YEAR-END REPORT
FOR THE 2015 FIELD SEASON
AT LEVIATHAN MINE

Alpine County, California

January 2016

Prepared by:
California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150

Submitted to:
USEPA, Region IX
75 Hawthorne Street, SFD-7-2
San Francisco, CA 94105-3901

YEAR-END REPORT FOR THE 2015 FIELD SEASON AT LEVIATHAN MINE

Table of Contents

1. INTRODUCTION 1

2. BACKGROUND 2

2.1 Site Setting and History 2
2.2 AMD Collection and Storage 3
2.3 Pond Water Treatment (PWT) Processes 4

3. 2015 POND WATER TREATMENT AND SLUDGE REMOVAL 5

3.1 Pit Clarifier Sludge Removal and Disposal 5
3.2 2015 Summer Pond Water Treatment Plant Operation 5
3.3 Summer Pond Water Treatment Monitoring 7
3.4 Sampling Results from Summer Pond Water Treatment Monitoring 8
3.4.1 Monitoring Objectives 8
3.4.2 Data Summary 9
3.4.3 Data Quality Evaluation 10
3.4.4 Database Format Discrepancies 11

4. METEOROLOGICAL AND SURFACE WATER MONITORING 12

4.1 Meteorological Monitoring 12
4.2 Flow and Stage Monitoring 12

5. SITE MAINTENANCE 13

5.1 Routine Maintenance 13
5.2 Revegetation Evaluation Study 13

LIST OF FIGURES

Figure 1: Site Location Map
Figure 2: Bryant Creek Watershed
Figure 3: Lahontan Water Board AMD Capture and Treatment System
Figure 4: Flow and Stage Monitoring Locations

LIST OF TABLES

Table 1: 2015 Summer Pond Water Treatment Monitoring Program
Table 2: USEPA Discharge Criteria
Table 3: 2015 Flow and Stage Monitoring Locations

APPENDICES

Appendix A - Data Summary for 2015 Pond Water Treatment

Table A-1: 2015 Pond Water Treatment, Daily Discharge Summary
Table A-2: 2015 Pond Water Treatment Effluent Field and Analytical Results
Table A-3: 2015 Pond Water Treatment Influent Field and Analytical Results
Table A-4: Summary of 2015 Pond Water Treatment Plant Operators' Logs
Table A-5: 2015 Pond Water Treatment Sludge Analytical Results

Appendix B – 2015 Pond Water Treatment Data

Laboratory Reports (PDF format)
Analytical Laboratory Electronic Data Deliverable Files (Microsoft Excel format)

Appendix C – 2015 Water Year Pond 1 Weather Station Data

Hourly Data Organized by Month (Microsoft Excel format)

Appendix D – 2015 Water Year USGS Flow and Stage Annual Data Reports

Annual Water Data Reports for 13 Stations (Microsoft Excel format)

Appendix E – URS: Leviathan Mine Pond Water Treatment, 2015 Data Summary Report

Attachment 4 – Data Quality Summary (PDF format)

Appendix F – Leviathan Mine Revegetation Evaluation Report (PDF format)

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 2015 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 at the Leviathan Mine Site on October 9, 2015.

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 2015. 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 *2015 Work Plan for Leviathan Mine, Alpine County, California* (Work Plan) prepared by the Water Board.

This report describes the site activities performed in 2015, 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 2015;
- A site meteorological and surface water flow monitoring section; and
- A general site maintenance section.

Pond water treatment data are summarized in five tables in Appendix A (A-1 through A-5). 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 by USGS at 15 minute intervals from1999 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 (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 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 by USGS at 15 minute intervals 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 is routed

to the pond system via underground PVC piping. AMD is directed to the pond system 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 (ARC) 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 to Pond 4. Any discharges from Pond 3 are routed to Leviathan Creek. In 2015, Pond 3 received no overflow from any of the upper ponds, and there was no discharge from Pond 3 to Leviathan Creek or Pond 4.

2.3 Pond Water Treatment (PWT) Processes

The Water Board treats AMD from the upper ponds and discharges the treated AMD 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 2015. The Water Board's treatment of AMD contained in the ponds 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 $Ca[OH]_2$), 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 2015. 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 adjacent to Pond 1, treats the AMD stored in the three upper ponds. The Plant draws AMD from Pond 1 for treatment, thereby lowering the surface elevation of AMD stored in Pond 1. The lower level in Pond 1 causes AMD from Pond 2 North and Pond 2 South to flow by gravity to Pond 1. As the level of AMD drops near 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 located in the bottom of the 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. 2015 POND WATER TREATMENT AND SLUDGE REMOVAL

The 2015 AMD treatment and associated activities included sludge removal from the Pit Clarifier in July and AMD treatment at the Plant in July and August. These activities are further discussed in the following sections.

3.1 Pit Clarifier Sludge Removal and Disposal

Approximately 156 tons of sludge generated during operation of the Plant in 2014 were removed from the Pit Clarifier by the Water Board's contractor, URS Corporation Americas (URS), in July 2015. The sludge was sampled, analyzed, and characterized in the fall of 2014; the results from the fall 2014 sampling were reported in the Water Board's 2014 Year-End Report. 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 2015 Summer Pond Water Treatment Plant Operation

The Water Board contracted with URS for Plant operations for the 2015 field season. AMD treatment began in mid-July, with the first treated AMD entering the Pit Clarifier on July 15, 2015. Discharge of treated AMD from the Pit Clarifier to Leviathan Creek began on July 21, 2015, and treatment ceased on August 4, 2015. URS chose to operate the Plant 24 hours per day, Monday through Friday during the treatment season.

In 2015 URS used pre-mixed lime slurry delivered to the site in tanker trucks. URS used a two point lime addition during the 2015 treatment season.

URS pumped AMD from Pond 1 to a 10,000-gallon fiberglass tank (R-1). A pH probe installed in R-1 measured the 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 2.6 to an approximate range of 3.4 to 4.0, as measured in R-1. A mixer and compressed air were used in R-1 at all times to agitate, oxidize and promote mixing. The AMD flowed by gravity from R-1 through a two-chambered combination flash/flocculation mix tank (FF-1). The fluid mixture flowed by gravity from FF-1 into a 10,000-gallon fiberglass reaction tank referred to as R-2. A mixer and compressed air were used in R-2 to further agitate, oxidize, and promote mixing. A pH probe in R-2 measured pH and metered the addition of lime slurry. 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) in which compressed air was used to promote mixing.

The fluid mixture flowed by gravity from FF-2 into a clarifier tank (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 2015, URS used a pH probe in FF-2 to control the mud pumps and to prevent the transfer of treated AMD having a pH below 8.1 or above 8.7 to the Pit Clarifier. By means of this control system, treated AMD having a pH outside the range of 8.1-8.7 is automatically diverted to Pond 1. The 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 such, utility water for plant startup during the 2015 treatment season was trucked to the site. Approximately 100,000 gallons of AMD were treated using water trucked to the site. Similar to the 2014 treatment season, sufficient utility water was not available to sustain plant operations until the effluent weir box was opened. URS began collecting treated AMD directly from the Pit Clarifier underdrain prior to initiating discharge to Leviathan Creek. Once the discharge of treated AMD to Leviathan Creek was initiated, treated AMD from the Water Board's effluent weir box was the source of utility water. Approximately 2.4 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 2015, treated AMD was discharged from the Pit Clarifier using only the underdrain. Discharge via the piccolo decant structure did not occur. Treated AMD 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 2015, the Water Board's stage data were used to calculate treated effluent discharge volumes. The V-notch 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 AMD from the Pit Clarifier to Leviathan Creek began on July 21, 2015. Discharge to Leviathan Creek occurred continuously until all treated AMD was discharged from the Pit Clarifier. After the pond water was treated and the Plant was shut down on August 4, 2015, treated AMD continued to be discharged from the Pit Clarifier as the accumulated sludge drained. By August 12, 2015, approximately 2.5 million gallons of treated AMD had been discharged to Leviathan Creek, and flows from the Pit Clarifier underdrain 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 2015 PWT Plant operation consumed approximately 78.52 standard tons of dry lime, 280 pounds of liquid flocculent, 1,100 gallons of diesel fuel, and 105 gallons of gasoline. The Water Board's treatment effort in 2015, 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 2015 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 212 - 255 tons of sludge will be disposed of in 2016.

