

YEAR-END REPORT FOR THE 2013 FIELD SEASON AT LEVIATHAN MINE

Alpine County, California

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1. INTRODUCTION

Leviathan Mine is a former sulfur mine that the State of California acquired in the early 1980s to address water quality problems caused by historical mining. Jurisdiction over Leviathan Mine rests with the State Water Resources Control Board, which, in turn, has delegated jurisdiction over cleanup work to the California Regional Water Quality Control Board, Lahontan Region (Water Board). On May 11, 2000, the United States Environmental Protection Agency (USEPA) placed Leviathan Mine on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List, thus making Leviathan Mine a federal Superfund site.

On July 19, 2000, pursuant to its authority under CERCLA, USEPA issued an Administrative Abatement Action (AAA) to the Water Board and directed the Water Board to implement certain pollution abatement and site monitoring activities at Leviathan Mine. With slight modifications, USEPA subsequently reissued the AAA in 2001, 2002, 2003, 2004, and 2005. In its 2005 AAA, USEPA decided, instead of issuing the AAA every year, to allow its Remedial Project Manager to notify Water Board of the necessity to continue the Work for an additional year, for each year that the first phase of Non-Time Critical Removal Action (NTCRA) continues.

This Year-End Report for the 2013 Field Season at Leviathan Mine (Year-End Report) has been prepared by the Water Board for the USEPA. This Year-End Report was prepared to comply with Paragraph No. 50 of USEPA's July 14, 2005 AAA, which states:

"Within thirty (30) days after the LRWQCB [Water Board] concludes that the seasonal work on the NTCRA has been fully performed, the LRWQCB shall so notify EPA and shall schedule and conduct a pre-certification inspection to be attended by the LRWQCB and EPA. The pre-certification inspection shall be followed by a written report submitted within ninety (90) days of the inspection by the LRWQCB's Project Coordinator certifying that all work to date on the NTCRA has been completed in full satisfaction of the requirements of this Administrative Action."

The pre-certification inspection occurred by telephone conference call on November 5, 2013.

This Year-End Report constitutes the "*written report*" as referenced in Paragraph No. 50 of the AAA, and contains year-end summaries of Water Board field activities performed in 2013. The activities required of the Water Board by the USEPA are described in Paragraph No. 37 of the AAA. These activities consist of:

1. Summer treatment of Acid Mine Drainage (AMD) captured year-round in a series of ponds;
2. Site maintenance of ponds, drainage and diversion channels, and gates and fences; and
3. Site monitoring of water quality, water quantity, and meteorological information.

Water Board staff conducted the above-listed activities in accordance with the *2013 Work Plan for Leviathan Mine, Alpine County, California* (Work Plan) *Alpine County, California* prepared by the Water Board.

This report describes the site activities performed in 2013, and is organized into the following sections:

- A background section that describes the site setting and history; collection and storage of AMD; and the treatment process;
- A sludge removal and pond water treatment section describing the removal and disposal of sludge and treatment of AMD in 2013;
- A site meteorological and surface water flow monitoring section; and
- A general site maintenance section.

Pond water treatment data are summarized in six tables in Appendix A (A-1 through A-6). Laboratory reports and electronic data deliverables for pond water samples, USGS flow and stage data, and meteorological data are included as electronic files on the enclosed disc and organized into Appendices B through E.

2. BACKGROUND

2.1 SITE SETTING AND HISTORY

Leviathan Mine is located on the eastern slope of the Sierra Nevada Mountains in Alpine County, California (Figure 1). The mine is approximately six miles east of Markleeville, California and five miles west of Topaz Lake, Nevada. Based on the Final Title Search and Survey Report conducted by Science Applications International Corporation (SAIC) for the USEPA on January 31, 2000, the Leviathan Mine encompasses thirty-two patented mineral claims and a patented mill site. The majority of land disturbed by mining activities is on state-owned property, with the remainder of the disturbance located on property owned by the United States Department of Agriculture, Forest Service, Humboldt-Toiyabe National Forest (USFS). The USFS owns the majority of land surrounding the mine according to the above-mentioned SAIC report, with the exception of ten private parcels along the southern boundary of the mine site.

Leviathan and Aspen Creeks (Figure 2) flow across the mine site and join below the mine. Approximately 1.5 miles downstream of the confluence of Leviathan and Aspen Creeks, Leviathan Creek joins Mountaineer Creek. The combined flow of Leviathan and Mountaineer Creeks forms Bryant Creek. Approximately 3.5 miles downstream of the confluence of Leviathan and Mountaineer Creeks, Bryant Creek flows across the Nevada state line. Approximately 3.3 miles downstream of the Nevada state line, Bryant Creek joins the East Fork Carson River.

Historical mining activities at Leviathan Mine included underground and open pit extraction of sulfur-rich ore. These activities resulted in the exposure of naturally occurring sulfide minerals to air and water. This exposure triggered a series of chemical reactions that caused local groundwater to become acidic and metal-rich. The acidic groundwater discharges from an old mine tunnel as well as seeps at several locations within the Leviathan Mine site. When this AMD enters local surface water bodies, it adversely affects water quality, which, in turn, affects algae, insect, and fish growth, and damages the in-stream habitat through deposition of metal-rich precipitates.

The Water Board has implemented several projects to abate AMD from entering local surface water bodies. In 1985, the Water Board completed construction of a pollution abatement project at Leviathan Mine to address certain specific problem areas. This project included the construction of AMD storage and evaporation ponds, which are a major component of the Water Board's pond water collection and treatment activities.

2.2 AMD Collection and Storage

The 1985 pollution abatement project included construction of five lined evaporation ponds (Figure 3) to capture and evaporate AMD from remnant underground mine workings. The primary sources of AMD to the pond system are the Adit and the Pit Under-Drain (PUD).

- The Adit is the location where acidic groundwater emanated from a remnant tunnel excavated during underground mining activities in the 1930s. The exact condition of the interior of the tunnel is unknown, but the tunnel is collapsed at its portal. The approximate location of the tunnel and other site features are shown in Figure 3. As part of the 1985 pollution abatement project, the Water Board's contractor installed an underground drain to collect acidic groundwater emanating from the Adit. The underground drain consists of a 12-inch-diameter perforated pipe in a bed of drain rock. The perforated pipe is connected to a non-perforated 12-inch pipe that carries the AMD to a concrete flow control structure. AMD from the Adit has a pH of less than 3.0 and typically has a discharge rate between 9 and 15 gallons per minute (gpm) with rates as high as approximately 50 gpm (flow data collected from 1999 to present).
- The Water Board's contractor installed the PUD during construction of the 1985 pollution abatement project to dewater saturated soils in the bottom of the open pit prior to backfilling the pit to its current elevation. The PUD consists of approximately 1,500 linear feet of 12-inch-diameter perforated pipe set in a bed of drain rock beneath the pit bottom, buried in pit backfill material. The perforated pipes connect to a non-perforated 18-inch-diameter pipe that conveys the PUD discharge to the flow control structure. AMD from the PUD has a pH of less than 3.0 and typically has a flow rate between 0.1 and 4 gpm, with rates as high as approximately 42 gpm (flow data collected from 1999 to present).
- The five evaporation ponds (Ponds 1, 2 South, 2 North, 3, and 4; see Figure 3) cover a combined surface area of approximately 12.8 acres with a cumulative holding capacity of approximately 16.5 million gallons, based on an October 1998 survey conducted by ARCO Environmental Remediation, LLC. AMD from the flow control structure can be routed directly to Leviathan Creek or to the pond system via a weir gate. When the AMD is directed to the pond system, it can be distributed by gravity to any combination of Ponds 1, 2 South, and 2 North via a series of valves, as these ponds are interconnected and are at the same elevation. These three ponds are commonly called the "upper ponds" and have a combined volume of approximately 14 million gallons. Pond 3 can receive overflow from the upper ponds by gravity via PVC overflow pipes. Overflow from Pond 3 flows in PVC piping and can be directed by gravity, via valves, to either the Leviathan Creek or to Pond 4. Pond 4 overflows directly to the Leviathan Creek via PVC piping. Pond 4 is being utilized by Atlantic Richfield Company (ARCO) for storage and treatment of other AMD sources. Since the spring of

2006, Pond 4 has been isolated from Pond 3 by a closed valve, and there has been no discharge from the Pond 3 system to Pond 4. Any discharges from Pond 3 are routed to Leviathan Creek.

- In 2013, no AMD was routed directly from the flow control structure to Leviathan Creek.
- In 2013, Pond 3 received no overflow from any of the upper ponds, and there was no discharge from Pond 3.

2.3 Pond Water Treatment (PWT) Processes

The Water Board treats and discharges treated pond water during the summer (and spring, if needed) to renew pond storage capacity for the subsequent winter and spring months. There was no need for spring treatment in 2013. The Water Board's treatment of AMD contained in the pond system is accomplished through lime neutralization. The neutralization of AMD by the addition of lime has long been accepted as an effective means to raise pH and remove metals in AMD. Lime (calcium hydroxide or $\text{Ca}[\text{OH}]_2$), is mixed into the AMD from the pond system; the addition of lime causes an increase in pH and the precipitation of dissolved constituents, including metals, contained in the AMD. The precipitated solids are settled out of solution, and the final products are: (1) a practically metal-free effluent with near neutral pH, and (2) a metal-rich waste sludge.

The Water Board assembled the PWT plant (Plant) during the 1999 field season on the northeast corner of Pond 1 and tested the process at full-scale during the 1999 and 2000 field seasons. The Water Board has continued to operate the Plant during the summer months from 2001 through 2013. The typical Water Board field season at Leviathan Mine runs from mid-June through mid-October.

The Plant, which has also been referred to as the Pond 1 lime treatment plant because the treatment system is located on the north side of Pond 1, treats the AMD stored in the three upper ponds. The Plant draws the AMD from Pond 1 for treatment, thereby lowering the water elevation of Pond 1. The lower water level in Pond 1 causes AMD from Pond 2 North and Pond 2 South to flow by gravity to Pond 1 to be treated by the treatment system. As pond water levels decline toward the end of the treatment season, portable transfer pumps have to be used to move water from Ponds 2N and 2S to Pond 1. The Plant conveys the treated AMD and suspended precipitated solids to the Pit Clarifier that is located in the bottom of the Leviathan Mine open pit. The Pit Clarifier has plan dimensions of approximately 150-feet by 150-feet, and includes a gravel/sand-covered perforated pipe underdrain and a 10-inch diameter PVC decanting device, known as the piccolo decant structure.

3. 2013 POND WATER TREATMENT AND SLUDGE REMOVAL

The 2013 AMD treatment and associated activities included sludge removal from the Pit Clarifier in June and AMD treatment at the Plant in July. Each is discussed below.

3.1 Pit Clarifier Sludge Removal and Disposal

Approximately 324 tons of sludge generated during operation of the Plant in 2012 was removed from the Pit Clarifier by the Water Board's contractor, URS Corporation Americas (URS), in June 2013. The sludge had been sampled, analyzed, and characterized in the fall of 2012; the results from the fall 2012 sampling were reported in the Water Board's 2012 year-end report. In addition to analytical results contained in the Water Board's 2012 year-end report, in June of 2013, the Water Board collected six additional sludge samples (1213PWT020PC-A(0-5"), 1213PWT021PC-B(0-20"), 1213PWT022PC-C(0-18"), 1213PWT023PC-A(0-5"), 1213PWT024PC-B(6-12"), and 1213PWT025PC-C(12-18"). These additional samples from sludge generated during the 2012 treatment season were collected for laboratory analysis of bulk density and percent solids; these additional data are summarized in Table A-6 of Appendix A. The average wet bulk density of sludge generated during the 2012 treatment season was 42.7 lb/ft³ as sampled in June 2013. Sludge generated during the 2012 field season averaged 62 percent solids when sampled in June 2013, whereas the percent solids averaged 30 percent when sampled in October 2012. With the exception of the TTLC analysis for arsenic and the STLC analysis for nickel, the sludge did not exceed any other STLC or TTLC limits. These results are consistent with results obtained during the October 2012 sampling event. The sludge was hauled to a Class I hazardous waste landfill in Beatty, Nevada for disposal. Hazardous waste manifests are available for review at the Water Board's office in South Lake Tahoe. The sand drainage layer in the bottom of the pit clarifier was evaluated following sludge removal; the sand layer was adequate and replenishment was not necessary.

3.2 2013 Summer Pond Water Treatment Plant Operation

The Water Board contracted with URS for Plant operations for the 2013 field season. AMD treatment began in early July, with the first treated water entering the Pit Clarifier on July 8, 2013. Discharge to Leviathan Creek began on July 11, 2013, and treatment ceased on July 26, 2013. URS chose to operate the Plant 24 hours per day, 7 days per week during the treatment season, with one exception; the treatment plant was shut down on the evening of July 12, and treatment resumed on the morning of July 14th.

In 2013 URS used pre-mixed lime slurry delivered to the site in tanker trucks. URS used both a one point and two point lime addition at times during the 2013 treatment season.

URS pumped AMD from Pond 1 to a 10,000-gallon fiberglass reaction tank (R-1). When a two point lime addition was in use, a pH probe installed in R-1 measured pH in R-1 and controlled the amount of lime slurry added to R-1. The lime slurry raised the pH of the AMD from approximately 2.5 to an approximate range of 3.0 to 3.4, as measured in R-1. When a one point lime addition was used, lime was not added to R-

1. A mixer and compressed air were used in R-1 at all times to agitate, oxidize, and promote mixing.

The partially-treated AMD flowed by gravity from R-1 through a two-chambered combination flash/flocculation mix tank (FF-1) in which URS used two mixers to maintain high mixing energy and keep the precipitated solids in suspension. The fluid mixture flowed by gravity from FF-1 into a second 10,000 gallon fiberglass tank referred to as R-2. A mixer and compressed air were used in R-2 to further agitate, oxidize, and promote mixing. The lime addition into R-2 was the only lime addition when a one point lime addition was used. When a two point lime addition was used, the lime addition into R-2 was the second lime addition. A pH probe in R-2 measured pH and metered lime slurry to R-2. The lime slurry raised the pH of the partially-treated AMD to an approximate range of 8.2 to 8.5, as measured in R-2. The fluid mixture then flowed by gravity through a second flash/flocculation mix tank (FF-2) where compressed air was used to promote mixing.

