:21	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:21	7440-62-2	
Zinc	**688**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 17:55	7429-90-5	
Antimony, Dissolved	**0.20J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:55	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-38-2	
Barium, Dissolved	**17.7**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:55	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-41-7	
Cadmium, Dissolved	**3.7**	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 17:55	7440-43-9	
Chromium, Dissolved	**0.35J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:55	7440-47-3	
Cobalt, Dissolved	**0.11J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 17:55	7440-48-4	
Copper, Dissolved	**0.97J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:55	7440-50-8	
Iron, Dissolved	**5.7J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 17:55	7439-89-6	
Lead, Dissolved	**0.080J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 17:55	7439-92-1	
Manganese, Dissolved	**69.0**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:55	7439-96-5	
Molybdenum, Dissolved	**12.7**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 17:55	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: ROCK DRAIN MP 130618 **Lab ID: 60147163002** Collected: 06/18/13 13:20 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 17:55	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 17:55	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 17:55	7440-22-4	
Thallium, Dissolved	**0.038J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 17:55	7440-28-0	
Vanadium, Dissolved	**0.50J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 17:55	7440-62-2	
Zinc, Dissolved	**682**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 17:55	7440-66-6	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**625**	mg/L	100	16.0	100		06/29/13 18:55	14808-79-8	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: WETLAND OUT 130618 **Lab ID: 60147163003** Collected: 06/18/13 13:45 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**241000**	ug/L	100	10.4	1	06/20/13 10:00	06/27/13 12:10	7440-70-2	
Magnesium	**21700**	ug/L	50.0	6.5	1	06/20/13 10:00	06/27/13 12:10	7439-95-4	
Potassium	**6380**	ug/L	500	44.4	1	06/20/13 10:00	06/27/13 12:10	7440-09-7	
Sodium	**14200**	ug/L	500	21.7	1	06/20/13 10:00	06/27/13 12:10	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**251000**	ug/L	100	10.4	1	06/20/13 10:00	07/02/13 10:06	7440-70-2	D9
Magnesium, Dissolved	**22400**	ug/L	50.0	6.5	1	06/20/13 10:00	07/01/13 16:06	7439-95-4	D9
Potassium, Dissolved	**6090**	ug/L	500	44.4	1	06/20/13 10:00	07/02/13 10:06	7440-09-7	
Sodium, Dissolved	**13500**	ug/L	500	21.7	1	06/20/13 10:00	07/02/13 10:06	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**21.1J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/24/13 16:37	7429-90-5	
Antimony	**0.16J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:37	7440-36-0	
Arsenic	**3.4**	ug/L	1.0	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-38-2	
Barium	**106**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:37	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-41-7	
Cadmium	**0.15J**	ug/L	0.50	0.050	1	06/20/13 10:00	06/24/13 16:37	7440-43-9	
Chromium	**0.46J**	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:37	7440-47-3	B
Cobalt	**0.13J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/24/13 16:37	7440-48-4	
Copper	ND	ug/L	1.0	0.12	1	06/25/13 13:45	07/02/13 12:34	7440-50-8	
Iron	**26.7J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/24/13 16:37	7439-89-6	B
Lead	**0.12J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/24/13 16:37	7439-92-1	
Manganese	**542**	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:37	7439-96-5	
Molybdenum	**0.57J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/24/13 16:37	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/24/13 16:37	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/24/13 16:37	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/24/13 16:37	7440-22-4	
Thallium	**0.060J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/24/13 16:37	7440-28-0	
Vanadium	**0.42J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/24/13 16:37	7440-62-2	
Zinc	**50.2**	ug/L	10.0	1.0	1	06/20/13 10:00	06/24/13 16:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**13.5J**	ug/L	50.0	6.4	1	06/20/13 10:00	06/27/13 18:12	7429-90-5	
Antimony, Dissolved	**0.15J**	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 18:12	7440-36-0	
Arsenic, Dissolved	**3.0**	ug/L	1.0	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-38-2	
Barium, Dissolved	**110**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 18:12	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	06/20/13 10:00	06/27/13 18:12	7440-43-9	
Chromium, Dissolved	**1.1**	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 18:12	7440-47-3	D9
Cobalt, Dissolved	**0.11J**	ug/L	1.0	0.080	1	06/20/13 10:00	06/27/13 18:12	7440-48-4	
Copper, Dissolved	**0.30J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 18:12	7440-50-8	
Iron, Dissolved	**11.6J**	ug/L	50.0	3.0	1	06/20/13 10:00	06/27/13 18:12	7439-89-6	
Lead, Dissolved	ND	ug/L	1.0	0.030	1	06/20/13 10:00	06/27/13 18:12	7439-92-1	
Manganese, Dissolved	**560**	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 18:12	7439-96-5	D9
Molybdenum, Dissolved	**0.33J**	ug/L	1.0	0.12	1	06/20/13 10:00	06/27/13 18:12	7439-98-7	

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ANALYTICAL RESULTS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Sample: WETLAND OUT 130618 **Lab ID: 60147163003** Collected: 06/18/13 13:45 Received: 06/19/13 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	06/20/13 10:00	06/27/13 18:12	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	06/20/13 10:00	06/27/13 18:12	7782-49-2	
Silver, Dissolved	**0.028J**	ug/L	0.50	0.010	1	06/20/13 10:00	06/27/13 18:12	7440-22-4	
Thallium, Dissolved	**0.070J**	ug/L	1.0	0.020	1	06/20/13 10:00	06/27/13 18:12	7440-28-0	
Vanadium, Dissolved	**0.77J**	ug/L	1.0	0.11	1	06/20/13 10:00	06/27/13 18:12	7440-62-2	
Zinc, Dissolved	**1.4J**	ug/L	10.0	1.0	1	06/20/13 10:00	06/27/13 18:12	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**39.8**	mg/L	2.0	2.0	1	06/20/13 11:28	06/25/13 10:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**423**	mg/L	100	16.0	100		06/29/13 19:10	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**40.6**	mg/L	15.0	1.2	30		07/03/13 18:49	7440-44-0	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23142 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207296 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	06/27/13 11:54	
Magnesium	ug/L	ND	50.0	06/27/13 11:54	
Potassium	ug/L	ND	500	06/27/13 11:54	
Sodium	ug/L	23.4J	500	06/27/13 11:54	

LABORATORY CONTROL SAMPLE: 1207297

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	8930	89	85-115	
Magnesium	ug/L	10000	9670	97	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207298 1207299

Parameter	Units	60147163001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	246000	10000	10000	254000	255000	77	88	70-130	0	9	
Magnesium	ug/L	21600	10000	10000	30600	30900	90	94	70-130	1	9	
Potassium	ug/L	4240	10000	10000	14800	14800	105	105	70-130	0	7	
Sodium	ug/L	12900	10000	10000	23500	23600	106	106	70-130	0	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23144 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207307 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	11.6J	100	07/01/13 15:46	
Magnesium, Dissolved	ug/L	12.9J	50.0	07/01/13 15:46	
Potassium, Dissolved	ug/L	ND	500	07/01/13 15:46	
Sodium, Dissolved	ug/L	ND	500	07/01/13 15:46	

LABORATORY CONTROL SAMPLE: 1207308

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9730	97	85-115	
Magnesium, Dissolved	ug/L	10000	10200	102	85-115	
Potassium, Dissolved	ug/L	10000	10300	103	85-115	
Sodium, Dissolved	ug/L	10000	9980	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207309 1207310

Parameter	Units	60147163001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	256000	10000	10000	254000	256000	-21	3	70-130	1	9	M1
Magnesium, Dissolved	ug/L	21800	10000	10000	31600	31800	98	100	70-130	1	9	
Potassium, Dissolved	ug/L	4050	10000	10000	15100	14400	111	103	70-130	5	7	
Sodium, Dissolved	ug/L	12400	10000	10000	24200	22800	119	105	70-130	6	8	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23143 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207303 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	06/24/13 16:08	
Antimony	ug/L	ND	1.0	06/24/13 16:08	
Arsenic	ug/L	ND	1.0	06/24/13 16:08	
Barium	ug/L	0.25J	1.0	06/24/13 16:08	
Beryllium	ug/L	ND	0.50	06/24/13 16:08	
Cadmium	ug/L	ND	0.50	06/24/13 16:08	
Chromium	ug/L	0.32J	1.0	06/24/13 16:08	
Cobalt	ug/L	ND	1.0	06/24/13 16:08	
Copper	ug/L	0.66J	1.0	06/25/13 10:34	
Iron	ug/L	3.3J	50.0	06/24/13 16:08	
Lead	ug/L	ND	1.0	06/24/13 16:08	
Manganese	ug/L	0.20J	1.0	06/24/13 16:08	
Molybdenum	ug/L	ND	1.0	06/24/13 16:08	
Nickel	ug/L	ND	1.0	06/24/13 16:08	
Selenium	ug/L	ND	1.0	06/24/13 16:08	
Silver	ug/L	ND	0.50	06/24/13 16:08	
Thallium	ug/L	ND	1.0	06/24/13 16:08	
Vanadium	ug/L	ND	1.0	06/24/13 16:08	
Zinc	ug/L	1.8J	10.0	06/24/13 16:08	

LABORATORY CONTROL SAMPLE: 1207304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	907	91	85-115	
Antimony	ug/L	40	36.1	90	85-115	
Arsenic	ug/L	40	37.1	93	85-115	
Barium	ug/L	40	36.4	91	85-115	
Beryllium	ug/L	40	36.7	92	85-115	
Cadmium	ug/L	40	36.2	90	85-115	
Chromium	ug/L	40	36.4	91	85-115	
Cobalt	ug/L	40	36.3	91	85-115	
Copper	ug/L	40	37.0	93	85-115	
Iron	ug/L	1000	922	92	85-115	
Lead	ug/L	40	36.1	90	85-115	
Manganese	ug/L	40	37.3	93	85-115	
Molybdenum	ug/L	40	36.4	91	85-115	
Nickel	ug/L	40	37.1	93	85-115	
Selenium	ug/L	40	36.5	91	85-115	
Silver	ug/L	20	17.8	89	85-115	
Thallium	ug/L	40	34.6	87	85-115	
Vanadium	ug/L	40	36.8	92	85-115	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

LABORATORY CONTROL SAMPLE: 1207304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	95.1	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207305 1207306

Parameter	Units	60147163002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	13.6J	1000	1000	906	917	89	90	70-130	1	20	
Antimony	ug/L	0.18J	40	40	39.1	38.8	97	97	70-130	1	20	
Arsenic	ug/L	0.12J	40	40	40.6	40.6	101	101	70-130	0	20	
Barium	ug/L	17.7	40	40	55.3	54.1	94	91	70-130	2	20	
Beryllium	ug/L	ND	40	40	35.2	34.9	88	87	70-130	1	20	
Cadmium	ug/L	3.7	40	40	41.2	41.0	94	93	70-130	1	20	
Chromium	ug/L	0.55J	40	40	38.8	38.8	96	96	70-130	0	20	
Cobalt	ug/L	0.12J	40	40	37.6	37.4	94	93	70-130	1	20	
Iron	ug/L	87.8	1000	1000	1030	1020	94	93	70-130	1	20	
Lead	ug/L	0.32J	40	40	38.3	38.2	95	95	70-130	0	20	
Manganese	ug/L	76.5	40	40	112	112	90	88	70-130	1	20	
Molybdenum	ug/L	12.9	40	40	53.3	53.2	101	101	70-130	0	20	
Nickel	ug/L	ND	40	40	37.3	37.2	93	93	70-130	0	20	
Selenium	ug/L	ND	40	40	40.6	39.3	101	98	70-130	3	20	
Silver	ug/L	ND	20	20	18.3	18.1	91	90	70-130	1	20	
Thallium	ug/L	0.035J	40	40	37.4	36.9	93	92	70-130	1	20	
Vanadium	ug/L	ND	40	40	39.4	39.1	98	98	70-130	1	20	
Zinc	ug/L	688	100	100	761	758	73	70	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23225 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60147163002, 60147163003

METHOD BLANK: 1210591 Matrix: Water
Associated Lab Samples: 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Copper	ug/L	0.41J	1.0	07/02/13 12:22	

LABORATORY CONTROL SAMPLE: 1210592

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Copper	ug/L	40	40.1	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1210593 1210594

Parameter	Units	60147163003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Copper	ug/L	ND	40	40	37.4	37.6	94	94	70-130	0	20	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: MPRP/23145 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1207311 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	06/27/13 17:43	
Antimony, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Arsenic, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Barium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Beryllium, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Cadmium, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Chromium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Cobalt, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Copper, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Iron, Dissolved	ug/L	ND	50.0	06/27/13 17:43	
Lead, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Manganese, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Molybdenum, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Nickel, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Selenium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Silver, Dissolved	ug/L	ND	0.50	06/27/13 17:43	
Thallium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Vanadium, Dissolved	ug/L	ND	1.0	06/27/13 17:43	
Zinc, Dissolved	ug/L	ND	10.0	06/27/13 17:43	

LABORATORY CONTROL SAMPLE: 1207312

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	992	99	85-115	
Antimony, Dissolved	ug/L	40	40.2	101	85-115	
Arsenic, Dissolved	ug/L	40	39.8	100	85-115	
Barium, Dissolved	ug/L	40	39.5	99	85-115	
Beryllium, Dissolved	ug/L	40	41.1	103	85-115	
Cadmium, Dissolved	ug/L	40	40.2	100	85-115	
Chromium, Dissolved	ug/L	40	40.0	100	85-115	
Cobalt, Dissolved	ug/L	40	39.5	99	85-115	
Copper, Dissolved	ug/L	40	39.6	99	85-115	
Iron, Dissolved	ug/L	1000	990	99	85-115	
Lead, Dissolved	ug/L	40	39.5	99	85-115	
Manganese, Dissolved	ug/L	40	40.2	100	85-115	
Molybdenum, Dissolved	ug/L	40	39.9	100	85-115	
Nickel, Dissolved	ug/L	40	40.0	100	85-115	
Selenium, Dissolved	ug/L	40	40.2	100	85-115	
Silver, Dissolved	ug/L	20	19.3	96	85-115	
Thallium, Dissolved	ug/L	40	37.4	94	85-115	
Vanadium, Dissolved	ug/L	40	39.8	100	85-115	

REPORT OF LABORATORY ANALYSIS

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

LABORATORY CONTROL SAMPLE: 1207312

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	103	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1207313 1207314

Parameter	Units	60147163002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	928	919	92	91	70-130	1	20	
Antimony, Dissolved	ug/L	0.20J	40	40	39.7	39.4	99	98	70-130	1	20	
Arsenic, Dissolved	ug/L	ND	40	40	40.7	40.2	102	100	70-130	1	20	
Barium, Dissolved	ug/L	17.7	40	40	56.2	55.1	96	93	70-130	2	20	
Beryllium, Dissolved	ug/L	ND	40	40	36.3	36.1	91	90	70-130	1	20	
Cadmium, Dissolved	ug/L	3.7	40	40	41.9	41.7	96	95	70-130	1	20	
Chromium, Dissolved	ug/L	0.35J	40	40	39.3	38.8	97	96	70-130	1	20	
Cobalt, Dissolved	ug/L	0.11J	40	40	38.3	38.0	96	95	70-130	1	20	
Copper, Dissolved	ug/L	0.97J	40	40	37.9	37.2	92	90	70-130	2	20	
Iron, Dissolved	ug/L	5.7J	1000	1000	968	964	96	96	70-130	0	20	
Lead, Dissolved	ug/L	0.080J	40	40	39.3	38.7	98	96	70-130	2	20	
Manganese, Dissolved	ug/L	69.0	40	40	107	104	96	87	70-130	3	20	
Molybdenum, Dissolved	ug/L	12.7	40	40	52.6	51.5	100	97	70-130	2	20	
Nickel, Dissolved	ug/L	ND	40	40	37.6	37.5	94	94	70-130	0	20	
Selenium, Dissolved	ug/L	ND	40	40	39.6	38.5	99	96	70-130	3	20	
Silver, Dissolved	ug/L	ND	20	20	18.0	18.0	90	90	70-130	0	20	
Thallium, Dissolved	ug/L	0.038J	40	40	37.6	37.2	94	93	70-130	1	20	
Vanadium, Dissolved	ug/L	0.50J	40	40	40.3	40.0	100	99	70-130	1	20	
Zinc, Dissolved	ug/L	682	100	100	770	744	89	62	70-130	4	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WET/41952 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60147163001, 60147163003

METHOD BLANK: 1207805 Matrix: Water
Associated Lab Samples: 60147163001, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	06/25/13 10:10	

LABORATORY CONTROL SAMPLE: 1207806

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	186	94	85-115	

SAMPLE DUPLICATE: 1207807

Parameter	Units	60147249001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	5.1	6.1	17	17	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WETA/25291 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60147163001, 60147163002, 60147163003

METHOD BLANK: 1213568 Matrix: Water
Associated Lab Samples: 60147163001, 60147163002, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	06/29/13 13:31	

LABORATORY CONTROL SAMPLE: 1213569

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1213570 1213571

Parameter	Units	60147372006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	16.7	10	10	27.2	26.9	105	101	61-119	1	10	

MATRIX SPIKE SAMPLE: 1213572

Parameter	Units	60147260001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	144	100	232	89	61-119	

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QUALITY CONTROL DATA

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

QC Batch: WETA/18399
QC Batch Method: SM 5310C
Analysis Method: SM 5310C
Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60147163001, 60147163003

METHOD BLANK: 817883 Matrix: Water
Associated Lab Samples: 60147163001, 60147163003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	07/03/13 10:55	

LABORATORY CONTROL SAMPLE: 817884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 817885 817886

Parameter	Units	60147978001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	1.4	2.5	2.5	3.6	3.7	90	91	80-120	1	20	

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QUALIFIERS

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICO-ARGENTINE MINE SITE
Pace Project No.: 60147163

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163003	**WETLAND OUT 130618**	EPA 200.7	MPRP/23142	EPA 200.7	ICP/18263
60147163001	**ROCK DRAIN IN 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163002	**ROCK DRAIN MP 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163003	**WETLAND OUT 130618**	EPA 200.7	MPRP/23144	EPA 200.7	ICP/18264
60147163001	**ROCK DRAIN IN 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23225	EPA 200.8	ICPM/2351
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23143	EPA 200.8	ICPM/2336
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23225	EPA 200.8	ICPM/2351
60147163001	**ROCK DRAIN IN 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163002	**ROCK DRAIN MP 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163003	**WETLAND OUT 130618**	EPA 200.8	MPRP/23145	EPA 200.8	ICPM/2337
60147163001	**ROCK DRAIN IN 130618**	SM 5210B	WET/41952	SM 5210B	WET/42026
60147163003	**WETLAND OUT 130618**	SM 5210B	WET/41952	SM 5210B	WET/42026
60147163001	**ROCK DRAIN IN 130618**	EPA 300.0	WETA/25291		
60147163002	**ROCK DRAIN MP 130618**	EPA 300.0	WETA/25291		
60147163003	**WETLAND OUT 130618**	EPA 300.0	WETA/25291		
60147163001	**ROCK DRAIN IN 130618**	SM 5310C	WETA/18399		
60147163003	**WETLAND OUT 130618**	SM 5310C	WETA/18399		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60147163

60147163

Client Name: BP AMSC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z733W870221005654 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: T-112 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 3.2

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 6/19/13

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☑No ☐N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 6/19/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1132	Start:
End: 1144	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: _____

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision x OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level
Standard X
Full Data Package ___

60147163

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	RockDrainIn130618	6/18/13	12:30		X		5	2	1	2	Ø	X	X	X	X	X	BPW	BP2W	BP3W 1.5	BP3E 1.5		Dissolved metals are field filtered. 001
*	RockDrainMP130618	6/18/13	13:20		X		3	1	Ø	2	Ø	X	X	X				↓	↓	↓		002
*	WetlandOut130618	6/18/13	13:45		X		5	2	1	2	Ø	X	X	X	X	X	BPW	↓	↓	↓		Metals are: Ca, K, Na, Mg (E200.7); 003
																						Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
*	13:20 RockDrainMP																					Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
*	13:45 Wetland Out																					

Sampler's Name: Hallie Bevan Simpson
Sampler's Company: AMEC
Shipment Method: UPS Ship Date: 6/18/13
Shipment Tracking No: 1Z 733 W87 2210056654

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Hallie Simpson / AMEC	6/18/13	16:15	[signature] PASI	6/19	1030

Special Instructions:

THIS LINE LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Chain of Custody

4086599
JBK

Pace Analytical
www.pacelabs.com

Workorder: 60147163 **Workorder Name:** RICO-ARGENTINE MINE SITE **Owner Received Date:** 6/19/2013 **Results Requested By:** 7/3/2013

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: H2SO4	5310C TOC	LAB USE ONLY
1	ROCK DRAIN IN 130618 001	PS	6/18/2013 12:30	60147163001	Water	1	X	1-250mbpg c
2	ROCK DRAIN OUT 130618 002	PS	6/18/2013 13:45	60147163003	Water	1	X	↓
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] / Pace	7/2/13 1700		
2	Fed EX	7/3/13 1005	[signature] / Pace GB	7/3/13 1005
3				

Comments

Cooler Temperature on Receipt 2 °C **Custody Seal** Y or N **Received on Ice** Y or N **Samples Intact** Y or N

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical

Sample Condition Upon Receipt

Client Name: Pace-KS Project # 40266599

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other
Tracking #: 5689 1277 8998
Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no
Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no
Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other
Thermometer Used SR-45 Type of Ice: (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun
Cooler Temperature Uncorr: 2 /Corr: 2 °C Biological Tissue is Frozen: ☐ yes ☐ no
Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 7/3/13
Initials: BF

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4. SUB work. 7/3/13 BF
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7. requested due date 7/3/13, samples received 7/3/13. 7/3/13 BF
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	7/3/13 BF ☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10. 002 received with broken cap. 7/3/13 BK
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
Exceptions: VOA, coliform (TOC) TOX, TOH, HG, WIDROW, Phenolics, OTHER:	☐Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐
Person Contacted: Date/Time:
Comments/ Resolution:

Project Manager Review: Date: 7/3/13

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

July 25, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on July 11, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60148574001	**ROCK DRAIN IN 130710**	Water	07/10/13 11:15	07/11/13 10:25
60148574002	**ROCK DRAIN MP 130710**	Water	07/10/13 12:50	07/11/13 10:25
60148574003	**WETLAND OUT 130710**	Water	07/10/13 12:50	07/11/13 10:25

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60148574001	**ROCK DRAIN IN 130710**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60148574002	**ROCK DRAIN MP 130710**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60148574003	**WETLAND OUT 130710**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	NDL	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: July 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23456

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60148602003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1219402)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: July 25, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23454

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60148602003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1219393)
  - Calcium, Dissolved
  - Magnesium, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: July 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23455

B: Analyte was detected in the associated method blank.
- BLANK for HBN 298517 [MPRP/234 (Lab ID: 1219395)
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23455

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60148602002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1219397)
  - Manganese
  - Zinc
- MSD (Lab ID: 1219398)
  - Manganese

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: July 25, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23457

B: Analyte was detected in the associated method blank.

- BLANK for HBN 298522 [MPRP/234 (Lab ID: 1219404)
  - Lead, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23457