3.3 Summer Pond Water Treatment Monitoring

Treatment process monitoring, sampling and analysis were performed in accordance with the Water Board's April 2015 *Sampling and Analysis Plan for Leviathan Mine Site Pond Water Treatment* (PWT SAP). A summary of the monitoring parameters, locations, and frequencies for the 2015 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 2015, there was one minor deviation from the PWT SAP as explained in Section 3.4.3. Samples collected by URS 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 AMD discharged to Leviathan Creek, the Water Board's contractor, URS, collected grab samples of the treated AMD (effluent) twice weekly during the 2015 treatment season. URS collected effluent samples from the Water Board's weir box located near the Pit Clarifier. As specified in the 2015 Work Plan, effluent sample collection stopped when the discharge of effluent dropped below 5 gpm, which occurred on August 10, 2015. The first effluent sample was collected on July 21, 2015, and the last effluent sample was collected on August 6, 2015. To confirm the USEPA discharge criteria would be met, two pre-discharge samples were taken prior to discharging effluent to Leviathan Creek. These samples were collected by URS staff on July 16 and 17, 2015 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's contractor collected the following samples for analytical laboratory analysis as part of the 2015 PWT monitoring program:

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

A portion of each grab sample was field filtered using a 0.45 micron filter, 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 Plant influent and effluent for total dissolved solids (TDS), dissolved sulfate (SO_4), 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's office in South Lake Tahoe. Analytical and field monitoring results of Plant effluent and 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 check against in-system pH probes 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 office in South Lake Tahoe.

Sludge generated during the 2015 treatment effort, and contained in the Pit Clarifier, was sampled on October 7, 2015, for waste characterization and disposal purposes. URS collected three sludge samples from three different locations in the Pit Clarifier. At the time of sampling, the depth of accumulated sludge in the Pit Clarifier ranged from 13 to 16 inches.

Sludge samples were analyzed for comparisons with Total Threshold Limit Concentrations (TTLCs) and Soluble Threshold Limit Concentrations (STLCs) for California Code of Regulations 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 Plant influent.
- Identify the chemical characteristics of the 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 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 2015. Four samples, 1516PWT009-EFF, 1516PWT0012-EFF, 1516PWT013-EFF, and 1516PWT014-EFF individually exceeded the more stringent USEPA 4-day Average Discharge Criteria for selenium. However, samples 1516PWT0012-EFF and 1516PWT013-EFF were taken on the same day because 1516PWT013-EFF is a field duplicate sample.

Table A-3 summarizes laboratory analytical results for Plant influent samples. Results are fairly consistent with previous treatment seasons. Plant influent sample pH ranged from 2.35 to 2.77 and TDS ranged from 5,370 to 6,450 milligrams per liter (mg/L) with an average of 5,910 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 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 approximately 2.5 million gallons of effluent was discharged to Leviathan Creek in 2015. 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 office in South Lake Tahoe.

Results of the Pit Clarifier sludge characterization analyses are presented in Table A-5 for sludge generated during the 2015 treatment season. On October 07, 2015, URS collected three sludge samples from the Pit Clarifier to characterize sludge generated during the 2015 treatment season. These three sludge samples averaged 21 percent solids. With the exception of the TTLC analysis for arsenic, and STLC analysis for nickel, the sludge did not exceed any other TTLC or STLC limits. The total concentrations for arsenic exceeded the TTLC in all three samples. The arithmetic average arsenic concentration for these three samples was 613 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 82 percent or greater solids by weight; therefore, the sludge is not likely to exceed the TTLC when it is disposed of in the late spring or early summer of 2016. The concentration for nickel exceeded the STLC in one of three samples. The nickel concentration for this sample was 22 mg/L. The regulatory standard STLC for nickel is

20 mg/L. The average nickel concentration for these three STLC samples was 19 mg/L, which is generally consistent with past treatment seasons.

Copies of the laboratory's electronic data deliverable (EDD) files for Plant influent, effluent, and sludge samples are provided 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 three field duplicate samples and one field method blank (FMB), 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 field duplicate sample and FMB results.

Data qualifiers from the laboratory, URS, and Water Board review are presented with the data in Tables A-2, A-3, and A-5. In 2015, Water Board staff assigned a data qualifier of "*" for data that did not meet our field duplicate assessment (relative percent difference), and a data qualifier of "**" for data that did not meet our FMB analysis for effluent data in Table A-2. URS data qualifiers are summarized in Appendix E – URS 2015 Data Summary Report, Attachment 4.

URS submitted three field duplicate samples to the laboratory to measure the precision of the entire measurement system including sampling and analytical procedures in 2015. 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 2015, the field duplicate samples were within the control limits for RPD with four exceptions. The RPD for dissolved cobalt was 32 percent for the sample/duplicate pair (sample 1516PWT006-EFF and duplicate 1516PWT007-EFF). The RPD for dissolved aluminum was 25 percent and the RPD for total recoverable selenium was 40 percent for the sample/duplicate pair (sample 1516PWT009-EFF and duplicate 1516PWT010-

EFF). The RPD for dissolved cobalt was 30 percent for the sample/duplicate pair (sample 1516PWT012-EFF and duplicate 1516PWT013-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.

One FMB sample was collected and submitted for laboratory analysis of the same parameters as PWT effluent samples. The FMB was collected and processed in the same method as that of effluent samples, except using laboratory-supplied purified deionized water for the FMB. There was one positive detection in the FMB, or sample 1516PWT005-FMB. This detection is discussed below and concentrations are compared with sample 1516PWT004-EFF which was taken on the same day as the FMB sample. The parameter detected in the FMB is total dissolved solids and does not have discharge criteria established by the USEPA at Leviathan Mine. The total dissolved solids concentration was detected in FMB 1516PWT005-FMB at 62 mg/L; the total dissolved solids concentration in the effluent sample analyzed in the same batch as sample 1516PWT005-FMB was 3090 mg/L.

There was one minor deviation from the PWT SAP that occurred this year on Plant influent sample (1516PWT003-INF) for total dissolved solids analysis. For this sample, sulfate and total dissolved solids were initially analyzed within hold time; however it appeared that the initial sample results were erroneous as the sulfate result exceeded the total dissolved solids result. The holding time for sulfate is 28 days. The holding time for total dissolved solids is 7 days. Water Board staff requested that sulfate and total dissolved solids samples be reanalyzed, at which time the holding time for the total dissolved solids sample had elapsed. For total dissolved solids, the sample was reanalyzed 3 days past the hold time. The sulfate and total dissolved solids results from the reanalysis are included in Table A-3.

3.4.4 Database Format Discrepancies

Water Board staff did not format the laboratory-supplied EDDs in accordance with the template provided by ARC in their September 2006 Database Tech memo report (section B.6.3.1 of the 2010 PWT QAPP). ARC 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 laboratory used by the Water Board's contractor provides laboratory data in an EDD that will require minimal changes by ARC prior to upload to the database. This information was submitted to ARC 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 2016 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 AND SURFACE WATER 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. Although the Water Board is not required to monitor meteorological data at the site, it continued to do so through 2015. In addition, and as required by the USEPA, the Water Board continued its efforts through the 2015 water year to monitor surface water flow in the vicinity of Leviathan Mine. The Water Board also monitored the level of Pond 1. The meteorological and surface water flow data generated by Water Board monitoring activities are presented in the following section.

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 2014 to September 2015 are included on compact disc in Appendix C.

4.2 Flow and Stage Monitoring

Flow data are reported on the basis of water year. The 2015 water year began October 1, 2014 and ended September 30, 2015. 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 2015 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 which occur approximately every six weeks, 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) provide the final provisional data for the 2015 water year. The USGS typically publishes the data by the spring following the completion of the water year. 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/.

5. SITE MAINTENANCE

The Water Board conducted routine site maintenance work during the 2015 field season in accordance with the 2015 Work Plan.

5.1 Routine Maintenance

Routine maintenance activities performed in 2015 included repairing the perimeter fence, removing sediment from storm water conveyances, removing sediment from the flow control structure, and coordinating invasive plant control.

The perimeter fencing is barbed-wire and surrounds the majority of the site. In late-May 2015, Water Board staff inspected the perimeter fence and noted that minor repairs to the fence were required in a number of locations around the site. Water Board staff performed periodic fence repairs throughout the field season and completed fence repairs by early-September. It should be noted that in mid-September Atlantic Richfield contractors found it necessary to remove sections of fence to perform investigation activities in the beaver dam/pond complex area, between Station 15 and 4L Creek. Although Atlantic Richfield contractors indicated that the fence would be repaired prior to winter conditions, these repairs were not completed. Atlantic Richfield has communicated to the Water Board that the fence will be reinstalled in early summer following completion of Remedial Investigation activities in the beaver dam/pond complex or prior to when livestock have historically been observed near Leviathan Mine, whichever condition occurs sooner.

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 to reestablish and improve a drainage swale above the Flow Control Structure, to remove accumulated sediment from storm water conveyance ditches in the Pit, Pond 2 North/South area, and the Pond 1 area, and remove accumulated sediment from the Flow Control Structure and Pit Junction Box. The drainage swale above the Flow Control Structure was reestablished and improved in late-August 2015 and sediment removal from the storm water conveyances and Flow Control Structure was completed in mid-August 2015.

Water Board staff also directed URS to fill in minor rills in the Pond 2 North and Pond 2 South liner cover material. These minor rills were filled in late-August 2015.