The fluid mixture flowed by gravity from FF-2 into a Lamella clarifier (CL-2). A polyacrylamide polymer solution was injected into the fluid mixture at the bottom of CL-2 to promote flocculation and solids settling in the Pit Clarifier. Two 10-hp mud pumps transferred the fluid mixture from the bottom of CL-2 to the Pit Clarifier, where solids settled out in near-quiescent conditions. In 2013, URS monitored a pH probe in FF-2. The pH probe in FF-2 controlled the mud pumps, preventing transfer of treated AMD to the Pit Clarifier if the pH dropped below 8.1 or went above 8.7. This pH probe, controller, and pump combination provided additional reliability as well as a final confirmation pH measurement.

A small portion of utility water is used to dilute the polyacrylamide polymer that is added into the fluid mixture at the bottom of CL-2. Typically, this utility water is collected from Leviathan Creek upstream of the disturbed portion of the site and is stored in two 15,000 gallon utility water tanks adjacent to the Plant. This year, due to unusually low precipitation over the winter months, flow in Leviathan Creek was insufficient to supply an adequate volume of utility water. As was done during the 2012 treatment season, the Water Board began using treated AMD from the Water Board's effluent weir box as a source of utility water shortly after treatment began. Approximately 2.3 million gallons of AMD were neutralized while using treated effluent as utility water. Based on laboratory analytical results of effluent samples and field observations, no negative impacts on treatment efficiency were observed while using treated effluent as utility water.

In 2013, the fluid mixture was routed around the Lamella clarifier (CL-1) typically used between FF-1 and R-2. CL-1 was first removed from the treatment system during the 2012 treatment season. As in 2012, Water Board and URS staff monitored treatment plant chemistry and sample analytical results to ensure that removing CL-1 from the treatment system did not have a negative impact on treatment effectiveness. No negative impacts on treatment effectiveness were observed. Removing CL-1 from the treatment system eliminates a significant maintenance issue since precipitates typically cake the inside of CL-1.

In 2013, the treated water was discharged from the Pit Clarifier using only the underdrain, the piccolo decant structure was not needed. Stage data and water quality

control samples were collected at the 90-degree V-notch weir in the Water Board's effluent weir box. Stage data were recorded at 15-minute intervals using a data logger/pressure transducer system. For 2013, the Water Board's stage data were used to calculate treated effluent discharge volumes. The Water Board weir was flow tested by USGS and Water Board staff at both high flows (approximately 240 gpm) and low flows (less than 50 gpm). The USGS developed a rating curve based on these data; the rating curve was used to convert the 15-minute stage readings into flow rates.

Discharge of treated effluent from the Pit Clarifier to Leviathan Creek began on July 11, 2013. Discharge to Leviathan Creek occurred continuously, with two exceptions; (1) discharge to Leviathan Creek was stopped for approximately 49 hours from July 12 through July 14, 2013, due to a temporary shutdown of the pond water treatment plant over the weekend, and (2) discharge to Leviathan Creek was stopped for approximately two hours on the morning of July 23, 2013, due to a temporary shutdown of the pond water treatment plant to clear lime clogs. After the pond water was treated and the Plant was shut down on July 26, 2013, treated water continued to be discharged from the Pit Clarifier as the accumulated sludge drained. By July 31, 2013, approximately 2.66 million gallons of treated AMD had been discharged to Leviathan Creek, and flows from the Pit Clarifier were well below 5 gpm. A summary of daily flow volumes discharged to Leviathan Creek is presented in Table A-1 of Appendix A.

The 2013 PWT Plant operation consumed approximately 47.65 standard tons of dry lime, 270.4 pounds of liquid flocculent, 2,413 gallons of diesel fuel, and 233 gallons of gasoline. The Water Board's treatment effort in 2013, combined with natural evaporation, resulted in the upper pond system having the maximum available storage capacity of approximately 14 million gallons at the end of the treatment effort.

Sludge generated by the Plant in 2013 is contained in the Pit Clarifier to allow for further dewatering. Dewatering of the sludge over the winter will increase solids content and reduce both the volume and mass of the sludge. Water Board staff estimates that approximately 220 - 280 tons of sludge will be disposed of in 2014.

3.3 Summer Pond Water Treatment Monitoring

Treatment process monitoring, sampling and analysis were performed in accordance with the Water Board's *Sampling and Analysis Plan for Leviathan Mine Site Pond Water Treatment* (PWT SAP) dated May 2013. A summary of the monitoring parameters, locations, and frequencies for the 2013 PWT monitoring program is presented in Table 1. Specific details of sample collection and handling are described in the PWT SAP. Effluent samples were collected and analyzed for comparison with USEPA Discharge Criteria; the USEPA Discharge Criteria are set forth in the September 25, 2008 Non-Time Critical Removal Action for the Leviathan Mine Site and summarized in Table 2. In 2013 there were no deviations from the PWT SAP. Samples collected by URS and Water Board staff were transferred under chain of custody for laboratory analysis by off-site laboratories, Microbac, of Marietta, Ohio, and Curtis and Tompkins, Ltd, Analytical Laboratories, of Berkeley, California.

To confirm the quality of treated water discharged to Leviathan Creek, the Water Board's contractor, URS, collected grab samples of the treated effluent twice weekly during the 2013 treatment season. URS collected effluent samples from the Water

Board's weir box located near the Pit Clarifier. As specified in the 2013 Work Plan, effluent sample collection stopped when the discharge of effluent dropped below 5 gpm, which occurred on July 30, 2013. The first effluent sample was collected on July 11, 2013, and the last effluent sample was collected on July 29, 2013. To confirm the USEPA discharge criteria would be met, two pre-discharge samples were taken prior to discharging the treated effluent to Leviathan Creek. These samples were collected by Water Board staff on July 9 and 10, 2013 from the pit clarifier. Additionally, URS collected Plant influent samples from the line conveying pond water to the treatment plant on a weekly basis.

In summary, the Water Board and the Water Board's contractor collected the following samples for analytical laboratory analysis as part of the 2013 Pond Water Treatment monitoring program:

- 6 treated effluent samples (2 per week)
- 2 treated effluent duplicate samples
- 2 pre-discharge samples
- 3 pre-treatment influent samples (1 per week)
- 2 field method blanks

A portion of each grab sample was field filtered, preserved with nitric acid, and submitted to the laboratory to be analyzed for the following dissolved metals/metalloids: aluminum (Al), arsenic (As), copper (Cu), chromium (Cr), cadmium (Cd), nickel (Ni), iron (Fe), lead (Pb), and zinc (Zn). An unfiltered portion of each grab sample was preserved with nitric acid and submitted to the laboratory for Total Recoverable Selenium (Se) analysis. At least once per week, in addition to the above analyses, URS submitted to the laboratory samples of influent and treated effluent for total dissolved solids (TDS), and dissolved sulfate (SO₄), calcium (Ca), cobalt (Co), magnesium (Mg), and manganese (Mn). During influent and effluent sample collection activities, URS monitored and recorded pH and temperature in the field on sampling record forms. Sample identification tracking forms and sampling record forms are available for review at the Water Board office in South Lake Tahoe. Analytical and field monitoring results of treated effluent and Plant influent samples are summarized in Tables A-2 and A-3 of Appendix A, respectively.

To provide real-time information on effluent quality and system operation, treatment plant operators measured the pH and temperature approximately every hour while the system was operating at four mid-process locations (R-1, R-2, FF-2, and influent to Pit Clarifier) and at one effluent location (weir box). Operators used these data to modify lime additions, if necessary, and maintain effluent quality. Temperature and pH data collected by URS from R-1, R-2, the Pit Clarifier, and the weir box are summarized in Table A-4 of Appendix A. Copies of URS's operator logs are available for review in the Water Board's South Lake Tahoe office.

Sludge generated during the 2013 treatment effort, and contained in the Pit Clarifier, was sampled on October 17, 2013, for waste characterization and disposal purposes. URS collected three sludge samples from three different locations in the Pit Clarifier. The sludge thickness during sampling ranged from 8 to 22 inches.

Sludge samples were analyzed for comparisons with Total Threshold Limit Concentrations (TTLCs) and Soluble Threshold Limit Concentrations (STLCs) for Title 22 metals, aluminum, and iron; and percent solids. Analytical results for the sludge samples are summarized in Table A-5 of Appendix A.

3.4 Sampling Results from Summer Pond Water Treatment Monitoring

3.4.1 Monitoring Objectives

Specific objectives of the PWT monitoring program are:

- Identify the chemical characteristics of the treatment plant influent.
- Identify the chemical characteristics of the treated effluent.
- Identify the chemical characteristics of solids generated in the treatment process.
- Monitor field pH at critical points within the treatment system and at the discharge point as a means to monitor and control treatment efficiency.
- Monitor the Plant's effectiveness in meeting USEPA Discharge Criteria.

3.4.2 Data Summary

Laboratory analytical results for treated effluent are summarized in Table A-2. These data are collected for comparison with the USEPA Daily Maximum Discharge Criteria, which are also included in Table A-2. No exceedences of the Daily Maximum Discharge Criteria occurred in 2013. Three samples, 1314PWT012-EFF, 1314PWT013-EFF and 1314PWT014-EFF individually exceeded the more stringent USEPA 4-day Average Discharge Criterion for selenium.

Table A-3 summarizes laboratory analytical results for Plant influent samples. Results are consistent with previous treatment seasons. The pH ranged from 2.30 to 2.68 and TDS ranged from 6,550 to 8,390 milligrams per liter (mg/L) with an average of 7,483 mg/L.

Results of pH and temperature for data collected by Plant operators are included in Table A-4. Measurements of pH taken by Plant operators show that the discharge of treated effluent to Leviathan Creek was within the USEPA Discharge Criteria, and that desired pH levels were achieved in the Plant throughout the treatment season.

A summary of daily discharge from the Pit Clarifier is included in Table A-1. A total of 2.66 million gallons of treated effluent was discharged to Leviathan Creek in 2013. The 15-minute discharge stage data recorded by the data logger (which are the basis of discharge flow calculations) are available for review at the Water Board's South Lake Tahoe office.

Results of the pit clarifier sludge characterization analyses are presented in Table A-5 for sludge generated during the 2013 treatment season. On October 17, 2013, URS collected three sludge samples from the Pit Clarifier to characterize sludge generated during the 2013 treatment season. These three sludge samples averaged 30 percent solids. With the exception of the TTLC analysis for arsenic and the STLC analysis for

nickel, the sludge did not exceed any other STLC or TTLC limits. These results are consistent with the past sludge generated at the Pond 1 treatment system. The total concentrations for arsenic exceeded the TTLC in all three samples. The arithmetic average arsenic concentration for these three samples was 577 milligrams per kilogram (mg/kg) on a dry-weight basis. The regulatory standard TTLC for arsenic is 500 mg/kg as measured on a wet-weight basis. Sludge sample results are reported on a dry-weight basis for this sampling effort because the percent solids at the time of disposal is not known, and therefore the dry-weight basis results constitute the most conservative evaluation of sludge quality. At the time of disposal in the late spring or early summer, the concentration of solids in the sludge has typically varied from about 25 to 55 percent. The average concentration of arsenic measured in the sludge would not exceed the TTLC on a wet-weight basis unless the sludge was approximately 87 percent or greater solids by weight; therefore, the sludge likely will not exceed the TTLC when it is disposed of in the late spring or early summer of 2013. The STLC for nickel was exceeded in one of three samples collected. The arithmetic average STLC nickel concentration for the three samples is 20.3 mg/L. The STLC for nickel is 20 mg/L.

Copies of the laboratory's electronic data deliverable (EDD) files for PWT effluent, influent, and sludge samples are in Appendix B on compact disc. Appendix B also includes Portable Document Format (PDF) versions of the hard copy laboratory reports.

3.4.3 Data Quality Evaluation

URS and Water Board staff reviewed the quality of the PWT monitoring results. Sample collection, handling, preservation, and analysis were conducted as specified in the PWT SAP. Field quality control samples, including two Field Method Blank (FMB) and two field duplicate samples, were collected. A Chain of Custody form was completed for each group of samples submitted to the analytical laboratory. Upon receipt of the laboratory report, Water Board staff reviewed the Chain of Custody to ensure that details such as the project name, sample ID numbers, sample dates, sample times, and requested parameters were properly reported. Water Board staff's data review also included an evaluation of sample holding times, an assessment of precision, an assessment of anomalous data, and a review of FMB results.

Data qualifiers from the laboratory, URS, and Water Board review are presented with the data in Tables A-2, A-3, A-5, and A-6. In 2013, Water Board staff assigned a data qualifier of "*" for data that did not meet our field duplicate assessment (relative percent difference) for effluent data in Table A-2. URS data qualifiers are summarized in Appendix E – URS 2013 Data Summary Report, Attachment 4.

URS submitted two field duplicate samples to the laboratory to measure the precision of the entire measurement system including sampling and analytical procedures in 2013. The relative percent difference (RPD) was calculated for each analyte in the primary and corresponding duplicate samples, as follows:

- If both the sample and duplicate values were equal to or greater than five times the Reporting Limit (RL), then the RPD was calculated by dividing the absolute value of the difference of the two measurements by the average of the two

measurements and multiplying by 100. The RPD must be equal to or less than 25 percent to be within control limits.

- If either the sample or duplicate value was less than five times the RL, then the absolute value of the difference between the sample and duplicate values had to be equal to or less than the RL to be in control limits.

In 2013, the two duplicate samples were within the control limits for RPD with two exceptions. The RPD for dissolved copper was 42 percent and the RPD for dissolved manganese was 33 percent for the sample/duplicate pair (sample 1314PWT012-EFF and duplicate 1314PWT013-EFF). Per the PWT SAP, the control limit of 25 percent is based on the analytical precision goals for the laboratory matrix spike duplicate samples.