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60148602002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1219406)
  - Manganese, Dissolved
- MSD (Lab ID: 1219407)
  - Manganese, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: July 25, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: July 25, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: July 25, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: ROCK DRAIN IN 130710 **Lab ID: 60148574001** Collected: 07/10/13 11:15 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**235000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 12:47	7440-70-2	
Magnesium	**19800**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 12:47	7439-95-4	
Potassium	**4920**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 12:47	7440-09-7	
Sodium	**35700**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 12:47	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**234000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 13:35	7440-70-2	
Magnesium, Dissolved	**19800**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 13:35	7439-95-4	
Potassium, Dissolved	**4880**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 13:35	7440-09-7	
Sodium, Dissolved	**35400**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 13:35	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**82.6**	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 14:17	7429-90-5	
Antimony	**0.077J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:17	7440-36-0	
Arsenic	ND	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 14:17	7440-38-2	
Barium	**18.4**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:17	7440-39-3	
Beryllium	**0.20J**	ug/L	0.50	0.050	1	07/12/13 16:15	07/17/13 17:00	7440-41-7	
Cadmium	**14.7**	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 14:17	7440-43-9	
Chromium	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:17	7440-47-3	
Cobalt	**2.1**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:17	7440-48-4	
Copper	**25.3**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:17	7440-50-8	
Iron	**1270**	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 14:17	7439-89-6	
Lead	**2.2**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:17	7439-92-1	
Manganese	**1580**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:17	7439-96-5	
Molybdenum	**22.6**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:17	7439-98-7	
Nickel	**3.6**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:17	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:17	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 14:17	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 14:17	7440-28-0	
Vanadium	ND	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 14:17	7440-62-2	
Zinc	**2580**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 14:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 12:19	7429-90-5	
Antimony, Dissolved	**0.11J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:19	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 12:19	7440-38-2	
Barium, Dissolved	**18.1**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:19	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:19	7440-41-7	
Cadmium, Dissolved	**12.8**	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:19	7440-43-9	
Chromium, Dissolved	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:19	7440-47-3	
Cobalt, Dissolved	**2.1**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:19	7440-48-4	
Copper, Dissolved	**2.8**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:19	7440-50-8	
Iron, Dissolved	ND	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 12:19	7439-89-6	
Lead, Dissolved	**0.22J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:19	7439-92-1	B
Manganese, Dissolved	**1560**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:19	7439-96-5	
Molybdenum, Dissolved	**22.5**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:19	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: ROCK DRAIN IN 130710 **Lab ID: 60148574001** Collected: 07/10/13 11:15 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.5**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:19	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:19	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 12:19	7440-22-4	
Thallium, Dissolved	**0.023J**	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 12:19	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 12:19	7440-62-2	
Zinc, Dissolved	**2070**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 12:19	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	07/12/13 10:11	07/17/13 12:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**680**	mg/L	50.0	8.0	50		07/23/13 18:23	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.11J**	mg/L	0.50	0.041	1		07/19/13 19:50	7440-44-0	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: ROCK DRAIN MP 130710 **Lab ID: 60148574002** Collected: 07/10/13 12:50 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**238000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 12:51	7440-70-2	
Magnesium	**19800**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 12:51	7439-95-4	
Potassium	**5300**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 12:51	7440-09-7	
Sodium	**34500**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 12:51	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**236000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 13:38	7440-70-2	
Magnesium, Dissolved	**19900**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 13:38	7439-95-4	D9
Potassium, Dissolved	**5280**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 13:38	7440-09-7	
Sodium, Dissolved	**34300**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 13:38	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 14:21	7429-90-5	
Antimony	**0.047J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:21	7440-36-0	
Arsenic	ND	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 14:21	7440-38-2	
Barium	**18.5**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:21	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/17/13 17:04	7440-41-7	
Cadmium	**3.6**	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 14:21	7440-43-9	
Chromium	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:21	7440-47-3	
Cobalt	ND	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:21	7440-48-4	
Copper	**1.6**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:21	7440-50-8	
Iron	**44.0J**	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 14:21	7439-89-6	
Lead	**0.29J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:21	7439-92-1	B
Manganese	**16.5**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:21	7439-96-5	
Molybdenum	**20.2**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:21	7439-98-7	
Nickel	**0.58J**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:21	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:21	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 14:21	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 14:21	7440-28-0	
Vanadium	**0.25J**	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 14:21	7440-62-2	
Zinc	**485**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 14:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 12:23	7429-90-5	
Antimony, Dissolved	**0.072J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:23	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 12:23	7440-38-2	
Barium, Dissolved	**18.0**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:23	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:23	7440-41-7	
Cadmium, Dissolved	**3.6**	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:23	7440-43-9	
Chromium, Dissolved	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:23	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:23	7440-48-4	
Copper, Dissolved	**1.4**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:23	7440-50-8	
Iron, Dissolved	ND	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 12:23	7439-89-6	
Lead, Dissolved	**0.22J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:23	7439-92-1	B
Manganese, Dissolved	**10.3**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:23	7439-96-5	
Molybdenum, Dissolved	**20.0**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:23	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: ROCK DRAIN MP 130710 **Lab ID: 60148574002** Collected: 07/10/13 12:50 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.40J**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:23	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:23	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 12:23	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 12:23	7440-28-0	
Vanadium, Dissolved	**0.28J**	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 12:23	7440-62-2	
Zinc, Dissolved	**488**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 12:23	7440-66-6	D9
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**671**	mg/L	50.0	8.0	50		07/25/13 14:14	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: WETLAND OUT 130710 **Lab ID: 60148574003** Collected: 07/10/13 12:50 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**244000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 12:54	7440-70-2	
Magnesium	**20900**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 12:54	7439-95-4	
Potassium	**7140**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 12:54	7440-09-7	
Sodium	**31000**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 12:54	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**238000**	ug/L	100	10.4	1	07/12/13 16:15	07/16/13 13:42	7440-70-2	
Magnesium, Dissolved	**20500**	ug/L	50.0	6.5	1	07/12/13 16:15	07/16/13 13:42	7439-95-4	
Potassium, Dissolved	**6950**	ug/L	500	44.4	1	07/12/13 16:15	07/16/13 13:42	7440-09-7	
Sodium, Dissolved	**30200**	ug/L	500	21.7	1	07/12/13 16:15	07/16/13 13:42	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**19.1J**	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 14:26	7429-90-5	
Antimony	**0.059J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:26	7440-36-0	
Arsenic	**5.4**	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 14:26	7440-38-2	
Barium	**112**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:26	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/17/13 17:08	7440-41-7	
Cadmium	**0.12J**	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 14:26	7440-43-9	
Chromium	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:26	7440-47-3	
Cobalt	**0.14J**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 14:26	7440-48-4	
Copper	**1.1**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:26	7440-50-8	
Iron	**85.3**	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 14:26	7439-89-6	
Lead	**0.56J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 14:26	7439-92-1	B
Manganese	**461**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:26	7439-96-5	
Molybdenum	**0.26J**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 14:26	7439-98-7	
Nickel	**0.90J**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 14:26	7440-02-0	
Selenium	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 14:26	7782-49-2	
Silver	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 14:26	7440-22-4	
Thallium	ND	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 14:26	7440-28-0	
Vanadium	**0.83J**	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 14:26	7440-62-2	
Zinc	**36.7**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 14:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**7.4J**	ug/L	50.0	6.4	1	07/12/13 16:15	07/16/13 12:27	7429-90-5	
Antimony, Dissolved	**0.068J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:27	7440-36-0	
Arsenic, Dissolved	**5.2**	ug/L	1.0	0.050	1	07/12/13 16:15	07/16/13 12:27	7440-38-2	
Barium, Dissolved	**110**	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:27	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:27	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	07/12/13 16:15	07/16/13 12:27	7440-43-9	
Chromium, Dissolved	ND	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:27	7440-47-3	
Cobalt, Dissolved	ND	ug/L	1.0	0.080	1	07/12/13 16:15	07/16/13 12:27	7440-48-4	
Copper, Dissolved	**0.16J**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:27	7440-50-8	
Iron, Dissolved	**6.8J**	ug/L	50.0	3.0	1	07/12/13 16:15	07/16/13 12:27	7439-89-6	
Lead, Dissolved	**0.22J**	ug/L	1.0	0.030	1	07/12/13 16:15	07/16/13 12:27	7439-92-1	B
Manganese, Dissolved	**452**	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:27	7439-96-5	
Molybdenum, Dissolved	**0.13J**	ug/L	1.0	0.12	1	07/12/13 16:15	07/16/13 12:27	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Sample: WETLAND OUT 130710 **Lab ID: 60148574003** Collected: 07/10/13 12:50 Received: 07/11/13 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.72J**	ug/L	1.0	0.070	1	07/12/13 16:15	07/16/13 12:27	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	07/12/13 16:15	07/16/13 12:27	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	07/12/13 16:15	07/16/13 12:27	7440-22-4	
Thallium, Dissolved	ND	ug/L	1.0	0.020	1	07/12/13 16:15	07/16/13 12:27	7440-28-0	
Vanadium, Dissolved	**0.61J**	ug/L	1.0	0.11	1	07/12/13 16:15	07/16/13 12:27	7440-62-2	
Zinc, Dissolved	**2.2J**	ug/L	10.0	1.0	1	07/12/13 16:15	07/16/13 12:27	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**129**	mg/L	2.0	2.0	1	07/12/13 12:03	07/17/13 15:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**353**	mg/L	50.0	8.0	50		07/23/13 19:29	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**17.6**	mg/L	5.0	0.41	10		07/19/13 20:09	7440-44-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: MPRP/23456 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60148574001, 60148574002, 60148574003

METHOD BLANK: 1219400 Matrix: Water
Associated Lab Samples: 60148574001, 60148574002, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	07/16/13 11:59	
Magnesium	ug/L	ND	50.0	07/16/13 11:59	
Potassium	ug/L	ND	500	07/16/13 11:59	
Sodium	ug/L	33.1J	500	07/16/13 11:59	

LABORATORY CONTROL SAMPLE: 1219401

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9980	100	85-115	
Magnesium	ug/L	10000	10300	103	85-115	
Potassium	ug/L	10000	10400	104	85-115	
Sodium	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1219402 1219403

Parameter	Units	60148602003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	388000	10000	10000	392000	395000	39	71	70-130	1	9	M1
Magnesium	ug/L	220000	10000	10000	226000	228000	64	76	70-130	1	9	M1
Potassium	ug/L	2690	10000	10000	12100	12500	94	98	70-130	3	7	
Sodium	ug/L	8720	10000	10000	18300	18600	96	98	70-130	2	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: MPRP/23454 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60148574001, 60148574002, 60148574003

METHOD BLANK: 1219390 Matrix: Water
Associated Lab Samples: 60148574001, 60148574002, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	07/16/13 13:16	
Magnesium, Dissolved	ug/L	ND	50.0	07/16/13 13:16	
Potassium, Dissolved	ug/L	ND	500	07/16/13 13:16	
Sodium, Dissolved	ug/L	ND	500	07/16/13 13:16	

LABORATORY CONTROL SAMPLE: 1219391

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	9710	97	85-115	
Magnesium, Dissolved	ug/L	10000	9950	100	85-115	
Potassium, Dissolved	ug/L	10000	10200	102	85-115	
Sodium, Dissolved	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1219392 1219393

Parameter	Units	60148602003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	379000	10000	10000	387000	382000	72	31	70-130	1	9	M1
Magnesium, Dissolved	ug/L	215000	10000	10000	222000	219000	76	44	70-130	1	9	M1
Potassium, Dissolved	ug/L	2580	10000	10000	12000	12200	94	96	70-130	2	7	
Sodium, Dissolved	ug/L	8550	10000	10000	18100	18200	96	96	70-130	0	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: MPRP/23455 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60148574001, 60148574002, 60148574003

METHOD BLANK: 1219395 Matrix: Water
Associated Lab Samples: 60148574001, 60148574002, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	07/16/13 13:09	
Antimony	ug/L	ND	1.0	07/16/13 13:09	
Arsenic	ug/L	ND	1.0	07/16/13 13:09	
Barium	ug/L	ND	1.0	07/16/13 13:09	
Beryllium	ug/L	ND	0.50	07/17/13 16:43	
Cadmium	ug/L	ND	0.50	07/16/13 13:09	
Chromium	ug/L	ND	1.0	07/16/13 13:09	
Cobalt	ug/L	ND	1.0	07/16/13 13:09	
Copper	ug/L	ND	1.0	07/16/13 13:09	
Iron	ug/L	ND	50.0	07/16/13 13:09	
Lead	ug/L	0.20J	1.0	07/16/13 13:09	
Manganese	ug/L	0.19J	1.0	07/16/13 13:09	
Molybdenum	ug/L	ND	1.0	07/16/13 13:09	
Nickel	ug/L	ND	1.0	07/16/13 13:09	
Selenium	ug/L	ND	1.0	07/16/13 13:09	
Silver	ug/L	ND	0.50	07/16/13 13:09	
Thallium	ug/L	ND	1.0	07/16/13 13:09	
Vanadium	ug/L	ND	1.0	07/16/13 13:09	
Zinc	ug/L	ND	10.0	07/16/13 13:09	

LABORATORY CONTROL SAMPLE: 1219396

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	938	94	85-115	
Antimony	ug/L	40	39.2	98	85-115	
Arsenic	ug/L	40	38.1	95	85-115	
Barium	ug/L	40	38.6	96	85-115	
Beryllium	ug/L	40	37.9	95	85-115	
Cadmium	ug/L	40	39.2	98	85-115	
Chromium	ug/L	40	38.8	97	85-115	
Cobalt	ug/L	40	38.8	97	85-115	
Copper	ug/L	40	38.8	97	85-115	
Iron	ug/L	1000	938	94	85-115	
Lead	ug/L	40	38.0	95	85-115	
Manganese	ug/L	40	38.5	96	85-115	
Molybdenum	ug/L	40	39.5	99	85-115	
Nickel	ug/L	40	38.8	97	85-115	
Selenium	ug/L	40	38.1	95	85-115	
Silver	ug/L	20	19.1	96	85-115	
Thallium	ug/L	40	37.0	93	85-115	
Vanadium	ug/L	40	39.2	98	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

LABORATORY CONTROL SAMPLE: 1219396

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	99.7	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1219397 1219398

Parameter	Units	60148602002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	209	1000	1000	1150	1140	94	93	70-130	1	20	
Antimony	ug/L	0.12J	40	40	40.2	39.6	100	99	70-130	2	20	
Arsenic	ug/L	0.28J	40	40	41.2	40.8	102	101	70-130	1	20	
Barium	ug/L	18.8	40	40	57.2	55.8	96	93	70-130	2	20	
Beryllium	ug/L	0.50	40	40	37.6	37.2	93	92	70-130	1	20	
Cadmium	ug/L	19.8	40	40	59.2	57.7	99	95	70-130	3	20	
Chromium	ug/L	ND	40	40	39.8	39.5	99	99	70-130	1	20	
Cobalt	ug/L	2.4	40	40	41.0	40.4	96	95	70-130	1	20	
Copper	ug/L	60.3	40	40	100	97.9	101	94	70-130	3	20	
Iron	ug/L	3860	1000	1000	4880	4780	102	91	70-130	2	20	
Lead	ug/L	3.5	40	40	42.4	41.6	97	95	70-130	2	20	
Manganese	ug/L	1820	40	40	1880	1830	170	25	70-130	3	20	M1
Molybdenum	ug/L	19.0	40	40	61.4	60.3	106	103	70-130	2	20	
Nickel	ug/L	3.8	40	40	41.8	41.4	95	94	70-130	1	20	
Selenium	ug/L	ND	40	40	41.3	40.9	103	102	70-130	1	20	
Silver	ug/L	ND	20	20	18.6	18.4	93	92	70-130	2	20	
Thallium	ug/L	0.029J	40	40	38.0	37.4	95	94	70-130	2	20	
Vanadium	ug/L	ND	40	40	40.0	39.8	100	100	70-130	0	20	
Zinc	ug/L	3630	100	100	3800	3700	173	74	70-130	3	20	M1

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: MPRP/23457 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60148574001, 60148574002, 60148574003

METHOD BLANK: 1219404 Matrix: Water
Associated Lab Samples: 60148574001, 60148574002, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	07/16/13 11:29	
Antimony, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Arsenic, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Barium, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Beryllium, Dissolved	ug/L	ND	0.50	07/16/13 11:29	
Cadmium, Dissolved	ug/L	ND	0.50	07/16/13 11:29	
Chromium, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Cobalt, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Copper, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Iron, Dissolved	ug/L	ND	50.0	07/16/13 11:29	
Lead, Dissolved	ug/L	0.20J	1.0	07/16/13 11:29	
Manganese, Dissolved	ug/L	0.19J	1.0	07/16/13 11:29	
Molybdenum, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Nickel, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Selenium, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Silver, Dissolved	ug/L	ND	0.50	07/16/13 11:29	
Thallium, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Vanadium, Dissolved	ug/L	ND	1.0	07/16/13 11:29	
Zinc, Dissolved	ug/L	ND	10.0	07/16/13 11:29	

LABORATORY CONTROL SAMPLE: 1219405

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	935	93	85-115	
Antimony, Dissolved	ug/L	40	39.6	99	85-115	
Arsenic, Dissolved	ug/L	40	39.0	98	85-115	
Barium, Dissolved	ug/L	40	39.5	99	85-115	
Beryllium, Dissolved	ug/L	40	38.3	96	85-115	
Cadmium, Dissolved	ug/L	40	39.5	99	85-115	
Chromium, Dissolved	ug/L	40	39.6	99	85-115	
Cobalt, Dissolved	ug/L	40	39.4	98	85-115	
Copper, Dissolved	ug/L	40	39.8	100	85-115	
Iron, Dissolved	ug/L	1000	961	96	85-115	
Lead, Dissolved	ug/L	40	38.6	96	85-115	
Manganese, Dissolved	ug/L	40	39.6	99	85-115	
Molybdenum, Dissolved	ug/L	40	40.2	100	85-115	
Nickel, Dissolved	ug/L	40	39.5	99	85-115	
Selenium, Dissolved	ug/L	40	39.4	98	85-115	
Silver, Dissolved	ug/L	20	19.4	97	85-115	
Thallium, Dissolved	ug/L	40	37.6	94	85-115	
Vanadium, Dissolved	ug/L	40	39.8	99	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

LABORATORY CONTROL SAMPLE: 1219405

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	101	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1219406 1219407

Parameter	Units	60148602002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	912	918	91	92	70-130	1	20	
Antimony, Dissolved	ug/L	0.31J	40	40	40.2	40.3	100	100	70-130	0	20	
Arsenic, Dissolved	ug/L	0.066J	40	40	40.9	41.2	102	103	70-130	1	20	
Barium, Dissolved	ug/L	18.9	40	40	57.3	57.0	96	95	70-130	1	20	
Beryllium, Dissolved	ug/L	0.12J	40	40	34.8	34.4	87	86	70-130	1	20	
Cadmium, Dissolved	ug/L	18.6	40	40	57.6	57.9	98	98	70-130	0	20	
Chromium, Dissolved	ug/L	ND	40	40	39.3	39.5	98	99	70-130	1	20	
Cobalt, Dissolved	ug/L	3.9	40	40	42.3	42.5	96	96	70-130	1	20	
Copper, Dissolved	ug/L	4.4	40	40	42.3	43.4	95	98	70-130	2	20	
Iron, Dissolved	ug/L	4.3J	1000	1000	956	958	95	95	70-130	0	20	
Lead, Dissolved	ug/L	0.22J	40	40	39.0	38.7	97	96	70-130	1	20	
Manganese, Dissolved	ug/L	1860	40	40	1870	1880	28	58	70-130	1	20	M1
Molybdenum, Dissolved	ug/L	18.5	40	40	60.0	60.1	104	104	70-130	0	20	
Nickel, Dissolved	ug/L	4.1	40	40	41.9	42.5	95	96	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	41.2	41.6	103	104	70-130	1	20	
Silver, Dissolved	ug/L	ND	20	20	18.7	18.7	93	93	70-130	0	20	
Thallium, Dissolved	ug/L	0.026J	40	40	38.6	38.3	96	96	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	40.3	40.5	101	101	70-130	1	20	
Zinc, Dissolved	ug/L	3430	100	100	3510	3550	78	114	70-130	1	20	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: WET/42315 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60148574001

METHOD BLANK: 1218844 Matrix: Water
Associated Lab Samples: 60148574001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	07/17/13 11:39	

LABORATORY CONTROL SAMPLE: 1218845

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	178	90	85-115	

SAMPLE DUPLICATE: 1218846

Parameter	Units	60148559001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	28200	29200	4	17	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: WET/42323 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60148574003

METHOD BLANK: 1218960 Matrix: Water
Associated Lab Samples: 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	07/17/13 14:37	

LABORATORY CONTROL SAMPLE: 1218961

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	180	91	85-115	

SAMPLE DUPLICATE: 1218962

Parameter	Units	60148544001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	ND		17	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: WETA/25552 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60148574001, 60148574002, 60148574003

METHOD BLANK: 1224200 Matrix: Water
Associated Lab Samples: 60148574001, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	07/23/13 17:50	

METHOD BLANK: 1225425 Matrix: Water
Associated Lab Samples: 60148574001, 60148574002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	07/25/13 10:57	

LABORATORY CONTROL SAMPLE: 1224201

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	99	90-110	

LABORATORY CONTROL SAMPLE: 1225426

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1224202 1224203

Parameter	Units	60148574001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	680	250	250	892	872	85	77	61-119	2	10	

MATRIX SPIKE SAMPLE: 1224204

Parameter	Units	60148726004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	43.3	50	91.5	96	61-119	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

QC Batch: WETA/18583 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60148574001, 60148574003

METHOD BLANK: 824983 Matrix: Water
Associated Lab Samples: 60148574001, 60148574003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	07/19/13 14:41	

LABORATORY CONTROL SAMPLE: 824984

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.5	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 824985 824986

Parameter	Units	10234956013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	ND	2.5	2.5	2.5	2.5	98	100	80-120	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 824987 824988

Parameter	Units	4081052001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	6.6	15	15	22.1	22.1	103	103	80-120	0	20	

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60148574

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60148574001	**ROCK DRAIN IN 130710**	EPA 200.7	MPRP/23456	EPA 200.7	ICP/18446
60148574002	**ROCK DRAIN MP 130710**	EPA 200.7	MPRP/23456	EPA 200.7	ICP/18446
60148574003	**WETLAND OUT 130710**	EPA 200.7	MPRP/23456	EPA 200.7	ICP/18446
60148574001	**ROCK DRAIN IN 130710**	EPA 200.7	MPRP/23454	EPA 200.7	ICP/18447
60148574002	**ROCK DRAIN MP 130710**	EPA 200.7	MPRP/23454	EPA 200.7	ICP/18447
60148574003	**WETLAND OUT 130710**	EPA 200.7	MPRP/23454	EPA 200.7	ICP/18447
60148574001	**ROCK DRAIN IN 130710**	EPA 200.8	MPRP/23455	EPA 200.8	ICPM/2382
60148574002	**ROCK DRAIN MP 130710**	EPA 200.8	MPRP/23455	EPA 200.8	ICPM/2382
60148574003	**WETLAND OUT 130710**	EPA 200.8	MPRP/23455	EPA 200.8	ICPM/2382
60148574001	**ROCK DRAIN IN 130710**	EPA 200.8	MPRP/23457	EPA 200.8	ICPM/2383
60148574002	**ROCK DRAIN MP 130710**	EPA 200.8	MPRP/23457	EPA 200.8	ICPM/2383
60148574003	**WETLAND OUT 130710**	EPA 200.8	MPRP/23457	EPA 200.8	ICPM/2383
60148574001	**ROCK DRAIN IN 130710**	SM 5210B	WET/42315	SM 5210B	WET/42399
60148574003	**WETLAND OUT 130710**	SM 5210B	WET/42323	SM 5210B	WET/42409
60148574001	**ROCK DRAIN IN 130710**	EPA 300.0	WETA/25552		
60148574002	**ROCK DRAIN MP 130710**	EPA 300.0	WETA/25552		
60148574003	**WETLAND OUT 130710**	EPA 300.0	WETA/25552		
60148574001	**ROCK DRAIN IN 130710**	SM 5310C	WETA/18583		
60148574003	**WETLAND OUT 130710**	SM 5310C	WETA/18583		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60148574

60148574

Client Name: BP Amec

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 127339787 84 4942 5772 Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ 2pkg

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.8

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 7-11-13 BA

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, (TOC), O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 1110	Start:
End: 1115	End:
Temp:	Temp:

Project Manager Review: AMW Date: 7/11/13

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lab Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number: 60148574

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage: 4-Execute	Activity: Spend	Invoice To:	BP/ARC x Contractor ___
BP/ARC EBM:	Anthony Brown				
EBM Phone:	714-228-6770				
EBM Email:	anthony.brown@bp.com				

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor		Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD	Comments
	RockDrainIn130710	7/10/13	11:15		X			6	3	1	2	Ø			X	X	X	X	X	3BP24	1BP3N	1BP3S	1AG		Dissolved metals are field filtered. 01
	RockDrainMP130710	7/10/13	12:50		X			3	1	Ø	2	Ø			X	X	X			1BP24	↓	↓			02
	WetlandOut130710	7/10/13	12:50		X			6	3	1	2	Ø			X	X	X	X	X	3BP24	↓	↓		1AG	Metals are: Ca, K, Na, Mg (E200.7); 03
																									Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
																									Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

APS

Sampler's Name: Hallie Bevan Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	Hallie Simpson / AMEC	7/10/13	14:15	Bernel Chao / PACE	7-11-13	BATTING ~~0845~~
Shipment Method: UPS Ship Date: 7/10/13						1025
Shipment Tracking No: 1Z733W878449425772						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Chain of Custody

4081060

Pace Analytical
www.pacelabs.com

Workorder: 60148574 **Workorder Name:** WETLAND PILOT SCALE TEST **Owner Received Date:** 7/11/2013 **Results Requested By:** 7/25/2013

Report To	Subcontract To
Heather Wilson Pace Analytical Services, Inc. 9608 Loiret Blvd. Lenexa, KS 66219 Phone (913)599-5665 Fax (913)599-1759	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

						Preserved Containers						Requested Analysis												
Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	H2SO4						5310C TOC												LAB USE ONLY
1	ROCK DRAIN IN 130710 001	PS	7/10/2013 11:15	60148574001	Water	1						X												1-250mlag C
2	WETLAND OUT 130710 002	PS	7/10/2013 12:50	60148574003	Water	1						X												
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] FedEx	7/11/13 1700		
2		7/12/13 0945	E Zelig Pace GB	7/12/13 0945
3				

Comments

Cooler Temperature on Receipt 3 °C **Custody Seal** (Y) or N **Received on Ice** (Y) or N **Samples Intact** (Y) or N

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Sample Condition Upon Receipt

Client Name: Pace KS Project # 4081060

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 5689 1277 9479

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used 5R43 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 3 /Corr: 3 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☑ yes ☐ no

Person examining contents:
Date: 7/12/13
Initials: EMH

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, (OC) TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ **Date:** 7/15/13

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

September 03, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on August 15, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60151053001	**ROCKDRAININ130814**	Water	08/14/13 11:00	08/15/13 10:00
60151053002	**ROCKDRAINMP130814**	Water	08/14/13 11:50	08/15/13 10:00
60151053003	**WETLANDOUT130814**	Water	08/14/13 12:35	08/15/13 10:00

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60151053001	**ROCKDRAININ130814**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW, TJG	19	PASI-K
		SM 5210B	DJR	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60151053002	**ROCKDRAINMP130814**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW, TJG	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60151053003	**WETLANDOUT130814**	EPA 200.7	JGP	4	PASI-K
		EPA 200.7	JGP	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW, TJG	19	PASI-K
		SM 5210B	DJR	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: September 03, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23918

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60151053002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1239268)
  - Calcium

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: September 03, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.
- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: September 03, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23919

B: Analyte was detected in the associated method blank.

- BLANK for HBN 303567 [MPRP/239 (Lab ID: 1239274)
  - Antimony
  - Copper
  - Lead
  - Molybdenum
  - Nickel
  - Silver
  - Thallium
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23919

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60151053001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1239276)
  - Iron

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: September 03, 2013

QC Batch: MPRP/23919

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60151053001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Manganese
- Zinc

- MSD (Lab ID: 1239277)
  - Iron
  - Manganese
  - Zinc

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: September 03, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/23910

B: Analyte was detected in the associated method blank.