The El Dorado County, Department of Agriculture (EDCDA) visited Leviathan Mine on August 6, 2015, and spot applied an herbicide (Telar®) on invasive plants. This year, as in 2002 through 2014, the EDCDA sprayed to eradicate tall whitetop (*Lepidium latifolium*) as well as dyers woad (*Isatis tinctoria L.)*.

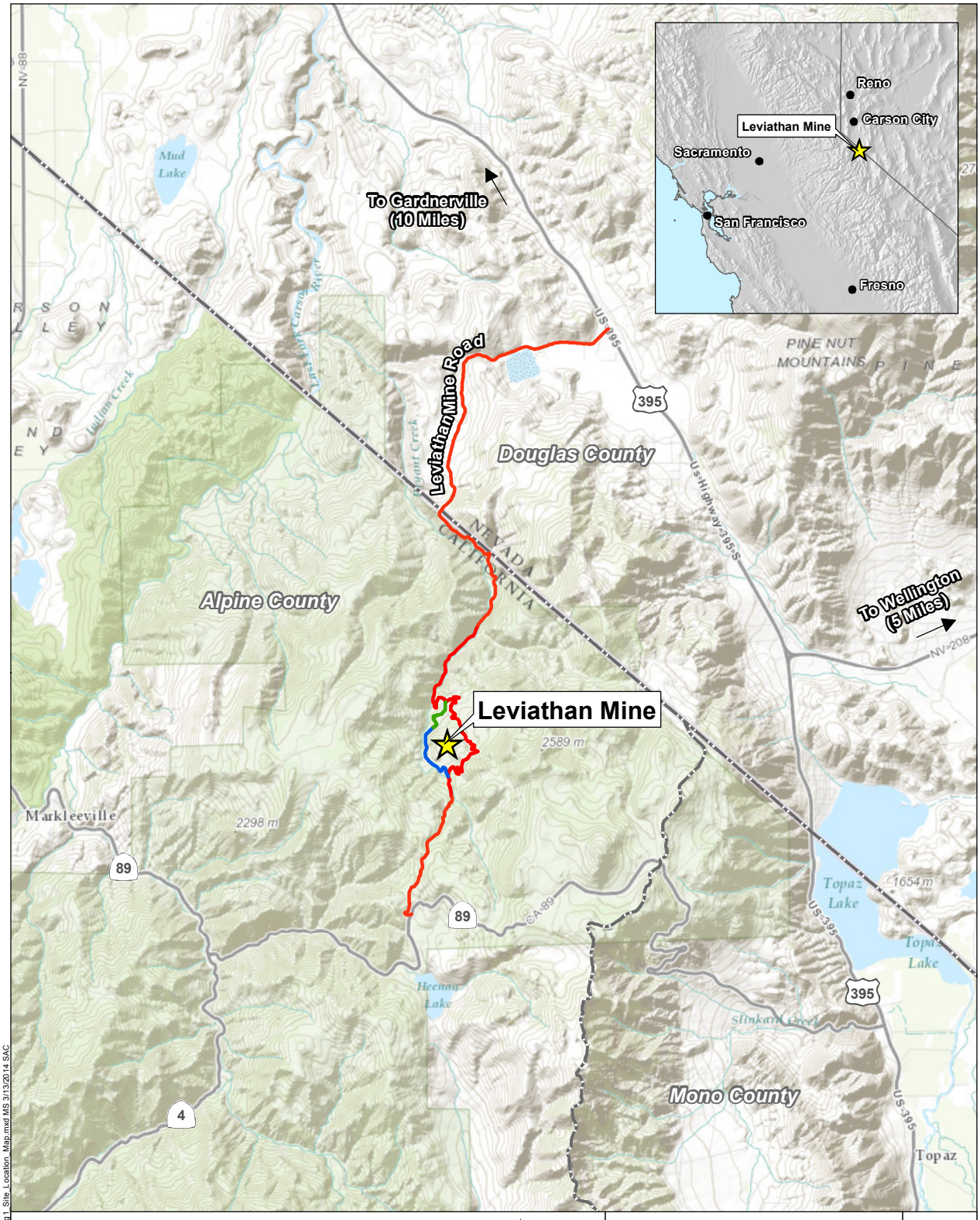
5.2 Revegetation Evaluation Study

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 Pit and pond slope areas. In 2014 and 2015 Dr. Claassen evaluated those earlier revegetation efforts and investigated potential enhancements. Revegetation evaluation activities performed during the 2014 and 2015 field seasons in the Pit, Pond 2 slopes, and the Delta Slope are summarized in the *Leviathan Mine Revegetation Evaluation Report* (Appendix F).

LIST OF FIGURES

Figure 1: Site Location Map
Figure 2: Bryant Creek Watershed
Figure 3: Lahontan Water Board AMD Capture and Treatment System
Figure 4: Flow and Stage Monitoring Locations



Forest Service Road 31348
Leviathan Mine Access Road
Leviathan Mine Road
(Forest Service Road 31052)
National Forest