Two field method blank samples were collected and submitted for laboratory analysis of the same parameters as PWT effluent samples. The field method blanks were collected and processed in the same method as that of effluent samples, except using laboratory-supplied purified deionized water for each FMB. There were 5 detections in the field method blank 1314PWT006-FMB, these detections are discussed below and concentrations are compared with sample 1314PWT008-EFF. With the exception of zinc, none of the parameters detected in the FMB have discharge criteria established by the USEPA at Leviathan Mine. Dissolved calcium was detected in field method blank 1314PWT006-FMB at 6.53 mg/L; the dissolved calcium concentration in the treated effluent sample analyzed in the same batch as sample 1314PWT006-FMB was 669 mg/L. Dissolved magnesium was detected in the field method blank 1314PWT006-FMB at 5.09 mg/L; the dissolved magnesium concentration in the treated effluent sample analyzed in the same batch as sample 1314PWT006-FMB was 45.1 mg/L. Dissolved manganese was detected in the field method blank 1314PWT006-FMB at 0.00592 mg/L; the dissolved manganese concentration in the treated effluent sample analyzed in the same batch as sample 1314PWT006-FMB was 0.208 mg/L. Total dissolved solids was detected in field method blank 1314PWT006-FMB at 134 mg/L; the total dissolved solids concentration in the treated effluent sample analyzed in the same batch as sample 1314PWT006-FMB was 2740 mg/L. Dissolved zinc was detected in in field method blank 1314PWT006-FMB at 0.146 mg/L; the dissolved zinc concentration in the treated effluent sample analyzed in the same batch as sample 1314PWT006-FMB was a non-detect with a reporting limit of 0.02 mg/L. The USEPA maximum discharge criterion for dissolved zinc at Leviathan Mine is 0.21 mg/L.

There were 7 detections in the field method blank sample 1314PWT011-FMB, these detections are discussed below and are compared to concentrations from sample 1314PWT012-EFF. With the exception of arsenic and zinc, none of the parameters detected in the FMB have discharge criteria established by the USEPA at Leviathan Mine. Dissolved arsenic was detected in the field method blank 1314PWT011-FMB at 0.00136 mg/L; the dissolved arsenic concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 0.0117 mg/L. The USEPA maximum discharge criterion for dissolved arsenic at Leviathan Mine is 0.34 mg/L. Dissolved calcium was detected in the field method blank 1314PWT011-FMB at 6.79 mg/L; the dissolved calcium concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 654 mg/L. Dissolved cobalt was detected in the field method blank 1314PWT011-FMB at 0.00165 mg/L; the dissolved

cobalt concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 0.00172 mg/L. Dissolved magnesium was detected in the field method blank 1314PWT011-FMB at 5.20 mg/L; the dissolved magnesium concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 57.9 mg/L. Dissolved manganese was detected in the field method blank 1314PWT011-FMB at 0.00939 mg/L; the dissolved manganese concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 0.399 mg/L. Total dissolved solids was detected in the field method blank 1314PWT011-FMB at 104 mg/L; the total dissolved solids concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was 2490 mg/L. Dissolved zinc was detected in the field method blank 1314PWT011-FMB at 0.135 mg/L; the dissolved zinc concentration in the treated effluent sample collected in the same batch as sample 1314PWT011-FMB was a non-detect with a reporting limit of 0.02 mg/L. The USEPA maximum discharge criterion for dissolved zinc at Leviathan Mine is 0.21 mg/L.

3.4.4 Database Format Discrepancies

Water Board staff did not format the laboratory-supplied EDDs in accordance with the template provided by ARCO in their September 2006 Database Tech memo report (section B.6.3.1 of the 2010 PWT QAPP). ARCO indicated in early January 2011 that they are trying to improve consistency across the Site-wide database, and therefore the EDD templates are being refined. The Water Board's and URS's laboratory provides laboratory data in an EDD that will require minimal changes by ARCO prior to upload to the database. This information was submitted to ARCO in a letter dated January 13, 2011, and the USEPA was also copied on this communication.

Water Board staff will continue to coordinate with subcontractors and laboratories during the 2014 Pond Water Treatment activities to ensure that samples required by the Water Board's Work Plan are collected and analyzed in accordance with the PWT SAP.

4. METEOROLOGICAL, SURFACE WATER FLOW, AND POND STAGE MONITORING

In a letter dated March 28, 2011, the USEPA authorized the Water Board to discontinue surface water quality monitoring and meteorological monitoring responsibilities for the site. As required by the USEPA, the Water Board continued its efforts in the 2013 field season to monitor surface water flow in the vicinity of Leviathan Mine. In addition, pond stage is measured at Pond 1. Meteorological monitoring activities by the Water Board were continued in 2013. Those data collection efforts are discussed below.

4.1 Meteorological Monitoring

A weather station is located on the Water Board's construction trailer near Pond 1. It is a Davis Integrated Sensor Suite model and has been in operation since November 2002. The system measures the following conditions hourly: wind speed, wind direction, rainfall, outside temperature, outside humidity, ultraviolet radiation, and solar

radiation. Water Board staff download data from this weather station periodically. Hourly data organized in monthly files in Microsoft Excel format from October 2012 to September 2013 are included on compact disc in Appendix C. Hourly data from November 6, 2012 through December 10, 2012 is not available because the datalogger's memory was exceeded.

4.2 Flow and Stage Monitoring

Flow data are reported on the basis of water year. The 2013 water year began October 1, 2012 and ended September 30, 2013. Under contract to the Water Board, the United States Geological Survey (USGS) monitored water flows and pond water level stage at 15 locations during the 2013 water year. Flow monitoring locations, USGS station numbers, and equipment are detailed in Table 3 and shown on Figure 4. As shown in Table 3, 13 of the 15 stations have continuous stage records, one of the 15 stations (Station 16, Aspen Creek above the confluence of Aspen and Leviathan Creeks) is monitored manually only during USGS field visits, and one station (Station 24, Mountaineer Creek) is a calculated relationship derived by subtracting Station 23 (Leviathan Creek above the confluence of Mountaineer and Leviathan Creeks) from Station 25 (Bryant Creek below the confluence of Mountaineer and Leviathan Creeks). Tables D-1 through D-13 (Appendix D) contain the final provisional data for the 2013 water year. The USGS typically publishes the data by the spring following the completion of the water year. Once published, the data is no longer provisional, and will then be submitted to ARCO by the Water Board for uploading to the Site-Wide Database. Some flow and stage data may have been impacted by snow and/or ice and modified accordingly by the USGS.

Real-time provisional flow and stage recordings can be viewed on the web for the following six stations: Adit, PUD, Station 1, Station 15, Station 25, and Pond 1. The real-time data can be accessed through the USGS's website at:
<http://waterdata.usgs.gov/ca/nwis/current?type=flow>.

Published data reports can be searched by USGS station number at the USGS website:
<http://ca.water.usgs.gov/waterdata/>.

In early-October 2012, following the 2012 water year, flow and stage monitoring activities were discontinued by the Water Board at three locations: (1) the Channel Under Drain (CUD), (2) the overburden seep (Aspen Seep), and (3) Pond 4. The USGS discontinued flow and stage monitoring activities at these three locations because of access and health and safety concerns. More than 12 years of continuous flow and stage data are available for these three locations.

5. SITE MAINTENANCE

The Water Board conducted routine site maintenance work during the 2013 field season in accordance with the 2013 Work Plan.

5.1 Routine Maintenance

Routine maintenance activities performed in 2013 included repairing the perimeter fence, removing sediment from storm water conveyances, placing rock and gravel armoring, and coordinating invasive plant control.

The perimeter fencing is barbed-wire and surrounds the majority of the site. In mid-June 2013, Water Board staff inspected the perimeter fence and noted that moderate repairs to the fence were required in numerous locations around the site. URS's subcontractor repaired the perimeter fence in mid-August 2013.

Water Board staff visually inspected storm water conveyances in the pit and around the ponds for the presence of accumulated sediment. Water Board staff directed URS staff to remove accumulated sediment from the storm water conveyance ditches in the pit, Pond 2 North/South area, and Pond 1 area. Sediment removal from the storm water conveyances was completed in late-June and early-July 2013. Following a rainstorm in mid-August, the Water Board directed URS staff to remove additional sediment from storm water conveyance ditches near the flow control structure on September 12, 2013.

In mid-June, three-inch crushed rock was placed between the road and storm water ditches in the pit and Pond 1 areas to armor soil. Also at this time, additional gravel was added in the pond water treatment plant area at Pond 1 to supplement existing gravel armoring this high-use area.

The El Dorado County, Department of Agriculture (EDCDA) visited Leviathan Mine on June 18, August 13, and September 17, 2013 and spot applied an herbicide (Telar[®]) on invasive plants. This year, as in 2002 through 2012, the EDCDA sprayed to eradicate tall whitetop (*Lepidium latifolium*) as well as dyers woad (*Isatis tinctoria L.*) and spotted knapweed (*Centaurea biebersteinii DC*).

5.2 Revegetation Evaluation Study

In the late 1990's, Dr. Vic Claassen, with the Soils and Revegetation Laboratory at the University of California, Davis, worked with the Water Board to develop specifications for soil treatment and revegetation of the barren Leviathan pit and pond slope areas. Now over ten years later, Dr. Claassen is evaluating those revegetation efforts and evaluating potential enhancements. Revegetation evaluation study activities performed during the 2013 field season are part of a two year study. The revegetation evaluation study final report is expected to be completed by mid-2015.

During the summer and fall of 2013, Dr. Claassen evaluated existing vegetative growth and substrate (mine waste material) conditions in the pit, Pond 2 slopes, and the Delta Slope to generate recommendations to improve revegetation. As part of the work, plant transects were established and vegetative cover was estimated using a line-intercept method. Existing substrate conditions associated with the plant transects were evaluated by measuring or evaluating infiltration, moisture retention, acidity, and nutrient availability.

Using historical and current field data, treatment recommendations for improved revegetation were generated for the different substrates. Demonstration plots were then installed in the pit, Pond 2 slope, and Delta Slope areas. The demonstration plots were developed to enhance deep rooting of plants used in revegetation efforts. The plots will be evaluated in 2014 for root depth, residual pH and buffering, and moisture content.

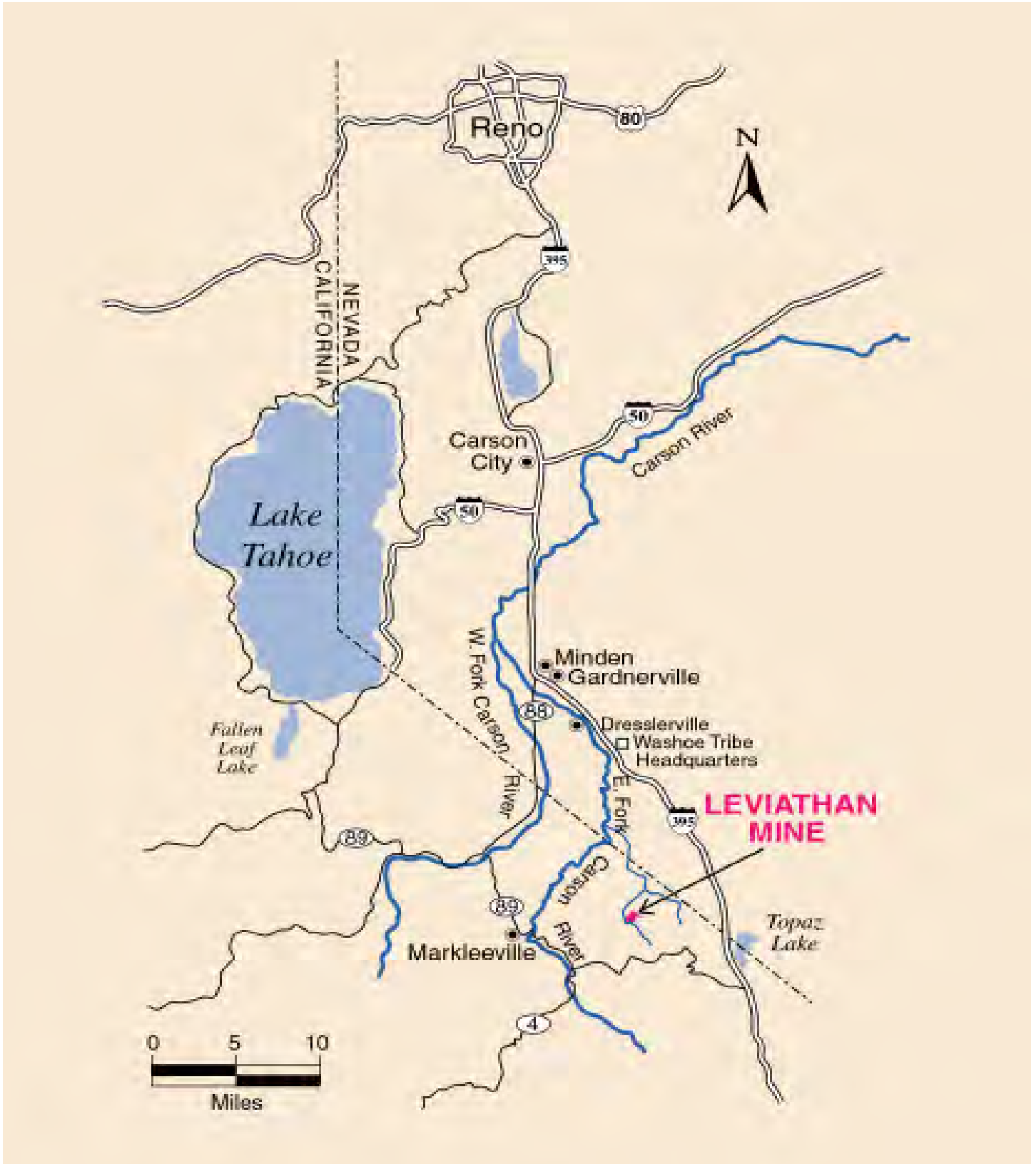
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Figure 2: Bryant Creek Watershed