- BLANK for HBN 303437 [MPRP/239 (Lab ID: 1238844)
  - Lead, Dissolved
  - Thallium, Dissolved
  - Vanadium, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/23910

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60151091001,60151091002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1238846)
  - Copper, Dissolved
  - Manganese, Dissolved
  - Zinc, Dissolved
- MS (Lab ID: 1238848)
  - Iron, Dissolved
  - Manganese, Dissolved

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: September 03, 2013

QC Batch: MPRP/23910

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60151091001,60151091002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Zinc, Dissolved

- MSD (Lab ID: 1238847)
  - Copper, Dissolved
  - Manganese, Dissolved
  - Zinc, Dissolved

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: September 03, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/42912

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1237094)
  - BOD, 5 day

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: September 03, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Sample Comments:

The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.
- ROCKDRAININ130814 (Lab ID: 60151053001)

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: September 03, 2013

General Information:
1 sample was analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: ROCKDRAININ130814 **Lab ID: 60151053001** Collected: 08/14/13 11:00 Received: 08/15/13 10:00 Matrix: Water

Comments: • The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**253000**	ug/L	100	10.4	1	08/21/13 10:00	08/23/13 15:06	7440-70-2	
Magnesium	**20900**	ug/L	50.0	6.5	1	08/21/13 10:00	08/23/13 15:06	7439-95-4	
Potassium	**3670**	ug/L	500	44.4	1	08/21/13 10:00	08/23/13 15:06	7440-09-7	
Sodium	**17000**	ug/L	500	21.7	1	08/21/13 10:00	08/23/13 15:06	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**253000**	ug/L	100	10.4	1	08/20/13 14:00	08/22/13 11:36	7440-70-2	
Magnesium, Dissolved	**20800**	ug/L	50.0	6.5	1	08/20/13 14:00	08/22/13 11:36	7439-95-4	
Potassium, Dissolved	**3450**	ug/L	500	44.4	1	08/20/13 14:00	08/22/13 11:36	7440-09-7	
Sodium, Dissolved	**16700**	ug/L	500	21.7	1	08/20/13 14:00	08/22/13 11:36	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**114**	ug/L	50.0	6.4	1	08/21/13 10:00	08/28/13 19:47	7429-90-5	
Antimony	**0.26J**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:47	7440-36-0	B
Arsenic	**0.24J**	ug/L	1.0	0.050	1	08/21/13 10:00	08/28/13 19:47	7440-38-2	
Barium	**18.8**	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:47	7440-39-3	
Beryllium	**0.17J**	ug/L	0.50	0.050	1	08/21/13 10:00	08/29/13 18:58	7440-41-7	
Cadmium	**14.2**	ug/L	0.50	0.050	1	08/21/13 10:00	08/28/13 19:47	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:47	7440-47-3	
Cobalt	**2.2**	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:47	7440-48-4	
Copper	**26.7**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:47	7440-50-8	
Iron	**1450**	ug/L	50.0	3.0	1	08/21/13 10:00	08/30/13 19:55	7439-89-6	M1
Lead	**2.5**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:47	7439-92-1	B
Manganese	**1640**	ug/L	1.0	0.14	1	08/21/13 10:00	08/30/13 19:55	7439-96-5	M1
Molybdenum	**16.5**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:47	7439-98-7	
Nickel	**3.8**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:47	7440-02-0	B
Selenium	ND	ug/L	1.0	0.14	1	08/21/13 10:00	08/28/13 19:47	7782-49-2	
Silver	**0.056J**	ug/L	0.50	0.010	1	08/21/13 10:00	08/28/13 19:47	7440-22-4	B
Thallium	**0.18J**	ug/L	1.0	0.020	1	08/21/13 10:00	08/28/13 19:47	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	08/21/13 10:00	08/28/13 19:47	7440-62-2	
Zinc	**2270**	ug/L	10.0	1.0	1	08/21/13 10:00	08/28/13 19:47	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	08/20/13 14:00	08/22/13 21:26	7429-90-5	
Antimony, Dissolved	**0.26J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:26	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	08/20/13 14:00	08/22/13 21:26	7440-38-2	
Barium, Dissolved	**19.1**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:26	7440-39-3	D9
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:26	7440-41-7	
Cadmium, Dissolved	**13.3**	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:26	7440-43-9	
Chromium, Dissolved	ND	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:26	7440-47-3	
Cobalt, Dissolved	**3.5**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:26	7440-48-4	D9
Copper, Dissolved	**2.6**	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:26	7440-50-8	
Iron, Dissolved	ND	ug/L	50.0	3.0	1	08/20/13 14:00	08/30/13 18:50	7439-89-6	
Lead, Dissolved	**0.088J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:26	7439-92-1	B
Manganese, Dissolved	**1650**	ug/L	5.0	0.70	5	08/20/13 14:00	08/26/13 15:21	7439-96-5	D9

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: ROCKDRAININ130814 **Lab ID: 60151053001** Collected: 08/14/13 11:00 Received: 08/15/13 10:00 Matrix: Water

Comments: • The container for the 5310C TOC analysis was broken during shipment; therefore, it was not analyzed for TOC.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Molybdenum, Dissolved	**16.5**	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:26	7439-98-7	
Nickel, Dissolved	**2.6**	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:26	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	08/20/13 14:00	08/22/13 21:26	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	08/20/13 14:00	08/22/13 21:26	7440-22-4	
Thallium, Dissolved	**0.27J**	ug/L	1.0	0.020	1	08/20/13 14:00	08/22/13 21:26	7440-28-0	B
Vanadium, Dissolved	**0.33J**	ug/L	1.0	0.11	1	08/20/13 14:00	08/22/13 21:26	7440-62-2	B
Zinc, Dissolved	**1990**	ug/L	10.0	1.0	1	08/20/13 14:00	08/22/13 21:26	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	08/16/13 09:36	08/21/13 10:38		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**642**	mg/L	100	16.0	100		08/26/13 17:07	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: ROCKDRAINMP130814 **Lab ID: 60151053002** Collected: 08/14/13 11:50 Received: 08/15/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**252000**	ug/L	100	10.4	1	08/21/13 10:00	08/23/13 15:10	7440-70-2	M1
Magnesium	**20900**	ug/L	50.0	6.5	1	08/21/13 10:00	08/23/13 15:10	7439-95-4	
Potassium	**3740**	ug/L	500	44.4	1	08/21/13 10:00	08/23/13 15:10	7440-09-7	
Sodium	**17200**	ug/L	500	21.7	1	08/21/13 10:00	08/23/13 15:10	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**248000**	ug/L	100	10.4	1	08/20/13 14:00	08/22/13 11:42	7440-70-2	
Magnesium, Dissolved	**20300**	ug/L	50.0	6.5	1	08/20/13 14:00	08/22/13 11:42	7439-95-4	
Potassium, Dissolved	**3500**	ug/L	500	44.4	1	08/20/13 14:00	08/22/13 11:42	7440-09-7	
Sodium, Dissolved	**16700**	ug/L	500	21.7	1	08/20/13 14:00	08/22/13 11:42	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**16.4J**	ug/L	50.0	6.4	1	08/21/13 10:00	08/28/13 19:51	7429-90-5	
Antimony	**0.26J**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:51	7440-36-0	B
Arsenic	ND	ug/L	1.0	0.050	1	08/21/13 10:00	08/28/13 19:51	7440-38-2	
Barium	**17.2**	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:51	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	08/21/13 10:00	08/29/13 19:02	7440-41-7	
Cadmium	**5.9**	ug/L	0.50	0.050	1	08/21/13 10:00	08/28/13 19:51	7440-43-9	
Chromium	**0.20J**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:51	7440-47-3	
Cobalt	ND	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:51	7440-48-4	
Copper	**10.3**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:51	7440-50-8	
Iron	**96.3**	ug/L	50.0	3.0	1	08/21/13 10:00	08/30/13 19:59	7439-89-6	
Lead	**0.49J**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:51	7439-92-1	B
Manganese	**5.7**	ug/L	1.0	0.14	1	08/21/13 10:00	08/30/13 19:59	7439-96-5	
Molybdenum	**14.3**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:51	7439-98-7	
Nickel	**1.6**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:51	7440-02-0	B
Selenium	ND	ug/L	1.0	0.14	1	08/21/13 10:00	08/28/13 19:51	7782-49-2	
Silver	**0.050J**	ug/L	0.50	0.010	1	08/21/13 10:00	08/28/13 19:51	7440-22-4	B
Thallium	**0.14J**	ug/L	1.0	0.020	1	08/21/13 10:00	08/28/13 19:51	7440-28-0	B
Vanadium	**0.17J**	ug/L	1.0	0.11	1	08/21/13 10:00	08/28/13 19:51	7440-62-2	
Zinc	**871**	ug/L	10.0	1.0	1	08/21/13 10:00	08/28/13 19:51	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	08/20/13 14:00	08/22/13 21:38	7429-90-5	
Antimony, Dissolved	**0.22J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:38	7440-36-0	
Arsenic, Dissolved	ND	ug/L	1.0	0.050	1	08/20/13 14:00	08/22/13 21:38	7440-38-2	
Barium, Dissolved	**16.8**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:38	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:38	7440-41-7	
Cadmium, Dissolved	**5.6**	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:38	7440-43-9	
Chromium, Dissolved	ND	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:38	7440-47-3	
Cobalt, Dissolved	**0.92J**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:38	7440-48-4	
Copper, Dissolved	**6.2**	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:38	7440-50-8	
Iron, Dissolved	ND	ug/L	50.0	3.0	1	08/20/13 14:00	08/30/13 18:54	7439-89-6	
Lead, Dissolved	**0.087J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:38	7439-92-1	B
Manganese, Dissolved	**6.8**	ug/L	2.0	0.28	2	08/20/13 14:00	08/26/13 15:25	7439-96-5	D9
Molybdenum, Dissolved	**14.1**	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:38	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: ROCKDRAINMP130814 **Lab ID: 60151053002** Collected: 08/14/13 11:50 Received: 08/15/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.34J**	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:38	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	08/20/13 14:00	08/22/13 21:38	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	08/20/13 14:00	08/22/13 21:38	7440-22-4	
Thallium, Dissolved	**0.24J**	ug/L	1.0	0.020	1	08/20/13 14:00	08/22/13 21:38	7440-28-0	B
Vanadium, Dissolved	**0.60J**	ug/L	1.0	0.11	1	08/20/13 14:00	08/22/13 21:38	7440-62-2	B
Zinc, Dissolved	**842**	ug/L	10.0	1.0	1	08/20/13 14:00	08/22/13 21:38	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**637**	mg/L	100	16.0	100		08/27/13 13:48	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: WETLANDOUT130814 **Lab ID: 60151053003** Collected: 08/14/13 12:35 Received: 08/15/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**253000**	ug/L	100	10.4	1	08/21/13 10:00	08/23/13 15:22	7440-70-2	
Magnesium	**20900**	ug/L	50.0	6.5	1	08/21/13 10:00	08/23/13 15:22	7439-95-4	
Potassium	**5360**	ug/L	500	44.4	1	08/21/13 10:00	08/23/13 15:22	7440-09-7	
Sodium	**17400**	ug/L	500	21.7	1	08/21/13 10:00	08/23/13 15:22	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**238000**	ug/L	100	10.4	1	08/20/13 14:00	08/22/13 11:45	7440-70-2	
Magnesium, Dissolved	**19100**	ug/L	50.0	6.5	1	08/20/13 14:00	08/22/13 11:45	7439-95-4	
Potassium, Dissolved	**4870**	ug/L	500	44.4	1	08/20/13 14:00	08/22/13 11:45	7440-09-7	
Sodium, Dissolved	**16300**	ug/L	500	21.7	1	08/20/13 14:00	08/22/13 11:45	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**12.4J**	ug/L	50.0	6.4	1	08/21/13 10:00	08/28/13 19:56	7429-90-5	
Antimony	**0.13J**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:56	7440-36-0	B
Arsenic	**2.2**	ug/L	1.0	0.050	1	08/21/13 10:00	08/28/13 19:56	7440-38-2	
Barium	**99.2**	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:56	7440-39-3	
Beryllium	ND	ug/L	0.50	0.050	1	08/21/13 10:00	08/29/13 19:06	7440-41-7	
Cadmium	ND	ug/L	0.50	0.050	1	08/21/13 10:00	08/28/13 19:56	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:56	7440-47-3	
Cobalt	**0.16J**	ug/L	1.0	0.080	1	08/21/13 10:00	08/28/13 19:56	7440-48-4	
Copper	**0.15J**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:56	7440-50-8	B
Iron	**17.8J**	ug/L	50.0	3.0	1	08/21/13 10:00	08/30/13 20:03	7439-89-6	
Lead	**0.35J**	ug/L	1.0	0.030	1	08/21/13 10:00	08/28/13 19:56	7439-92-1	B
Manganese	**398**	ug/L	1.0	0.14	1	08/21/13 10:00	08/30/13 20:03	7439-96-5	
Molybdenum	**0.34J**	ug/L	1.0	0.12	1	08/21/13 10:00	08/28/13 19:56	7439-98-7	B
Nickel	**0.57J**	ug/L	1.0	0.070	1	08/21/13 10:00	08/28/13 19:56	7440-02-0	B
Selenium	ND	ug/L	1.0	0.14	1	08/21/13 10:00	08/28/13 19:56	7782-49-2	
Silver	**0.049J**	ug/L	0.50	0.010	1	08/21/13 10:00	08/28/13 19:56	7440-22-4	B
Thallium	**0.11J**	ug/L	1.0	0.020	1	08/21/13 10:00	08/28/13 19:56	7440-28-0	B
Vanadium	**0.46J**	ug/L	1.0	0.11	1	08/21/13 10:00	08/28/13 19:56	7440-62-2	
Zinc	**22.5**	ug/L	10.0	1.0	1	08/21/13 10:00	08/28/13 19:56	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	08/20/13 14:00	08/22/13 21:42	7429-90-5	
Antimony, Dissolved	**0.12J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:42	7440-36-0	
Arsenic, Dissolved	**1.9**	ug/L	1.0	0.050	1	08/20/13 14:00	08/22/13 21:42	7440-38-2	
Barium, Dissolved	**95.6**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:42	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:42	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	08/20/13 14:00	08/22/13 21:42	7440-43-9	
Chromium, Dissolved	**0.11J**	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:42	7440-47-3	
Cobalt, Dissolved	**0.53J**	ug/L	1.0	0.080	1	08/20/13 14:00	08/22/13 21:42	7440-48-4	
Copper, Dissolved	**0.23J**	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:42	7440-50-8	
Iron, Dissolved	ND	ug/L	50.0	3.0	1	08/20/13 14:00	08/30/13 18:58	7439-89-6	
Lead, Dissolved	**0.12J**	ug/L	1.0	0.030	1	08/20/13 14:00	08/22/13 21:42	7439-92-1	B
Manganese, Dissolved	**397**	ug/L	5.0	0.70	5	08/20/13 14:00	08/26/13 15:29	7439-96-5	
Molybdenum, Dissolved	ND	ug/L	1.0	0.12	1	08/20/13 14:00	08/22/13 21:42	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Sample: WETLANDOUT130814 **Lab ID: 60151053003** Collected: 08/14/13 12:35 Received: 08/15/13 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	08/20/13 14:00	08/22/13 21:42	7440-02-0	
Selenium, Dissolved	ND	ug/L	1.0	0.14	1	08/20/13 14:00	08/22/13 21:42	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	0.010	1	08/20/13 14:00	08/22/13 21:42	7440-22-4	
Thallium, Dissolved	**0.23J**	ug/L	1.0	0.020	1	08/20/13 14:00	08/22/13 21:42	7440-28-0	B
Vanadium, Dissolved	**0.61J**	ug/L	1.0	0.11	1	08/20/13 14:00	08/22/13 21:42	7440-62-2	B
Zinc, Dissolved	**11.2**	ug/L	10.0	1.0	1	08/20/13 14:00	08/22/13 21:42	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**94.3**	mg/L	2.0	2.0	1	08/16/13 12:21	08/21/13 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**412**	mg/L	50.0	8.0	50		08/27/13 18:51	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**9.7**	mg/L	5.0	0.41	10		08/20/13 06:46	7440-44-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: MPRP/23918 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60151053001, 60151053002, 60151053003

METHOD BLANK: 1239266 Matrix: Water
Associated Lab Samples: 60151053001, 60151053002, 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	08/23/13 15:00	
Magnesium	ug/L	ND	50.0	08/23/13 15:00	
Potassium	ug/L	ND	500	08/23/13 15:00	
Sodium	ug/L	ND	500	08/23/13 15:00	

LABORATORY CONTROL SAMPLE: 1239267

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10400	104	85-115	
Magnesium	ug/L	10000	10300	103	85-115	
Potassium	ug/L	10000	10700	107	85-115	
Sodium	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1239268 1239269

Parameter	Units	60151053002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	252000	10000	10000	267000	260000	151	75	70-130	3	9	M1
Magnesium	ug/L	20900	10000	10000	31700	31300	108	104	70-130	1	9	
Potassium	ug/L	3740	10000	10000	14600	14400	108	106	70-130	1	7	
Sodium	ug/L	17200	10000	10000	28100	27500	110	103	70-130	2	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: MPRP/23911 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60151053001, 60151053002, 60151053003

METHOD BLANK: 1238853 Matrix: Water
Associated Lab Samples: 60151053001, 60151053002, 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	08/21/13 14:33	
Magnesium, Dissolved	ug/L	8.2J	50.0	08/21/13 14:33	
Potassium, Dissolved	ug/L	46.0J	500	08/21/13 14:33	
Sodium, Dissolved	ug/L	ND	500	08/21/13 14:33	

LABORATORY CONTROL SAMPLE: 1238854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10300	103	85-115	
Magnesium, Dissolved	ug/L	10000	10300	103	85-115	
Potassium, Dissolved	ug/L	10000	10400	104	85-115	
Sodium, Dissolved	ug/L	10000	10200	102	85-115	

MATRIX SPIKE SAMPLE: 1238857

Parameter	Units	60151149001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	172000	10000	184000	118	70-130	
Magnesium, Dissolved	ug/L	43500	10000	54700	112	70-130	
Potassium, Dissolved	ug/L	1290	10000	10800	95	70-130	
Sodium, Dissolved	ug/L	11400	10000	20900	95	70-130	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: MPRP/23919 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60151053001, 60151053002, 60151053003

METHOD BLANK: 1239274 Matrix: Water
Associated Lab Samples: 60151053001, 60151053002, 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	08/28/13 19:43	
Antimony	ug/L	0.071J	1.0	08/28/13 19:43	
Arsenic	ug/L	ND	1.0	08/28/13 19:43	
Barium	ug/L	ND	1.0	08/28/13 19:43	
Beryllium	ug/L	ND	0.50	08/29/13 18:42	
Cadmium	ug/L	ND	0.50	08/28/13 19:43	
Chromium	ug/L	ND	1.0	08/28/13 19:43	
Cobalt	ug/L	ND	1.0	08/28/13 19:43	
Copper	ug/L	0.31J	1.0	08/28/13 19:43	
Iron	ug/L	ND	50.0	08/30/13 19:39	
Lead	ug/L	0.30J	1.0	08/28/13 19:43	
Manganese	ug/L	0.45J	1.0	08/30/13 19:39	
Molybdenum	ug/L	0.36J	1.0	08/28/13 19:43	
Nickel	ug/L	0.42J	1.0	08/28/13 19:43	
Selenium	ug/L	ND	1.0	08/28/13 19:43	
Silver	ug/L	0.064J	0.50	08/28/13 19:43	
Thallium	ug/L	0.045J	1.0	08/28/13 19:43	
Vanadium	ug/L	ND	1.0	08/28/13 19:43	
Zinc	ug/L	4.7J	10.0	08/28/13 19:43	

LABORATORY CONTROL SAMPLE: 1239275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	959	96	85-115	
Antimony	ug/L	40	40.1	100	85-115	
Arsenic	ug/L	40	41.2	103	85-115	
Barium	ug/L	40	39.9	100	85-115	
Beryllium	ug/L	40	40.1	100	85-115	
Cadmium	ug/L	40	40.2	100	85-115	
Chromium	ug/L	40	41.0	103	85-115	
Cobalt	ug/L	40	40.1	100	85-115	
Copper	ug/L	40	40.5	101	85-115	
Iron	ug/L	1000	1050	105	85-115	
Lead	ug/L	40	39.4	99	85-115	
Manganese	ug/L	40	40.6	102	85-115	
Molybdenum	ug/L	40	39.7	99	85-115	
Nickel	ug/L	40	40.8	102	85-115	
Selenium	ug/L	40	41.6	104	85-115	
Silver	ug/L	20	19.5	98	85-115	
Thallium	ug/L	40	38.2	96	85-115	
Vanadium	ug/L	40	40.8	102	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

LABORATORY CONTROL SAMPLE: 1239275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	110	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1239276 1239277

Parameter	Units	60151053001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	114	1000	1000	1050	1030	94	92	70-130	2	20	
Antimony	ug/L	0.26J	40	40	40.6	39.7	101	99	70-130	2	20	
Arsenic	ug/L	0.24J	40	40	42.3	41.2	105	103	70-130	2	20	
Barium	ug/L	18.8	40	40	58.7	56.4	100	94	70-130	4	20	
Beryllium	ug/L	0.17J	40	40	36.2	35.1	90	87	70-130	3	20	
Cadmium	ug/L	14.2	40	40	53.0	51.7	97	94	70-130	3	20	
Chromium	ug/L	0.18J	40	40	38.9	38.1	97	95	70-130	2	20	
Cobalt	ug/L	2.2	40	40	39.8	38.7	94	91	70-130	3	20	
Copper	ug/L	26.7	40	40	61.8	59.6	88	82	70-130	4	20	
Iron	ug/L	1450	1000	1000	7910	8120	646	668	70-130	3	20	M1
Lead	ug/L	2.5	40	40	41.7	40.3	98	94	70-130	3	20	
Manganese	ug/L	1640	40	40	1820	1830	442	470	70-130	1	20	M1
Molybdenum	ug/L	16.5	40	40	58.5	56.4	105	100	70-130	4	20	
Nickel	ug/L	3.8	40	40	40.4	39.5	92	89	70-130	2	20	
Selenium	ug/L	ND	40	40	42.8	42.3	107	106	70-130	1	20	
Silver	ug/L	0.056J	20	20	18.3	18.0	91	90	70-130	2	20	
Thallium	ug/L	0.18J	40	40	38.8	37.3	96	93	70-130	4	20	
Vanadium	ug/L	ND	40	40	40.1	39.6	100	99	70-130	1	20	
Zinc	ug/L	2270	100	100	2310	2210	42	-64	70-130	5	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: MPRP/23910 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60151053001, 60151053002, 60151053003

METHOD BLANK: 1238844 Matrix: Water
Associated Lab Samples: 60151053001, 60151053002, 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	08/22/13 20:48	
Antimony, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Arsenic, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Barium, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Beryllium, Dissolved	ug/L	ND	0.50	08/22/13 20:48	
Cadmium, Dissolved	ug/L	ND	0.50	08/22/13 20:48	
Chromium, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Cobalt, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Copper, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Iron, Dissolved	ug/L	ND	50.0	08/30/13 18:30	
Lead, Dissolved	ug/L	0.062J	1.0	08/22/13 20:48	
Manganese, Dissolved	ug/L	0.20J	1.0	08/26/13 15:00	
Molybdenum, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Nickel, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Selenium, Dissolved	ug/L	ND	1.0	08/22/13 20:48	
Silver, Dissolved	ug/L	ND	0.50	08/22/13 20:48	
Thallium, Dissolved	ug/L	0.20J	1.0	08/22/13 20:48	
Vanadium, Dissolved	ug/L	0.39J	1.0	08/22/13 20:48	
Zinc, Dissolved	ug/L	ND	10.0	08/22/13 20:48	

LABORATORY CONTROL SAMPLE: 1238845

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	950	95	85-115	
Antimony, Dissolved	ug/L	40	40.2	100	85-115	
Arsenic, Dissolved	ug/L	40	39.8	100	85-115	
Barium, Dissolved	ug/L	40	39.3	98	85-115	
Beryllium, Dissolved	ug/L	40	39.6	99	85-115	
Cadmium, Dissolved	ug/L	40	40.2	101	85-115	
Chromium, Dissolved	ug/L	40	39.4	98	85-115	
Cobalt, Dissolved	ug/L	40	38.8	97	85-115	
Copper, Dissolved	ug/L	40	38.6	96	85-115	
Iron, Dissolved	ug/L	1000	1020	102	85-115	
Lead, Dissolved	ug/L	40	39.6	99	85-115	
Manganese, Dissolved	ug/L	40	41.5	104	85-115	
Molybdenum, Dissolved	ug/L	40	39.4	99	85-115	
Nickel, Dissolved	ug/L	40	38.8	97	85-115	
Selenium, Dissolved	ug/L	40	40.2	100	85-115	
Silver, Dissolved	ug/L	20	19.3	96	85-115	
Thallium, Dissolved	ug/L	40	37.9	95	85-115	
Vanadium, Dissolved	ug/L	40	39.7	99	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

LABORATORY CONTROL SAMPLE: 1238845

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	103	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1238846 1238847

Parameter	Units	60151091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	7400	1000	1000	8430	8380	104	98	70-130	1	20	
Antimony, Dissolved	ug/L	ND	40	40	38.5	38.3	96	96	70-130	1	20	
Arsenic, Dissolved	ug/L	0.71J	40	40	40.7	41.2	100	101	70-130	1	20	
Barium, Dissolved	ug/L	4.3	40	40	41.4	40.5	93	91	70-130	2	20	
Beryllium, Dissolved	ug/L	5.1	40	40	40.0	40.3	87	88	70-130	1	20	
Cadmium, Dissolved	ug/L	107	40	40	150	150	106	106	70-130	0	20	
Chromium, Dissolved	ug/L	2.2	40	40	40.4	40.8	96	97	70-130	1	20	
Cobalt, Dissolved	ug/L	39.4	40	40	79.2	78.9	99	99	70-130	0	20	
Copper, Dissolved	ug/L	952	40	40	1030	1020	191	171	70-130	1	20	M1
Iron, Dissolved	ug/L	18300	1000	1000	19300	19200	104	94	70-130	0	20	
Lead, Dissolved	ug/L	187	40	40	228	228	102	100	70-130	0	20	
Manganese, Dissolved	ug/L	50500	40	40	52400	52100	4900	4075	70-130	1	20	M1
Molybdenum, Dissolved	ug/L	ND	40	40	41.3	41.5	103	104	70-130	1	20	
Nickel, Dissolved	ug/L	45.4	40	40	83.8	84.4	96	97	70-130	1	20	
Selenium, Dissolved	ug/L	1.1	40	40	41.4	42.0	101	102	70-130	1	20	
Silver, Dissolved	ug/L	0.25J	20	20	19.1	19.3	94	95	70-130	1	20	
Thallium, Dissolved	ug/L	11.6	40	40	47.9	48.3	91	92	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	37.9	37.8	95	95	70-130	0	20	
Zinc, Dissolved	ug/L	27000	100	100	28200	27900	1130	910	70-130	1	20	M1

MATRIX SPIKE SAMPLE: 1238848

Parameter	Units	60151091002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	62.0	1000	955	89	70-130	
Antimony, Dissolved	ug/L	0.067J	40	40.4	101	70-130	
Arsenic, Dissolved	ug/L	1.5	40	43.1	104	70-130	
Barium, Dissolved	ug/L	14.3	40	52.9	96	70-130	
Beryllium, Dissolved	ug/L	1.0	40	36.2	88	70-130	
Cadmium, Dissolved	ug/L	72.7	40	113	100	70-130	
Chromium, Dissolved	ug/L	0.68J	40	40.4	99	70-130	
Cobalt, Dissolved	ug/L	40.3	40	78.6	96	70-130	
Copper, Dissolved	ug/L	18.6	40	56.4	95	70-130	
Iron, Dissolved	ug/L	18600	1000	18500	-12	70-130	M1
Lead, Dissolved	ug/L	0.26J	40	40.4	100	70-130	
Manganese, Dissolved	ug/L	49700	40	48900	-1875	70-130	M1
Molybdenum, Dissolved	ug/L	0.27J	40	41.8	104	70-130	
Nickel, Dissolved	ug/L	46.7	40	84.3	94	70-130	
Selenium, Dissolved	ug/L	ND	40	41.6	104	70-130	
Silver, Dissolved	ug/L	ND	20	19.0	95	70-130	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

MATRIX SPIKE SAMPLE: 1238848

Parameter	Units	60151091002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Thallium, Dissolved	ug/L	10.4	40	48.9	96	70-130	
Vanadium, Dissolved	ug/L	ND	40	40.0	100	70-130	
Zinc, Dissolved	ug/L	25700	100	25400	-260	70-130	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: WET/42912
QC Batch Method: SM 5210B
Analysis Method: SM 5210B
Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60151053001

METHOD BLANK: 1237092 Matrix: Water
Associated Lab Samples: 60151053001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	08/21/13 10:24	

LABORATORY CONTROL SAMPLE: 1237093

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	169	85	85-115	

SAMPLE DUPLICATE: 1237094

Parameter	Units	60151036003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	10.1	12.7	23	17	D6

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: WET/42918 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60151053003

METHOD BLANK: 1237369 Matrix: Water
Associated Lab Samples: 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	08/21/13 11:23	

LABORATORY CONTROL SAMPLE: 1237370

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	220	111	85-115	

SAMPLE DUPLICATE: 1237371

Parameter	Units	60151026004 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	ND		17	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: WETA/25938 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60151053001

METHOD BLANK: 1242289 Matrix: Water
Associated Lab Samples: 60151053001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	08/26/13 08:57	

LABORATORY CONTROL SAMPLE: 1242290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.2	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1242291 1242292

Parameter	Units	60151027001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	47.4	25	25	73.8	73.4	105	104	61-119	1	10	

MATRIX SPIKE SAMPLE: 1242293

Parameter	Units	60151053001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	642	500	1090	90	61-119	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: WETA/25950 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60151053002, 60151053003

METHOD BLANK: 1242766 Matrix: Water
Associated Lab Samples: 60151053002, 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	08/27/13 08:57	