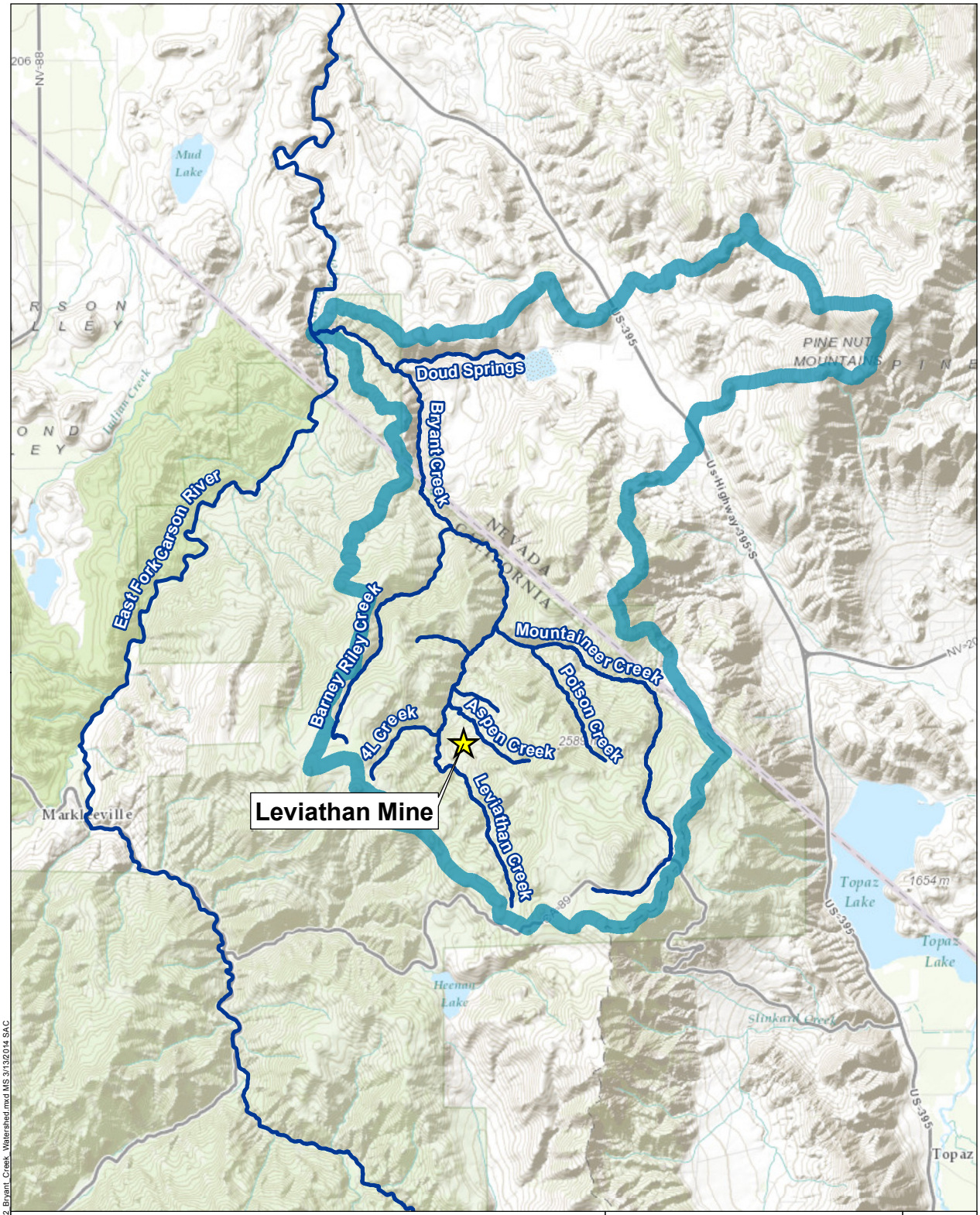
N

0 1 2
Miles

Leviathan Mine
Site Location Map

Figure 1

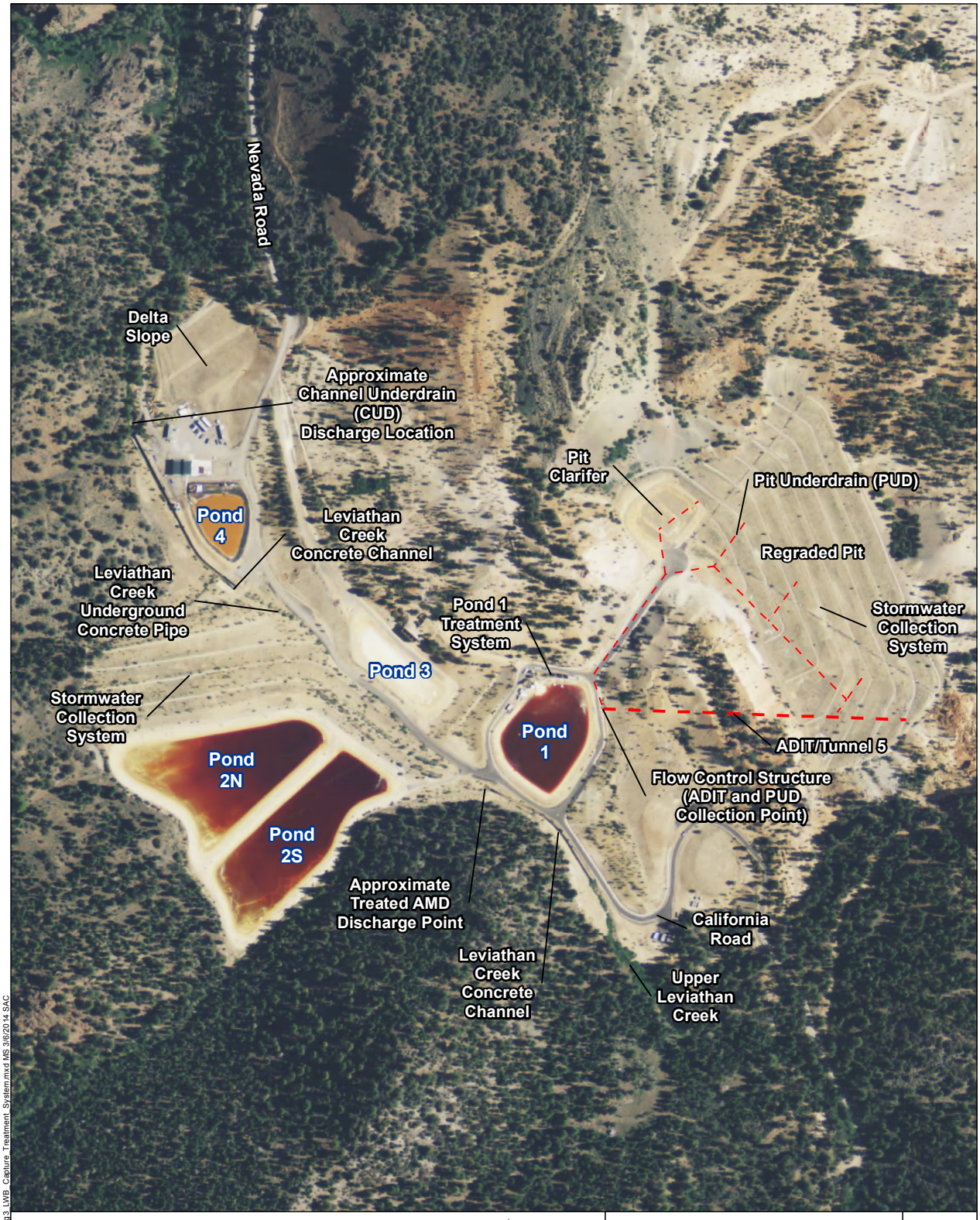
L:\Projects\Leviathan\ArcMaps\Fig1_Site_Location_Map.mxd MS 3/13/2014 SAC



Bryant Creek Watershed

Figure 2

I:\Projects\Leviathan\ArcMaps\Fig2_Bryant_Creek_Watershed.mxd MS 3/13/2014 SAC



ADIT/Tunnel 5

Pit Underdrain (PUD)

N

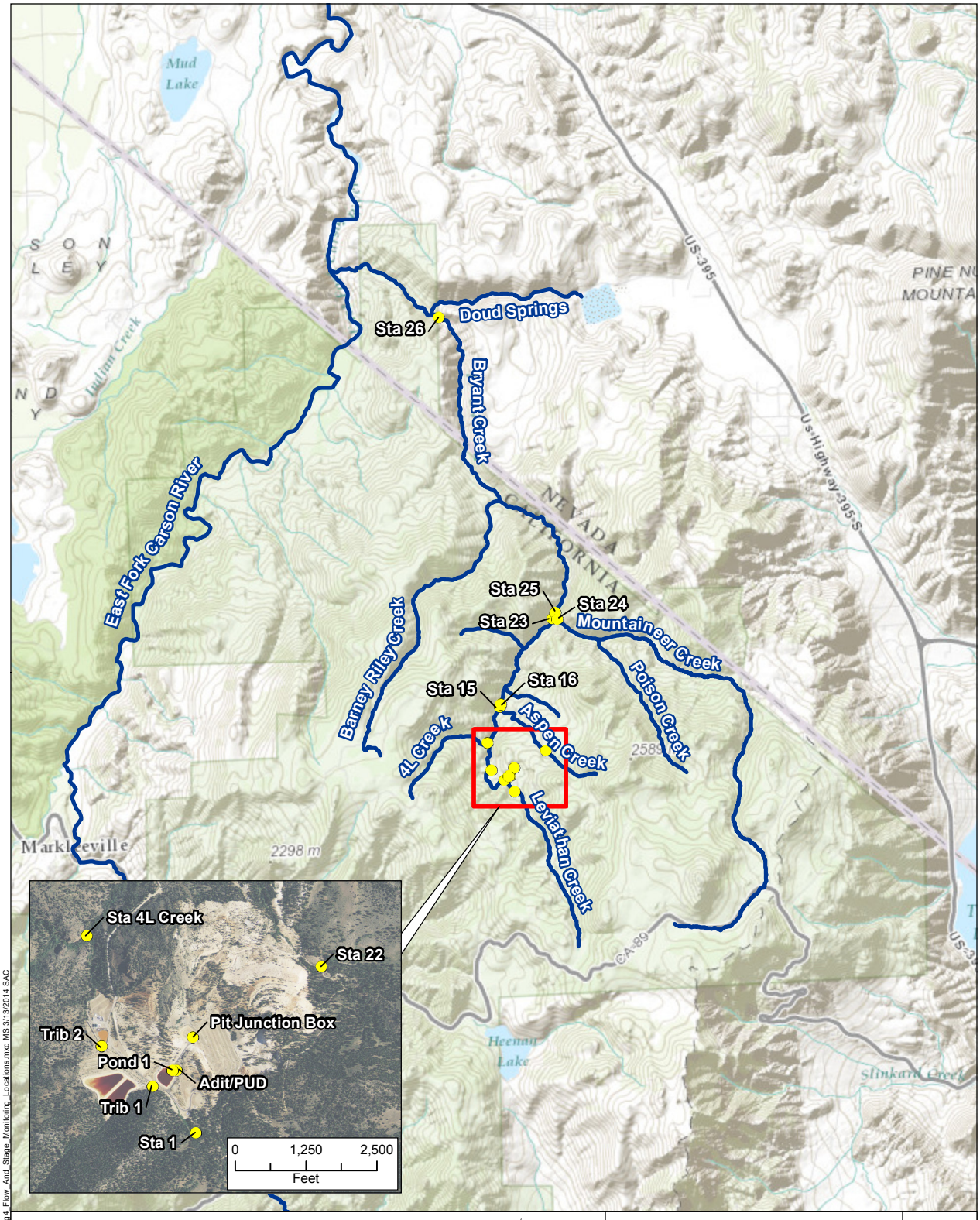
0 250 500

Feet

Lahontan Water Board AMD Capture and Treatment System

Figure 3

L:\Projects\Leviathan\ArcMaps\Fig3_LWB_Capture_Treatment_System.mxd MS 3/6/2014 SAC



L:\Projects\Leviathan\ArcMaps\Fig4_Flow_And_Stage_Monitoring_Locations.mxd MS 3/13/2014 SAC

Flow and Stage Monitoring Locations

Figure 4

LIST OF TABLES

Table 1: 2015 Pond Water Treatment Monitoring Program
Table 2: USEPA Discharge Criteria
Table 3: 2015 Flow and Stage Monitoring Locations

TABLE 1
2015 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 promplty 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
2015 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 2015 Pond Water Treatment