Figure 3: Lahontan Water Board AMD Capture and Treatment System

Figure 4: Surface Water Monitoring Locations



**FIGURE 1
SITE LOCATION**

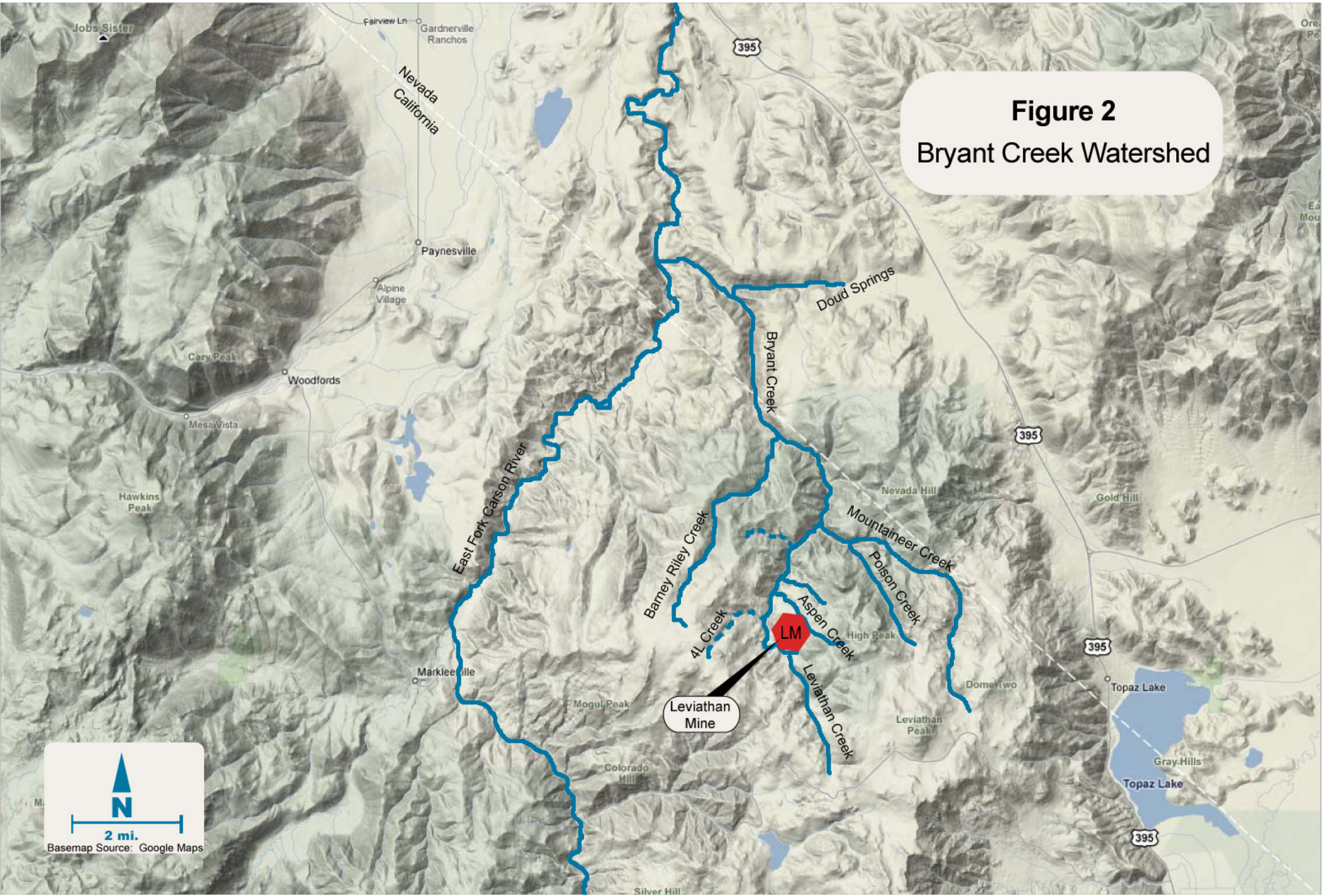


Figure 2
Bryant Creek Watershed



FIGURE 3
 LAHONTAN WATER BOARD AMD CAPTURE AND TREATMENT SYSTEM

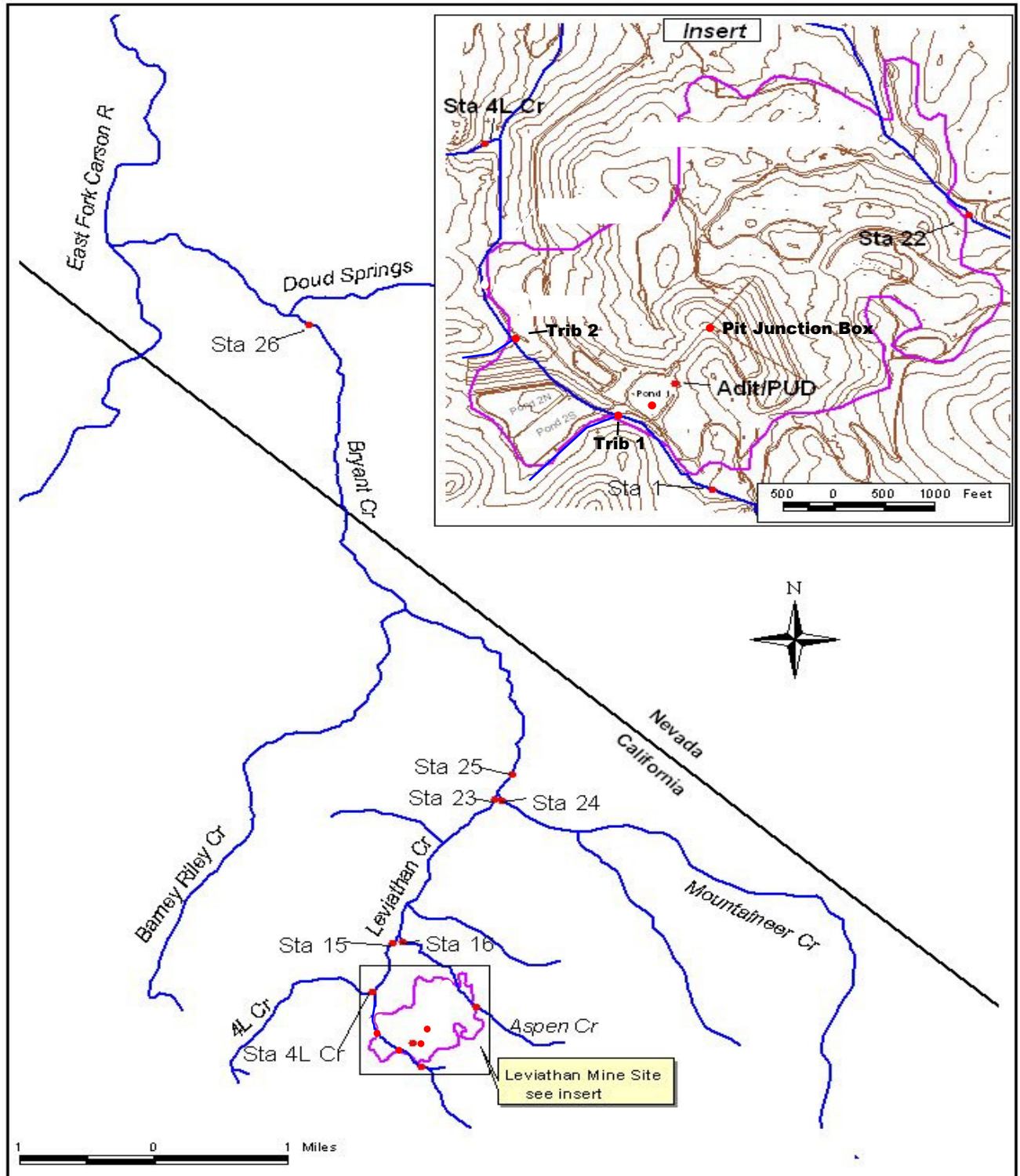


FIGURE 4
FLOW AND STAGE MONITORING LOCATIONS

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Table 1: 2013 Pond Water Treatment Monitoring Program

Table 2: USEPA Discharge Criteria

Table 3: 2013 Flow and Stage Monitoring Locations

TABLE 1
2013 SUMMER POND WATER TREATMENT MONITORING PROGRAM
LEVIATHAN MINE, ALPINE COUNTY, CALIFORNIA

SAMPLE LOCATION	LOCATION DESCRIPTION	ANALYSES	SCHEDULE	SAMPLER
Influent	Sampling port prior to lime addition	EPA-Required Discharge Criteria ¹ with Additional Analytes ²	weekly	Contractor
Mid Process	Various	pH, Temperature (field)	several times per day, as needed	Contractor
Effluent	Weir Box	pH, Temperature (field)	several times per day, as needed	Contractor
		EPA-Required Discharge Criteria	twice per week ⁵	Contractor
		EPA-Required Discharge Criteria with Additional Analytes	weekly	Contractor
Duplicate Samples	Effluent samples at weir box	EPA-Required Discharge Criteria	minimum of 10%	Contractor
Field Method Blank	Collected at Weir Box using laboratory-supplied inorganic blank water	EPA-Required Discharge Criteria	minimum of 10%	Contractor
Sludge	Pit Clarifier	CAM-17 ³ metals plus Al and Fe (for comparison with STLC and TTLC) ⁴	three composite samples collected once per year after treatment	Contractor

Notes:

1. Dissolved As, Al, Cd, Cr, Cu, Fe, Pb, Ni, Zn (off-site laboratory); total recoverable Se (off-site laboratory); pH (field); temperature (field)
2. Dissolved Ca, Co, Mg, Mn, sulfate, TDS (off-site laboratory analysis)
3. Refers to 22 CCR 66261.24(a)(2)(A); CAM-17 metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Mo, Ni, Se, Ag, Tl, V, Zn (off-site lab analysis)
4. STLC is the Soluble Threshold Limit Concentration and TTLC is the Total Threshold Limit Concentration.
5. Effluent samples were collected twice per week until discharge from the Pit Clarifier dropped below 5 gallons per minute.

Table 2
USEPA Discharge Criteria
Leviathan Mine, Alpine County, California

Water Quality Parameter	Maximum ²	Average ⁴
pH	Between 6.0 – 9.0 SU ¹	
Arsenic (dissolved)	0.34 mg/l	0.15 mg/l ³
Aluminum (dissolved)	4.0 mg/l	2.0 mg/l ³
Cadmium (dissolved)	0.009 mg/l	0.004 mg/l ³
Chromium (dissolved)	0.97 mg/l	0.31 mg/l ³
Copper (dissolved)	0.026 mg/l	0.016 mg/l ³
Iron (dissolved)	2.0 mg/l	1.0 mg/l ³
Lead (dissolved)	0.136 mg/l	0.005 mg/l ³
Nickel (dissolved)	0.84 mg/l	0.094 mg/l ³
Selenium (Total Recoverable)	Not Promulgated	0.005 mg/l ³
Zinc (dissolved)	0.21 mg/l	0.21 mg/l ³

Notes:

- 1: pH measurement based on 24-hour (single day) average discharge.
- 2: Concentrations based on a daily grab samples, each grab sample field-filtered and acid fixed promptly after collection.
- 3: Concentrations based on four daily grab samples, each grab sample field-filtered and acid fixed promptly after collection.
- 4: If the concentration detected by the contract laboratory is less than the detection limit, 1/2 the detection limit shall be used in calculating the Average concentration.

**TABLE 3
2013 FLOW AND STAGE MONITORING LOCATIONS
LEVIATHAN MINE, ALPINE COUNTY, CALIFORNIA**

Station ID (USGS Number)	Station Description	Equipment	Installation of Gaging Station
Continuous Stage Measurement and Calculated Flow			
Station 1 (10308783)	Leviathan Creek above the mine	Continuous flow recorder and appurtenances, solar power supply.	October 1998
Pit Under Drain (PUD) (10308785)	Drainage from shallow ground water collection pipes in pit, diverted into evaporation ponds	Continuous flow recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	October 1999
Adit (10308784)	Drainage from tunnel #5 diverted into evaporation ponds	Continuous flow recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	October 1999
4L Creek (103087889)	4L Creek just above confluence with Leviathan Creek	Continuous flow recorder and appurtenances, solar power supply.	October 2003
Station 15 (10308789)	Leviathan Creek, above the confluence of Leviathan and Aspen creeks	Continuous flow recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	October 1998
Station 22 (103087891)	Aspen Creek above mine	Continuous flow recorder and appurtenances, solar power supply.	October 2003
Station 23 (10308792)	Leviathan Creek above the confluence of Leviathan and Mountaineer creeks	Continuous flow recorder and appurtenances, solar power supply	November 1999
Station 25 (10308794)	Bryant Creek below the confluence of Leviathan and Mountaineer creeks	Continuous flow recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	October 1998
Station 26 (10308800)	Bryant Creek above the confluence of Doud Springs and Bryant Creek	Continuous flow recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	August 2001
Pit Junction Box (103087855)	Storm water collection vault in open pit	Continuous flow recorder and appurtenances, solar power supply.	October 2009
Unnamed Trib 2 (103087865)	Ephemeral tributary north of Pond 2 North (Commonly referred to as the Lower Tributary)	Continuous flow recorder and appurtenances, solar power supply.	November 2009
Unnamed Trib 1 (103087835)	Ephemeral tributary south of Pond 2 South (Commonly referred to as the Upper Tributary)	Continuous flow recorder and appurtenances, solar power supply.	November 2009
Continuous Stage Measurement			
Pond 1 Stage (103087853)	Water level in Pond 1	Continuous stage recorder and appurtenances, solar power supply, telemetry (real time provisional data available).	October 1999
Other Flow Data			
Station 16 (103087898)	Aspen Creek, above the confluence of Leviathan and Aspen creeks	Hand-held flow meters. Monthly flow measurements to establish relationship with STA 15.	not applicable
Station 24	Mountaineer Creek above the confluence of Leviathan and Mountaineer creeks	None. Flow calculated by difference on a monthly basis: (STA 25 – STA 23 = STA 24).	not applicable

APPENDICES

Appendix A - Data Summary for 2013 Pond Water Treatment

Table A-1: 2013 Pond Water Treatment, Daily Discharge Summary

Table A-2: 2013 Pond Water Treatment Effluent Field and Analytical Results

Table A-3: 2013 Pond Water Treatment Influent Field and Analytical Results

Table A-4: Summary of 2013 Pond Water Treatment Plant Operators' Logs

Table A-5: 2013 Pond Water Treatment Sludge Analytical Results

Table A-6: 2012 Pond Water Treatment Sludge Additional Analytical Results

Table A-1
2013 Pond Water Treatment
Daily Discharge Summary

Date	Daily Discharge (Gallons)	Cumulative Discharge (Gallons)
7/11/2013	37,365	37,365
7/12/2013	54,810	92,175
7/13/2013	0	92,175
7/14/2013	47,460	139,635
7/15/2013	162,720	302,355
7/16/2013	162,720	465,075
7/17/2013	201,600	666,675
7/18/2013	214,560	881,235
7/19/2013	201,600	1,082,835
7/20/2013	201,600	1,284,435
7/21/2013	201,600	1,486,035
7/22/2013	187,200	1,673,235
7/23/2013	161,610	1,834,845
7/24/2013	175,680	2,010,525
7/25/2013	187,200	2,197,725
7/26/2013	187,200	2,384,925
7/27/2013	162,720	2,547,645
7/28/2013	100,800	2,648,445
7/29/2013	11,520	2,659,965
7/30/2013	2,592	2,662,557
7/31/2013	1,152	2,663,709