LABORATORY CONTROL SAMPLE: 1242767

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1242768 1242769

Parameter	Units	60151049004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	279	100	100	375	377	96	97	80-120	0	15	

MATRIX SPIKE SAMPLE: 1242770

Parameter	Units	60151053002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	637	500	1090	91	80-120	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

QC Batch: WETA/19027
QC Batch Method: SM 5310C
Analysis Method: SM 5310C
Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60151053003

METHOD BLANK: 841417 Matrix: Water
Associated Lab Samples: 60151053003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	08/20/13 00:00	

LABORATORY CONTROL SAMPLE: 841418

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.4	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 841419 841420

Parameter	Units	10238746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	41.2	75	75	122	124	108	111	80-120	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 841421 841422

Parameter	Units	10238682001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	18.0	50	50	67.4	67.5	99	99	80-120	0	20	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60151053

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60151053001	**ROCKDRAININ130814**	EPA 200.7	MPRP/23918	EPA 200.7	ICP/18723
60151053002	**ROCKDRAINMP130814**	EPA 200.7	MPRP/23918	EPA 200.7	ICP/18723
60151053003	**WETLANDOUT130814**	EPA 200.7	MPRP/23918	EPA 200.7	ICP/18723
60151053001	**ROCKDRAININ130814**	EPA 200.7	MPRP/23911	EPA 200.7	ICP/18717
60151053002	**ROCKDRAINMP130814**	EPA 200.7	MPRP/23911	EPA 200.7	ICP/18717
60151053003	**WETLANDOUT130814**	EPA 200.7	MPRP/23911	EPA 200.7	ICP/18717
60151053001	**ROCKDRAININ130814**	EPA 200.8	MPRP/23919	EPA 200.8	ICPM/2463
60151053002	**ROCKDRAINMP130814**	EPA 200.8	MPRP/23919	EPA 200.8	ICPM/2463
60151053003	**WETLANDOUT130814**	EPA 200.8	MPRP/23919	EPA 200.8	ICPM/2463
60151053001	**ROCKDRAININ130814**	EPA 200.8	MPRP/23910	EPA 200.8	ICPM/2460
60151053002	**ROCKDRAINMP130814**	EPA 200.8	MPRP/23910	EPA 200.8	ICPM/2460
60151053003	**WETLANDOUT130814**	EPA 200.8	MPRP/23910	EPA 200.8	ICPM/2460
60151053001	**ROCKDRAININ130814**	SM 5210B	WET/42912	SM 5210B	WET/42988
60151053003	**WETLANDOUT130814**	SM 5210B	WET/42918	SM 5210B	WET/42991
60151053001	**ROCKDRAININ130814**	EPA 300.0	WETA/25938		
60151053002	**ROCKDRAINMP130814**	EPA 300.0	WETA/25950		
60151053003	**WETLANDOUT130814**	EPA 300.0	WETA/25950		
60151053003	**WETLANDOUT130814**	SM 5310C	WETA/19027		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60151053

60151053

Client Name: BP AMEC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 127331187221005 6645 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ ZPLC

Thermometer Used: T-113 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 3.3

Date and initials of person examining contents: 8-15-13 BA

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix: WT	☑Yes ☐No ☐N/A	13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, (TOC) O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased):	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMW Date: 8/15/13

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1040	Start:
End: 1043	End:
Temp	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
BP/ARC Facility No:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
Lab Work Order Number: (0015/053)

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D00ML-0003 (WR 262026)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage:	4-Execute Activity: Spend	Invoice To:	BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level
Standard X
Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)	~~RUSH~~ MC 8/14/13			MS/MSD	HOLD	Comments
	RockDrainIn130814	8/14/13	11:00		X		5	~~3~~ 2	1	2	~~0~~	X	X	X	X	X	X	1BP1U	1BP2U	1BP3N1.5		Dissolved metals are field filtered. a1 1BP3F1.5 1AG3S
	RockDrainMP130814	8/14/13	11:50		X		3	1	~~0~~	2	~~0~~	X	X	X			X					a2
	Wetlandout130814	8/14/13	12:35		X		5	2	1	2	~~0~~	X	X	X	X	X	X	1BP1U				Metals are: Ca, K, Na, Mg (E200.7); a3 1AG3S
																						Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
																						Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)
																						~~RUSH 5-DAY TAT~~ MC 8/14/13

MC 8/14/13

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: Hallie Beran Simpson	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: AMEC	Hallie Simpson	8/14/13	16:15	Bernd Cks / PACE	8-15-13	1000
Shipment Method: UPS Ship Date: 8/14/13						
Shipment Tracking No: 1Z733W8722100566645						

Special Instructions: 1Z733W8722100566645

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP/ARC LaMP COC Rev. 6 01/01/2009

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

October 10, 2013

Lynda Lombardi
AMEC Environmental & Infrastructure, Inc.
10670 White Rock Road
Suite 100
Rancho Cordova, CA 95670

RE: Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Dear Lynda Lombardi:
Enclosed are the analytical results for sample(s) received by the laboratory on September 20, 2013. The results relate only to the within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

heather.wilson@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

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SAMPLE SUMMARY

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60153615001	**ROCK DRAIN IN 130919**	Water	09/19/13 09:55	09/20/13 10:05
60153615002	**ROCK DRAIN MP 130919**	Water	09/19/13 11:06	09/20/13 10:05
60153615003	**WETLAND OUT 130919**	Water	09/19/13 11:47	09/20/13 10:05

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SAMPLE ANALYTE COUNT

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60153615001	**ROCK DRAIN IN 130919**	EPA 200.7	NDJ	4	PASI-K
		EPA 200.7	NDJ	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	DJR	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G
60153615002	**ROCK DRAIN MP 130919**	EPA 200.7	NDJ	4	PASI-K
		EPA 200.7	NDJ	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 300.0	OL	1	PASI-K
60153615003	**WETLAND OUT 130919**	EPA 200.7	NDJ	4	PASI-K
		EPA 200.7	NDJ	4	PASI-K
		EPA 200.8	SMW	19	PASI-K
		EPA 200.8	SMW	19	PASI-K
		SM 5210B	DJR	1	PASI-K
		EPA 300.0	OL	1	PASI-K
		SM 5310C	TJJ	1	PASI-G

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: BP AMEC
Date: October 10, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/24456

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60153615001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1261078)
  - Calcium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 200.7**
Description: 200.7 Metals, Dissolved
Client: BP AMEC
Date: October 10, 2013

General Information:
3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/24455

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60153615001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1261073)
  - Calcium, Dissolved
- MSD (Lab ID: 1261074)
  - Calcium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: October 10, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/24458

B: Analyte was detected in the associated method blank.

- BLANK for HBN 308967 [MPRP/244 (Lab ID: 1261089)
  - Antimony
  - Beryllium
  - Cadmium
  - Chromium
  - Cobalt
  - Copper
  - Iron
  - Nickel
  - Selenium
  - Silver
  - Thallium

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BP AMEC
Date: October 10, 2013

QC Batch: MPRP/24458

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60153615002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1261091)
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BP AMEC
Date: October 10, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/24457

B: Analyte was detected in the associated method blank.

- BLANK for HBN 308966 [MPRP/244 (Lab ID: 1261084)
  - Antimony, Dissolved
  - Beryllium, Dissolved
  - Cadmium, Dissolved
  - Chromium, Dissolved
  - Cobalt, Dissolved
  - Copper, Dissolved
  - Iron, Dissolved
  - Nickel, Dissolved
  - Selenium, Dissolved
  - Silver, Dissolved
  - Zinc, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **SM 5210B**
Description: 5210B BOD, 5 day
Client: BP AMEC
Date: October 10, 2013

General Information:
2 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SM 5210B with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/43519

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1257268)
  - BOD, 5 day

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: BP AMEC
Date: October 10, 2013

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Method: **SM 5310C**
Description: 5310C TOC
Client: BP AMEC
Date: October 10, 2013

General Information:
2 samples were analyzed for SM 5310C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: ROCK DRAIN IN 130919 **Lab ID: 60153615001** Collected: 09/19/13 09:55 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**247000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 16:39	7440-70-2	M1
Magnesium	**22200**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:18	7439-95-4	
Potassium	**3890**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 16:39	7440-09-7	
Sodium	**14800**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 16:39	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**253000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 17:01	7440-70-2	D9,M1
Magnesium, Dissolved	**22200**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:40	7439-95-4	
Potassium, Dissolved	**4060**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 17:01	7440-09-7	D9
Sodium, Dissolved	**15200**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 17:01	7440-23-5	D9
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**78.0**	ug/L	50.0	6.4	1	09/26/13 17:25	10/02/13 12:59	7429-90-5	
Antimony	**0.50J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:59	7440-36-0	B
Arsenic	**0.30J**	ug/L	1.0	0.050	1	09/26/13 17:25	10/02/13 12:59	7440-38-2	
Barium	**21.6**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:59	7440-39-3	
Beryllium	**0.28J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:59	7440-41-7	B
Cadmium	**18.5**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:59	7440-43-9	
Chromium	**0.39J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:59	7440-47-3	B
Cobalt	**2.6**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:59	7440-48-4	
Copper	**16.1**	ug/L	1.0	0.12	1	09/26/13 17:25	10/02/13 12:59	7440-50-8	
Iron	**936**	ug/L	50.0	3.0	1	09/26/13 17:25	10/02/13 12:59	7439-89-6	
Lead	**2.3**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:59	7439-92-1	
Manganese	**1780**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:59	7439-96-5	
Molybdenum	**19.7**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 12:36	7439-98-7	
Nickel	**3.1**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:59	7440-02-0	
Selenium	**0.42J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:59	7782-49-2	B
Silver	**0.19J**	ug/L	0.50	0.010	1	09/26/13 17:25	10/02/13 12:59	7440-22-4	B
Thallium	**0.072J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/02/13 12:59	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 12:36	7440-62-2	
Zinc	**3050**	ug/L	10.0	1.0	1	09/26/13 17:25	10/02/13 12:59	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**9.3J**	ug/L	50.0	6.4	1	09/26/13 17:25	10/02/13 12:18	7429-90-5	
Antimony, Dissolved	**0.55J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:18	7440-36-0	B
Arsenic, Dissolved	**0.14J**	ug/L	1.0	0.050	1	09/26/13 17:25	10/02/13 12:18	7440-38-2	
Barium, Dissolved	**21.6**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:18	7440-39-3	
Beryllium, Dissolved	**0.19J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:18	7440-41-7	B
Cadmium, Dissolved	**17.5**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:18	7440-43-9	
Chromium, Dissolved	**0.36J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:18	7440-47-3	B
Cobalt, Dissolved	**3.0**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:18	7440-48-4	D9
Copper, Dissolved	**3.6**	ug/L	1.0	0.12	1	09/26/13 17:25	10/02/13 12:18	7440-50-8	
Iron, Dissolved	**102**	ug/L	50.0	3.0	1	09/26/13 17:25	10/02/13 12:18	7439-89-6	
Lead, Dissolved	**0.28J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:18	7439-92-1	
Manganese, Dissolved	**1810**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:18	7439-96-5	D9
Molybdenum, Dissolved	**20.2**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 11:56	7439-98-7	D9

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: ROCK DRAIN IN 130919 **Lab ID: 60153615001** Collected: 09/19/13 09:55 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**3.3**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:18	7440-02-0	D9
Selenium, Dissolved	**0.46J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:18	7782-49-2	B
Silver, Dissolved	**0.20J**	ug/L	0.50	0.010	1	09/26/13 17:25	10/02/13 12:18	7440-22-4	B
Thallium, Dissolved	**0.12J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/02/13 12:18	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 11:56	7440-62-2	
Zinc, Dissolved	**2840**	ug/L	10.0	1.0	1	09/26/13 17:25	10/02/13 12:18	7440-66-6	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	09/20/13 15:13	09/25/13 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**632**	mg/L	50.0	8.0	50		10/04/13 18:34	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.33J**	mg/L	0.50	0.041	1		10/09/13 15:21	7440-44-0	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: ROCK DRAIN MP 130919 **Lab ID: 60153615002** Collected: 09/19/13 11:06 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**251000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 16:52	7440-70-2	
Magnesium	**21900**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:27	7439-95-4	
Potassium	**3680**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 16:52	7440-09-7	
Sodium	**15100**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 16:52	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**246000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 17:10	7440-70-2	
Magnesium, Dissolved	**21600**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:49	7439-95-4	
Potassium, Dissolved	**3640**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 17:10	7440-09-7	
Sodium, Dissolved	**14900**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 17:10	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**14.0J**	ug/L	50.0	6.4	1	09/26/13 17:25	10/03/13 12:40	7429-90-5	
Antimony	**0.47J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/03/13 12:40	7440-36-0	B
Arsenic	**0.20J**	ug/L	1.0	0.050	1	09/26/13 17:25	10/03/13 12:40	7440-38-2	
Barium	**20.1**	ug/L	1.0	0.080	1	09/26/13 17:25	10/03/13 12:40	7440-39-3	
Beryllium	**0.12J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/03/13 12:40	7440-41-7	B
Cadmium	**7.5**	ug/L	0.50	0.050	1	09/26/13 17:25	10/03/13 12:40	7440-43-9	
Chromium	**0.15J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/03/13 12:40	7440-47-3	B
Cobalt	**0.32J**	ug/L	1.0	0.080	1	09/26/13 17:25	10/03/13 12:40	7440-48-4	B
Copper	**3.6**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 12:40	7440-50-8	
Iron	**102**	ug/L	50.0	3.0	1	09/26/13 17:25	10/03/13 12:40	7439-89-6	
Lead	**0.28J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/03/13 12:40	7439-92-1	
Manganese	**10.0**	ug/L	1.0	0.14	1	09/26/13 17:25	10/03/13 12:40	7439-96-5	
Molybdenum	**14.2**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 12:40	7439-98-7	
Nickel	**2.0**	ug/L	1.0	0.070	1	09/26/13 17:25	10/03/13 12:40	7440-02-0	B
Selenium	**0.19J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/03/13 12:40	7782-49-2	B
Silver	ND	ug/L	0.50	0.010	1	09/26/13 17:25	10/03/13 12:40	7440-22-4	
Thallium	**0.036J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/03/13 12:40	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 12:40	7440-62-2	
Zinc	**1150**	ug/L	10.0	1.0	1	09/26/13 17:25	10/03/13 12:40	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	ND	ug/L	50.0	6.4	1	09/26/13 17:25	10/02/13 12:22	7429-90-5	
Antimony, Dissolved	**0.52J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:22	7440-36-0	B
Arsenic, Dissolved	**0.11J**	ug/L	1.0	0.050	1	09/26/13 17:25	10/02/13 12:22	7440-38-2	
Barium, Dissolved	**20.3**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:22	7440-39-3	D9
Beryllium, Dissolved	**0.15J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:22	7440-41-7	B
Cadmium, Dissolved	**7.4**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:22	7440-43-9	
Chromium, Dissolved	**0.41J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:22	7440-47-3	B
Cobalt, Dissolved	**0.53J**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:22	7440-48-4	B
Copper, Dissolved	**1.6**	ug/L	1.0	0.12	1	09/26/13 17:25	10/02/13 12:22	7440-50-8	B
Iron, Dissolved	**6.0J**	ug/L	50.0	3.0	1	09/26/13 17:25	10/02/13 12:22	7439-89-6	B
Lead, Dissolved	**0.037J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:22	7439-92-1	
Manganese, Dissolved	**10.1**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:22	7439-96-5	D9
Molybdenum, Dissolved	**13.8**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 13:50	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: ROCK DRAIN MP 130919 **Lab ID: 60153615002** Collected: 09/19/13 11:06 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	**0.52J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:22	7440-02-0	B
Selenium, Dissolved	**0.33J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:22	7782-49-2	B
Silver, Dissolved	**0.18J**	ug/L	0.50	0.010	1	09/26/13 17:25	10/02/13 12:22	7440-22-4	B
Thallium, Dissolved	**0.044J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/02/13 12:22	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 12:00	7440-62-2	
Zinc, Dissolved	**1110**	ug/L	10.0	1.0	1	09/26/13 17:25	10/02/13 12:22	7440-66-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**622**	mg/L	50.0	8.0	50		10/04/13 18:49	14808-79-8	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: WETLAND OUT 130919 **Lab ID: 60153615003** Collected: 09/19/13 11:47 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**244000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 16:55	7440-70-2	
Magnesium	**20500**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:34	7439-95-4	
Potassium	**5210**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 16:55	7440-09-7	
Sodium	**13100**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 16:55	7440-23-5	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium, Dissolved	**242000**	ug/L	100	10.4	1	09/26/13 17:25	09/27/13 17:12	7440-70-2	
Magnesium, Dissolved	**20100**	ug/L	50.0	6.5	1	09/26/13 17:25	09/30/13 11:51	7439-95-4	
Potassium, Dissolved	**5200**	ug/L	500	44.4	1	09/26/13 17:25	09/27/13 17:12	7440-09-7	
Sodium, Dissolved	**13100**	ug/L	500	21.7	1	09/26/13 17:25	09/27/13 17:12	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**7.5J**	ug/L	50.0	6.4	1	09/26/13 17:25	10/02/13 13:19	7429-90-5	
Antimony	**0.37J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 13:19	7440-36-0	B
Arsenic	**1.7**	ug/L	1.0	0.050	1	09/26/13 17:25	10/02/13 13:19	7440-38-2	
Barium	**89.9**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 13:19	7440-39-3	
Beryllium	**0.15J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 13:19	7440-41-7	B
Cadmium	**0.26J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 13:19	7440-43-9	B
Chromium	**0.47J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 13:19	7440-47-3	B
Cobalt	**0.33J**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 13:19	7440-48-4	B
Copper	**0.44J**	ug/L	1.0	0.12	1	09/26/13 17:25	10/02/13 13:19	7440-50-8	B
Iron	**20.2J**	ug/L	50.0	3.0	1	09/26/13 17:25	10/02/13 13:19	7439-89-6	B
Lead	**0.067J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 13:19	7439-92-1	
Manganese	**320**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 13:19	7439-96-5	
Molybdenum	**0.22J**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 12:57	7439-98-7	
Nickel	ND	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 13:19	7440-02-0	
Selenium	**0.26J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 13:19	7782-49-2	B
Silver	**0.20J**	ug/L	0.50	0.010	1	09/26/13 17:25	10/02/13 13:19	7440-22-4	B
Thallium	**0.056J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/02/13 13:19	7440-28-0	B
Vanadium	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 12:57	7440-62-2	
Zinc	**43.2**	ug/L	10.0	1.0	1	09/26/13 17:25	10/02/13 13:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	**10.0J**	ug/L	50.0	6.4	1	09/26/13 17:25	10/02/13 12:38	7429-90-5	
Antimony, Dissolved	**0.42J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:38	7440-36-0	B
Arsenic, Dissolved	**1.3**	ug/L	1.0	0.050	1	09/26/13 17:25	10/02/13 12:38	7440-38-2	
Barium, Dissolved	**89.1**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:38	7440-39-3	
Beryllium, Dissolved	**0.17J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:38	7440-41-7	B
Cadmium, Dissolved	**0.19J**	ug/L	0.50	0.050	1	09/26/13 17:25	10/02/13 12:38	7440-43-9	B
Chromium, Dissolved	**0.42J**	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:38	7440-47-3	B
Cobalt, Dissolved	**0.43J**	ug/L	1.0	0.080	1	09/26/13 17:25	10/02/13 12:38	7440-48-4	B
Copper, Dissolved	**0.51J**	ug/L	1.0	0.12	1	09/26/13 17:25	10/02/13 12:38	7440-50-8	B
Iron, Dissolved	**16.0J**	ug/L	50.0	3.0	1	09/26/13 17:25	10/02/13 12:38	7439-89-6	B
Lead, Dissolved	**0.030J**	ug/L	1.0	0.030	1	09/26/13 17:25	10/02/13 12:38	7439-92-1	
Manganese, Dissolved	**319**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:38	7439-96-5	
Molybdenum, Dissolved	**0.29J**	ug/L	1.0	0.12	1	09/26/13 17:25	10/03/13 12:16	7439-98-7	

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ANALYTICAL RESULTS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Sample: WETLAND OUT 130919 **Lab ID: 60153615003** Collected: 09/19/13 11:47 Received: 09/20/13 10:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Nickel, Dissolved	ND	ug/L	1.0	0.070	1	09/26/13 17:25	10/02/13 12:38	7440-02-0	
Selenium, Dissolved	**0.22J**	ug/L	1.0	0.14	1	09/26/13 17:25	10/02/13 12:38	7782-49-2	B
Silver, Dissolved	**0.20J**	ug/L	0.50	0.010	1	09/26/13 17:25	10/02/13 12:38	7440-22-4	B
Thallium, Dissolved	**0.056J**	ug/L	1.0	0.020	1	09/26/13 17:25	10/02/13 12:38	7440-28-0	
Vanadium, Dissolved	ND	ug/L	1.0	0.11	1	09/26/13 17:25	10/03/13 12:16	7440-62-2	
Zinc, Dissolved	**5.1J**	ug/L	10.0	1.0	1	09/26/13 17:25	10/02/13 12:38	7440-66-6	B
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	**47.3**	mg/L	2.0	2.0	1	09/20/13 15:17	09/25/13 15:23		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**433**	mg/L	50.0	8.0	50		10/04/13 19:03	14808-79-8	
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**3.5**	mg/L	0.50	0.041	1		10/09/13 15:39	7440-44-0	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: MPRP/24456 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60153615001, 60153615002, 60153615003

METHOD BLANK: 1261076 Matrix: Water
Associated Lab Samples: 60153615001, 60153615002, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	09/27/13 16:37	
Magnesium	ug/L	ND	50.0	09/30/13 11:16	
Potassium	ug/L	ND	500	09/27/13 16:37	
Sodium	ug/L	22.1J	500	09/27/13 16:37	

LABORATORY CONTROL SAMPLE: 1261077

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10100	101	85-115	
Magnesium	ug/L	10000	10500	105	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	9810	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1261078 1261079

Parameter	Units	60153615001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	247000	10000	10000	262000	259000	150	120	70-130	1	9	M1
Magnesium	ug/L	22200	10000	10000	32700	32200	105	101	70-130	1	9	
Potassium	ug/L	3890	10000	10000	14600	14600	107	107	70-130	0	7	
Sodium	ug/L	14800	10000	10000	25100	25000	103	102	70-130	1	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: MPRP/24455 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60153615001, 60153615002, 60153615003

METHOD BLANK: 1261071 Matrix: Water
Associated Lab Samples: 60153615001, 60153615002, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium, Dissolved	ug/L	ND	100	09/27/13 16:59	
Magnesium, Dissolved	ug/L	ND	50.0	09/30/13 11:38	
Potassium, Dissolved	ug/L	ND	500	09/27/13 16:59	
Sodium, Dissolved	ug/L	ND	500	09/27/13 16:59	

LABORATORY CONTROL SAMPLE: 1261072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	ug/L	10000	10100	101	85-115	
Magnesium, Dissolved	ug/L	10000	10100	101	85-115	
Potassium, Dissolved	ug/L	10000	10400	104	85-115	
Sodium, Dissolved	ug/L	10000	9940	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1261073 1261074

Parameter	Units	60153615001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	ug/L	253000	10000	10000	256000	257000	28	39	70-130	0	9	M1
Magnesium, Dissolved	ug/L	22200	10000	10000	31500	31800	94	96	70-130	1	9	
Potassium, Dissolved	ug/L	4060	10000	10000	14600	14600	105	105	70-130	0	7	
Sodium, Dissolved	ug/L	15200	10000	10000	25000	24800	98	96	70-130	1	8	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: MPRP/24458 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60153615001, 60153615002, 60153615003

METHOD BLANK: 1261089 Matrix: Water
Associated Lab Samples: 60153615001, 60153615002, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	50.0	10/02/13 12:46	
Antimony	ug/L	0.32J	1.0	10/02/13 12:46	
Arsenic	ug/L	ND	1.0	10/02/13 12:46	
Barium	ug/L	0.40J	1.0	10/02/13 12:46	
Beryllium	ug/L	0.15J	0.50	10/02/13 12:46	
Cadmium	ug/L	0.18J	0.50	10/02/13 12:46	
Chromium	ug/L	0.29J	1.0	10/02/13 12:46	
Cobalt	ug/L	0.24J	1.0	10/02/13 12:46	
Copper	ug/L	0.29J	1.0	10/02/13 12:46	
Iron	ug/L	5.5J	50.0	10/02/13 12:46	
Lead	ug/L	ND	1.0	10/02/13 12:46	
Manganese	ug/L	0.33J	1.0	10/02/13 12:46	
Molybdenum	ug/L	ND	1.0	10/03/13 12:20	
Nickel	ug/L	0.25J	1.0	10/02/13 12:46	
Selenium	ug/L	0.22J	1.0	10/02/13 12:46	
Silver	ug/L	0.20J	0.50	10/02/13 12:46	
Thallium	ug/L	0.061J	1.0	10/02/13 12:46	
Vanadium	ug/L	ND	1.0	10/03/13 12:20	
Zinc	ug/L	1.3J	10.0	10/02/13 12:46	

LABORATORY CONTROL SAMPLE: 1261090

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	1000	1030	103	85-115	
Antimony	ug/L	40	41.6	104	85-115	
Arsenic	ug/L	40	41.2	103	85-115	
Barium	ug/L	40	41.0	103	85-115	
Beryllium	ug/L	40	43.2	108	85-115	
Cadmium	ug/L	40	41.8	104	85-115	
Chromium	ug/L	40	42.2	105	85-115	
Cobalt	ug/L	40	41.0	103	85-115	
Copper	ug/L	40	41.2	103	85-115	
Iron	ug/L	1000	963	96	85-115	
Lead	ug/L	40	40.9	102	85-115	
Manganese	ug/L	40	42.3	106	85-115	
Molybdenum	ug/L	40	41.1	103	85-115	
Nickel	ug/L	40	42.0	105	85-115	
Selenium	ug/L	40	41.9	105	85-115	
Silver	ug/L	20	20.3	102	85-115	
Thallium	ug/L	40	39.0	98	85-115	
Vanadium	ug/L	40	41.4	104	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

LABORATORY CONTROL SAMPLE: 1261090

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	100	111	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1261091 1261092

Parameter	Units	60153615002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	14.0J	1000	1000	972	988	96	97	70-130	2	20	
Antimony	ug/L	0.47J	40	40	41.0	41.8	101	103	70-130	2	20	
Arsenic	ug/L	0.20J	40	40	42.0	43.2	104	107	70-130	3	20	
Barium	ug/L	20.1	40	40	59.5	60.8	98	102	70-130	2	20	
Beryllium	ug/L	0.12J	40	40	39.4	39.9	98	99	70-130	1	20	
Cadmium	ug/L	7.5	40	40	46.9	48.0	98	101	70-130	2	20	
Chromium	ug/L	0.15J	40	40	40.2	40.7	100	101	70-130	1	20	
Cobalt	ug/L	0.32J	40	40	38.8	39.5	96	98	70-130	2	20	
Copper	ug/L	3.6	40	40	40.1	41.0	91	94	70-130	2	20	
Iron	ug/L	102	1000	1000	997	1000	90	90	70-130	0	20	
Lead	ug/L	0.28J	40	40	41.4	42.4	103	105	70-130	2	20	
Manganese	ug/L	10.0	40	40	49.9	50.4	100	101	70-130	1	20	
Molybdenum	ug/L	14.2	40	40	56.6	57.3	106	108	70-130	1	20	
Nickel	ug/L	2.0	40	40	38.8	39.1	92	93	70-130	1	20	
Selenium	ug/L	0.19J	40	40	41.7	43.2	104	107	70-130	3	20	
Silver	ug/L	ND	20	20	18.8	19.0	94	95	70-130	1	20	
Thallium	ug/L	0.036J	40	40	39.7	40.7	99	102	70-130	2	20	
Vanadium	ug/L	ND	40	40	40.9	41.4	102	104	70-130	1	20	
Zinc	ug/L	1150	100	100	1220	1230	65	79	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: MPRP/24457 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60153615001, 60153615002, 60153615003