Table A-1: 2015 Pond Water Treatment, Daily Discharge Summary
Table A-2: 2015 Pond Water Treatment Effluent Field and Analytical Results
Table A-3: 2015 Pond Water Treatment Influent Field and Analytical Results
Table A-4: Summary of 2015 Pond Water Treatment Plant Operators' Logs
Table A-5: 2015 Pond Water Treatment Sludge Analytical Results

Table A-1
2015 Pond Water Treatment
Daily Discharge Summary

Date	Volume Discharged (Gallons)	Cumulative Discharge (Gallons)
7/21/2015	117,600	117,600
7/22/2015	276,480	394,080
7/23/2015	293,760	687,840
7/24/2015	144,030	831,870
7/25/2015	61,920	893,790
7/26/2015	56,160	949,950
7/27/2015	96,510	1,046,460
7/28/2015	175,680	1,222,140
7/29/2015	187,200	1,409,340
7/30/2015	244,800	1,654,140
7/31/2015	154,029	1,808,169
8/1/2015	50,400	1,858,569
8/2/2015	50,400	1,908,969
8/3/2015	64,440	1,973,409
8/4/2015	163,605	2,137,014
8/5/2015	201,600	2,338,614
8/6/2015	92,160	2,430,774
8/7/2015	30,240	2,461,014
8/8/2015	14,098	2,475,112
8/9/2015	11,693	2,486,805
8/10/2015	7,704	2,494,509
8/11/2015	3,600	2,498,109
8/12/2015	1,152	2,499,261
Pre-discharge utility water *	38,000	2,537,261

Note:

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

* - Utility water collected from the pit clarifier prior to initiating discharge to Leviathan Creek

Table A-2
2015 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		
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**			**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**		
					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**	**Result**	**DQ**	**EQ**
1516PWT001-PC	Pre-Discharge	07/16/2015	8.03	70.7°F	0.675			0.00750			0.000359	J	J	998			0.00959			0.0187			0.00771			0.05	U		0.000500	U		41.7			0.902			0.0790			0.00436		J	2730			3830			0.0100	U	
1516PWT002-PC	Pre-Discharge	07/17/2015	8.12	71.8°F	0.774			0.00913			0.000300	U		1030			0.00579			0.0147			0.00754			0.0500	U		0.000500	U		46.0			0.711		J+	0.0615			0.00481			3300			3710			0.0100	U	
1516PWT004-EFF	PWT Effluent	07/21/2015	7.66	73.0°F	0.0666	J	J	0.00622			0.000300	U		808			0.00492			0.00307			0.00357			0.125			0.000500	U		55.2			0.111			0.0221			0.00422			2590			3090			0.0100	U	
1516PWT005-FMB	Field Blank	07/21/2015	NA	NA	0.0500	U		0.000500	U		0.000300	U		0.440	J	J	0.00100	U		0.000500	U		0.00100	U		0.0500	U		0.000500	U		0.375	J	J	0.00132	J	J	0.00200	U		0.000500	U		0.500	U		62		**	0.0100	U	
1516PWT006-EFF	PWT Effluent	07/23/2015	7.77	64.9°F	0.0500	U		0.0103			0.000300	U		711			0.00392			0.00191		*	0.00407			0.0500	U		0.000500	U		42.9			0.141			0.0238			0.00494			NA			NA			0.0100	U	
1516PWT007-EFF	Duplicate	07/23/2015	7.77	64.9°F	0.0500	U		0.0102			0.000300	U		704			0.00355			0.00264		*	0.00431			0.0500	U		0.000500	U		43.1			0.144			0.0250			0.00437			NA			NA			0.0100	U	
1516PWT009-EFF	PWT Effluent	07/28/2015	7.16	62.0°F	0.0645	J	J, *	0.0112			0.000300	U		604			0.00343			0.00178			0.00439			0.0969	J	J	0.000500	U		47.5			0.110			0.0238			0.00648		*	2000			2610			0.0100	U	
1516PWT010-EFF	Duplicate	07/28/2015	7.16	62.0°F	0.0500	U	*	0.0102			0.000300	U		618			0.00316			0.00190			0.00476			0.0927	J	J	0.000500	U		48.5			0.114			0.0239			0.00430		*	1980			2560			0.0100	U	
1516PWT011-EFF	PWT Effluent	07/30/2015	7.52	68.7°F	0.0500	U		0.0118			0.000300	U		613			0.00380			0.00275			0.00479			0.0851	J	J	0.000500	U		45.1			0.117			0.0293			0.00467			NA			NA			0.0100	U	
1516PWT012-EFF	PWT Effluent	08/04/2015	7.41	72.4°F	0.0500	U		0.00616			0.000300	U		618			0.00399			0.00155		*	0.00735			0.0824	J	J	0.000500	U		55.5			0.0786			0.0212			0.00552			1640			2470			0.0100	U	
1516PWT013-EFF	Duplicate	08/04/2015	7.41	72.4°F	0.0500	U		0.00568			0.000300	U		622		J+	0.00390			0.00210		*	0.00696			0.0861	J	J	0.000500	U		55.6			0.0740			0.0204			0.00595			1670			2460			0.0100	U	
1516PWT014-EFF	PWT Effluent	08/06/2015	7.40	59.6°F	0.0500	U		0.00648			0.000300	U		606			0.00366			0.00232			0.00759			0.0852	J	J	0.000500	U		54.0			0.111			0.0212			0.00535			NA			NA			0.0100	U	

All parameters are dissolved except Selenium which is total recoverable.
NP - Not Promulgated
NA - Not Analyzed

Data Qualifiers (DQ) from the Laboratory:
J = Analyte positively identifed, but the quantitation was below the reporting limit.
U = Not detected at or above adjusted sample detection limit.

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 concentraton; potential high bias
* - failed Relative Percent Difference assessment
** - failed Field Method Blank assessment

Table A-3
2015 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	Result	DQ	EQ
1516PWT003-INF	PWT Influent	07/21/2015	2.35	70.1°F	441			2.27			0.0379			385			0.833			2.52			1.74			300			0.000502	J	J	59.9			11.9			7.05			0.00402			4490		H2	5370	H1	H3	1.25		
1516PWT008-INF	PWT Influent	07/28/2015	2.77	57.7°F	542			2.94			0.0462			424			0.915			2.99			2.30			384			0.000548	J	J	74.3			14.6			8.21			0.00336			5190			6450			2.08		

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.

Data Qualifiers (DQ) from the Laboratory:
J = Analyte positively identifed, but the quantitation was below the reporting limit.
H1 = Sample analysis performed past holding time.

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.
H2 = Original Sulfate samples were analyzed within hold time, however the results appeared to be anomolous, samples were re-analyzed on 7/31/15 and are still within hold time. Results from 7/31/15 analysis are displayed in table.
H3 = Original Total Dissolved Solids samples were analyzed within hold time, however the results appeared to be anomolous, samples were re-analyzed on 7/31/15 and are three days past hold. Results from 7/31/15 analysis are displayed in table.