Note:

Volume of treated AMD discharged to Leviathan Creek as measured at the Water Board weir box

**Table A-2
2013 Pond Water Treatment Effluent Field and Analytical Results**

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO ₄)			Total Dissolved Solids			Zinc		
					Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ			
USEPA Daily Maximum Discharge Criteria			6.0 - 9.0		4			0.34			0.009			NP			0.97			NP			0.026			2			0.136			NP			NP			0.84			NP			NP			0.21					
USEPA 4-Day Average Discharge Criteria			NP		2			0.15			0.004			NP			0.31			NP			0.016			1			0.005			NP			NP			0.094			0.005			NP			NP			0.21		
1314PWT001-PC	Pre-Discharge	07/09/2013	7.60	18.1 °C	0.262			0.00577			0.000383	J	J				0.00595			0.00363			0.0500	U		0.000500	U						0.0874			0.00477					0.0100	U										
1314PWT002-PC	Pre-Discharge	07/10/2013	8.16	18.7 °C	0.946			0.00629			0.000300	U					0.00458			0.00372			0.143	U		0.000500	U					0.0532			0.00542					0.0100	U											
1314PWT004-EFF	PWT Effluent	07/11/2013	6.63	66.9 °F	0.151			0.00487			0.000300	U		590			0.00407			0.000917	J	J	0.00541			0.262	U		60.3			0.0278			0.0145			0.00344			2010			2730			0.0100	U				
1314PWT007-EFF	Field Duplicate	07/15/2013	7.28	68.9 °F	0.0500	U		0.00831			0.000300	U		654			0.00330			0.00180			0.00827			0.0500	U		46.8			0.218			0.0238	J-		0.00415			1850			2800			0.0100	U				
1314PWT008-EFF	PWT Effluent	07/15/2013	7.28	68.9 °F	0.0500	U		0.00766			0.000300	U		669			0.00332			0.00174			0.00711			0.0500	U		45.1			0.208			0.0224	J-		0.00443			1820			2740			0.0100	U				
1314PWT009-EFF	PWT Effluent	07/18/2013	7.55	68.4 °F	0.0500	U		0.0103			0.000300	U		647			0.00224			0.00291			0.0109			0.0500	U		47.8			0.341			0.0663			0.00458			1630			2530			0.0100	U				
1314PWT012-EFF	PWT Effluent	07/23/2013	7.43	67.6 °F	0.0500	U		0.0117			0.000300	U		654	B		0.00142	J	J	0.00172			0.00273	*	0.0500	U		57.9			0.399	*		0.0197			0.00617			1640			2490			0.0100	U					
1314PWT013-EFF	Field Duplicate	07/23/2013	7.43	67.6 °F	0.0500	U		0.0117			0.000300	U		543	B		0.00156	J	J	0.00169			0.00417	*	0.0500	U		53.0			0.559	*		0.0213			0.00589			1660			2520			0.0100	U					
1314PWT014-EFF	PWT Effluent	07/26/2013	7.50	66.6 °F	0.0500	U		0.00864			0.000300	U		638			0.00108	J	J	0.00217			0.00207			0.0500	U		51.8			0.540			0.0223			0.00877			1580			2530			0.0100	U				
1314PWT015-EFF	PWT Effluent	07/29/2013	7.38	63.8 °F	0.0500	U		0.00259			0.000300	U		541			0.00155	J	J	0.00106			0.00356			0.0500	U		65.8			0.148			0.0253			0.00486	J+		1570			2460			0.0100	U				

Notes:

PC indicates sample collected from Pit Clarifier prior to the start of discharge of treated AMD to Leviathan Creek.

EFF indicates sample is a sample of effluent discharged to Leviathan Creek.

All values reported in milligrams per liter (mg/L) except pH which are in Standard Units and temperature which are in the units specified above.

All parameters are dissolved except Selenium which is total recoverable.

NP - Not Promulgated

Data Qualifiers (DQ) from the Laboratory:

J = Analyte positively identified, but the quantitation was below the reporting limit.

U = Not detected at or above adjusted sample detection limit.

B = Analyte present in method blank.

EPA Qualifiers (EQ) from an additional QA/QC:

J = estimated concentration; the analyte was detected between the RL and DL and/or one or more quality control parameters were not met

J+ = estimated concentration; potential high bias

J- = estimated concentration; potential low bias

* - failed Relative Percent Difference assessment

**Table A-3
2013 Pond Water Treatment Influent Field and Analytical Results**

SAMPLE ID	Sample Description	SAMPLE DATE	PH	TEMP	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO ₄)			Total Dissolved Solids			Zinc		
					Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ			
1314PWT003-INF	PWT Influent	07/11/2013	2.68	72.3 °F	437			3.20			0.0442			350			1.06			2.67			1.87			420			0.000672	J	J	57.3			12.3			7.25			0.00254			4590			7510			2.01		
1314PWT005-INF	PWT Influent	07/15/2013	2.30	68.3 °F	517			5.09			0.0494			420			1.46			3.29	J-		2.84			502			0.000542	J	J	68.5			16.5			10.2			0.00132			5680			6550			1.67		
1314PWT010-INF	PWT Influent	07/23/2013	2.66	65.2 °F	596			3.26			0.0569			521	B		1.55			3.94			2.86			562			0.000795	J	J	84.0			16.7			10.2			0.00449			7290			8390			2.73		

Notes:

All values reported in milligrams per liter (mg/L) except pH which are in Standard Units and temperature which are in the units specified above.

All parameters are dissolved except Selenium which is total recoverable.

NP - Not Promulgated

Data Qualifiers (DQ) from the Laboratory:

J = Analyte positively identified, but the quantitation was below the reporting limit.

B = Analyte present in method blank.

EPA Qualifiers (EQ) from an additional QA/QC from URS:

J = estimated concentration; the analyte was detected between the RL and DL and/or one or more quality control parameters were not met

J- = estimated concentration; potential low bias

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/08/13 13:30	--	3.20	2.46	66.30	8.00	7.90	78.60	8.15	ND	ND	ND	ND
07/08/13 14:30	150	3.50	2.41	67.30	8.10	8.09	79.20	8.27	ND	ND	ND	ND
07/08/13 15:30	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/08/13 16:30	154	3.50	2.43	70.10	8.50	8.48	81.70	8.33	8.11	76.60	ND	ND
07/08/13 17:30	--	3.50	2.40	70.60	8.50	8.45	82.10	7.88	7.54	76.90	ND	ND
07/08/13 18:30	154	3.50	2.42	70.90	8.40	8.48	83.00	8.64	8.45	76.20	ND	ND
07/08/13 19:30	--	ND	2.42	70.10	8.30	8.48	83.20	8.46	8.31	72.70	ND	ND
07/08/13 20:30	154	ND	2.41	69.40	8.30	8.38	82.70	8.48	8.48	73.10	ND	ND
07/08/13 21:30	--	ND	2.41	68.50	8.17	8.27	82.30	8.36	8.30	71.80	ND	ND
07/08/13 22:30	154	ND	2.41	67.50	8.17	8.21	81.30	8.11	8.12	70.00	ND	ND
07/08/13 23:30	--	ND	2.42	66.80	8.17	8.30	80.30	8.34	8.11	70.00	ND	ND
07/09/13 0:30	154	ND	2.41	65.60	8.17	8.13	79.20	8.31	8.10	68.20	ND	ND
07/09/13 1:30	--	ND	2.40	64.20	8.17	8.00	78.70	8.24	8.05	66.80	ND	ND
07/09/13 2:30	154	ND	2.40	63.20	8.17	8.44	77.40	8.20	8.09	65.80	ND	ND
07/09/13 3:30	--	ND	2.40	62.00	8.17	8.18	76.30	8.11	8.05	64.70	ND	ND
07/09/13 4:30	154	ND	2.39	60.90	8.17	8.13	74.90	8.05	7.95	69.90	ND	ND
07/09/13 5:30	--	ND	2.39	59.90	8.20	8.20	73.60	8.29	7.81	66.20	ND	ND
07/09/13 6:30	154	ND	2.39	59.00	8.25	8.26	73.30	8.03	7.81	63.60	ND	ND
07/09/13 7:30	--	3.50	2.38	58.00	8.32	8.16	72.00	8.15	7.92	63.60	ND	ND
07/09/13 8:30	154	3.50	2.33	58.00	8.20	8.29	71.70	8.18	7.92	64.00	ND	ND
07/09/13 9:30	--	3.50	2.32	58.50	8.30	8.15	71.90	8.30	8.00	63.10	ND	ND
07/09/13 10:30	154	3.50	2.33	59.00	8.30	8.28	72.00	8.32	8.00	66.60	ND	ND
07/09/13 11:30	--	3.50	2.34	60.40	8.50	8.44	72.70	8.65	8.25	66.60	ND	ND
07/09/13 12:30	154	3.50	2.33	61.80	8.50	8.34	74.50	8.53	8.28	68.60	ND	ND
07/09/13 13:30	--	3.50	2.34	64.20	8.40	8.45	75.70	8.62	8.30	69.80	ND	ND
07/09/13 14:30	154	3.50	2.35	64.90	8.45	8.40	77.70	8.39	8.28	72.00	ND	ND
07/09/13 15:30	--	3.50	2.35	67.50	8.45	8.39	79.30	8.61	8.44	73.40	ND	ND
07/09/13 16:30	154	3.50	2.35	69.20	8.40	8.26	81.00	8.50	8.36	74.10	ND	ND
07/09/13 17:30	--	3.50	2.34	70.10	8.35	8.16	81.40	8.56	8.47	75.00	ND	ND
07/09/13 18:30	154	3.50	2.42	70.60	8.20	8.50	82.70	8.59	8.40	76.10	ND	ND
07/09/13 19:30	--	3.50	2.43	70.10	8.10	8.20	83.30	8.32	8.00	74.80	ND	ND
07/09/13 20:30	154	3.50	2.42	69.40	8.10	7.80	83.00	8.25	7.59	73.50	ND	ND
07/09/13 21:30	--	3.50	2.42	68.50	8.30	8.25	82.30	8.47	7.92	73.00	ND	ND
07/09/13 22:30	154	3.50	2.41	67.30	8.30	8.22	81.30	8.40	8.01	70.90	ND	ND
07/09/13 23:30	--	3.50	2.41	66.40	8.35	8.25	80.40	8.48	8.17	70.10	ND	ND
07/10/13 0:30	135	3.50	2.41	65.10	8.35	8.40	79.60	8.50	8.21	68.20	ND	ND
07/10/13 1:30	--	3.50	2.40	64.20	8.35	8.22	77.90	8.34	8.22	66.60	ND	ND
07/10/13 2:30	137	3.50	2.39	63.00	8.35	8.37	77.20	8.35	8.27	66.90	ND	ND
07/10/13 3:30	--	3.50	2.38	61.80	8.33	8.28	76.40	8.27	8.24	65.40	ND	ND
07/10/13 4:30	137	3.50	2.37	60.60	8.30	8.23	75.10	8.15	8.15	65.70	ND	ND
07/10/13 5:30	--	3.50	2.37	59.70	8.35	8.35	73.80	8.06	8.04	68.50	ND	ND
07/10/13 6:30	137	3.50	2.36	58.20	8.35	8.23	72.80	8.09	8.03	65.60	ND	ND
07/10/13 7:30	--	3.50	2.35	57.30	8.40	8.43	71.90	8.25	7.41	63.40	ND	ND
07/10/13 8:30	68	3.50	2.31	57.10	8.30	8.49	71.30	8.30	ND	ND	ND	ND
07/10/13 9:30	--	3.50	2.31	57.30	8.35	8.50	71.00	8.34	8.10	64.50	ND	ND
07/10/13 10:30	154	3.50	2.33	58.70	8.35	8.35	71.70	8.44	8.19	67.30	ND	ND
07/10/13 11:30	--	3.50	2.32	60.10	8.35	8.35	72.10	8.23	8.62	67.20	ND	ND
07/10/13 12:30	154	3.50	2.36	62.30	8.25	8.50	74.00	8.21	8.17	64.70	ND	ND
07/10/13 13:30	--	3.50	2.37	63.70	8.25	8.27	75.80	8.38	8.41	68.50	ND	ND
07/10/13 14:30	154	3.50	2.37	65.60	8.20	8.35	77.40	8.20	8.29	71.50	ND	ND
07/10/13 15:30	--	3.50	2.36	67.80	8.20	8.30	79.00	8.23	8.50	70.10	ND	ND
07/10/13 16:30	154	3.50	2.36	68.70	8.10	8.35	80.40	8.16	8.24	72.50	ND	ND
07/10/13 17:30	--	3.50	2.37	68.70	8.10	8.05	81.40	8.22	8.39	73.00	ND	ND
07/10/13 19:00	154	3.50	2.53	68.70	8.00	8.15	82.00	7.76	7.63	73.40	ND	ND
07/10/13 19:30	--	3.50	2.54	68.50	8.20	8.19	81.60	7.92	7.09	73.70	ND	ND
07/10/13 20:30	135	3.50	2.54	68.00	8.40	8.35	81.40	8.20	ND	ND	ND	ND
07/10/13 21:30	--	3.50	2.54	67.50	8.40	8.33	81.20	8.29	7.25	72.50	ND	ND
07/10/13 22:30	135	3.50	2.56	66.80	8.20	8.35	80.50	8.25	ND	ND	ND	ND
07/10/13 23:30	--	3.50	2.58	66.10	8.65	8.40	80.10	8.54	7.82	71.30	ND	ND
07/11/13 0:30	133	3.50	2.61	65.60	8.80	8.61	79.30	8.73	8.16	69.70	ND	ND
07/11/13 1:30		3.50	2.62	65.10	8.80	8.68	78.70	8.45	8.15	70.10	ND	ND