METHOD BLANK: 1261084 Matrix: Water
Associated Lab Samples: 60153615001, 60153615002, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	ND	50.0	10/02/13 12:10	
Antimony, Dissolved	ug/L	0.30J	1.0	10/02/13 12:10	
Arsenic, Dissolved	ug/L	ND	1.0	10/02/13 12:10	
Barium, Dissolved	ug/L	0.32J	1.0	10/02/13 12:10	
Beryllium, Dissolved	ug/L	0.13J	0.50	10/02/13 12:10	
Cadmium, Dissolved	ug/L	0.18J	0.50	10/02/13 12:10	
Chromium, Dissolved	ug/L	0.27J	1.0	10/02/13 12:10	
Cobalt, Dissolved	ug/L	0.23J	1.0	10/02/13 12:10	
Copper, Dissolved	ug/L	0.24J	1.0	10/02/13 12:10	
Iron, Dissolved	ug/L	6.0J	50.0	10/02/13 12:10	
Lead, Dissolved	ug/L	ND	1.0	10/02/13 12:10	
Manganese, Dissolved	ug/L	0.36J	1.0	10/02/13 12:10	
Molybdenum, Dissolved	ug/L	ND	1.0	10/03/13 11:47	
Nickel, Dissolved	ug/L	0.20J	1.0	10/02/13 12:10	
Selenium, Dissolved	ug/L	0.18J	1.0	10/02/13 12:10	
Silver, Dissolved	ug/L	0.18J	0.50	10/02/13 12:10	
Thallium, Dissolved	ug/L	ND	1.0	10/02/13 12:10	
Vanadium, Dissolved	ug/L	0.37J	1.0	10/03/13 11:47	
Zinc, Dissolved	ug/L	1.7J	10.0	10/02/13 12:10	

LABORATORY CONTROL SAMPLE: 1261085

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	1000	1010	101	85-115	
Antimony, Dissolved	ug/L	40	41.5	104	85-115	
Arsenic, Dissolved	ug/L	40	40.8	102	85-115	
Barium, Dissolved	ug/L	40	40.7	102	85-115	
Beryllium, Dissolved	ug/L	40	42.1	105	85-115	
Cadmium, Dissolved	ug/L	40	41.5	104	85-115	
Chromium, Dissolved	ug/L	40	41.7	104	85-115	
Cobalt, Dissolved	ug/L	40	41.1	103	85-115	
Copper, Dissolved	ug/L	40	41.3	103	85-115	
Iron, Dissolved	ug/L	1000	982	98	85-115	
Lead, Dissolved	ug/L	40	40.4	101	85-115	
Manganese, Dissolved	ug/L	40	41.9	105	85-115	
Molybdenum, Dissolved	ug/L	40	41.5	104	85-115	
Nickel, Dissolved	ug/L	40	41.6	104	85-115	
Selenium, Dissolved	ug/L	40	41.4	103	85-115	
Silver, Dissolved	ug/L	20	20.2	101	85-115	
Thallium, Dissolved	ug/L	40	38.4	96	85-115	
Vanadium, Dissolved	ug/L	40	41.2	103	85-115	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

LABORATORY CONTROL SAMPLE: 1261085

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc, Dissolved	ug/L	100	109	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1261086 1261087

Parameter	Units	60153615002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	ND	1000	1000	960	943	96	94	70-130	2	20	
Antimony, Dissolved	ug/L	0.52J	40	40	41.6	41.2	103	102	70-130	1	20	
Arsenic, Dissolved	ug/L	0.11J	40	40	42.9	42.0	107	105	70-130	2	20	
Barium, Dissolved	ug/L	20.3	40	40	60.3	59.7	100	99	70-130	1	20	
Beryllium, Dissolved	ug/L	0.15J	40	40	38.6	37.5	96	93	70-130	3	20	
Cadmium, Dissolved	ug/L	7.4	40	40	48.0	47.3	101	100	70-130	1	20	
Chromium, Dissolved	ug/L	0.41J	40	40	41.2	40.8	102	101	70-130	1	20	
Cobalt, Dissolved	ug/L	0.53J	40	40	39.8	39.9	98	98	70-130	0	20	
Copper, Dissolved	ug/L	1.6	40	40	38.8	38.7	93	93	70-130	0	20	
Iron, Dissolved	ug/L	6.0J	1000	1000	942	958	94	95	70-130	2	20	
Lead, Dissolved	ug/L	0.037J	40	40	42.2	42.0	106	105	70-130	1	20	
Manganese, Dissolved	ug/L	10.1	40	40	51.3	51.3	103	103	70-130	0	20	
Molybdenum, Dissolved	ug/L	13.8	40	40	57.2	56.4	108	106	70-130	1	20	
Nickel, Dissolved	ug/L	0.52J	40	40	39.3	38.7	97	96	70-130	1	20	
Selenium, Dissolved	ug/L	0.33J	40	40	42.6	42.7	106	106	70-130	0	20	
Silver, Dissolved	ug/L	0.18J	20	20	19.2	18.9	95	94	70-130	1	20	
Thallium, Dissolved	ug/L	0.044J	40	40	40.6	40.3	101	101	70-130	1	20	
Vanadium, Dissolved	ug/L	ND	40	40	41.9	40.8	105	102	70-130	3	20	
Zinc, Dissolved	ug/L	1110	100	100	1210	1200	97	87	70-130	1	20	

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: WET/43519 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 60153615001, 60153615003

METHOD BLANK: 1257266 Matrix: Water
Associated Lab Samples: 60153615001, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	09/25/13 14:28	

LABORATORY CONTROL SAMPLE: 1257267

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	177	89	85-115	

SAMPLE DUPLICATE: 1257268

Parameter	Units	60153535003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	7.7	9.4	21	17	D6

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QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: WETA/26476 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60153615001, 60153615002, 60153615003

METHOD BLANK: 1265087 Matrix: Water
Associated Lab Samples: 60153615001, 60153615002, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	10/04/13 17:37	

LABORATORY CONTROL SAMPLE: 1265088

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1265089 1265090

Parameter	Units	60153603001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1760	1000	1000	2620	2650	86	89	80-120	1	15	

MATRIX SPIKE SAMPLE: 1265091

Parameter	Units	60153603002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	1110	1000	2000	89	80-120	

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

QC Batch: WETA/19875 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60153615001, 60153615003

METHOD BLANK: 870237 Matrix: Water
Associated Lab Samples: 60153615001, 60153615003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	0.50	10/09/13 10:57	

LABORATORY CONTROL SAMPLE: 870238

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	2.5	2.6	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870239 870240

Parameter	Units	60153804001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	1.2	2.5	2.5	4.1	4.1	116	116	80-120	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870241 870242

Parameter	Units	4085392002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	1.3	5	5	7.0	7.0	113	114	80-120	0	20	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
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QUALIFIERS

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WETLAND PILOT SCALE TEST
Pace Project No.: 60153615

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60153615001	**ROCK DRAIN IN 130919**	EPA 200.7	MPRP/24456	EPA 200.7	ICP/19052
60153615002	**ROCK DRAIN MP 130919**	EPA 200.7	MPRP/24456	EPA 200.7	ICP/19052
60153615003	**WETLAND OUT 130919**	EPA 200.7	MPRP/24456	EPA 200.7	ICP/19052
60153615001	**ROCK DRAIN IN 130919**	EPA 200.7	MPRP/24455	EPA 200.7	ICP/19051
60153615002	**ROCK DRAIN MP 130919**	EPA 200.7	MPRP/24455	EPA 200.7	ICP/19051
60153615003	**WETLAND OUT 130919**	EPA 200.7	MPRP/24455	EPA 200.7	ICP/19051
60153615001	**ROCK DRAIN IN 130919**	EPA 200.8	MPRP/24458	EPA 200.8	ICPM/2533
60153615002	**ROCK DRAIN MP 130919**	EPA 200.8	MPRP/24458	EPA 200.8	ICPM/2533
60153615003	**WETLAND OUT 130919**	EPA 200.8	MPRP/24458	EPA 200.8	ICPM/2533
60153615001	**ROCK DRAIN IN 130919**	EPA 200.8	MPRP/24457	EPA 200.8	ICPM/2532
60153615002	**ROCK DRAIN MP 130919**	EPA 200.8	MPRP/24457	EPA 200.8	ICPM/2532
60153615003	**WETLAND OUT 130919**	EPA 200.8	MPRP/24457	EPA 200.8	ICPM/2532
60153615001	**ROCK DRAIN IN 130919**	SM 5210B	WET/43519	SM 5210B	WET/43615
60153615003	**WETLAND OUT 130919**	SM 5210B	WET/43519	SM 5210B	WET/43615
60153615001	**ROCK DRAIN IN 130919**	EPA 300.0	WETA/26476		
60153615002	**ROCK DRAIN MP 130919**	EPA 300.0	WETA/26476		
60153615003	**WETLAND OUT 130919**	EPA 300.0	WETA/26476		
60153615001	**ROCK DRAIN IN 130919**	SM 5310C	WETA/19875		
60153615003	**WETLAND OUT 130919**	SM 5310C	WETA/19875		

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Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60153615

60153615

Client Name: CP AMEC

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☐ UPS ☒ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 1Z 733 W87 22 1005 6136 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ Zpic

Thermometer Used: T-112 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 2-3

Date and initials of person examining contents: pvr 9/20/13

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. BOD
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Matrix:	☑Yes ☐No ☐N/A NT	13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased):	☐Yes ☐No ☑N/A	15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMW Date: 9/20/13

Temp Log: Record start and finish times when unpacking cooler. if >20 min, recheck sample temps.

Start: 1050	Start:
End: 1053	End:
Temp:	Temp:

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program Lab... Chain of Custody Record

Page 1 of 1

BP/ARC Project Name: Rico-Argentine Mine Site
Req Due Date (mm/dd/yy): _____
Rush TAT: Yes ___ No X
BP/ARC Facility No: _____
Lab Work Order Number: 60153615

Lab Name:	Pace Analytical Laboratories, Inc.	BP/ARC Facility Address:	Rico-Argentine Mine	Consultant/Contractor:	AMEC E&I, Inc.
Lab Address:	9608 Loiret Blvd., Lenexa, KS 66219	City, State, ZIP Code:	Rico, Colorado 81332	Consultant/Contractor Project No:	SA11161302.200A
Lab PM:	Heather Wilson	Lead Regulatory Agency:	U.S. EPA Region 8	Address:	10670 White Rock Road, Suite 100, Rancho Cordova, CA
Lab Phone:	(913) 563-1407	California Global ID No.:	NA	Consultant/Contractor PM:	Marc Lombardi
Lab Shipping Accnt:	UPS # 733W87	Enfos Proposal No:	D009J-0066 (WR 268174)	Phone:	916-636-3200
Lab Bottle Order No:	NA	Accounting Mode:	Provision X OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@amec.com
Other Info:	Wetland Pilot Scale Test	Stage:	4-Execute Activity: Spend	Invoice To:	BP/ARC x Contractor ___

BP/ARC EBM: Anthony Brown
EBM Phone: 714-228-6770
EBM Email: anthony.brown@bp.com

Report Type & QC Level: Standard X; Full Data Package ___

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix:	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			Requested Analyses: Tot Metals-see notes (E200.7/200.8)	Dis Metals-see notes (E200.7/200.8)	Sulfate (E300.0)	TOC (SM5310B)	BOD (SM5210B)				MS/MSD	HOLD
	RockDrainIn130919	9/9/13	09:55		X	IBA	14	5	2	1	2	Ø	1AG	3S	X	X	X	X	X	1BF	3N	1BP	1F	1BP2U
	RockDrainMP130919	9/9/13	11:06		X			3	1	Ø	2	Ø			X	X	X							
	Wetland Out 130919	9/9/13	11:47		X	↓		5	2	1	2	Ø	↓		X	X	X	X	X	↓		↓		↓	

Comments
Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Dissolved metals are field filtered. CG
COC
Metals are: Ca, K, Na, Mg (E200.7); CG
Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe,
Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn (E200.8)

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Hallie Bevan Simpson						
Sampler's Company: AMEC	Hallie Bevan Simpson	9/19/13	13:30	PASI	9/20	1005
Shipment Method: UPS Ship Date: 9/9/2013						
Shipment Tracking No: 1Z733W872210056136						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: (Yes) / No | Temp Blank: (Yes) / No | Cooler Temp on Receipt: 2-3 °F/C | Trip Blank: (Yes) / No | MS/MSD Sample Submitted: Yes / (No)

9/20/13

amec

APPENDIX E

Baseline Matrix Sampling Technical Memorandum, December 7, 2012

Technical Memorandum

To: Spencer Archer, AMEC
Marc Lombardi, AMEC

Project: SA11161302.200A

From: Hallie Bevan Simpson, AMEC

cc: Andre Sobolewski, AMEC
Lynda Lombardi, AMEC
Ron Borrego, AMEC
Abby Cazier, AMEC

Tel: (720) 284-4043

Date: December 7, 2012

Subject: Baseline Matrix Sampling
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01
Dolores County, Colorado

This technical memorandum describes the baseline matrix sampling conducted for the Constructed Wetland Pilot Scale Test at the Rico-Argentine Mine Site (site). Compliant with the *St. Louis Tunnel Discharge Constructed Wetland Pilot Scale Test Work Plan* (Work Plan) and associated Sampling and Analysis Plan (SAP), baseline matrix sampling was completed on Thursday, December 6, 2012. Matrix samples were collected from the rock drain and wetland cells and submitted for laboratory analysis of total metals to Pace Analytical Laboratories ("Pace") in Lenexa, Kansas. Sampling coincided with wetland liner repair and re-plumbing activities, for which power and water to the rock drain and wetland were shut off and water levels in the rock drain and wetland were lowered.

SAMPLE PREPARATION AND METHODS

Matrix sampling was conducted in accordance with the site Task Specific Health and Safety Plan (TSHASP) and the following site-specific Standard Operating Procedures (SOPs):

- SOP 1 – Field Documentation and Sample Handling
- SOP 2 – Sample Collection Techniques and Data Collection Strategies
- SOP 4 – Equipment Decontamination
- SOP 7 – Rock Drain Matrix Field Sampling and Laboratory Procedures
- SOP 8 – Wetland Organic Matrix Field Sampling and Laboratory Procedures

Sample locations were evenly spaced and flagged along transects. Samples were collected using a metal scoop and placed on a decontaminated acrylic sheet. Photo documentation was completed for each sample, and samples were then transferred into sealable plastic bags labeled with the sample ID. The acrylic sheet was sprayed with deionized water in a fine-point squirt bottle to flush any remaining sample material into the sample bag. Sample bags were sealed and placed in tertiary bags in a cooler. The acrylic sheet and metal scoop were decontaminated, sample locations were backfilled with surrounding matrix material, and sampling was continued at the next location.

AMEC Environment & Infrastructure, Inc.
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670-6032
Tel (916) 636-3200
amec.com

The following naming structure was used to generate sample IDs:

- "P9" – referring to Pond 9 as the primary site location;
- "RD" or "W" – referring to the rock drain or wetland cell;
- "1", "2", or "3" – the transect number; transects ran north-south, with transect 1 being the western-most transect;
- "a", "b", or "c" – the point along the transect; the northernmost point along each transect was "a" and the southernmost was "c" or "d";
- "121206" – the sample collection date, December 6, 2012;
- Examples: *P9RD1a121206* and *P9W3c121206*.

ROCK DRAIN SAMPLING

Six samples were collected from the rock drain along two transects. Sample locations were spaced approximately 4.5 feet from the west and east walls and from eachother. Sample locations were spaced approximately 7.5 feet from the north and south walls and from eachother. Approximately 500 grams of rock was collected from a depth of approximately six inches below the rock surface at each location.

Photo documentation of rock drain samples is included in Attachment A. The following are the sample locations and corresponding matrix samples submitted to Pace for laboratory analysis.

Sample Location Name	Laboratory Sample ID
RD1a	P9RD1a121206
RD1b	P9RD1b121206
RD1c	P9RD1c121206
RD2a	P9RD2a121206
RD2b	P9RD2b121206
RD2c	P9RD2c121206

WETLAND SAMPLING

Sample locations were identified along three transects within the wetland cell. A total of 12 sample locations were spaced approximately 3.25 feet from the west and east walls and from eachother. Sample locations were spaced approximately 14 feet from the north and south walls and from eachother. Approximately 500 grams of wetland matrix was collected from a depth of approximately six inches below the bottom of the mulch layer at nine of the locations. At the three southern-most "d" locations, near the wetland outlet, the matrix material was frozen and could not be sampled. A strong organic odor was detected at all of the wetland cell sampling locations, with the "a" locations exibiting the strongest odor and the "c" locations exhibiting a somewhat less strong odor.

Photo documentation of wetland samples is included in Attachment B. The following are the sample locations and corresponding matrix samples submitted to Pace for laboratory analysis.

Sample Location Name	Laboratory Sample ID
• W1a	• P9W1a121206
• W1b	• P9W1b121206
• W1c	• P9W1c121206
• W1d	• *no sample collected*
• W2a	• P9W2a121206
• W2b	• P9W2b121206
• W2c	• P9W2c121206
• W2d	• *no sample collected*
• W3a	• P9W3a121206
• W3b	• P9W3b121206
• W3c	• P9W3c121206
• W3d	• *no sample collected*

POST-IMPLEMENTATION SAMPLING

Post-implementation matrix samples are anticipated to be collected from the rock drain and wetland cells at the end of the 2013 Spring/Summer Pilot Test Period. No additional matrix sampling is identified in the Work Plan or associated SAP.

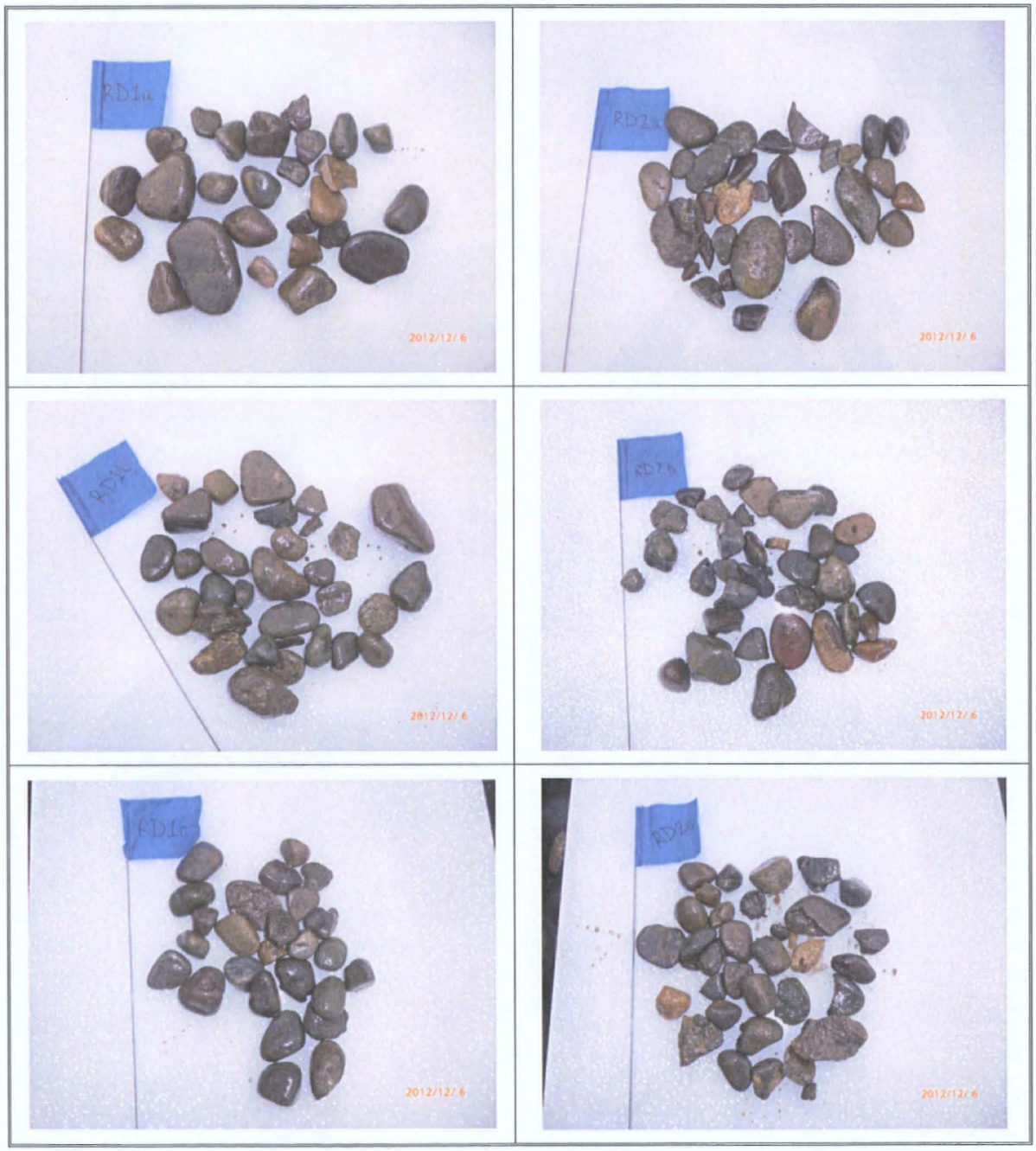
amec

ATTACHMENT A

Rock Drain Baseline Matrix Sampling Photo Log

Rock Drain **Sampling Locations** • View looking north toward the inlet. • Sample locations spaced approximately 4.5 feet from the west and east walls and from eachother. • Sample locations spaced approximately 7.5 feet from the north and south walls and from eachother.	
Rock Drain **Sampling Locations** • Samples were collected approximately 6 inches below the rock surface.	

Inlet to Rock Drain ↓



To Wetland Cell ↓

ATTACHMENT B

Wetland Baseline Matrix Sampling Photo Log

Wetland Cell **Sampling Locations** • View looking south toward the outlet. • Sample locations spaced approximately 3.25 feet from the west and east walls and from eachother. • Sample locations spaced approximately 14 feet from the north and south walls and from eachother.	
Wetland Cell **Sampling Locations** • Samples collected approximately 6 inches below the bottom of the mulch layer.	

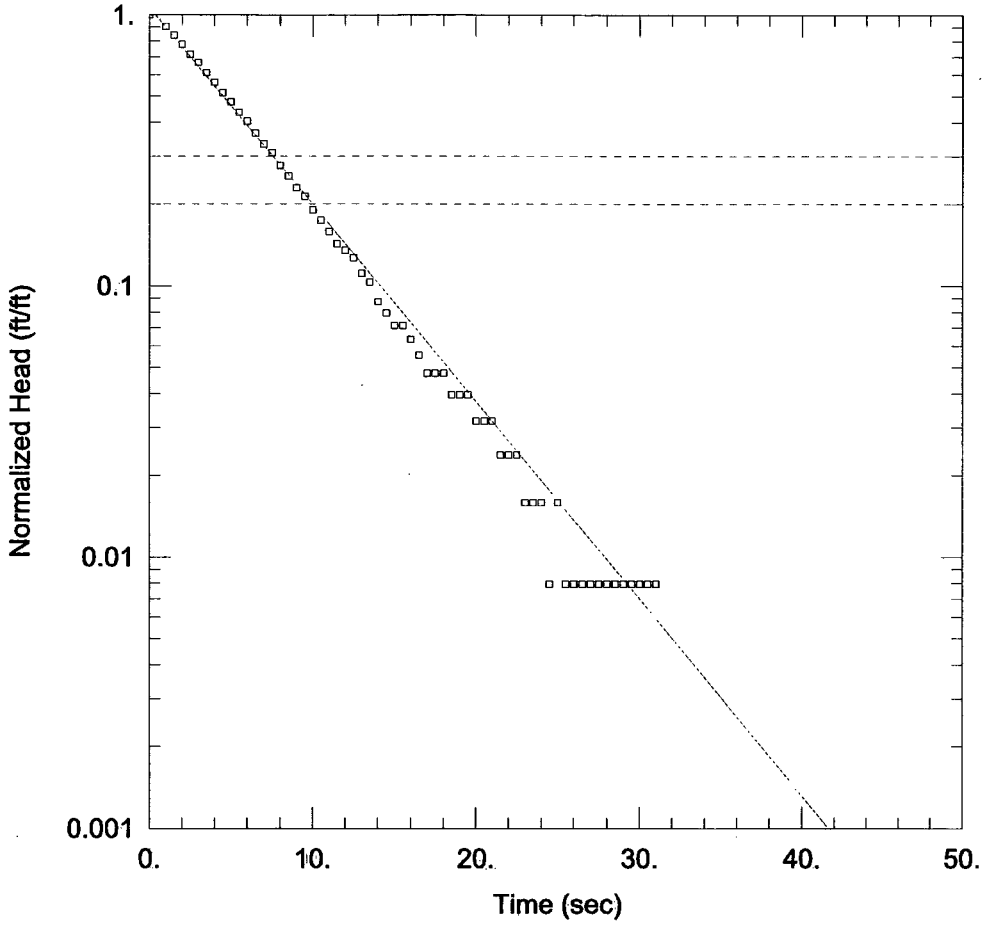
Inlet to Wetland Cell ↓

W1d – ice prevented sampling	W2d – ice prevented sampling	W3d – ice prevented sampling

Outlet ↓

APPENDIX F

Slug Test Results



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1

Data Set: P:\...\MP1_01_Slug Out_ BR.aqt
Date: 10/30/13 Time: 14:30:12

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1; Slug-Out
Test Date: 3/12/13