Table A-4
Summary of 2015
Pond Water Treatment Plant Operator's Logs

Date	Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp ˚F	R-2 Setpoint	R-2 pH	R-2 temp ˚F	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp ˚F	Discharge Weir pH	Discharge Weir temp ˚F
07/15/15	11:30	NA	3.50	3.44	62.20	8.10	8.25	65.10	8.35	8.12	76.80	ND	ND
07/15/15	12:30	NA	3.50	3.70	64.40	8.10	8.40	65.70	8.20	8.66	72.80	ND	ND
07/15/15	13:30	NA	3.50	3.45	66.30	8.10	8.01	67.10	8.12	8.64	73.30	ND	ND
07/15/15	14:30	160	3.60	3.52	67.70	8.10	8.12	68.60	8.16	8.62	74.10	ND	ND
07/15/15	15:30	NA	3.60	3.63	69.10	8.10	8.65	73.90	8.70	8.51	75.20	ND	ND
07/15/15	16:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/15/15	17:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/15/15	18:30	105	3.60	3.74	68.90	8.07	8.28	71.60	8.48	8.25	74.20	ND	ND
07/15/15	19:30	NA	3.50	3.73	68.70	8.07	8.21	71.60	8.15	8.16	72.40	ND	ND
07/15/15	20:30	115	3.60	3.74	68.00	8.07	8.47	70.90	8.46	8.30	66.60	ND	ND
07/15/15	21:30	NA	3.60	3.74	67.70	8.07	8.03	70.50	8.51	8.18	65.90	ND	ND
07/15/15	22:30	115	3.60	3.66	67.20	8.07	8.30	70.30	8.48	8.25	63.90	ND	ND
07/15/15	23:30	NA	3.60	3.73	66.50	8.07	8.10	69.60	8.54	8.08	66.80	ND	ND
07/16/15	0:30	115	3.60	3.67	65.60	8.07	8.44	69.10	8.51	8.36	67.40	ND	ND
07/16/15	1:30	NA	3.60	3.73	64.60	8.07	8.48	68.40	8.50	8.28	65.50	ND	ND
07/16/15	2:30	115	3.60	3.69	63.70	8.07	8.37	67.20	8.52	8.41	66.60	ND	ND
07/16/15	3:30	NA	3.60	3.70	63.60	8.07	8.44	66.50	8.51	8.47	64.10	ND	ND
07/16/15	4:30	115	3.60	3.61	62.20	8.07	8.38	65.50	8.51	8.36	64.40	ND	ND
07/16/15	5:30	NA	3.60	3.66	61.30	8.07	8.44	65.60	8.50	8.20	64.00	ND	ND
07/16/15	6:30	115	3.60	3.70	60.60	8.07	8.26	64.30	8.50	8.25	63.20	ND	ND
07/16/15	7:30	NA	3.60	3.70	59.70	8.07	8.24	63.50	8.49	8.29	61.00	ND	ND
07/16/15	8:30	117	3.60	3.71	59.90	8.07	8.47	62.90	8.50	8.17	65.60	ND	ND
07/16/15	9:30	NA	3.60	3.67	60.10	8.05	8.13	63.30	8.47	8.25	67.30	ND	ND
07/16/15	10:30	115	3.60	3.69	61.60	8.00	8.26	63.40	8.44	8.15	69.30	ND	ND
07/16/15	11:30	NA	3.60	3.71	63.20	7.95	8.22	64.30	8.38	8.15	69.90	ND	ND
07/16/15	12:30	111	3.60	3.70	65.10	7.95	8.19	65.90	8.38	8.25	70.50	ND	ND
07/16/15	13:30	NA	3.60	3.62	67.00	7.95	8.29	67.60	8.39	8.24	71.00	ND	ND
07/16/15	14:30	110	3.60	3.63	67.50	7.95	8.08	69.00	8.43	8.32	71.40	ND	ND
07/16/15	15:30	NA	3.60	3.62	67.00	7.95	7.87	69.70	8.41	8.32	70.30	ND	ND
07/16/15	16:30	126	3.60	3.73	66.30	7.95	8.03	69.60	8.43	8.35	70.70	ND	ND
07/16/15	17:30	NA	3.60	3.62	65.60	7.95	8.27	69.10	8.43	8.39	69.40	ND	ND
07/16/15	18:30	125	3.60	3.74	65.80	8.00	8.33	68.60	8.34	8.26	70.60	ND	ND
07/16/15	19:30	NA	3.60	3.67	66.30	8.00	8.37	68.70	8.40	8.43	70.90	ND	ND
07/16/15	20:30	117	3.60	3.62	66.30	8.00	8.47	68.90	8.43	8.42	70.40	ND	ND
07/16/15	21:30	NA	3.60	3.74	66.10	8.00	8.48	68.80	8.41	8.43	71.60	ND	ND
07/16/15	22:30	117	3.60	3.71	65.40	8.00	8.24	68.50	8.41	8.48	69.70	ND	ND
07/16/15	23:30	NA	3.60	3.78	64.40	8.00	8.33	68.10	8.40	8.47	69.40	ND	ND
07/17/15	0:30	117	3.60	3.74	63.90	8.00	8.25	67.50	8.40	8.46	68.50	ND	ND
07/17/15	1:30	NA	3.60	3.60	63.20	8.00	8.20	66.60	8.41	8.49	67.70	ND	ND
07/17/15	2:30	117	3.60	3.60	62.30	8.00	8.35	65.90	8.44	8.44	67.50	ND	ND
07/17/15	3:30	NA	3.60	3.66	61.80	8.00	8.26	64.90	8.37	8.43	67.60	ND	ND
07/17/15	4:30	117	3.60	3.62	61.10	8.00	8.39	64.10	8.39	8.47	67.90	ND	ND
07/17/15	5:30	NA	3.60	3.72	60.40	8.00	8.05	63.80	8.29	8.57	68.30	ND	ND
07/17/15	6:30	117	3.60	3.70	60.40	8.00	8.36	63.70	8.33	8.43	64.30	ND	ND
07/17/15	7:30	NA	3.60	3.64	58.90	8.00	8.16	62.10	8.40	8.56	64.10	ND	ND
07/17/15	8:30	120	3.60	3.85	58.70	7.95	8.36	62.10	8.34	8.58	65.60	ND	ND
07/17/15	9:30	NA	3.60	3.65	59.70	7.95	7.86	62.20	8.47	8.86	68.20	ND	ND
07/17/15	10:30	131	3.60	3.63	60.40	7.95	7.85	62.70	8.31	8.45	65.60	ND	ND
07/17/15	11:30	NA	3.60	3.73	62.80	7.95	7.79	63.90	8.15	8.54	72.70	ND	ND
07/17/15	12:30	133	3.60	3.66	69.60	8.05	7.99	65.80	8.43	8.59	73.50	ND	ND
07/17/15	13:30	NA	3.60	3.70	65.40	8.02	8.31	67.40	8.35	8.63	73.00	ND	ND
07/17/15	14:30	136	3.60	3.72	67.00	8.00	8.24	68.30	8.26	8.51	70.50	ND	ND
07/17/15	15:30	NA	3.60	3.66	67.30	8.00	8.01	69.30	8.30	8.27	68.80	ND	ND
07/17/15	16:30	133	3.60	3.68	66.60	8.00	7.99	69.30	8.33	8.62	67.60	ND	ND
07/17/15	17:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/17/15	18:30	142	3.60	3.71	65.80	7.95	8.31	69.00	8.33	8.43	69.70	ND	ND
07/17/15	19:30	NA	3.60	3.70	65.10	7.95	8.36	68.40	8.25	8.29	68.90	ND	ND
07/17/15	20:30	142	3.60	3.61	64.40	7.95	8.39	68.20	8.27	8.34	67.80	ND	ND
07/17/15	21:30	NA	3.60	3.71	64.40	7.95	8.00	67.50	8.25	8.27	68.30	ND	ND
07/17/15	22:30	142	3.60	3.74	63.70	7.95	8.18	67.70	8.26	8.31	69.60	ND	ND
07/17/15	23:30	NA	3.60	3.76	63.20	7.95	8.28	66.40	8.22	8.33	68.50	ND	ND