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/11/13 2:30	133	3.50	2.60	64.70	8.80	8.69	78.20	8.52	8.26	69.60	ND	ND
07/11/13 3:30	--	3.50	2.60	64.00	8.80	8.63	77.80	8.46	8.23	69.40	ND	ND
07/11/13 4:30	133	3.50	2.59	63.20	8.80	8.59	77.20	8.60	8.24	68.60	ND	ND
07/11/13 5:30	--	3.50	2.58	63.00	8.80	8.59	76.60	8.36	8.13	68.40	ND	ND
07/11/13 6:30	134	3.50	2.58	62.50	8.80	8.72	76.20	8.11	8.06	67.90	ND	ND
07/11/13 7:30	--	3.50	2.58	62.00	8.80	8.66	75.80	8.27	8.10	66.80	ND	ND
07/11/13 8:30	134	3.50	2.77	61.80	8.85	8.94	75.30	8.75	8.19	67.00	ND	ND
07/11/13 9:30	--	3.50	2.77	61.80	8.85	8.84	75.20	8.78	ND	ND	ND	ND
07/11/13 10:30	130	3.50	2.77	62.00	8.30	8.32	76.70	9.05	ND	ND	ND	ND
07/11/13 11:30	--	3.50	2.78	62.80	8.30	8.35	75.60	8.40	8.42	68.90	ND	ND
07/11/13 12:30	120	3.50	2.81	63.50	8.35	8.33	76.20	8.29	8.19	70.00	ND	ND
07/11/13 13:30	--	3.50	2.82	65.40	8.35	8.39	77.20	8.35	8.19	69.20	7.41	67.40
07/11/13 14:30	120	3.50	2.82	66.60	8.35	8.40	78.40	8.23	8.15	70.40	7.46	67.90
07/11/13 15:30	134	3.50	2.83	67.80	8.35	8.50	79.40	8.27	8.21	71.80	7.43	69.20
07/11/13 16:30	134	3.50	2.83	68.70	8.35	8.48	80.60	8.24	8.18	73.50	7.45	68.90
07/11/13 17:30	--	3.50	2.83	69.40	8.35	8.37	81.50	8.28	8.32	73.80	7.55	70.60
07/11/13 18:30	120	3.50	2.34	69.70	8.35	8.52	82.50	8.31	8.33	72.68	7.52	70.80
07/11/13 19:30	--	3.50	2.25	69.20	8.36	8.18	82.20	8.52	8.25	73.10	7.68	70.40
07/11/13 20:30	117	3.50	2.26	68.50	8.30	8.20	82.00	8.48	8.31	70.50	7.78	68.80
07/11/13 21:30	--	3.5	2.25	67.30	8.30	8.19	81.20	8.39	8.38	70.20	7.96	69.10
07/11/13 22:30	117	3.50	2.24	66.30	8.25	8.15	80.40	8.42	8.25	68.90	7.91	69.00
07/11/13 23:30	--	3.50	2.25	65.10	8.25	8.14	79.40	8.24	8.15	68.40	7.83	67.50
07/12/13 0:30	117	3.50	2.29	64.00	8.25	7.97	78.40	8.35	8.18	68.00	7.88	68.20
07/12/13 1:30	--	3.50	2.34	63.00	8.25	8.12	77.40	8.20	8.11	67.50	7.81	67.40
07/12/13 2:30	117	3.50	2.23	61.80	8.28	8.05	76.30	8.21	8.06	66.40	7.81	66.80
07/12/13 3:30	--	3.50	2.23	61.30	8.35	8.36	75.40	8.32	8.10	65.40	7.90	65.20
07/12/13 4:30	117	3.50	2.22	61.10	8.40	8.41	74.50	8.44	8.22	64.70	7.95	64.80
07/12/13 5:30	--	3.50	2.22	59.20	8.40	8.30	73.60	8.42	8.18	64.80	7.92	65.50
07/12/13 6:30	117	3.50	2.22	58.00	8.40	8.21	72.50	8.44	8.14	62.60	7.65	63.40
07/12/13 7:30	--	3.50	2.21	57.30	8.40	8.45	71.40	8.35	8.14	63.10	7.35	63.70
07/12/13 8:30	117	3.50	2.16	56.60	8.30	8.57	70.90	8.50	8.24	63.80	7.40	63.70
07/12/13 9:30	--	3.50	2.16	56.80	8.30	8.36	70.80	8.20	8.09	63.90	7.37	63.80
07/12/13 10:30	102	3.50	2.17	57.50	8.40	8.48	71.10	8.48	8.10	64.00	7.49	65.10
07/12/13 11:30	--	3.50	2.16	58.50	8.40	8.48	71.60	8.50	8.10	64.50	7.51	65.60
07/12/13 12:30	ND	ND	ND	ND	ND	ND	ND	ND	8.1	65.60	7.40	66.60
07/12/13 13:30	118	3.50	2.17	61.80	8.30	8.34	73.80	8.30	8.10	69.40	7.27	67.00
07/12/13 14:30	118	3.50	2.17	63.50	8.45	8.54	74.90	8.32	8.17	68.40	7.38	67.60
07/12/13 15:30	--	3.50	2.19	64.90	8.45	8.50	76.50	8.31	8.18	68.90	7.40	70.30
07/12/13 16:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/12/13 17:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/12/13 18:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/14/13 10:30	90	3.50	2.39	60.40	8.40	8.54	74.90	8.12	8.08	70.00	ND	ND
07/14/13 11:30	--	3.50	2.39	60.60	8.55	8.50	74.40	8.02	8.13	69.80	ND	ND
07/14/13 12:30	140	3.50	2.41	61.10	8.60	8.50	74.80	8.31	8.31	68.70	ND	ND
07/14/13 13:30	--	3.50	2.41	63.00	8.60	8.32	75.20	8.13	8.20	69.70	ND	ND
07/14/13 14:30	140	3.50	2.40	64.00	8.55	8.45	76.20	8.27	8.32	72.40	ND	ND
07/14/13 15:30	--	3.50	2.40	65.90	8.50	8.34	77.40	8.33	8.43	72.30	ND	ND
07/14/13 16:30	160	3.50	2.40	67.80	8.50	8.32	74.20	8.37	8.38	73.60	7.45	66.70
07/14/13 17:30	--	3.50	2.41	68.50	8.50	8.32	80.50	8.14	8.15	75.40	7.48	69.00
07/14/13 18:30	130	3.50	2.40	69.20	8.40	8.00	81.50	8.64	8.46	74.30	7.43	69.90
07/14/13 19:30	--	3.50	2.42	69.20	8.30	8.20	82.00	8.44	8.27	74.00	7.68	70.10
07/14/13 20:30	130	3.50	2.43	68.70	8.30	8.10	82.30	8.33	8.37	73.60	7.63	69.50
07/14/13 21:30	--	3.50	2.42	68.20	8.27	8.12	81.80	ND	8.36	72.30	7.79	69.10
07/14/13 22:30	133	3.50	2.43	67.20	8.23	8.00	81.10	ND	8.40	71.20	7.67	68.50
07/14/13 23:30	--	3.50	2.43	66.60	8.13	7.92	80.30	ND	8.25	70.40	7.70	68.50
07/15/13 0:30	133	3.50	2.43	65.10	8.13	8.27	79.40	ND	8.17	69.00	7.70	67.50
07/15/13 1:30	--	3.50	2.45	64.20	8.13	8.03	78.40	ND	8.10	68.80	7.61	67.10
07/15/13 2:30	133	3.50	2.44	63.00	8.18	7.99	77.20	ND	8.12	67.30	7.64	66.10
07/15/13 3:30	--	3.50	2.43	62.00	8.25	8.06	76.20	ND	8.06	67.40	7.64	66.90
07/15/13 4:30	133	3.50	2.42	61.00	8.25	8.02	75.20	ND	8.07	67.70	7.60	66.80
07/15/13 5:30	--	3.50	2.43	60.10	8.35	8.23	74.30	ND	8.18	66.00	7.62	65.60

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/15/13 6:30	133	3.50	2.43	59.20	8.35	8.19	73.30	ND	8.19	64.50	7.59	64.90
07/15/13 7:30	--	3.50	2.42	58.70	8.35	8.63	72.90	ND	8.12	64.90	7.43	65.50
07/15/13 8:30	40	3.50	2.42	58.50	8.35	8.39	72.80	ND	8.29	66.12	7.38	66.50
07/15/13 9:30	--	3.50	2.44	58.70	8.35	8.47	72.70	9.06	NA	NA	7.28	67.60
07/15/13 10:30	130	3.50	2.43	59.20	8.35	8.25	72.90	8.43	8.41	66.70	7.35	67.30
07/15/13 11:30	--	3.50	2.43	59.90	8.30	8.19	73.40	8.33	8.21	67.30	7.32	67.40
07/15/13 12:30	130	3.50	2.43	61.10	8.30	8.31	74.00	8.38	8.11	67.50	7.16	68.50
07/15/13 13:30	--	3.50	2.43	62.80	8.30	8.33	75.00	8.38	8.10	67.90	7.28	68.90
07/15/13 14:30	130	3.50	2.43	63.70	8.30	8.08	76.30	8.30	8.16	70.30	7.37	70.20
07/15/13 15:30	--	3.50	2.42	64.40	8.35	8.21	77.20	8.33	8.12	72.30	7.36	70.70
07/15/13 16:30	130	3.50	2.43	65.60	8.25	8.11	77.90	8.43	8.32	70.80	7.37	72.50
07/15/13 17:30	--	3.50	2.43	66.80	8.25	8.09	79.00	8.34	8.23	71.70	7.34	71.10
07/15/13 18:30	20	3.50	2.41	67.50	8.25	8.26	80.00	8.58	8.39	71.80	7.66	70.30
07/15/13 19:30	--	3.50	2.40	67.80	8.25	8.13	80.40	8.49	8.24	71.90	7.55	70.70
07/15/13 20:30	130	3.50	2.40	67.30	8.25	8.26	80.60	8.42	8.34	71.70	7.57	69.90
07/15/13 21:30	--	3.50	2.40	66.80	8.20	8.12	80.40	8.33	8.29	71.20	7.56	69.30
07/15/13 22:30	130	3.50	2.39	66.00	8.20	8.12	79.90	8.28	8.26	70.50	7.65	68.90
07/15/13 23:30	--	3.50	2.39	65.40	8.20	8.03	79.40	8.33	8.27	69.50	7.52	68.20
07/16/13 0:30	130	3.50	2.38	64.80	8.20	8.14	78.60	8.30	8.16	69.20	7.60	67.90
07/16/13 1:30	--	3.50	2.38	64.20	8.20	8.08	78.10	8.26	8.15	68.80	7.59	67.50
07/16/13 2:30	130	3.50	2.37	63.20	8.20	8.11	77.40	8.24	8.23	67.60	7.74	67.00
07/16/13 3:30	--	3.50	2.36	62.30	8.20	8.07	76.60	8.23	8.20	67.30	7.67	66.50
07/16/13 4:30	130	3.50	2.35	61.60	8.20	8.07	75.70	8.19	8.23	65.70	7.78	66.10
07/16/13 5:30	--	3.50	2.35	60.90	8.30	8.22	75.10	8.31	8.24	66.70	7.81	66.10
07/16/13 6:30	130	3.50	2.34	60.40	8.30	8.14	74.50	8.36	8.27	65.00	7.78	65.30
07/16/13 7:30	--	3.50	2.33	59.70	8.30	8.21	73.90	8.39	8.32	65.00	7.50	65.40
07/16/13 8:30	40	3.50	2.34	59.40	8.25	8.30	73.20	8.25	8.26	66.00	7.48	66.00
07/16/13 9:30		3.50	2.40	59.40	8.30	8.27	73.40	8.41	8.35	66.40	7.56	66.00
07/16/13 10:30	120	3.50	2.39	59.90	8.30	8.25	73.50	8.35	8.29	67.50	7.41	66.90
07/16/13 11:30	--	3.50	2.40	60.90	8.30	8.10	74.00	8.33	8.18	67.90	7.33	67.20
07/16/13 12:30	130	3.50	2.40	62.00	7.30	8.21	75.00	8.29	8.14	68.50	7.47	67.40
07/16/13 13:30	--	3.50	2.42	63.50	8.35	8.08	76.20	8.18	8.19	69.90	7.37	69.30
07/16/13 14:30	130	3.50	2.43	65.10	8.30	8.21	77.20	8.28	8.26	70.20	7.36	69.40
07/16/13 15:30		3.50	2.43	66.60	8.30	8.25	78.50	8.32	8.21	71.00	7.31	69.70
07/16/13 16:30	120	3.50	2.42	67.30	8.30	8.08	79.90	8.29	8.18	71.00	7.20	69.70
07/16/13 17:30		3.5	2.42	68.00	8.30	8.22	80.20	8.33	8.24	71.90	7.35	70.80
07/16/13 18:30	120	3.50	2.39	68.00	8.30	8.07	80.70	8.46	8.48	71.80	7.30	70.70
07/16/13 19:30	--	3.50	2.40	67.80	8.30	8.13	80.80	8.34	8.30	71.80	7.53	70.20
07/16/13 20:30	120	3.50	2.40	67.30	8.30	8.17	80.80	8.30	8.25	71.60	7.57	69.40
07/16/13 21:30	--	3.50	2.39	66.80	8.30	8.08	80.50	8.24	8.21	70.90	7.53	68.80
07/16/13 22:30	120	3.50	2.39	65.90	8.30	8.10	80.10	8.25	8.16	70.80	7.54	68.50
07/16/13 23:30		3.50	2.38	65.40	8.30	8.14	79.40	8.12	8.14	69.00	7.53	66.80
07/17/13 0:30	120	3.50	2.39	64.40	8.35	8.15	78.70	8.28	8.17	68.50	7.51	66.40
07/17/13 1:30		3.5	2.38	63.50	8.40	8.12	77.80	8.35	8.39	66.70	7.71	65.60
07/17/13 2:30	120	3.50	2.37	62.50	8.37	8.18	76.60	8.30	8.23	66.20	7.62	65.50
07/17/13 3:30	--	3.50	2.38	61.30	8.37	8.18	75.90	8.29	8.15	65.80	7.50	64.90
07/17/13 4:30	130	3.50	2.37	60.10	8.37	8.16	74.80	8.20	8.08	64.00	7.55	63.90
07/17/13 5:30	--	3.50	2.37	59.20	8.45	8.32	74.00	8.27	8.17	63.30	7.63	63.60
07/17/13 6:30	120	3.50	2.38	58.20	8.45	8.34	72.70	8.33	8.19	60.90	7.70	63.00
07/17/13 7:30	120	3.50	2.19	57.30	8.40	8.40	71.50	8.33	8.14	63.70	7.49	63.70
07/17/13 8:30	120	3.50	2.19	57.80	8.65	9.20	71.10	8.00	NA	NA	NA	NA
07/17/13 9:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/17/13 10:30	122	3.50	2.17	57.50	8.35	8.39	71.50	8.23	8.29	60.51	7.48	65.80
07/17/13 11:30	136	3.50	2.20	60.10	8.40	8.60	72.20	8.20	8.22	66.30	7.49	66.60
07/17/13 12:30	136	3.50	2.21	60.60	8.40	8.68	73.60	8.34	8.23	67.60	7.45	67.50
07/17/13 13:30		3.50	2.21	61.30	8.40	8.50	74.50	8.30	8.26	67.90	7.50	67.80
07/17/13 14:30	136	3.50	3.18	65.40	8.30	8.24	77.00	8.33	7.19	74.10	7.04	69.30
07/17/13 15:30	--	3.50	2.22	65.10	8.45	8.51	77.70	8.32	8.29	70.50	7.39	69.60
07/17/13 16:30	136	3.50	2.22	68.20	8.40	8.52	79.00	8.32	8.21	70.90	7.26	70.30
07/17/13 17:30	--	3.50	2.20	68.60	8.40	8.41	80.10	8.27	8.26	73.20	7.31	70.60
07/17/13 18:30	136	3.50	2.23	68.20	8.35	8.39	81.20	8.31	8.35	73.80	7.39	70.50