AQUIFER DATA

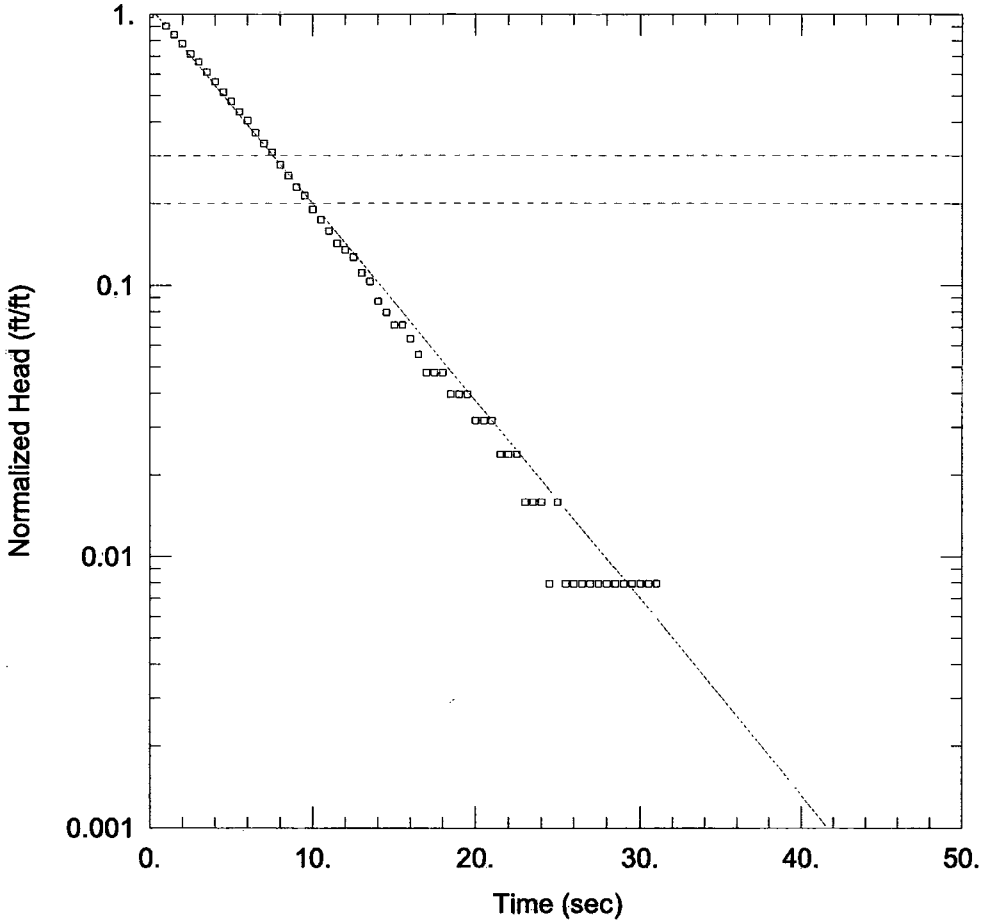
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MP1)

Initial Displacement: 1.26 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 160.7 ft/day
y0 = 1.343 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1

Data Set: P:\...\MP1_01_Slug Out_ BR.aqt
Date: 10/30/13 Time: 14:32:30

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out
Test Date: 3/12/13

AQUIFER DATA

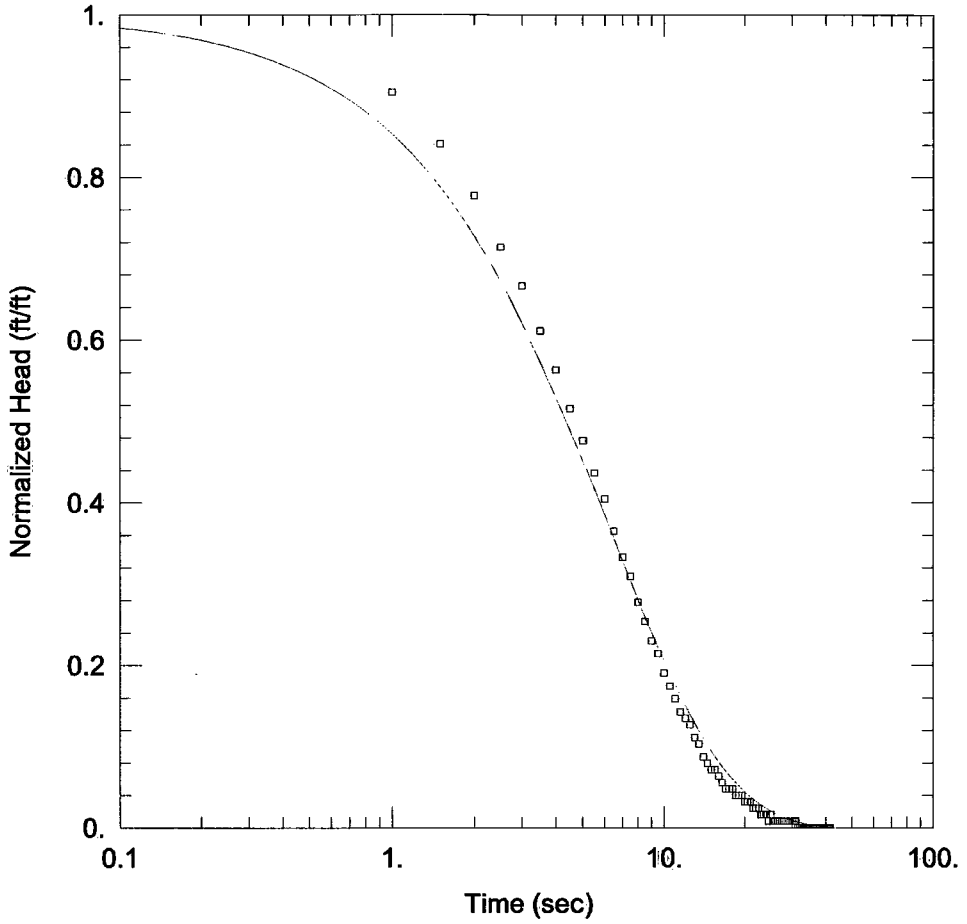
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MP1)

Initial Displacement: 1.26 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 160.7 ft/day
y0 = 1.343 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1

Data Set: P:\...\MP1_01_Slug Out_ KGS.aqt
Date: 10/30/13 Time: 14:23:09

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out
Test Date: 3/12/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

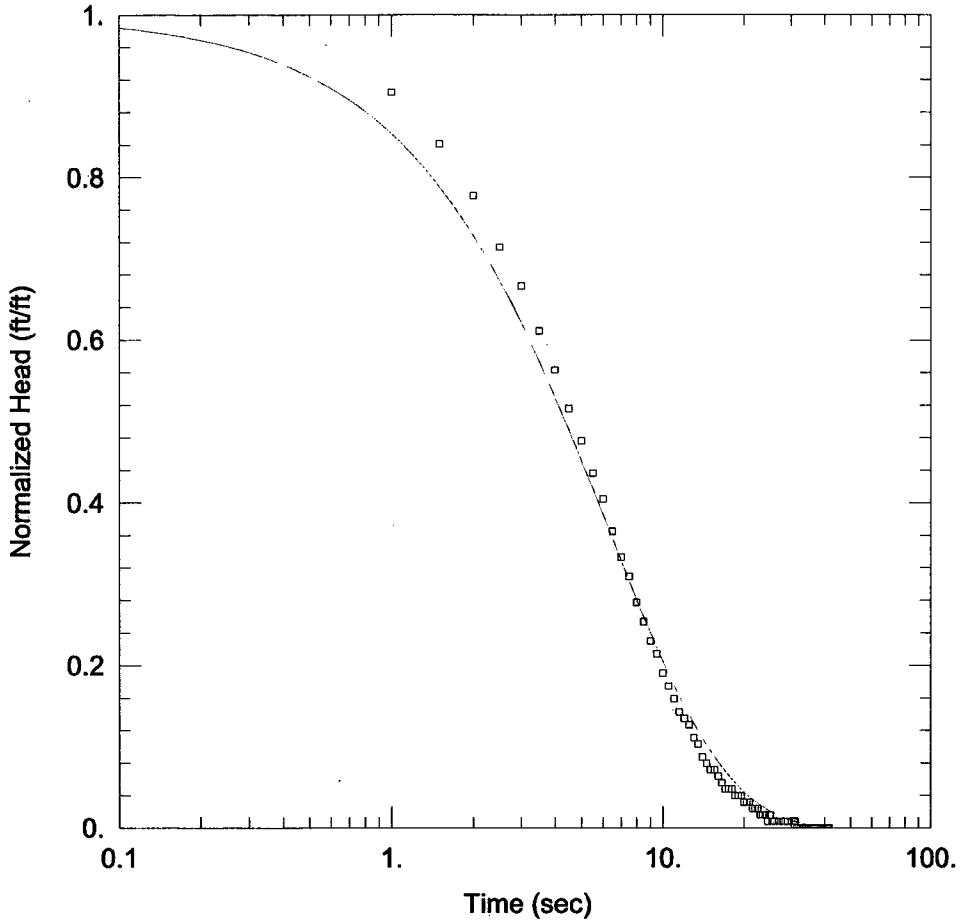
WELL DATA (MP1)

Initial Displacement: 1.26 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 189.9 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1

Data Set: P:\...\MP1_01_Slug Out_KGS CPE.aqt
Date: 10/30/13 Time: 14:16:30

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out
Test Date: 3/12/13

AQUIFER DATA

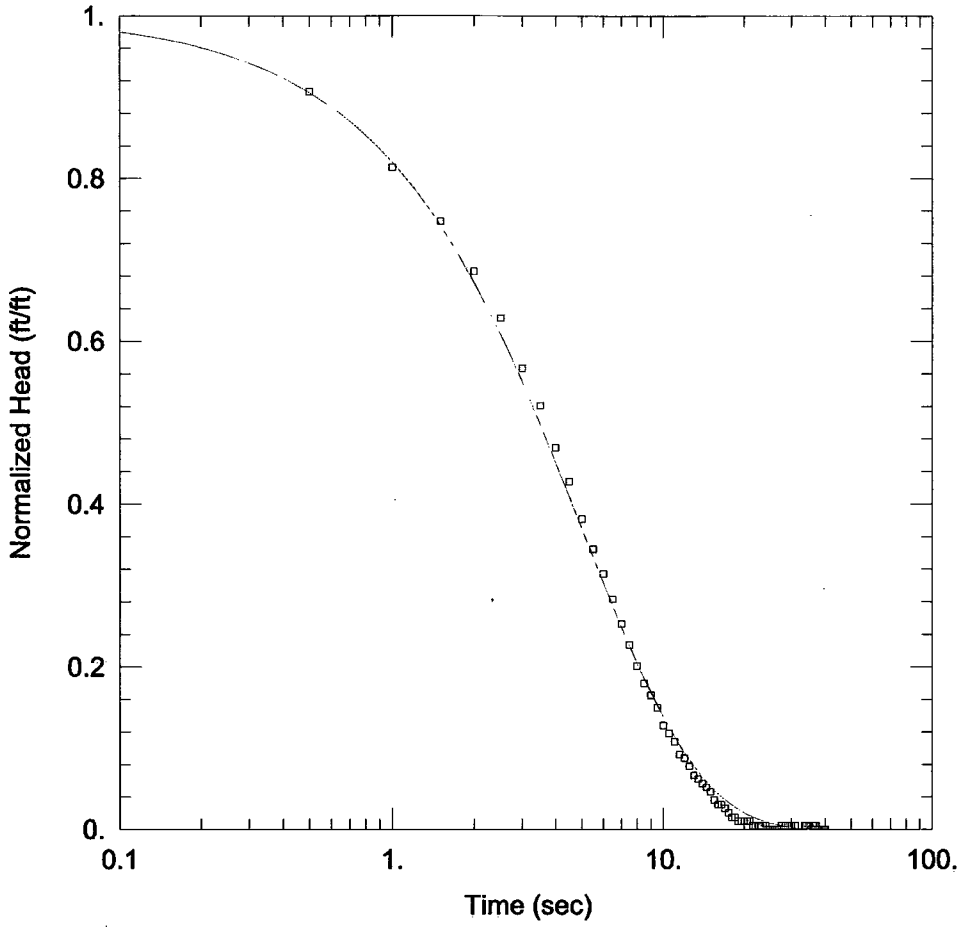
Saturated Thickness: 2.5 ft

WELL DATA (MP1)

Initial Displacement: 1.26 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model
Kr = 166.1 ft/day
Kz/Kr = 1.
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #2

Data Set: P:\...\MP1_02_Slug Out_ KGS.aqt
Date: 10/30/13 Time: 14:50:13

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #2
Test Date: 3/12/13

AQUIFER DATA

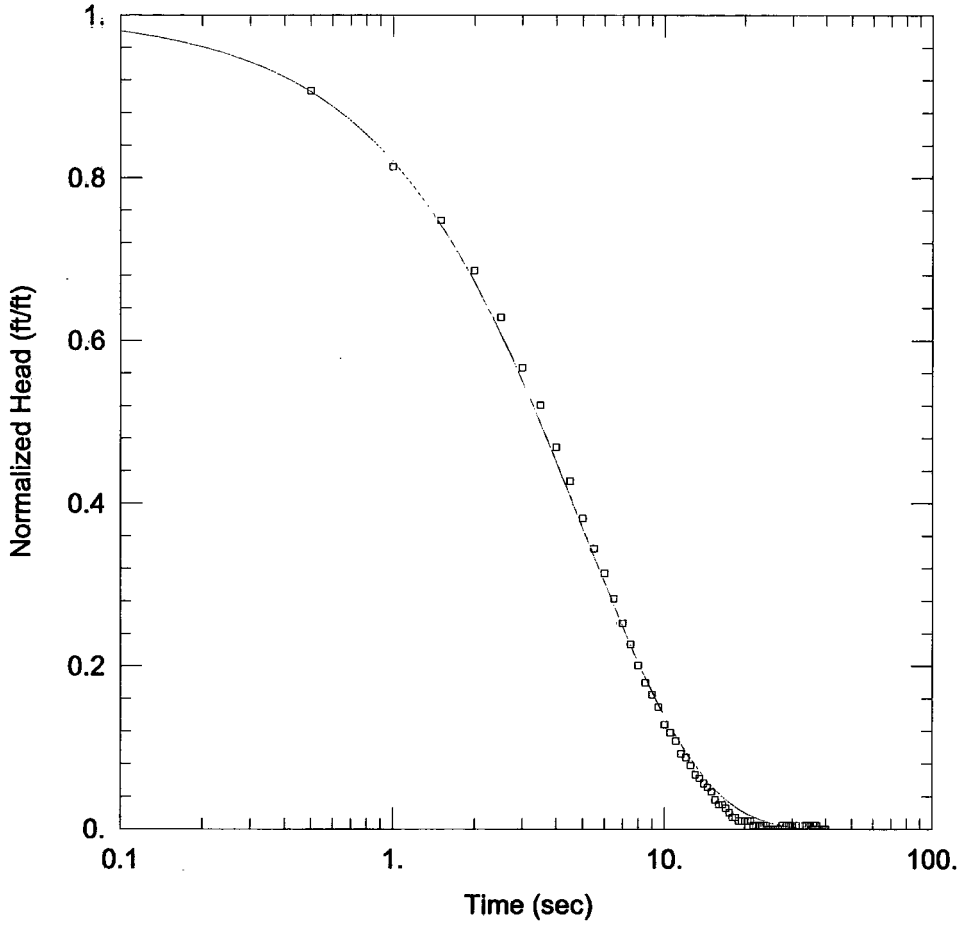
Saturated Thickness: 2.5 ft

WELL DATA (MP1)

Initial Displacement: 0.891 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.167 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model
Kr = 235.7 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #2

Data Set: P:\...\MP1_02_Slug Out_ KGS.aqt
Date: 10/30/13 Time: 14:46:24

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #2
Test Date: 3/12/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

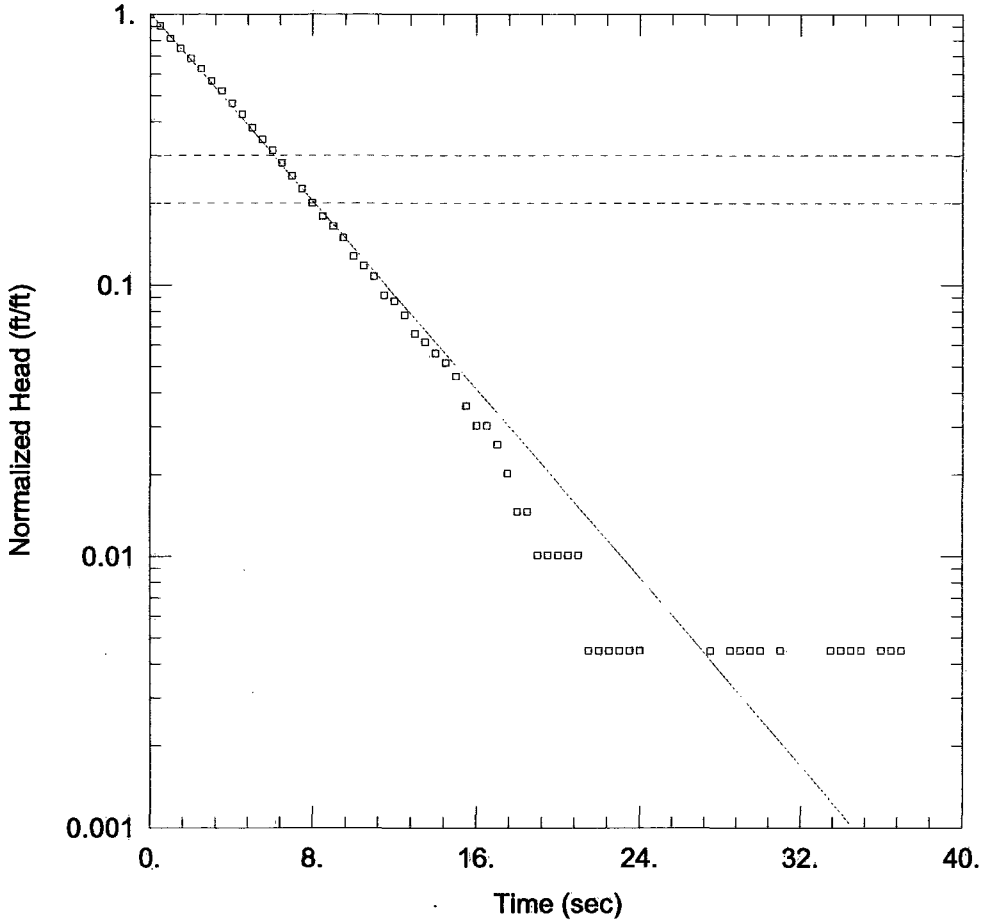
WELL DATA (MP1)

Initial Displacement: 0.891 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.167 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 206.1 ft/day
Kz/Kr = 1.
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #2

Data Set: P:\...\MP1_02_Slug Out_BR.aqt
Date: 10/30/13 Time: 14:54:01

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1; Slug-Out Test #2
Test Date: 3/12/13

AQUIFER DATA

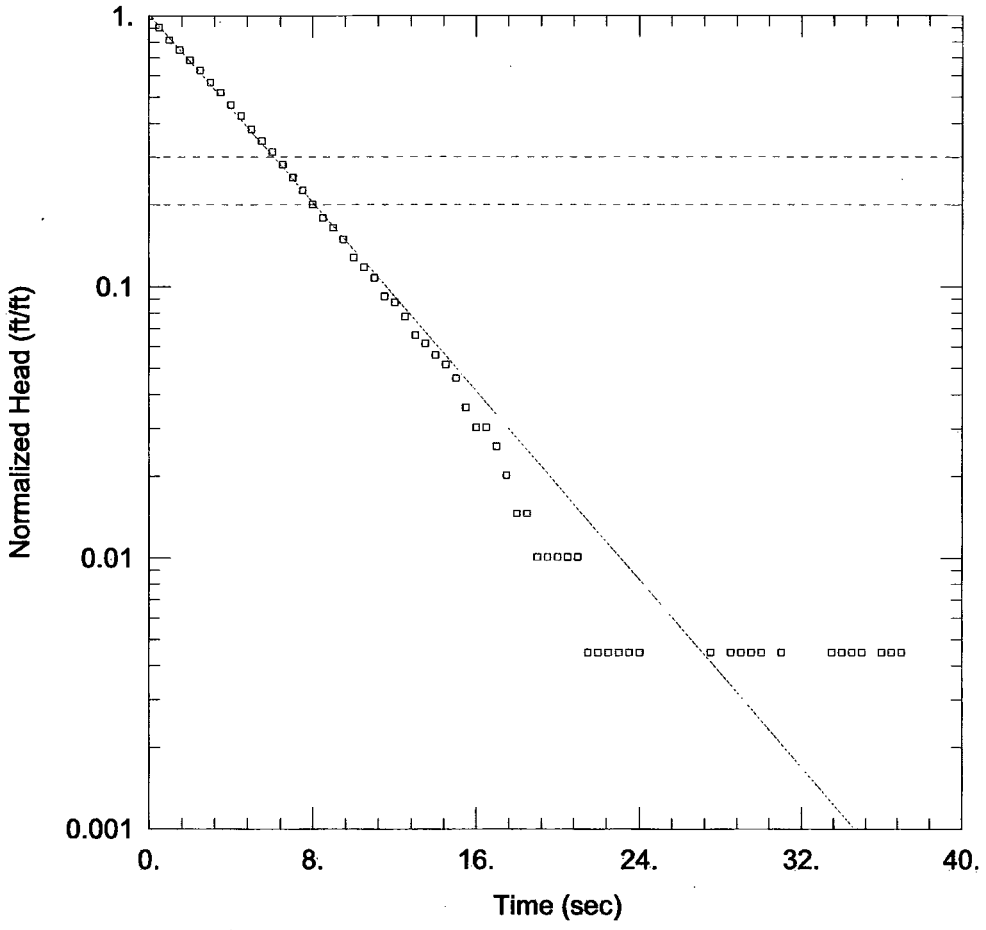
Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MP1)

Initial Displacement: 0.891 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.167 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 190.1 ft/day
y0 = 0.9023 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #2

Data Set: P:\...\MP1_02_Slug Out_BR.aqt
Date: 10/30/13 Time: 14:55:56

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #2
Test Date: 3/12/13

AQUIFER DATA

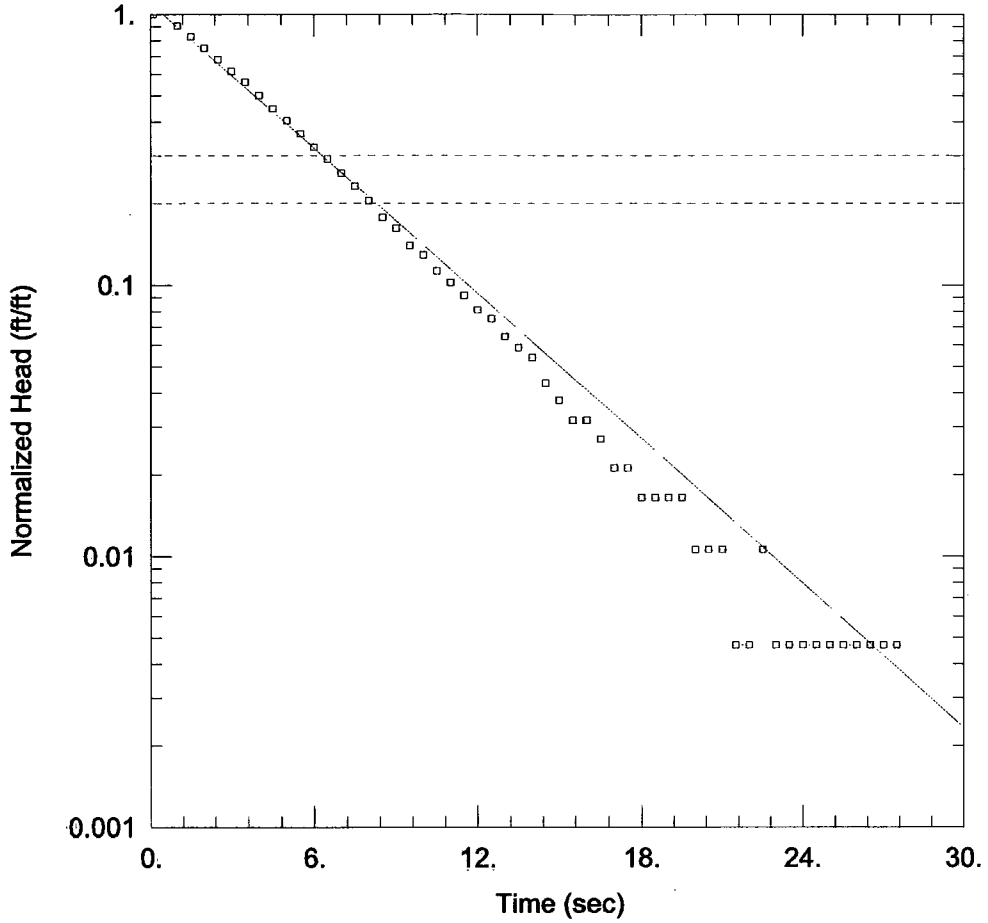
Saturated Thickness: 2.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MP1)

Initial Displacement: 0.891 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.167 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 190.1 ft/day
y0 = 0.9023 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #3

Data Set: P:\...\MP1_03_Slug Out_BR.aqt
Date: 10/30/13 Time: 15:18:58

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #3
Test Date: 3/12/13

AQUIFER DATA

Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 0.5

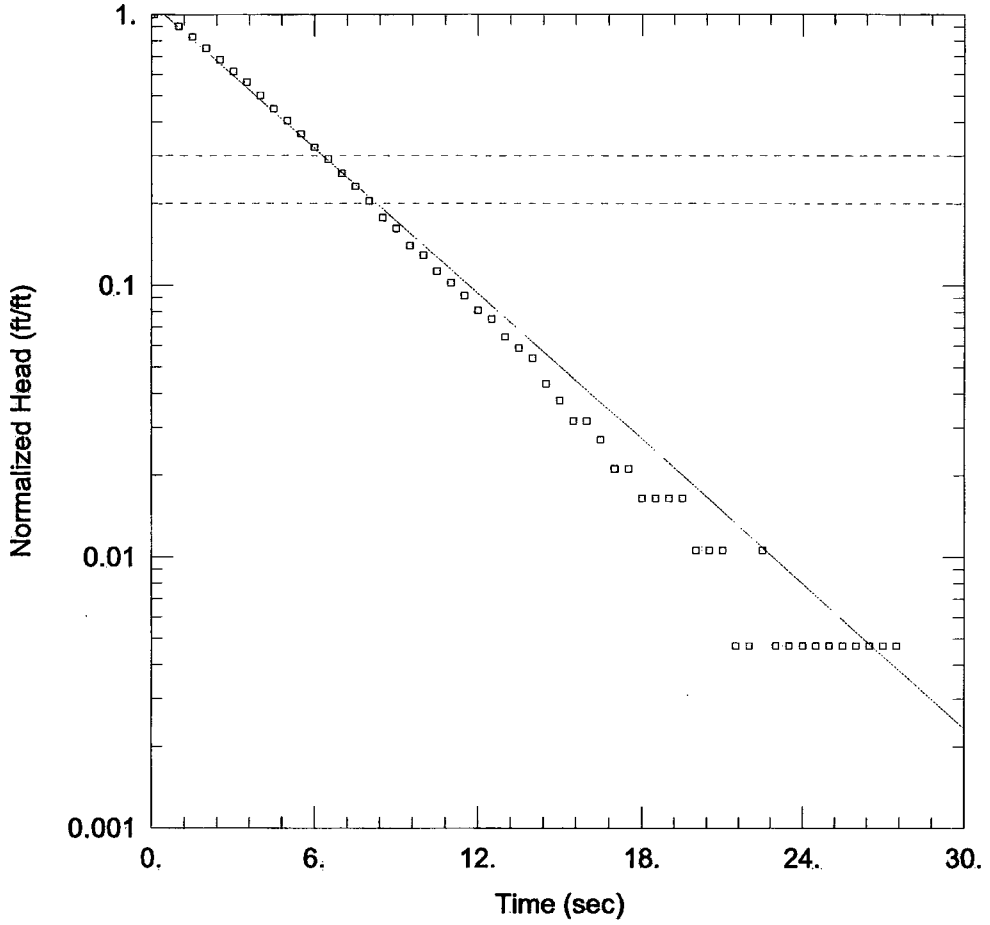
WELL DATA (MP1)