Table A-4
Summary of 2015
Pond Water Treatment Plant Operator's Logs

Date	Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp ˚F	R-2 Setpoint	R-2 pH	R-2 temp ˚F	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp ˚F	Discharge Weir pH	Discharge Weir temp ˚F
07/18/15	0:30	142	3.60	3.77	62.50	7.95	8.35	65.50	8.17	8.34	66.40	ND	ND
07/18/15	1:30	NA	3.60	3.63	61.60	7.95	8.36	65.50	8.22	8.32	67.10	ND	ND
07/18/15	2:30	142	3.60	3.64	60.40	7.95	8.30	64.00	8.17	8.39	65.50	ND	ND
07/18/15	3:30	NA	3.60	3.67	59.70	7.95	8.31	63.50	8.18	8.27	68.60	ND	ND
07/20/15	13:30	NA	3.60	3.81	61.80	8.05	8.27	64.10	8.21	6.80	64.70	ND	ND
07/20/15	14:30	150	3.60	3.65	62.50	8.15	8.17	64.30	8.31	7.40	70.40	ND	ND
07/20/15	15:30	NA	3.60	3.66	63.50	8.20	8.51	64.80	8.38	7.92	71.60	ND	ND
07/20/15	16:30	155	3.60	3.64	63.50	8.20	8.33	66.10	8.49	8.01	70.20	ND	ND
07/20/15	17:30	NA	3.60	3.25	63.50	8.20	8.16	66.10	8.50	8.13	70.20	ND	ND
07/20/15	18:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/20/15	19:30	NA	3.60	2.90	63.20	8.20	8.35	65.70	8.29	7.99	67.70	ND	ND
07/20/15	20:30	155	3.60	2.86	63.70	8.20	8.10	65.00	8.30	8.30	66.50	ND	ND
07/20/15	21:30	NA	3.60	2.87	63.20	8.20	8.11	66.20	8.35	8.33	68.80	ND	ND
07/20/15	22:30	155	3.60	2.89	62.50	8.20	8.35	65.40	8.32	8.36	68.20	ND	ND
07/20/15	23:30	NA	3.60	2.87	61.80	8.20	8.38	65.00	8.32	8.69	67.70	ND	ND
07/21/15	0:30	155	3.60	2.84	61.60	8.20	8.44	64.40	8.35	8.40	66.90	ND	ND
07/21/15	1:30	NA	3.60	2.85	60.60	8.20	8.26	63.30	8.34	8.43	68.20	ND	ND
07/21/15	2:30	155	3.60	2.84	59.70	8.20	8.47	63.30	8.33	8.50	65.10	ND	ND
07/21/15	3:30	NA	3.60	2.84	59.40	8.20	8.19	63.00	8.31	8.37	72.20	ND	ND
07/21/15	4:30	155	3.60	2.86	59.80	8.20	8.43	62.10	8.33	8.41	69.40	ND	ND
07/21/15	5:30	NA	3.60	2.83	58.00	8.20	8.13	61.50	8.29	8.42	62.20	ND	ND
07/21/15	6:30	155	3.60	2.82	57.50	8.20	8.31	61.50	8.27	8.46	62.60	ND	ND
07/21/15	7:30	NA	3.60	2.83	56.80	8.20	8.19	60.20	8.27	7.96	59.00	ND	ND
07/21/15	8:30	156	3.60	2.82	56.30	8.20	8.24	60.10	8.31	8.20	63.70	ND	ND
07/21/15	9:30	NA	3.60	2.82	57.30	8.20	8.44	60.00	8.28	8.15	65.10	ND	ND
07/21/15	10:30	156	3.60	3.06	58.90	8.20	8.10	60.60	8.49	7.94	68.00	7.58	68.70
07/21/15	11:30	NA	3.60	3.69	59.90	8.15	8.12	62.50	8.47	7.95	68.80	7.57	68.50
07/21/15	12:30	156	3.60	3.74	61.10	8.15	8.04	63.40	8.41	7.98	68.90	7.02	75.00
07/21/15	13:30	NA	3.60	3.73	62.80	8.15	8.06	64.80	8.45	8.29	70.30	7.72	68.70
07/21/15	14:30	156	3.60	3.69	62.50	8.15	8.11	65.00	8.48	7.66	67.20	7.39	65.30
07/21/15	15:30	NA	3.60	3.61	62.80	8.15	8.20	65.20	8.67	8.58	65.70	7.84	64.20
07/21/15	16:30	156	3.60	3.72	62.00	8.10	8.38	64.90	8.45	8.28	65.30	7.76	64.40
07/21/15	17:30	NA	3.60	3.75	62.00	8.10	8.13	65.00	8.46	8.36	64.30	7.75	65.20
07/21/15	18:30	156	3.60	3.70	61.80	8.10	8.30	64.50	8.53	8.50	64.80	7.86	63.50
07/21/15	19:30	NA	3.60	3.61	61.80	8.10	8.22	64.30	8.50	8.62	62.80	7.92	64.30
07/21/15	20:30	156	3.60	3.67	61.80	8.10	8.25	63.70	8.50	8.67	66.10	7.82	65.40
07/21/15	21:30	NA	3.60	3.71	61.30	8.08	8.40	63.80	8.47	8.64	67.50	7.77	66.10
07/21/15	22:30	156	3.60	3.66	60.60	8.05	8.15	63.40	8.43	8.52	70.70	7.80	69.30
07/21/15	23:30	NA	3.60	3.66	60.40	8.03	8.00	63.00	8.40	8.47	69.50	7.88	66.10
07/22/15	0:30	156	3.60	3.69	59.70	8.03	7.99	62.60	8.37	8.60	66.70	7.86	64.40
07/22/15	1:30	NA	3.60	3.70	59.40	8.03	8.13	63.00	8.41	8.61	66.50	7.75	64.00
07/22/15	2:30	156	3.60	3.74	58.70	8.03	7.95	61.60	8.41	8.54	69.00	7.78	64.70
07/22/15	3:30	NA	3.60	3.70	58.00	8.03	8.11	61.40	8.38	8.43	69.00	7.89	63.30
07/22/15	4:30	156	3.60	3.70	57.50	8.03	8.02	60.70	8.37	8.52	70.40	7.80	65.50
07/22/15	5:30	NA	3.60	3.71	57.00	8.03	7.99	60.20	8.40	8.54	71.30	7.90	65.70
07/22/15	6:30	156	3.60	3.66	56.30	8.03	7.97	59.50	8.44	8.51	75.10	7.85	65.40
07/22/15	7:30	NA	3.60	3.76	56.10	7.95	8.13	58.70	8.30	8.38	57.80	7.84	60.10
07/22/15	8:30	157	3.60	3.63	55.80	7.95	7.93	58.30	8.27	8.34	63.40	7.80	64.00
07/22/15	9:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/22/15	10:30	157	3.60	3.65	56.20	7.95	7.97	58.60	8.32	7.85	63.30	7.39	63.20
07/22/15	11:30	NA	3.70	3.78	66.80	7.95	7.98	60.10	8.39	7.67	64.50	7.35	65.40
07/22/15	12:30	157	3.70	3.74	65.60	7.95	7.89	61.20	8.37	8.03	65.30	7.77	63.70
07/22/15	13:30	NA	3.70	3.74	73.00	7.95	8.16	62.50	8.37	8.11	65.00	7.95	64.20
07/22/15	14:30	157	3.70	3.68	65.60	7.95	8.22	63.00	8.34	8.14	66.20	7.79	64.90
07/22/15	15:30	NA	3.70	3.38	67.60	7.95	7.85	63.60	8.40	8.13	66.80	7.75	67.10
07/22/15	16:30	157	3.70	3.25	69.70	7.95	7.83	64.50	8.35	7.94	67.20	7.65	67.00
07/22/15	17:30	NA	3.70	3.22	70.10	7.95	7.89	64.80	8.39	7.89	69.80	7.60	68.60
07/22/15	18:30	157	3.70	3.79	69.90	7.95	8.08	66.20	8.19	8.04	69.60	7.78	67.80
07/22/15	19:30	NA	3.70	3.81	68.60	8.10	8.21	67.00	8.32	8.53	68.40	8.00	65.40
07/22/15	20:30	157	3.70	3.94	69.70	8.10	8.22	67.30	8.34	8.54	71.00	7.98	66.60
07/22/15	21:30	NA	3.70	3.96	66.30	8.10	8.37	66.50	8.29	8.46	69.30	7.97	66.40