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/17/13 19:30	--	3.50	2.23	68.20	8.30	8.22	81.40	8.31	8.28	72.20	7.80	70.50
07/17/13 20:30	140	3.50	2.22	68.50	8.30	8.75	81.60	8.34	8.35	71.20	7.98	69.80
07/17/13 21:30	--	3.50	2.22	67.50	8.30	8.32	81.30	8.32	8.32	65.30	8.00	68.90
07/17/13 22:30	140	3.50	2.21	66.60	8.30	8.34	80.80	8.29	8.26	67.90	7.98	68.30
07/17/13 23:30	--	3.50	2.20	65.40	8.30	8.24	79.70	8.15	8.28	68.20	8.00	67.50
07/18/13 0:30	140	3.50	2.20	64.60	8.30	8.37	78.50	8.10	8.23	66.90	7.98	67.20
07/18/13 1:30	--	3.50	2.20	63.70	8.40	8.43	77.60	8.11	8.10	65.30	8.02	66.50
07/18/13 2:30	140	3.50	2.20	62.80	8.45	8.43	66.70	8.22	8.02	64.00	7.87	66.20
07/18/13 3:30	--	3.50	2.26	61.60	8.45	8.35	66.10	8.30	8.00	63.60	7.98	66.30
07/18/13 4:30	140	3.50	2.19	60.90	8.45	8.36	65.20	8.30	8.05	63.10	7.73	65.40
07/18/13 5:30	--	3.50	2.18	60.10	8.45	8.31	64.60	8.31	8.13	63.40	7.89	65.40
07/18/13 6:30	140	3.50	2.18	59.20	8.45	8.30	63.70	8.17	8.15	61.60	7.87	64.30
07/18/13 7:30	138	3.50	2.21	58.50	8.55	8.72	62.80	8.04	NA	NA	7.66	64.90
07/18/13 8:30	138	3.50	2.22	58.20	8.75	8.78	62.50	8.13	8.09	64.90	7.46	65.50
07/18/13 9:30	--	3.50	2.21	58.70	8.80	8.83	62.60	8.28	8.15	64.90	7.46	66.30
07/18/13 10:30	138	3.50	2.23	59.00	8.45	8.49	63.10	8.43	8.30	66.60	7.47	67.60
07/18/13 11:30	--	3.50	2.24	60.90	8.40	8.47	63.60	8.33	8.26	67.20	7.55	68.40
07/18/13 12:30	145	3.50	2.26	62.80	8.40	8.38	65.40	8.14	8.17	69.00	7.44	69.50
07/18/13 13:30	152	3.50	2.27	63.00	8.45	8.40	66.70	8.28	8.20	71.20	7.44	70.40
07/18/13 14:30	152	3.50	2.27	66.10	8.45	8.51	67.90	8.23	8.19	71.80	7.39	71.70
07/18/13 15:30	158	3.50	2.27	67.30	8.45	8.44	69.30	8.21	8.20	73.00	7.40	72.80
07/18/13 16:30	158	3.50	2.26	66.80	8.45	8.56	70.70	8.36	8.31	74.70	7.29	74.70
07/18/13 17:30	--	3.50	2.27	67.50	8.45	8.58	71.70	8.24	8.29	74.90	7.31	74.90
07/18/13 18:30	158	3.50	2.25	67.00	8.55	8.54	71.00	8.28	8.24	74.00	7.35	74.60
07/18/13 19:30	--	3.50	2.25	67.00	8.55	9.03	70.80	8.09	8.22	72.30	7.10	73.00
07/18/13 20:30	170	3.50	2.27	67.70	8.60	8.30	70.90	7.65	8.04	70.30	7.48	71.70
07/18/13 21:30	--	3.50	2.38	68.40	8.60	8.68	71.30	8.25	8.31	69.80	7.70	70.60
07/18/13 22:30	110	3.50	2.38	67.70	8.60	8.50	71.50	8.21	8.31	69.40	7.78	70.40
07/18/13 23:30	--	3.50	2.32	66.80	8.60	8.53	70.90	8.04	8.06	69.10	7.72	69.10
07/19/13 0:30	110	3.50	2.29	65.60	8.50	8.31	69.90	8.45	8.56	68.90	8.05	68.00
07/19/13 1:30	--	3.50	2.25	64.60	8.45	8.35	69.00	8.33	8.30	67.60	7.95	67.30
07/19/13 2:30	150	3.50	2.26	63.20	8.45	8.22	68.00	8.29	8.27	65.90	7.99	67.00
07/19/13 3:30	--	3.50	2.25	61.00	8.45	8.26	66.60	8.14	8.20	64.60	7.95	66.10
07/19/13 4:30	160	3.50	2.25	61.30	8.45	8.31	65.90	8.17	8.10	63.70	7.95	65.00
07/19/13 5:30	--	3.50	2.25	59.90	8.55	8.15	74.00	8.22	8.07	63.40	7.82	66.70
07/19/13 6:30	160	3.50	2.23	59.90	8.55	8.18	74.00	8.16	8.18	62.80	7.94	65.50
07/19/13 7:30	144	3.50	2.23	58.90	8.55	8.49	63.60	8.18	8.33	65.10	7.43	66.90
07/19/13 9:00	144	3.50	2.24	58.90	8.50	8.37	65.00	8.49	NA	NA	7.45	68.30
07/19/13 9:30		3.50	2.27	59.20	8.55	8.66	63.20	8.15	8.21	67.10	7.43	67.90
07/19/13 10:30	144	3.50	2.30	59.60	8.55	8.56	63.60	8.27	8.26	69.40	7.35	70.20
07/19/13 11:30	158	3.50	2.30	59.90	8.60	8.63	64.10	8.22	8.29	69.60	7.38	70.30
07/19/13 12:30	158	3.50	2.30	62.50	8.60	8.69	65.90	8.25	8.34	71.60	7.39	72.20
07/19/13 13:30	158	3.50	2.30	63.00	8.55	8.54	66.30	8.31	8.31	72.60	7.40	72.60
07/19/13 14:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/19/13 15:30	158	3.5	2.32	65.10	8.55	8.47	68.50	8.20	8.24	73.90	7.39	77.30
07/19/13 16:30	158	3.50	2.33	68.00	8.55	8.49	70.70	8.30	8.35	75.20	7.27	75.80
07/19/13 17:30	158	3.50	2.33	68.40	8.55	8.74	71.30	8.27	8.33	75.40	7.29	75.80
07/19/13 18:30	158	3.50	2.33	68.90	8.50	8.63	72.20	8.17	8.28	75.10	7.35	76.00
07/19/13 19:30	--	3.50	2.34	69.40	8.55	8.28	72.40	8.31	8.33	74.80	7.63	74.80
07/19/13 20:30	160	3.50	2.35	70.30	8.55	8.25	72.90	8.25	8.31	74.10	7.79	74.50
07/19/13 21:30	--	3.50	2.32	70.10	8.60	8.41	73.60	8.22	8.16	74.50	7.45	74.00
07/19/13 22:30	160	3.50	2.33	69.60	8.65	8.43	73.30	8.12	8.25	73.30	7.68	72.90
07/19/13 23:30	--	3.50	2.32	68.70	8.65	8.51	72.50	8.10	8.10	73.50	7.74	72.70
07/20/13 0:30	120	3.50	2.31	67.50	8.70	8.60	72.00	8.10	8.17	70.90	7.74	71.30
07/20/13 1:30	--	3.50	2.30	66.30	8.70	8.63	71.00	8.12	8.07	70.90	7.52	70.00
07/20/13 2:30	120	3.50	2.30	64.20	8.70	8.72	69.70	8.02	8.05	68.10	7.64	69.60
07/20/13 3:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/20/13 4:30	120	3.50	2.29	63.40	8.70	8.66	68.40	8.31	8.04	67.90	7.57	68.90
07/20/13 5:30	--	3.50	2.29	62.00	8.70	8.69	65.60	8.30	8.00	69.10	7.52	67.10
07/20/13 6:30	120	3.50	2.29	63.40	8.60	8.49	66.00	8.54	8.32	65.10	7.80	67.00
07/20/13 7:30	124	3.50	2.28	61.30	8.60	8.59	65.50	8.58	8.37	67.50	7.42	69.20

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/20/13 8:30	124	3.50	2.28	60.30	8.60	8.51	64.80	8.49	8.23	69.20	7.29	70.80
07/20/13 9:30	160	3.50	2.29	61.30	8.60	8.63	64.80	8.18	8.09	68.90	7.06	70.50
07/20/13 10:30	130	3.50	2.29	62.00	8.50	8.61	65.30	8.63	8.39	70.90	7.09	70.70
07/20/13 11:30	134	3.50	2.20	62.50	8.45	8.51	66.10	8.45	8.38	71.80	7.24	71.50
07/20/13 12:30	134	3.50	3.29	63.70	8.45	8.51	66.90	8.35	8.22	72.80	7.36	72.40
07/20/13 13:30	134	3.50	3.29	64.40	8.45	8.51	67.70	8.27	8.20	74.50	7.28	74.00
07/20/13 14:30	134	3.50	2.31	67.00	8.45	8.52	68.70	8.23	8.20	73.50	7.35	74.90
07/20/13 15:30	134	3.50	2.31	67.50	8.45	8.43	70.00	8.40	8.23	73.40	7.34	74.20
07/20/13 16:30	134	3.50	2.32	68.10	8.40	8.47	70.50	8.37	8.25	73.50	7.35	74.40
07/20/13 17:30	134	3.50	2.33	68.70	8.40	8.44	71.10	8.21	8.22	73.20	7.39	74.10
07/20/13 18:30	134	3.50	2.33	68.40	8.35	8.42	72.60	8.36	8.35	75.00	7.38	74.40
07/20/13 19:30	--	3.50	2.34	68.00	8.45	8.22	71.60	8.20	8.33	73.60	7.41	73.60
07/20/13 20:30	130	3.50	2.34	68.00	8.48	8.35	71.70	8.36	7.90	72.40	7.65	72.20
07/20/13 21:30	--	3.50	2.34	67.50	8.45	8.32	71.40	8.31	8.38	70.00	7.90	70.50
07/20/13 22:30	130	3.50	2.33	66.50	8.45	8.27	70.90	8.33	8.37	70.30	7.48	71.00
07/20/13 23:30	--	3.50	2.30	60.10	8.45	8.29	69.80	8.30	8.37	69.60	7.90	70.20
07/21/13 0:30	130	3.50	2.33	62.20	8.45	8.31	69.10	8.23	8.28	68.30	7.67	70.00
07/21/13 1:30	--	3.50	2.33	63.40	8.45	8.23	67.90	8.29	8.20	67.60	7.71	69.10
07/21/13 2:30	130	3.50	2.33	63.60	8.45	8.20	67.10	8.22	8.25	67.00	7.86	68.30
07/21/13 3:30	--	3.50	2.33	64.20	8.45	8.28	66.50	8.14	8.10	65.10	7.73	68.00
07/21/13 4:30	130	3.50	2.33	63.90	8.45	8.28	66.20	8.20	8.14	65.00	7.71	67.80
07/21/13 5:30	--	3.50	2.32	60.10	8.45	8.33	64.90	8.21	8.16	64.10	7.79	60.30
07/21/13 6:30	130	3.50	2.32	63.50	8.45	8.27	64.40	8.13	8.20	63.20	7.85	67.20
07/21/13 7:30	--	3.50	2.31	59.20	8.50	8.47	63.80	8.39	8.23	65.20	7.56	68.00
07/21/13 8:30	130	3.50	2.31	58.70	8.50	8.34	63.30	8.45	8.60	66.70	7.42	69.00
07/21/13 9:30	--	3.50	2.31	59.40	8.50	8.33	63.50	8.29	8.32	68.10	7.82	70.20
07/21/13 10:30	160	3.50	2.31	60.60	8.55	8.22	63.90	8.23	8.10	68.90	7.27	71.00
07/21/13 11:30	--	3.50	2.31	61.10	8.45	8.28	64.70	8.43	8.30	69.70	7.27	70.80
07/21/13 12:30	130	3.50	2.31	63.20	8.43	8.16	65.60	8.24	8.21	70.70	7.30	71.40
07/21/13 13:30	--	3.50	2.31	63.20	8.44	8.24	66.80	8.24	8.18	71.40	7.31	72.40
07/21/13 14:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/21/13 15:30	--	3.50	2.36	64.60	8.44	8.28	68.00	8.10	8.08	71.40	7.26	72.70
07/21/13 16:30	130	3.50	2.34	66.80	8.50	8.55	68.80	8.15	8.17	71.40	7.49	72.90
07/21/13 17:30	--	3.50	2.35	66.30	8.50	8.39	69.80	8.38	8.35	71.80	7.48	72.70
07/21/13 18:30	130	3.50	2.39	65.60	8.40	8.28	69.60	8.66	NA	NA	7.32	73.70
07/21/13 19:30	--	3.50	2.39	65.60	8.40	8.15	69.70	8.43	8.28	72.30	7.36	73.50
07/21/13 20:30	130	3.50	2.39	65.80	8.30	8.16	69.50	8.43	8.35	71.80	7.64	71.90
07/21/13 21:30	--	3.50	2.39	66.10	8.25	8.06	69.80	8.28	8.24	69.60	7.86	71.10
07/21/13 22:30	130	3.50	2.38	65.10	8.25	8.05	69.30	8.19	8.15	68.80	7.80	70.10
07/21/13 23:30	--	3.50	2.37	64.20	8.25	8.05	68.70	8.29	8.18	67.30	7.76	69.80
07/22/13 0:30	130	3.50	2.38	63.00	8.25	8.04	67.90	8.18	8.10	67.50	7.79	69.50
07/22/13 1:30	--	3.50	2.38	62.50	8.25	8.77	67.20	8.25	8.15	66.40	7.88	66.70
07/22/13 2:30	130	3.50	2.37	61.80	8.25	8.17	66.30	8.09	7.92	66.10	7.77	68.20
07/22/13 3:30		3.5	2.30	60.80	8.30	8.15	65.40	8.06	7.98	65.10	7.85	66.80
07/22/13 4:30	130	3.50	2.37	60.30	8.33	8.40	64.90	8.21	8.03	64.20	7.90	64.40
07/22/13 5:30	--	3.50	2.37	59.60	8.33	8.03	64.30	8.11	7.90	63.30	7.79	66.70
07/22/13 6:30	130	3.50	2.36	59.20	8.35	8.07	63.80	8.12	7.90	62.80	7.81	66.00
07/22/13 7:30	--	3.50	2.35	58.40	8.45	8.38	63.20	8.22	8.19	66.90	7.80	66.70
07/22/13 8:30	130	3.50	2.35	58.20	8.45	8.32	62.50	8.30	8.22	65.40	7.76	67.10
07/22/13 9:30	--	3.50	2.36	58.70	8.45	8.31	62.60	8.43	8.25	66.60	7.74	67.40
07/22/13 10:30	130	3.50	2.36	59.40	8.35	8.13	63.10	8.32	8.17	66.70	7.67	62.70
07/22/13 11:30	--	3.50	2.36	60.80	8.35	8.14	63.90	8.31	8.13	67.50	7.69	68.10
07/22/13 12:30	130	3.50	2.38	63.00	8.35	8.13	65.20	8.40	8.18	68.80	7.49	69.00
07/22/13 13:30	--	3.50	2.37	63.70	8.35	8.15	66.40	8.36	8.15	71.00	7.49	70.30
07/22/13 14:30	130	3.50	2.38	64.40	8.41	8.33	67.60	8.54	8.31	72.30	7.52	70.90
07/22/13 15:30	--	3.50	2.38	66.50	8.45	8.34	68.60	8.48	8.25	72.10	7.60	71.70
07/22/13 16:30	130	3.50	2.39	67.20	8.37	8.26	70.10	8.41	8.28	72.50	7.69	71.60
07/22/13 17:30	--	3.50	2.38	67.00	8.42	8.34	70.50	8.38	8.21	72.50	7.59	71.90
07/22/13 18:30	130	3.50	2.36	67.50	8.30	8.13	70.70	8.54	8.35	72.40	7.61	71.90
07/22/13 19:30	--	3.50	2.36	67.50	8.30	8.29	70.90	8.48	8.26	71.90	7.99	71.70
07/22/13 20:30	125	3.50	2.35	67.50	8.30	8.67	71.00	8.47	8.25	71.80	7.87	70.50