Initial Displacement: 0.85 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 197.1 ft/day y0 = 0.9339 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #3

Data Set: P:\...\MP1_03_Slug Out_BR.aqt
Date: 10/30/13 Time: 15:04:53

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #3
Test Date: 3/12/13

AQUIFER DATA

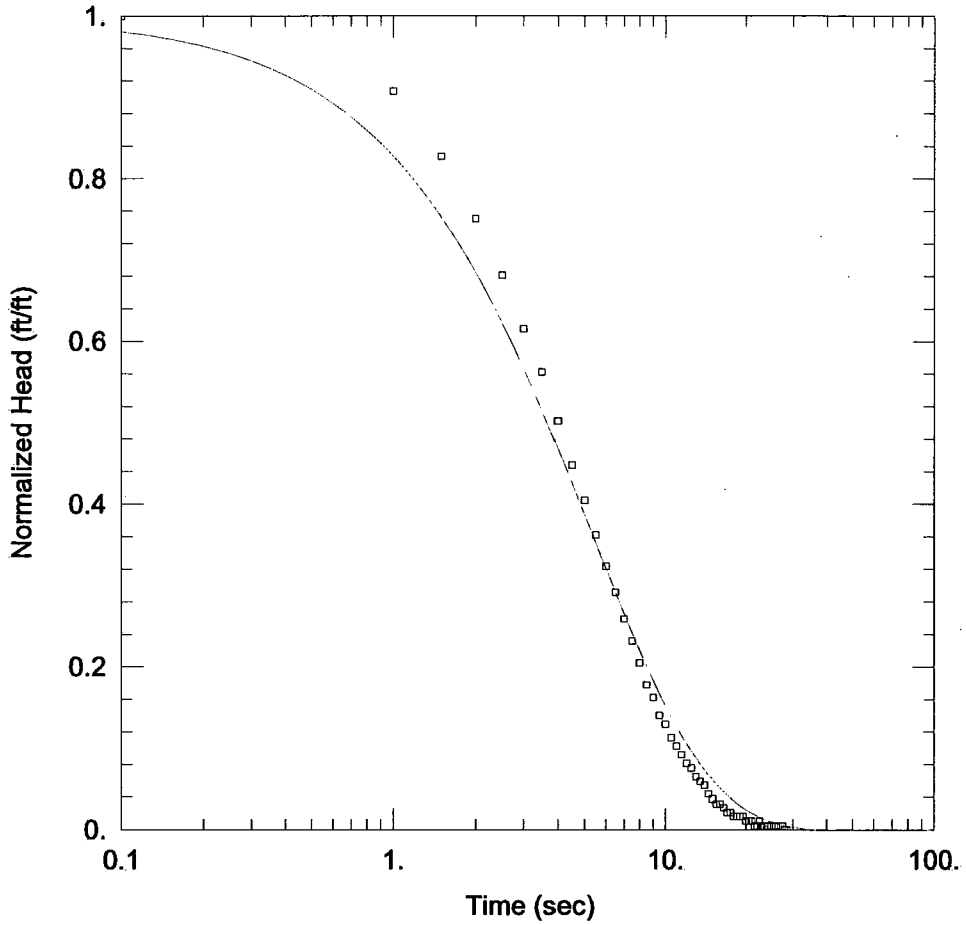
Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MP1)

Initial Displacement: 0.85 ft Static Water Column Height: 2.5 ft
Total Well Penetration Depth: 2.5 ft Screen Length: 2.5 ft
Casing Radius: 0.168 ft Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 197.1 ft/day y0 = 0.9339 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #3

Data Set: P:\...\MP1_03_Slug Out_KGS.aqt
Date: 10/30/13 Time: 15:27:04

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #3
Test Date: 3/12/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

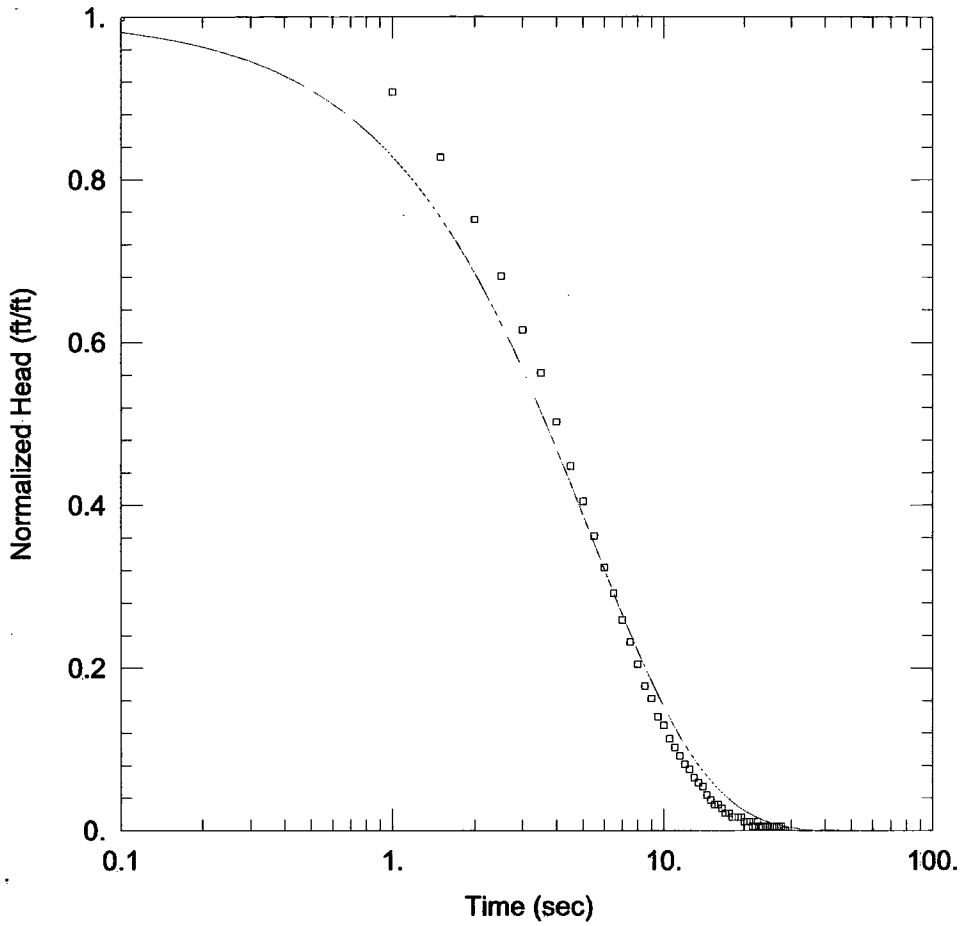
WELL DATA (MP1)

Initial Displacement: 0.85 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 226.7 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP1 - TEST #3

Data Set: P:\...\MP1_03_Slug Out_KGS.aqt
Date: 10/30/13 Time: 15:24:12

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP1: Slug-Out Test #3
Test Date: 3/12/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

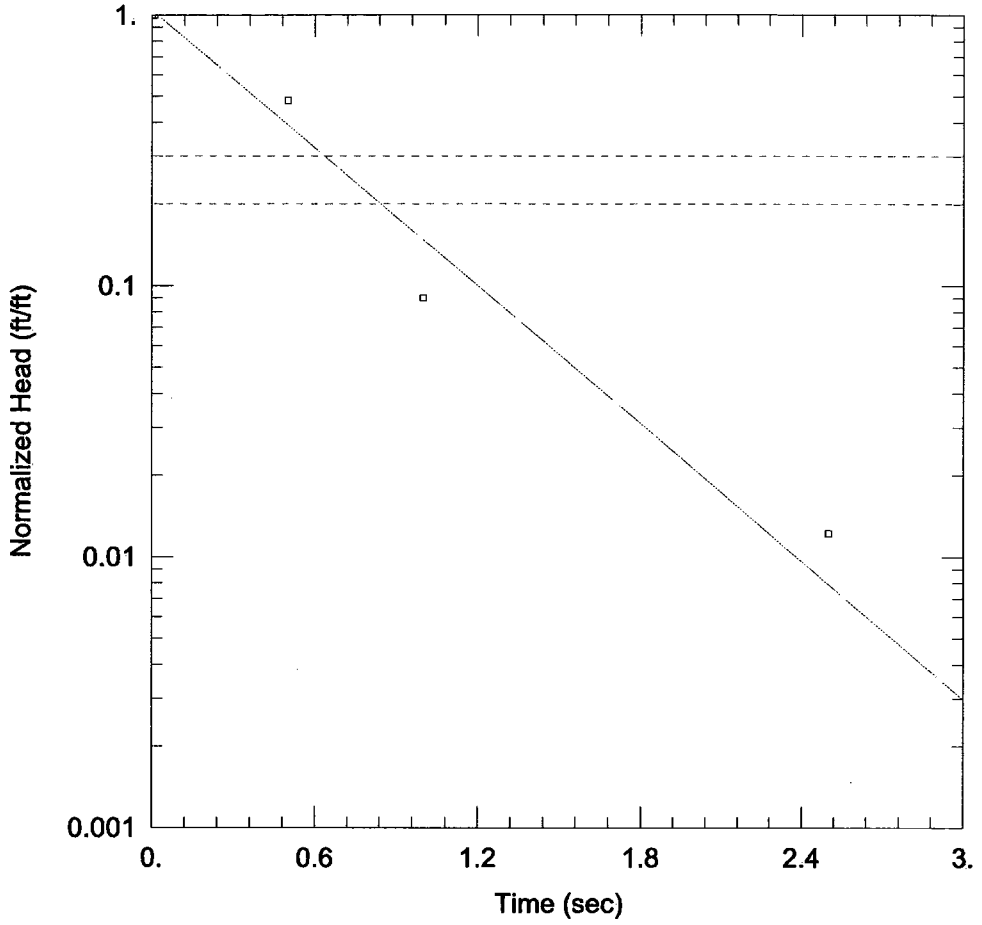
WELL DATA (MP1)

Initial Displacement: 0.85 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 198.2 ft/day
Kz/Kr = 1.
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG OUT TEST #1

Data Set: P:\...\MP2_01_Slug Out_BR.aqt
Date: 10/31/13 Time: 10:32:11

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #1
Test Date: 3/14/13

AQUIFER DATA

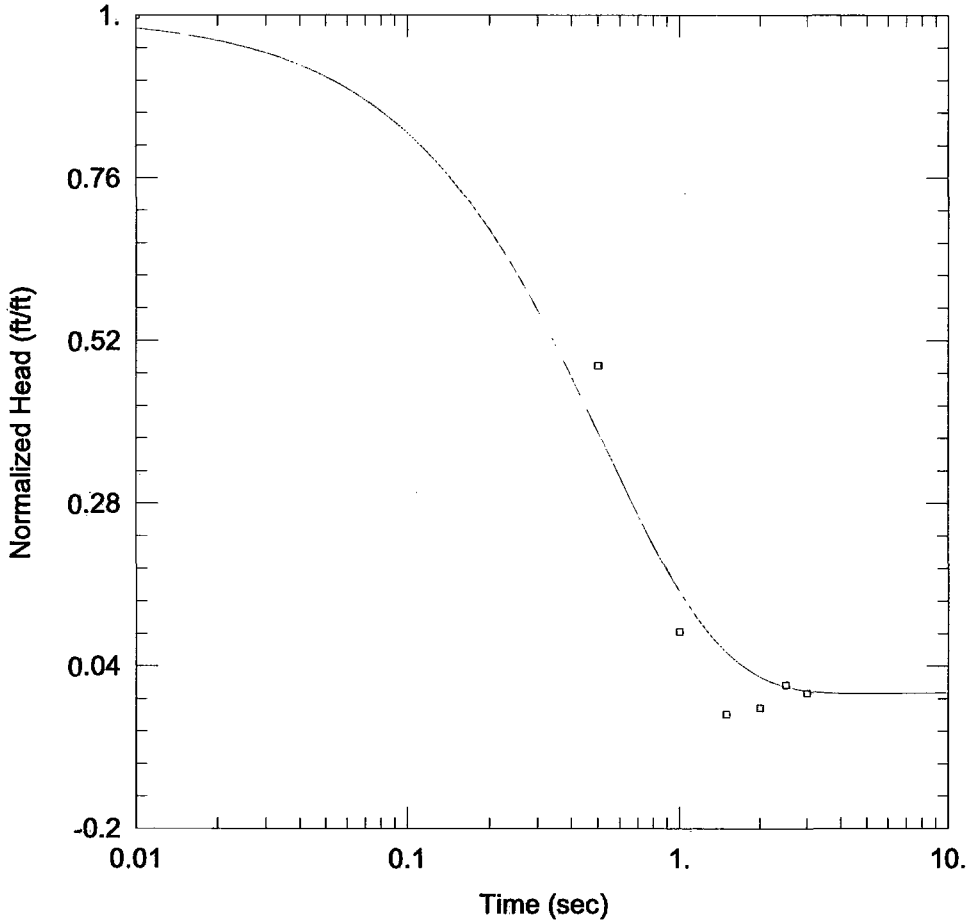
Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MP2)

Initial Displacement: 0.41 ft Static Water Column Height: 2.5 ft
Total Well Penetration Depth: 2.5 ft Screen Length: 2.5 ft
Casing Radius: 0.168 ft Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1873.7 ft/day y0 = 0.4268 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG OUT TEST #1

Data Set: P:\...\MP2_01_Slug Out_KGS.aqt
Date: 10/31/13 Time: 11:18:24

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #1
Test Date: 3/14/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

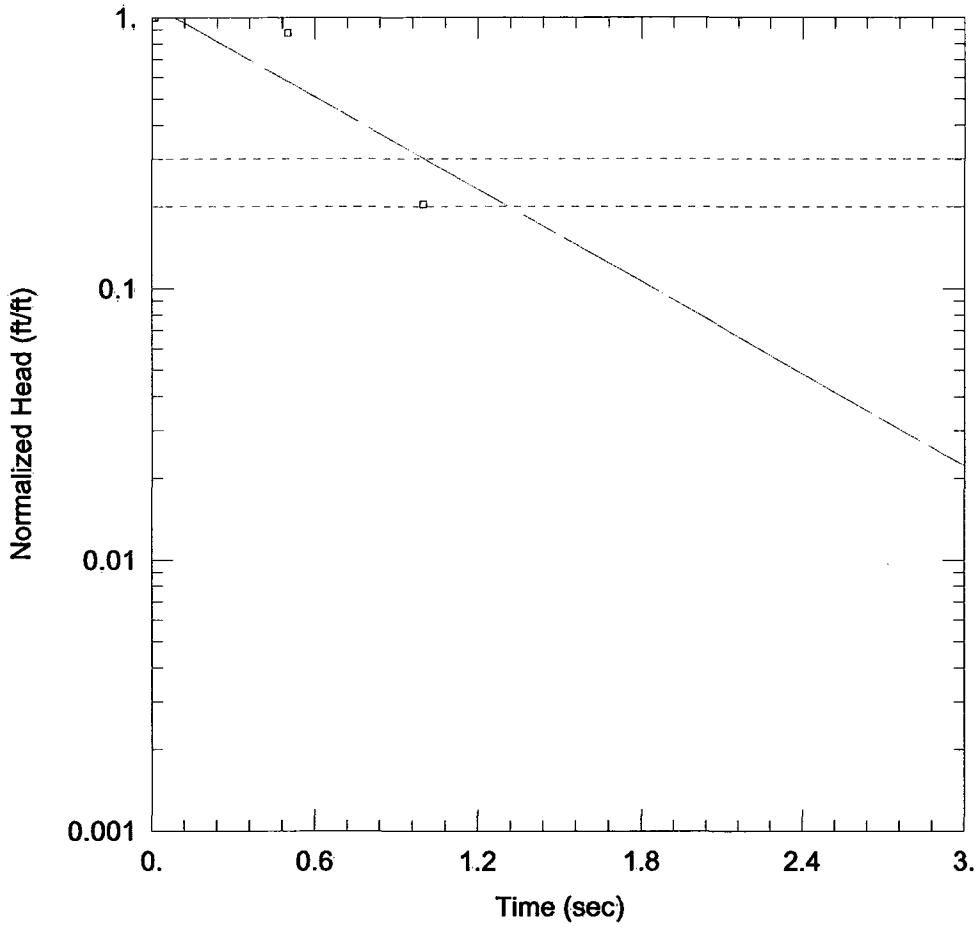
WELL DATA (MP2)

Initial Displacement: 0.41 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2285.5 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG OUT TEST #2

Data Set: P:\...\MP2_02_Slug Out_BR.aqt
Date: 10/31/13 Time: 10:45:22

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #2
Test Date: 3/14/13

AQUIFER DATA

Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 0.5

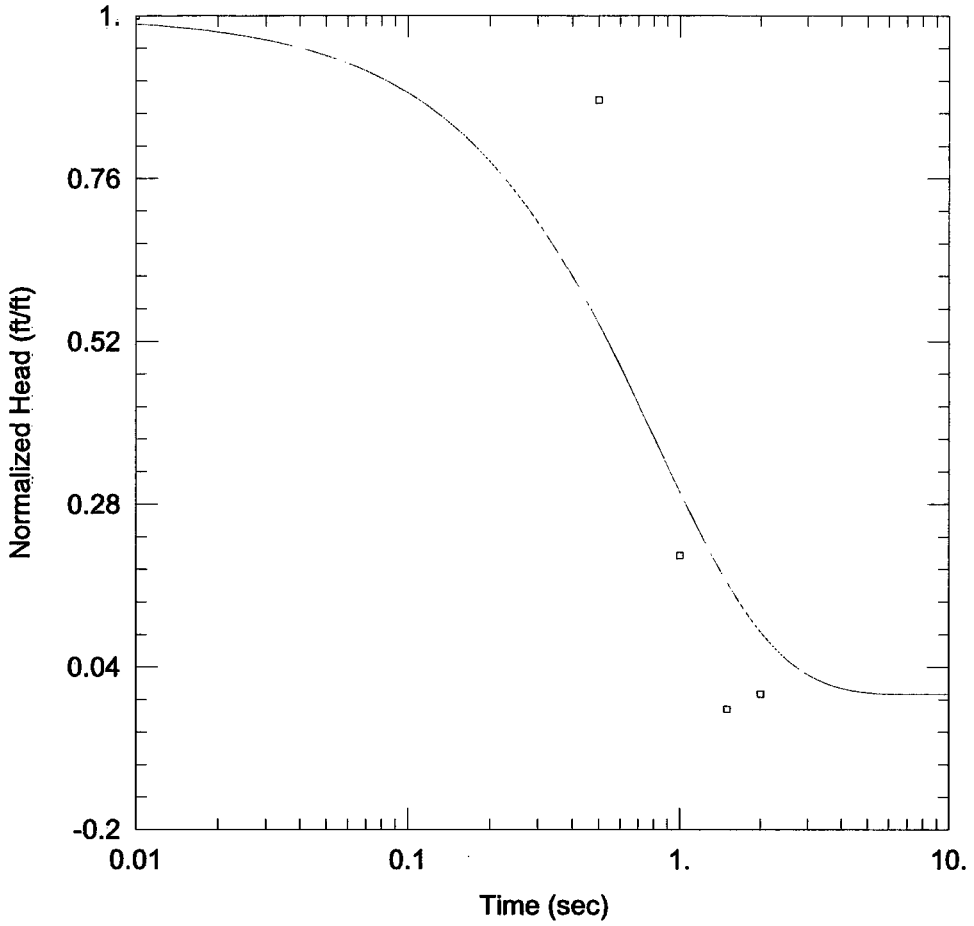
WELL DATA (MP2)

Initial Displacement: 0.225 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1253.2 ft/day y0 = 0.2503 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG OUT TEST #2

Data Set: P:\...\MP2_02_Slug Out_KGS.aqt
Date: 10/31/13 Time: 10:53:33

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #2
Test Date: 3/14/13

AQUIFER DATA

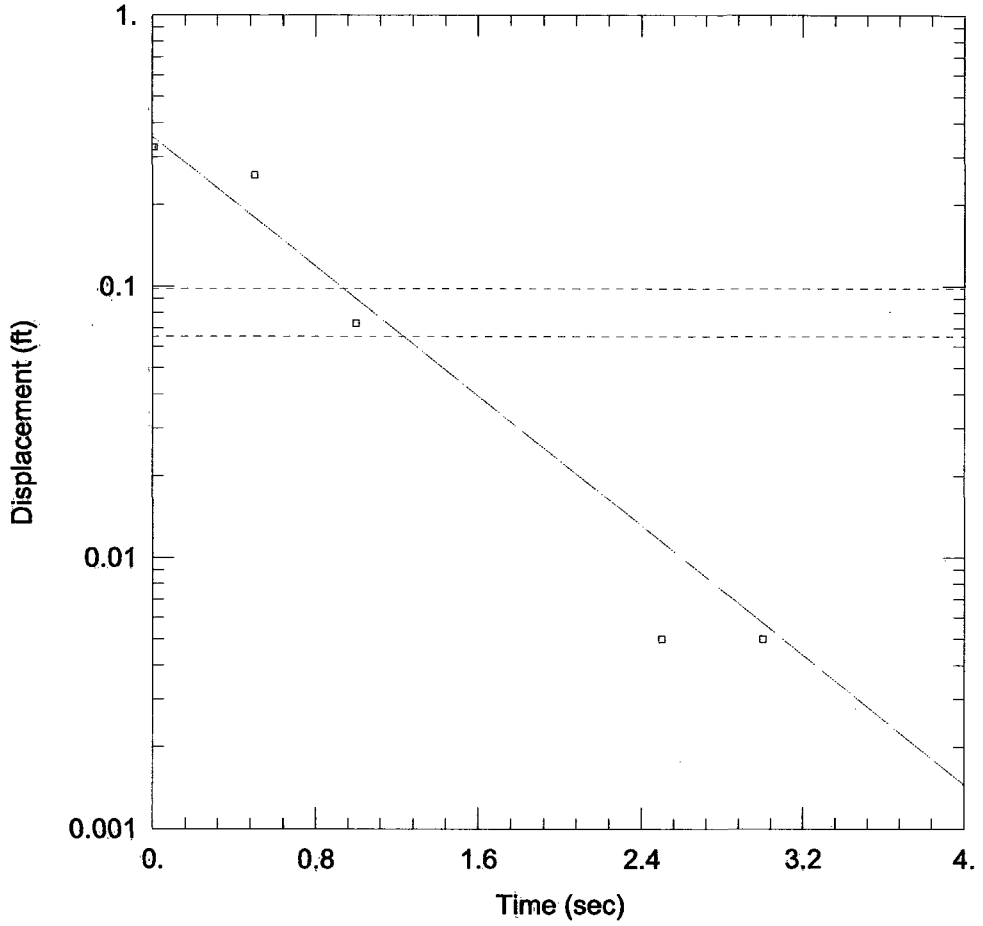
Saturated Thickness: 2.5 ft

WELL DATA (MP2)

Initial Displacement: 0.225 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model
Kr = 1448.7 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG TEST OUT #3

Data Set: P:\...\MP2_03_Slug Out_BR.aqt
Date: 10/31/13 Time: 11:02:57

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #3
Test Date: 3/14/13

AQUIFER DATA

Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 0.5

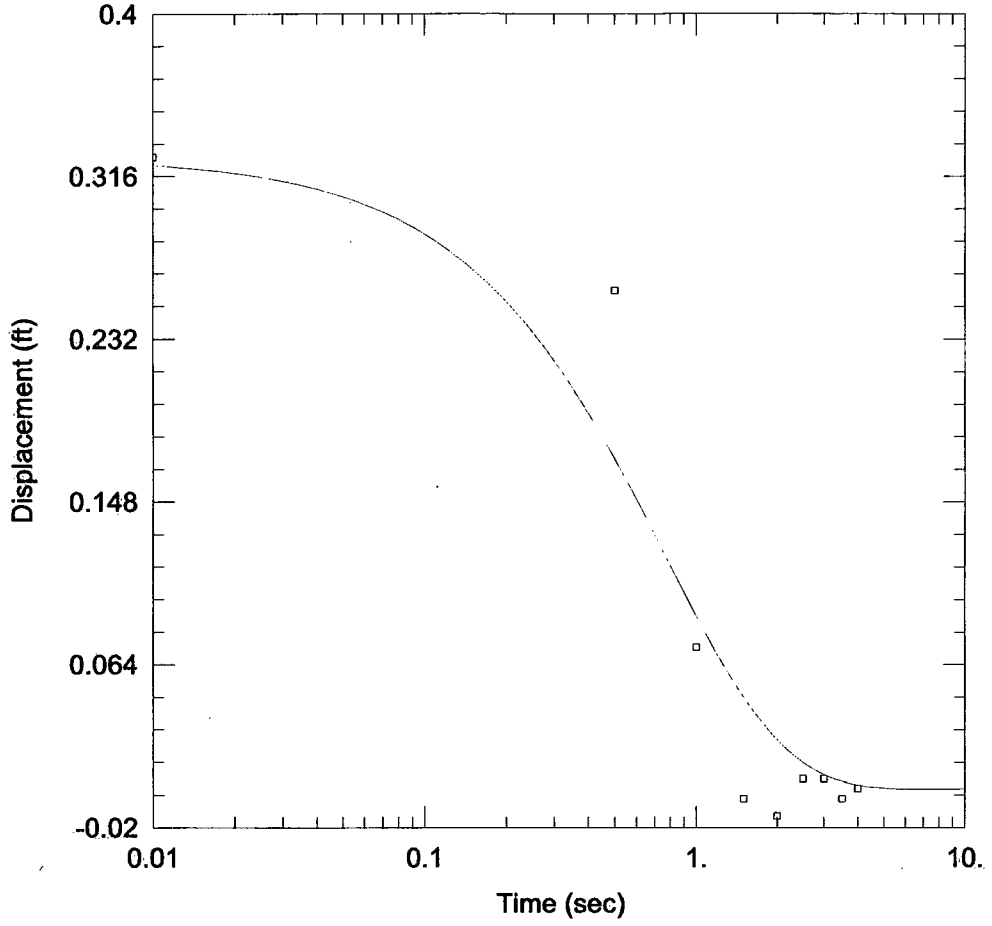
WELL DATA (MP2)

Initial Displacement: 0.326 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1321.8 ft/day y0 = 0.3569 ft



SLUG TEST AT CONSTRUCTED WETLAND MONITORING POINT MP2 - SLUG TEST OUT #3

Data Set: P:\...\MP2_03_Slug Out_KGS.aqt
Date: 10/31/13 Time: 11:13:32

PROJECT INFORMATION

Company: AMEC
Client: Atlantic Richfield Company
Project: SA111661301
Location: Rico-Argentine Mine
Test Well: MP2: Slug-Out Test #3
Test Date: 3/14/13

AQUIFER DATA

Saturated Thickness: 2.5 ft

WELL DATA (MP2)

Initial Displacement: 0.326 ft
Total Well Penetration Depth: 2.5 ft
Casing Radius: 0.168 ft
Static Water Column Height: 2.5 ft
Screen Length: 2.5 ft
Well Radius: 0.168 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1556.8 ft/day
Kz/Kr = 0.5
Ss = 1.5E-5 ft^{-1}

APPENDIX G

Hydrogen Sulfide Surveys

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 1/15/2013 Time: 1500 Personnel: S. Archer, John Freitas, H. Simpson

Multi-Gas Meter	MSA 5IR		00006 81
Meter Make/Model:	RKI / EAGLE 2	**Serial Number:**	E2B033
Date of Last Calibration:	DEC 2012 ~~16 OCT 12~~	**Calibration Gas Type & Concentration:**	-FACTORY FACTORY
Date/Time of Last Bump Check:	14 JAN 13	**Bump Check Gas Type & Concentration:**	H_2S - UNK - SUPPLIER
Bump Check Result:	NORMAL NORMAL	**Date/Time of Last Fresh Air Calibration:**	15 JAN 13 - 0800 15 JAN 13 - 0800
Personal Gas Monitoring Badges – SPENCER ARCHER (AMEC)			
Meter Make/Model:	GAS BADGE PRO	**Serial Number:**	120835 K-00B
Date/Time of Last Bump Check:	1/15/13 1405	**Bump Check Gas Type & Concentration:**	H_2S 25 PPM
Bump Check Result:	19.7 PPM	**Date Last Cleared:**	1/15/13 1402
Personal Gas Monitoring Badges – JOHN FREITAS (AECI)			
Meter Make/Model:	GAS BADGE PRO	**Serial Number:**	120841K ST-001
Date/Time of Last Bump Check:	1/15/13 1405	**Bump Check Gas Type & Concentration:**	H_2S 25 PPM
Bump Check Result:	19.7 PPM	**Date Last Cleared:**	1/15/13 1410

	Breathing Zone	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
☆	Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
	Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
	Inlet Flow Control Box	0	0	W Boundary	0	0
	Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
	Rock Drain NE Corner	0	0	Access Walkway N	0	0
	Rock Drain E Perimeter	0	0	RockDrainMP	0	0
	E Boundary	0	0	WetlandMP1	0	0
(*)	Wetland E Perimeter	0	0	Access Walkway S	0	0
(1)	Wetland SE Corner	0	0	WetlandMP2	0	0
(1)	Wetland Outlet	0	0	Top of Stairs to Outlet	0	0

(*) FIRST ODOR THRESHOLD.
(1) ODOR.