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/22/13 21:30	--	3.50	2.35	66.80	8.30	8.21	70.90	8.53	8.30	71.70	7.96	70.20
07/22/13 22:30	125	3.50	2.36	66.10	8.30	8.51	70.40	8.36	8.19	70.60	7.90	69.60
07/22/13 23:30	--	3.50	2.35	65.60	8.30	8.34	69.80	8.35	8.15	70.40	7.90	68.80
07/23/13 0:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 1:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 2:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 3:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 4:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 5:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 6:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 7:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 8:30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/23/13 9:30	--	3.50	2.44	59.90	8.40	8.38	64.00	8.35	7.57	65.90	7.21	66.90
07/23/13 10:30	130	3.50	2.48	60.10	8.55	8.37	63.90	8.44	8.26	66.30	7.45	66.80
07/23/13 11:30	--	3.50	2.48	60.10	8.53	8.46	63.90	8.38	8.18	66.00	7.39	67.10
07/23/13 12:30	130	3.50	2.45	60.00	8.50	8.37	64.20	8.60	8.44	68.10	7.42	67.60
07/23/13 13:30	--	3.50	2.43	60.80	8.58	8.54	64.40	8.24	8.12	67.90	7.35	67.30
07/23/13 14:30	160	3.50	2.44	61.50	8.60	8.59	65.10	8.41	8.21	69.30	7.43	68.20
07/23/13 15:30	--	3.50	2.45	62.00	8.60	8.59	65.50	8.30	8.15	67.70	7.34	68.00
07/23/13 16:30	160	3.50	2.45	62.50	8.60	8.66	65.80	8.42	8.30	63.00	7.45	68.10
07/23/13 17:30	--	3.50	2.45	62.70	8.60	8.55	66.30	8.18	8.13	67.40	7.34	68.30
07/23/13 18:30	160	3.50	2.44	62.70	8.50	8.35	66.50	8.62	8.51	67.90	7.46	67.80
07/23/13 19:30		3.50	2.42	62.30	8.45	8.28	66.40	8.22	8.03	67.50	7.66	66.20
07/23/13 20:30	155	3.50	2.42	62.50	8.42	8.35	66.20	8.34	8.01	67.00	7.68	67.00
07/23/13 21:30	--	3.50	2.42	62.30	8.40	8.21	66.10	8.26	8.11	66.80	7.87	66.10
07/23/13 22:30	155	3.50	2.42	62.00	8.43	8.32	65.80	8.28	8.12	66.60	7.85	65.80
07/23/13 23:30	--	3.50	2.43	61.80	8.43	8.28	65.50	8.29	8.05	66.90	7.75	65.90
07/24/13 0:30	155	3.50	2.41	61.30	8.50	8.43	65.40	8.25	8.14	65.00	7.84	65.40
07/24/13 1:30	--	3.50	2.41	61.10	8.50	8.62	65.00	8.30	8.15	63.70	7.87	64.70
07/24/13 2:30	155	3.50	2.41	60.60	8.50	8.63	64.90	8.30	8.18	63.30	7.81	64.50
07/24/13 3:30	--	3.50	2.41	59.60	8.50	8.65	64.00	8.33	8.21	62.50	7.81	64.60
07/24/13 4:30	155	3.50	2.41	59.20	8.50	8.51	63.50	8.30	8.13	62.00	7.86	63.70
07/24/13 5:30		3.5	2.40	58.40	8.50	8.52	63.10	8.32	8.12	61.70	7.93	63.70
07/24/13 6:30	155	3.50	2.39	57.50	8.50	8.57	61.90	8.27	8.10	60.90	7.78	63.50
07/24/13 7:30	--	3.50	2.39	56.50	8.50	8.45	61.10	8.37	8.19	67.70	7.68	63.80
07/24/13 8:30	160	3.50	2.40	56.30	8.50	8.45	61.00	8.40	8.15	63.40	7.64	64.40
07/24/13 9:30	--	3.50	2.38	57.00	8.50	8.47	60.50	8.55	8.34	65.40	7.65	65.30
07/24/13 10:30	160	3.50	2.39	58.40	8.35	8.16	61.60	8.38	8.13	65.80	7.58	65.30
07/24/13 11:30	--	3.50	2.44	59.90	8.50	8.23	62.80	8.41	8.03	65.80	7.56	66.10
07/24/13 12:30	160	3.50	2.62	61.50	8.45	8.16	64.10	8.42	8.15	67.10	7.65	67.40
07/24/13 13:30	--	3.50	3.41	63.70	8.43	8.25	65.60	8.47	8.20	70.60	7.56	67.80
07/24/13 14:30	160	3.50	3.16	65.80	8.33	8.19	67.40	8.41	8.11	71.50	7.53	69.20
07/24/13 15:30	--	3.50	3.15	67.50	8.35	8.22	69.10	8.48	8.14	73.20	7.45	70.40
07/24/13 16:30	160	3.50	3.16	68.90	8.35	8.16	70.60	8.46	8.25	73.30	7.44	71.30
07/24/13 17:30	--	3.50	3.14	70.10	8.35	8.22	71.70	8.46	8.19	75.30	7.45	72.70
07/24/13 18:30	160	3.50	2.58	71.10	8.40	8.06	73.10	8.53	8.33	74.50	7.54	72.50
07/24/13 19:30	--	3.50	2.48	70.80	8.20	7.99	78.80	8.47	8.31	74.30	7.52	72.40
07/24/13 20:30	155	3.50	2.43	70.30	8.30	8.54	73.50	8.26	8.14	73.00	7.79	71.60
07/24/13 21:30	--	3.50	2.44	69.60	8.30	7.98	73.30	8.22	8.18	74.20	7.70	71.50
07/24/13 22:30	155	3.50	2.42	68.90	8.30	8.31	72.70	8.25	8.13	70.90	7.66	71.20
07/24/13 23:30	--	3.50	2.40	68.00	8.30	8.59	71.70	8.26	8.09	70.40	7.54	70.20
07/25/13 0:30	155	3.50	2.40	66.30	8.35	8.40	71.80	8.18	8.06	69.40	7.81	69.50
07/25/13 1:30	--	3.50	2.39	64.90	8.35	8.03	69.60	8.30	8.13	70.10	7.73	69.20
07/25/13 2:30	155	3.50	2.39	63.00	8.35	8.30	61.90	8.29	8.15	66.50	7.68	68.30
07/25/13 3:30	--	3.50	2.38	61.50	8.35	8.89	66.60	8.28	8.10	69.30	7.71	67.30
07/25/13 4:30	155	3.50	2.38	60.30	8.35	8.26	65.20	8.25	8.14	63.80	7.83	66.90
07/25/13 5:30	--	3.50	2.37	58.90	8.35	8.66	62.80	8.24	7.98	61.80	7.63	66.40
07/25/13 6:30	155	3.50	2.36	57.70	8.40	9.04	62.60	8.30	8.07	63.40	7.75	66.50
07/25/13 7:30	--	3.50	2.37	56.50	8.50	8.32	61.50	8.29	8.06	63.20	7.55	67.40
07/25/13 8:30	160	3.50	2.35	56.80	8.60	8.30	60.80	8.37	8.28	63.70	7.46	67.30
07/25/13 9:30	--	3.50	2.36	57.50	8.50	8.26	60.90	8.29	8.10	65.00	7.48	68.20

**Table A-4
Summary of 2013
Pond Water Treatment Plant Operator's Logs**

Date/Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp	R-2 Setpoint	R-2 pH	R-2 temp	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp	Discharge Weir pH	Discharge Weir temp
07/25/13 10:30	160	3.50	2.36	59.90	8.50	8.09	62.10	8.32	8.01	65.30	7.52	68.90
07/25/13 11:30	--	3.50	2.37	63.20	8.55	8.54	64.20	8.61	7.15	68.80	7.50	69.20
07/25/13 12:30	160	3.50	2.38	67.70	8.50	8.15	67.40	8.54	8.27	72.70	7.51	70.00
07/25/13 13:30	--	3.50	2.39	70.80	8.50	8.19	71.10	8.20	8.15	71.60	7.57	69.70
07/25/13 14:30	160	3.50	2.39	70.80	8.45	8.21	72.80	8.65	8.41	73.00	7.65	70.60
07/25/13 15:30	NA	NA	NA	NA	8.43	8.13	73.40	8.57	8.34	72.20	7.63	70.20
07/25/13 16:30	160	3.50	2.42	68.70	8.43	8.21	72.40	7.74	NA	NA	7.49	69.70
07/25/13 17:30	--	3.50	2.42	67.20	8.35	8.26	71.80	8.12	8.47	74.70	7.70	69.70
07/25/13 18:30	160	3.50	2.36	66.50	8.33	8.08	79.40	8.57	8.38	71.70	7.57	70.00
07/25/13 19:30	--	3.50	2.35	66.30	8.33	8.16	67.90	8.59	8.25	71.90	7.74	69.80
07/25/13 20:30	160	3.50	2.35	66.50	8.33	8.23	69.30	8.56	8.31	70.70	7.67	67.70
07/25/13 21:30	--	3.50	2.37	65.80	8.25	8.29	69.30	8.49	8.26	68.70	7.71	68.70
07/25/13 22:30	160	3.50	2.36	65.10	8.25	8.25	68.80	8.53	8.22	68.00	7.76	68.00
07/25/13 23:30	--	3.50	2.36	63.70	8.20	8.27	68.10	8.52	8.21	68.70	7.80	67.60
07/26/13 0:30	160	3.50	2.37	62.30	8.20	7.89	66.80	8.49	8.50	67.90	7.84	67.50
07/26/13 1:30	--	3.50	2.36	61.30	8.20	8.47	65.70	8.48	8.23	64.50	7.79	66.80
07/26/13 2:30	160	3.50	2.36	60.10	8.20	8.17	64.70	8.48	8.28	63.70	7.83	65.70
07/26/13 3:30	--	3.50	2.36	58.40	8.20	8.16	63.30	8.50	8.27	62.60	7.87	65.80
07/26/13 4:30	160	3.50	2.35	57.00	8.15	8.02	61.90	8.44	8.13	63.00	7.89	64.90
07/26/13 5:30	--	3.50	2.34	55.60	8.15	8.23	60.90	8.43	8.15	61.60	7.76	65.30
07/26/13 6:30	160	3.50	2.35	54.60	8.15	8.21	59.20	8.48	8.02	60.30	7.72	64.50

Appendices B through E (on compact disc)

Appendix B – 2013 Pond Water Treatment Data

Laboratory Reports (PDF format)

Analytical Laboratory Electronic Data Deliverable Files (Microsoft Excel format)

Appendix C – 2013 Water Year Pond 1 Weather Station Data

Hourly data organized by month (Microsoft Excel format)

Appendix D – 2013 Water Year Flow and Stage Annual Data Reports

Annual Water Data Reports for 16 Stations (Microsoft Excel format)

**Appendix E – URS: Leviathan Mine Pond Water Treatment, 2013 Data
Summary Report**

Attachment 4 – Data Quality Summary (PDF format)