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

1 Foot Above Ground	Meter (ppm)	Badge (3) (ppm)		Meter (ppm)	Badge (3) (ppm)
Top of Stairs to Inlet	0	—	Wetland SW Corner	0	—
Inlet Flow Meter	0	—	Wetland W Perimeter	0	—
Inlet Flow Control Box	0	—	W Boundary	0	—
Rock Drain NW Corner	0	—	Rock Drain W Perimeter	0	—
Rock Drain NE Corner	0	—	Access Walkway N	0	—
Rock Drain E Perimeter	0	—	RockDrainMP	0	—
E Boundary	0	—	WetlandMP1	0	—
Wetland E Perimeter	0	—	Access Walkway S	0	—
Wetland SE Corner	0	—	WetlandMP2	0	SOIL
Wetland Outlet	4	0	Top of Stairs to Outlet	0	SOIL
Within Cells	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
Rock Drain NW Corner	0	—	Wetland SE Corner	0	—
Rock Drain NE Corner	0	—	Wetland SW Corner	0	—
Rock Drain E Perimeter	0	—	Wetland W Perimeter	0	—
E Bndry Rock Drain Side	0	—	W Bndry Rock Drain Side	0	—
E Bndry Wetland Side	0	—	W Bndry Wetland Side	0	—
Wetland E Perimeter	0	—	Rock Drain W Perimeter	0	—
Monitoring Ports	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
RockDrainMP	0	0	WetlandMP2	0	0
WetlandMP1	0	0	WetlandOut	20 (2)	0

Personnel Signatures: [signature]

(2) Peak GAGGLE 32.5 PPM. SECOND SAMPLE 74.0 PPM.
(3) All badge readings 0.0 PPM.

16852 | 1547

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 1/16/2013 Time: 1056 Personnel: H. Simpson, S. Archey, J. Fuentes

Multi-Gas Meter			
Meter Make/Model:	MSA SIR Eagle 2	Serial Number:	E2B033
Date of Last Calibration:	Dec 2012	Calibration Gas Type & Concentration:	factory
Date/Time of Last Bump Check:	Jan 14 2012	Bump Check Gas Type & Concentration:	H_2S unit supplies
Bump Check Result:	Normal/Normal	Date/Time of Last Fresh Air Calibration:	1/15/2013 0800
Personal Gas Monitoring Badges – Hallie			
Meter Make/Model:	Gas Badge Pro	Serial Number:	120845-001
Date/Time of Last Bump Check:	1/15/13	Bump Check Gas Type & Concentration:	—
Bump Check Result:	—	Date Last Cleared:	— 1/16/13
Personal Gas Monitoring Badges – Spencer			
Meter Make/Model:	Gas Badge Pro	Serial Number:	120835R-008
Date/Time of Last Bump Check:	1/15/13	Bump Check Gas Type & Concentration:	—
Bump Check Result:	—	Date Last Cleared:	— 1/16/13

Breathing Zone	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	0	2.2(1)	Top of Stairs to Outlet	0	0

(1) Peaked @ 2.2 ppm, back to 0, peaked again @ 2.2 ppm.

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

1 Foot Above Ground	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	33 / 23 (3)	3.2 (3)	Top of Stairs to Outlet	0	0
Within Cells	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
Rock Drain NW Corner	0	0	Wetland SE Corner	0	0
Rock Drain NE Corner	0	0	Wetland SW Corner	0	0
Rock Drain E Perimeter	0	0	Wetland W Perimeter	0	0
E Bndry Rock Drain Side	0	0	W Bndry Rock Drain Side	0	0
E Bndry Wetland Side	0	0	W Bndry Wetland Side	0	0
Wetland E Perimeter	0	0	Rock Drain W Perimeter	0	0
Monitoring Ports	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
RockDrainMP	0	0	WetlandMP2	4-8	0
WetlandMP1	0	0	WetlandOut	33 (2)	3.1 (2)

Personnel Signatures: Sara

1053 - SITE CONDITIONS (START)
TEMP. 42.6°F
WIND SPEED: 1.4 mph SW
clear skis

1143 - SITE CONDITIONS (END)
TEMP.: 54.5°F
WIND SPEED: 0.0 mph
Clear

(2) Peaks @ 33 ppm MSA, 19 ppm EAGLE; 3.1 Badge. Readings came in waves. Averages estimates Badge: 1.8 ppm; multi-gas ~10 ppm.

(3) Peaks 33 - MSA; 23 - EAGLE 4.8 - BADGE; Ave estimate multi-gas 8 ppm; Badge 3.2 ppm

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

Date: 2/6/13 Time: 12:15 Personnel: Hallie Bevan Simpson

Multi-Gas Meter			
Meter Make/Model:	Eagle 2 / RKI	Serial Number:	E2B033
Date of Last Calibration:	?	Calibration Gas Type & Concentration:	—
Date/Time of Last Bump Check:	?	Bump Check Gas Type & Concentration:	—
Bump Check Result:	?	Date/Time of Last Fresh Air Calibration:	2/6/13 12:18
Personal Gas Monitoring Badges			
Meter Make/Model:	IS Gas Badge Plus	Serial Number:	121404RA-452 H2S
Date/Time of Last Bump Check:	2/6/13 09:30	Bump Check Gas Type & Concentration:	H_2S 10 ppm
Bump Check Result:	9.7	Date Last Cleared:	2/6/13
Personal Gas Monitoring Badges			
Meter Make/Model:		Serial Number:	~~H2S~~
Date/Time of Last Bump Check:		Bump Check Gas Type & Concentration:	
Bump Check Result:		Date Last Cleared:	

Breathing Zone	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	0	0	Top of Stairs to Outlet	0	0

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

1 Foot Above Ground	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	Ø	Ø	Wetland SW Corner	Ø	Ø
Inlet Flow Meter	Ø	Ø	Wetland W Perimeter	Ø	Ø
Inlet Flow Control Box	Ø	Ø	W Boundary	Ø	Ø
Rock Drain NW Corner	Ø	Ø	Rock Drain W Perimeter	Ø	Ø
Rock Drain NE Corner	Ø	Ø	Access Walkway N	Ø	Ø
Rock Drain E Perimeter	Ø	Ø	RockDrainMP	Ø	Ø
E Boundary	Ø	Ø	WetlandMP1	Ø	Ø
Wetland E Perimeter	Ø	Ø	Access Walkway S	Ø	Ø
Wetland SE Corner	Ø	Ø	WetlandMP2	Ø	Ø
* Wetland Outlet	19.5	0.9	Top of Stairs to Outlet	Ø	Ø
Within Cells	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
Rock Drain NW Corner	Ø		Wetland SE Corner	Ø	
Rock Drain NE Corner	Ø		Wetland SW Corner	Ø	
Rock Drain E Perimeter	Ø		Wetland W Perimeter	Ø	
E Bndry Rock Drain Side	Ø		W Bndry Rock Drain Side	Ø	
E Bndry Wetland Side	Ø		W Bndry Wetland Side	Ø	
Wetland E Perimeter	Ø		Rock Drain W Perimeter	Ø	
Monitoring Ports	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
RockDrainMP	Ø		WetlandMP2	3.0	
WetlandMP1	Ø		WetlandOut	26.0	

Personnel Signatures: Hallie M Bevan Simpson

* detected when wind calmed down.

Winds gusty avg. 10 mph from South, air temperatures 34-39°F.

HBS

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 3/13/13 Time: 12:20 Personnel: Hallie, John, Daniel Mass

Multi-Gas Meter			
Meter Make/Model:	MSA Altair 5iR	Serial Number:	6681
Date of Last Calibration:	~~3/13~~ ?	~~Calibration~~ Bump Gas Type & Concentration:	H_2S 20ppm LEL 14.5%
Date/Time of Last Bump Check:	3/13/13	Bump Check Gas Type & Concentration:	
Bump Check Result:	10 ppm H_2S	Date/Time of Last Fresh Air Calibration:	3/13/13
Personal Gas Monitoring Badges			
Meter Make/Model:	Industrial Sci. GasBadge Plus	Serial Number:	12084K5-001
Date/Time of Last Bump Check:	3/13/13 11:00	Bump Check Gas Type & Concentration:	~~10~~ 20 ppm H_2S
Bump Check Result:	20 ppm	Date Last Cleared:	3/13/13
Personal Gas Monitoring Badges			
Meter Make/Model:	Industrial Sci GasBadge Plus	Serial Number:	12184RA-454
Date/Time of Last Bump Check:	3/13/13 9:30	Bump Check Gas Type & Concentration:	10 ppm H_2S
Bump Check Result:	10.0 ppm	Date Last Cleared:	3/13/13

Breathing Zone	H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)		H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	NM		
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
1 Foot Above Ground	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	NM		
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
Within Cells	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Rock Drain NW Corner	0	0	0	Wetland SE Corner	0	0	0
Rock Drain NE Corner	0	0	0	Wetland SW Corner	0	0	0
Rock Drain E Perimeter	0	0	0	Wetland W Perimeter	0	0	0
E Bndry Rock Drain Side	0	0	0	W Bndry Rock Drain Side	0	0	0
E Bndry Wetland Side	0	0	0	W Bndry Wetland Side	0	0	0
Wetland E Perimeter	0	0	0	Rock Drain W Perimeter	NM		
Monitoring Ports	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
RockDrainMP	0	0	0	WetlandMP2	0	0	0
WetlandMP1	0	0	0	WetlandOut	20	0.28	0

* Alarm sounded at outlet. Exposed 15'. Cleared alarm. Reading 0 ppm H_2S on MSA. Max on badge 0.28. LEL remained at 0.
NM - not measured. Wind calm up to ~3mph from north. Sunny, clear, temp. ~40°F.

Personnel Signatures: [signatures]

Revised: 3/12/2013
C:\Users\hallie.bevan\Documents\SA11161300 - Rico-Argentine Mine Site\15000_HSSE\15200 H2S\H2S_Survey_FieldSheet_130312

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 25APR13 Time: 0930 Personnel: JFreitas / BLoomis

Multi-Gas Meter			
Meter Make/Model:	MSA ALTAIR 5TR	Serial Number:	6681
Date of Last Calibration:		Calibration Gas Type & Concentration:	H_2S-20PPM
Date/Time of Last Bump Check:	25APR13/0830	Bump Check Gas Type & Concentration:	
Bump Check Result:	Normal - 20PPM H_2S	Date/Time of Last Fresh Air Calibration:	25APR13/0830
Personal Gas Monitoring Badges			
Meter Make/Model:	INDUSTRIAL SCIENTIFIC PRO LAS BADGE	Serial Number:	120
Date/Time of Last Bump Check:	25APR13/0830	Bump Check Gas Type & Concentration:	H_2S-20PPM
Bump Check Result:	NORMAL-20PPM H_2S	Date Last Cleared:	25APR13-0835
Personal Gas Monitoring Badges			
Meter Make/Model:		Serial Number:	
Date/Time of Last Bump Check:		Bump Check Gas Type & Concentration:	
Bump Check Result:		Date Last Cleared:	

Breathing Zone	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	0	0	Top of Stairs to Outlet	0	0

NEED TO SHORE SHORE-UP SOIL NEAR SOUTH-WEST CORNER of 2ND CELL
WHOLE UT TREE DOWN ON NW NEAR BOTTY
3 36-53

ONLY READINGS OBTAINED AT TOP OF EFFLUENT PIPE OPENING 36-53 PPM

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

1 Foot Above Ground	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	Ø	Ø	Wetland SW Corner	Ø	Ø
Inlet Flow Meter			Wetland W Perimeter		
Inlet Flow Control Box			W Boundary		
Rock Drain NW Corner			Rock Drain W Perimeter		
Rock Drain NE Corner			Access Walkway N		
Rock Drain E Perimeter			RockDrainMP		
E Boundary			WetlandMP1		
Wetland E Perimeter			Access Walkway S		
Wetland SE Corner			WetlandMP2		
Wetland Outlet			Top of Stairs to Outlet		
Within Cells	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
Rock Drain NW Corner	Ø	Ø	Wetland SE Corner	Ø	Ø
Rock Drain NE Corner			Wetland SW Corner		
Rock Drain E Perimeter			Wetland W Perimeter		
E Bndry Rock Drain Side			W Bndry Rock Drain Side		
E Bndry Wetland Side			W Bndry Wetland Side		
Wetland E Perimeter			Rock Drain W Perimeter		
Monitoring Ports	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
RockDrainMP	Ø	Ø	WetlandMP2	Ø	Ø
WetlandMP1	Ø	Ø	WetlandOut	36-53	1.4-2.6

Personnel Signatures: Jonn Freitas
Rico HSSE

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 5/21/2013 Time: 10:04 / 12:55 Personnel: Hallie B. Simpson, Mike Traynor

Multi-Gas Meter			
Meter Make/Model:	MSA Altair 5iR	Serial Number:	6681
Date of Last Calibration:	5/21/2013	Calibration Gas Type & Concentration:	SPAN – H_2S = 20 ppm
Date/Time of Last Bump Check:	5/21/2013 10:04	Bump Check Gas Type & Concentration:	SPAN – H_2S = 20 ppm
Bump Check Result:	20 ppm H_2S	Date/Time of Last Fresh Air Calibration:	5/21/2013 10:02
Personal Gas Monitoring Badges			
Meter Make/Model:	Gas Badge PLUS	Serial Number:	453
Date/Time of Last Bump Check:	5/21/2013 10:00	Bump Check Gas Type & Concentration:	H_2S 10 ppm
Bump Check Result:	9.5	Date Last Cleared:	5/21/2013
Personal Gas Monitoring Badges			
Meter Make/Model:	Gas Badge Plus	Serial Number:	452
Date/Time of Last Bump Check:	5/21/2013 10:00	Bump Check Gas Type & Concentration:	H_2S 10ppm
Bump Check Result:	10.0	Date Last Cleared:	5/21/2013

Breathing Zone	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	0	0	Top of Stairs to Outlet	0	0

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

1 Foot Above Ground	Meter (ppm)	Badge (ppm)		Meter (ppm)	Badge (ppm)
Top of Stairs to Inlet	0	0	Wetland SW Corner	0	0
Inlet Flow Meter	0	0	Wetland W Perimeter	0	0
Inlet Flow Control Box	0	0	W Boundary	0	0
Rock Drain NW Corner	0	0	Rock Drain W Perimeter	0	0
Rock Drain NE Corner	0	0	Access Walkway N	0	0
Rock Drain E Perimeter	0	0	RockDrainMP	0	0
E Boundary	0	0	WetlandMP1	0	0
Wetland E Perimeter	0	0	Access Walkway S	0	0
Wetland SE Corner	0	0	WetlandMP2	0	0
Wetland Outlet	0	0	Top of Stairs to Outlet	0	0
Within Cells	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
Rock Drain NW Corner	0	0	Wetland SE Corner	0	0
Rock Drain NE Corner	0	0	Wetland SW Corner	0	0
Rock Drain E Perimeter	0	0	Wetland W Perimeter	0	0
E Bndry Rock Drain Side	0	0	W Bndry Rock Drain Side	0	0
E Bndry Wetland Side	0	0	W Bndry Wetland Side	0	0
Wetland E Perimeter	0	0	Rock Drain W Perimeter	0	0
Monitoring Ports	**Meter (ppm)**	**Badge (ppm)**		**Meter (ppm)**	**Badge (ppm)**
RockDrainMP	0	0	WetlandMP2	0	0
WetlandMP1	0	0	WetlandOut	0	0

Personnel Signatures: Hallie M Bevan

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 6/18/13 Time: 14:30 Personnel: Hallie Bevan Simpson

Multi-Gas Meter			
Meter Make/Model:	MSA Altair 5iR	**Serial Number:**	6681
Date of Last Calibration:	6/18/13	**Calibration Gas Type & Concentration:**	Span 20 ppm
Date/Time of Last Bump Check:	6/18/13	**Bump Check Gas Type & Concentration:**	Span 20 ppm
Bump Check Result:	20 ppm	**Date/Time of Last Fresh Air Calibration:**	6/18/13
Personal Gas Monitoring Badges			
Meter Make/Model:	IS Gas Badge Plus	**Serial Number:**	452
Date/Time of Last Bump Check:	6/18/13	**Bump Check Gas Type & Concentration:**	H_2S 10 ppm
Bump Check Result:	9.2 (HBS)	**Date Last Cleared:**	6/18/13
Personal Gas Monitoring Badges			
Meter Make/Model:		**Serial Number:**	
Date/Time of Last Bump Check:		**Bump Check Gas Type & Concentration:**	
Bump Check Result:		**Date Last Cleared:**	

Breathing Zone	H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)		H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter				Wetland W Perimeter			
Inlet Flow Control Box				W Boundary			
Rock Drain NW Corner				Rock Drain W Perimeter			
Rock Drain NE Corner				Access Walkway N			
Rock Drain E Perimeter				RockDrainMP			
E Boundary				WetlandMP1			
Wetland E Perimeter				Access Walkway S			
Wetland SE Corner				WetlandMP2			
Wetland Outlet				Top of Stairs to Outlet			
1 Foot Above Ground	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter				Wetland W Perimeter			
Inlet Flow Control Box				W Boundary			
Rock Drain NW Corner				Rock Drain W Perimeter			
Rock Drain NE Corner				Access Walkway N			
Rock Drain E Perimeter				RockDrainMP			
E Boundary				WetlandMP1			
Wetland E Perimeter				Access Walkway S			
Wetland SE Corner				WetlandMP2			
Wetland Outlet				Top of Stairs to Outlet			
Within Cells	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Rock Drain NW Corner	0	0	0	Wetland SE Corner	0	0	0
Rock Drain NE Corner	0			Wetland SW Corner	0	0	0
Rock Drain E Perimeter	0			Wetland W Perimeter	0	0	0
E Bndry Rock Drain Side	0			W Bndry Rock Drain Side	0	0	0
E Bndry Wetland Side	0			W Bndry Wetland Side	0	0	0
Wetland E Perimeter	0			Rock Drain W Perimeter			
Monitoring Ports	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
RockDrainMP	0	0	0	WetlandMP2	0	0	0
WetlandMP1	0	0	0	WetlandOut	44	0	0

Personnel Signatures: Hallie Bevan Simpson

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

Date: 7/10/2013 Time: 15:50 Personnel: HBS, EW, JF

Multi-Gas Meter			
Meter Make/Model:	MSA Altair 5iR	Serial Number:	66681
Date of Last Calibration:	7/10/13	Calibration Gas Type & Concentration:	Span 20ppm H_2S
Date/Time of Last Bump Check:	7/10/13	Bump Check Gas Type & Concentration:	Span 20ppm H_2S
Bump Check Result:	ok 20 ppm H_2S	Date/Time of Last Fresh Air Calibration:	7/10/13 9:30
Personal Gas Monitoring Badges			
Meter Make/Model:	Industrial Scientific Gas Badge Plus	Serial Number:	452
Date/Time of Last Bump Check:	7/10/13 9:30	Bump Check Gas Type & Concentration:	10 ppm H_2S
Bump Check Result:		Date Last Cleared:	7/10/13
Personal Gas Monitoring Badges			
Meter Make/Model:	" "	Serial Number:	453
Date/Time of Last Bump Check:	7/10/13 9:30	Bump Check Gas Type & Concentration:	10ppm H_2S
Bump Check Result:		Date Last Cleared:	7/10/13

Breathing Zone	H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)		H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
1 Foot Above Ground	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
Within Cells	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Rock Drain NW Corner	0	0	0	Wetland SE Corner	0	0	0
Rock Drain NE Corner	0	0	0	Wetland SW Corner	0	0	0
Rock Drain E Perimeter	0	0	0	Wetland W Perimeter	0	0	0
E Bndry Rock Drain Side	0	0	0	W Bndry Rock Drain Side	0	0	0
E Bndry Wetland Side	0	0	0	W Bndry Wetland Side	0	0	0
Wetland E Perimeter	0	0	0	Rock Drain W Perimeter	0	0	0
Monitoring Ports	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
RockDrainMP	0	0	0	WetlandMP2	0	0	0
WetlandMP1	0	0	0	WetlandOut	6	0	0

Personnel Signatures: Hallie Simpson

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

Date: 8/15/13 Time: 14:35 Personnel: HH, MC

Multi-Gas Meter			
Meter Make/Model:	MSA Altair 5iR	Serial Number:	6681
Date of Last Calibration:	?	Calibration Gas Type & Concentration:	Span Gas 20ppm H_2S
Date/Time of Last Bump Check:	8/15/13 9:00	Bump Check Gas Type & Concentration:	Span Gas 20ppm H_2S
Bump Check Result:	pass	Date/Time of Last Fresh Air Calibration:	8/15/13 9:10
Personal Gas Monitoring Badges			
Meter Make/Model:	Industrial Scientific Gas Badge Plus	Serial Number:	452
Date/Time of Last Bump Check:	8/15/13 8:50	Bump Check Gas Type & Concentration:	H_2S 10ppm
Bump Check Result:	9.8 - pass	Date Last Cleared:	8/15/13
Personal Gas Monitoring Badges			
Meter Make/Model:	IS Gas Badge Plus	Serial Number:	455
Date/Time of Last Bump Check:	8/15/13 8:55	Bump Check Gas Type & Concentration:	H_2S 10ppm
Bump Check Result:	9.5 - pass	Date Last Cleared:	8/15/13

Breathing Zone	H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)		H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
1 Foot Above Ground	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
Within Cells	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Rock Drain NW Corner	0	0	0	Wetland SE Corner	0	0	0
Rock Drain NE Corner	0	0	0	Wetland SW Corner	0	0	0
Rock Drain E Perimeter	0	0	0	Wetland W Perimeter	0	0	0
E Bndry Rock Drain Side	0	0	0	W Bndry Rock Drain Side	0	0	0
E Bndry Wetland Side	0	0	0	W Bndry Wetland Side	0	0	0
Wetland E Perimeter	0	0	0	Rock Drain W Perimeter	0	0	0
Monitoring Ports	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
RockDrainMP	0	0	0	WetlandMP2	0	0	0
WetlandMP1	0	0	0	WetlandOut	24	0.9	0

Personnel Signatures: Hallie Beven Simpson

HYDROGEN SULFIDE SURVEY
Constructed Wetland Pilot Scale Test
Rico-Argentine Mine Site
Dolores County, Colorado

amec

ate: 9/19/2013 Time: 15:15 Personnel: HBS, MC

Multi-Gas Meter			
Meter Make/Model:	MSA AHair 5X	Serial Number:	14273
Date of Last Calibration:	9/16/13	Calibration Gas Type & Concentration:	~~SPAN – H_2S 20ppm~~ (HBS)
Date/Time of Last Bump Check:	9/19/13 0815	Bump Check Gas Type & Concentration:	H_2S 20ppm SPAN
Bump Check Result:	N/A – PASS	Date/Time of Last Fresh Air Calibration:	9/19/13 0830
Personal Gas Monitoring Badges			
Meter Make/Model:	Industrial Sci. Gas Badge Plus	Serial Number:	452
Date/Time of Last Bump Check:	9/19/13 0815	Bump Check Gas Type & Concentration:	≥ 10 ppm
Bump Check Result:		Date Last Cleared:	9/19/13
Personal Gas Monitoring Badges			
Meter Make/Model:	I.S. Gas Badge Plus	Serial Number:	455
Date/Time of Last Bump Check:	9/19/13 0815	Bump Check Gas Type & Concentration:	10 ppm
Bump Check Result:		Date Last Cleared:	9/19/13

Breathing Zone	H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)		H2S - Meter (ppm)	H2S - Badge (ppm)	LEL (%)
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
1 Foot Above Ground	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Top of Stairs to Inlet	0	0	0	Wetland SW Corner	0	0	0
Inlet Flow Meter	0	0	0	Wetland W Perimeter	0	0	0
Inlet Flow Control Box	0	0	0	W Boundary	0	0	0
Rock Drain NW Corner	0	0	0	Rock Drain W Perimeter	0	0	0
Rock Drain NE Corner	0	0	0	Access Walkway N	0	0	0
Rock Drain E Perimeter	0	0	0	RockDrainMP	0	0	0
E Boundary	0	0	0	WetlandMP1	0	0	0
Wetland E Perimeter	0	0	0	Access Walkway S	0	0	0
Wetland SE Corner	0	0	0	WetlandMP2	0	0	0
Wetland Outlet	0	0	0	Top of Stairs to Outlet	0	0	0
Within Cells	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
Rock Drain NW Corner	0	0	0	Wetland SE Corner	0	0	0
Rock Drain NE Corner	0	0	0	Wetland SW Corner	0	0	0
Rock Drain E Perimeter	0	0	0	Wetland W Perimeter	0	0	0
E Bndry Rock Drain Side	0	0	0	W Bndry Rock Drain Side	0	0	0
E Bndry Wetland Side	0	0	0	W Bndry Wetland Side	0	0	0
Wetland E Perimeter	0	0	0	Rock Drain W Perimeter	0	0	0
Monitoring Ports	**H2S - Meter**	**H2S - Badge**	**LEL**		**H2S - Meter**	**H2S - Badge**	**LEL**
RockDrainMP	0	0	0	WetlandMP2	0	0	0
WetlandMP1	0	0	0	WetlandOut	-20	0	0

Personnel Signatures: Hall M Thompson