Table A-4
Summary of 2015
Pond Water Treatment Plant Operator's Logs

Date	Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp ˚F	R-2 Setpoint	R-2 pH	R-2 temp ˚F	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp ˚F	Discharge Weir pH	Discharge Weir temp ˚F
07/22/15	22:30	157	3.70	4.03	60.90	8.10	8.40	65.60	8.31	8.62	70.70	7.98	66.20
07/22/15	23:30	NA	3.70	4.06	61.10	8.10	8.32	64.40	8.31	8.52	68.50	7.94	65.00
07/23/15	0:30	157	3.70	4.13	62.40	8.10	8.11	64.40	8.34	8.66	66.00	7.99	64.30
07/23/15	1:30	NA	3.70	4.08	56.90	8.10	8.30	63.60	8.29	8.58	69.10	8.01	65.50
07/23/15	2:30	157	3.70	4.10	54.20	8.10	8.27	62.70	8.35	8.50	71.50	8.06	65.60
07/23/15	3:30	NA	3.70	4.11	53.10	8.10	8.31	61.80	8.31	8.68	74.30	8.10	71.40
07/23/15	4:30	157	3.70	4.14	54.40	8.10	8.25	60.20	8.24	8.53	66.30	8.08	62.00
07/23/15	5:30	NA	3.70	4.15	53.00	8.10	8.11	60.10	8.31	8.49	67.40	8.02	62.40
07/23/15	6:30	157	3.70	4.14	53.00	8.10	8.03	59.40	8.31	8.75	64.50	8.07	60.60
07/23/15	7:30	NA	3.70	4.10	54.60	8.10	8.35	58.40	8.30	8.45	57.60	8.08	60.10
07/23/15	8:30	156	3.70	4.16	58.00	8.05	8.14	58.40	8.29	8.34	62.20	7.80	62.40
07/23/15	9:30	NA	3.70	4.17	61.20	8.05	8.08	58.00	8.27	8.41	63.70	8.01	64.10
07/23/15	10:30	156	3.70	4.10	63.40	8.05	8.01	59.90	8.30	8.38	64.70	8.06	63.60
07/23/15	11:30	NA	3.70	4.14	63.80	8.05	8.21	59.80	8.27	8.49	64.50	8.08	62.90
07/23/15	12:30	156	3.70	4.12	66.50	8.05	7.97	60.50	8.28	8.43	66.80	7.96	65.10
07/23/15	13:30	NA	3.70	4.01	68.90	8.15	8.27	61.70	8.19	8.35	67.50	7.60	68.80
07/23/15	14:30	156	3.70	4.00	69.50	8.15	8.18	62.90	8.24	8.32	70.70	7.73	67.20
07/23/15	15:30	NA	3.70	3.71	70.90	8.15	8.18	64.10	8.25	8.04	68.90	7.04	70.50
07/23/15	16:30	156	3.70	3.88	71.30	8.15	8.23	65.50	8.25	8.25	69.70	7.60	71.20
07/23/15	17:30	NA	3.70	3.87	71.40	8.15	8.25	65.90	8.25	8.44	68.60	7.69	69.80
07/23/15	18:30	156	3.70	3.87	70.70	8.15	8.10	67.90	8.45	8.59	67.00	7.72	69.60
07/23/15	19:30	NA	3.70	3.89	67.50	8.10	8.28	68.00	8.38	8.68	68.20	7.97	66.50
07/23/15	20:30	156	3.70	3.88	63.70	8.05	8.03	67.90	8.34	8.69	67.80	8.07	65.90
07/23/15	21:30	NA	3.70	3.93	61.90	8.00	7.99	67.50	8.28	8.66	70.80	7.99	66.20
07/23/15	22:30	156	3.70	3.94	62.60	7.95	8.16	67.00	8.21	8.61	72.90	7.94	66.80
07/23/15	23:30	NA	3.70	3.93	61.00	7.95	8.29	66.10	8.22	8.55	77.40	7.93	67.80
07/24/15	0:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/24/15	1:30	NA	3.70	2.64	60.30	7.95	8.08	65.00	8.50	8.52	73.70	8.07	67.20
07/24/15	2:30	160	3.70	3.91	58.80	7.95	8.34	64.10	8.39	8.62	70.90	7.99	65.50
07/24/15	3:30	NA	3.70	4.09	59.70	7.92	8.39	63.60	8.35	8.65	70.60	8.02	64.90
07/24/15	4:30	160	3.70	4.32	58.80	7.92	8.17	62.50	8.35	8.35	70.70	7.88	66.10
07/24/15	5:30	NA	3.70	4.50	58.90	7.92	7.90	61.90	8.22	8.15	66.40	7.94	63.90
07/24/15	6:30	160	3.70	4.59	56.30	7.92	8.07	62.40	8.25	8.07	65.50	7.89	62.60
07/24/15	7:30	NA	3.70	4.65	56.40	8.00	8.26	60.50	8.24	7.26	60.50	6.65	59.10
07/24/15	8:30	156	3.70	4.52	60.50	8.10	8.48	60.40	8.46	7.75	62.00	7.28	62.50
07/24/15	9:30	NA	3.70	4.58	60.70	8.25	8.79	60.00	8.46	7.91	62.60	7.40	63.90
07/24/15	10:30	156	3.70	4.58	65.80	8.25	8.27	60.70	8.51	7.92	66.40	7.32	65.90
07/27/15	13:30	NA	3.70	4.12	66.10	8.25	8.36	63.40	8.51	7.78	69.70	6.95	75.60
07/27/15	14:30	155	3.70	3.01	70.10	8.25	8.20	64.60	8.55	7.97	70.40	7.72	73.90
07/27/15	15:30	NA	3.70	3.74	72.80	8.25	8.29	66.00	8.56	8.07	70.90	7.44	73.50
07/27/15	16:30	155	3.70	3.98	75.40	8.25	8.37	68.70	8.52	8.04	71.80	7.29	74.70
07/27/15	17:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/27/15	18:30	155	3.70	3.61	75.10	8.25	8.41	71.60	8.54	8.01	72.20	7.07	73.30
07/27/15	19:30	NA	3.70	3.74	72.70	8.25	8.23	71.30	8.53	8.38	72.20	8.04	69.50
07/27/15	20:30	155	3.70	2.75	67.10	8.25	8.06	70.70	8.50	8.40	67.70	8.08	66.90
07/27/15	21:30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/27/15	22:30	155	3.70	3.29	62.90	8.25	8.27	69.10	8.53	7.68	68.20	7.65	66.00
07/27/15	23:30	NA	3.70	4.14	62.60	8.25	8.36	68.00	8.52	8.10	72.10	7.99	67.40
07/28/15	0:30	155	3.70	3.33	61.30	8.25	8.16	66.60	8.51	8.55	72.20	8.23	67.00
07/28/15	1:30	NA	3.70	3.96	59.30	8.25	8.53	65.50	8.51	8.49	68.70	8.00	65.70
07/28/15	2:30	155	3.70	4.38	56.60	8.25	8.34	64.20	8.47	8.55	66.20	8.04	65.10
07/28/15	3:30	NA	3.70	3.67	51.80	8.25	8.03	63.10	8.35	8.34	67.80	7.97	65.30
07/28/15	4:30	155	3.70	3.16	52.20	8.25	8.12	62.30	8.44	8.26	67.50	8.09	64.90
07/28/15	5:30	NA	3.70	2.98	57.60	8.25	8.10	60.80	8.45	8.36	71.50	8.04	65.60
07/28/15	6:30	155	3.70	2.98	53.10	8.25	8.35	60.10	8.47	8.61	67.20	8.24	63.90
07/28/15	7:30	NA	3.70	4.11	47.40	8.25	7.98	59.20	8.44	8.71	58.80	7.25	57.70
07/28/15	8:30	155	3.70	3.79	55.50	8.25	8.64	57.80	8.51	8.89	62.50	6.96	62.70
07/28/15	9:30	NA	3.70	3.86	58.80	8.00	8.10	58.40	8.30	8.65	61.40	7.16	62.80
07/28/15	10:30	155	3.70	3.93	63.90	7.95	7.92	57.30	8.36	8.40	63.30	7.01	64.10
07/28/15	11:30	NA	3.70	3.87	67.70	7.95	7.92	59.70	8.34	8.42	64.90	7.04	67.90
07/28/15	12:30	155	3.70	3.75	70.20	7.95	8.44	62.60	8.20	8.21	66.70	6.78	70.20

Table A-4
Summary of 2015
Pond Water Treatment Plant Operator's Logs

Date	Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp ˚F	R-2 Setpoint	R-2 pH	R-2 temp ˚F	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp ˚F	Discharge Weir pH	Discharge Weir temp ˚F
07/28/15	13:30	NA	3.70	3.75	73.00	7.95	8.46	64.40	8.36	8.32	67.50	6.91	70.20
07/28/15	14:30	155	3.70	3.72	75.50	7.95	8.25	66.30	8.33	8.43	72.10	6.65	71.10
07/28/15	15:30	NA	3.70	3.67	75.50	7.95	8.02	68.40	8.26	8.23	72.30	6.56	73.70
07/28/15	16:30	155	3.70	3.66	76.80	7.95	7.96	70.20	8.36	8.35	73.90	6.64	73.80
07/28/15	17:30	NA	3.70	3.96	77.50	7.95	8.47	71.70	8.37	8.42	73.50	6.60	74.40
07/28/15	18:30	155	3.70	3.94	75.30	7.95	8.07	72.10	8.31	8.33	73.80	6.71	71.50
07/28/15	19:30	NA	3.70	3.94	74.40	8.00	7.96	71.90	8.27	8.53	73.30	7.99	69.80
07/28/15	20:30	155	3.70	4.01	68.30	7.97	8.13	71.80	8.30	9.03	69.00	8.31	68.80
07/28/15	21:30	NA	3.70	4.12	66.70	7.95	7.96	71.20	8.16	8.98	72.70	7.87	69.50
07/28/15	22:30	155	3.70	4.06	63.90	7.95	8.55	70.30	8.23	9.08	70.40	7.85	69.30
07/28/15	23:30	NA	3.70	4.14	62.00	7.90	8.20	69.90	8.18	8.98	69.10	8.04	68.00
07/29/15	0:30	155	3.70	4.19	59.70	7.90	7.92	68.10	8.15	8.56	73.00	7.88	68.60
07/29/15	1:30	NA	3.70	4.25	55.30	7.90	8.30	66.40	8.16	8.68	70.40	7.99	66.10
07/29/15	2:30	155	3.70	4.48	57.10	7.95	8.16	65.20	8.19	8.52	70.80	7.87	65.10
07/29/15	3:30	NA	3.70	4.36	56.30	7.95	8.32	63.90	8.23	8.66	68.70	7.98	65.90
07/29/15	4:30	155	3.70	4.38	55.80	8.00	8.06	62.80	8.24	8.79	65.80	7.95	65.70
07/29/15	5:30	NA	3.70	4.61	50.90	8.00	8.09	61.50	8.18	8.75	63.60	7.89	65.30
07/29/15	6:30	155	3.70	4.75	51.20	8.00	8.41	60.70	8.48	8.63	68.80	7.93	65.40
07/29/15	7:30	NA	3.70	4.67	50.80	8.00	8.51	58.90	8.25	8.37	56.30	6.99	55.00
07/29/15	8:30	154	3.70	4.31	55.80	8.00	8.52	57.90	8.26	8.33	62.40	7.24	62.80
07/29/15	9:30	NA	3.70	4.36	58.10	8.00	8.45	59.00	8.16	9.12	64.10	8.60	64.60
07/29/15	10:30	154	3.70	4.05	63.80	8.00	8.08	58.30	8.26	8.46	64.40	7.66	67.30
07/29/15	11:30	NA	3.70	3.80	69.50	7.90	8.23	59.20	8.17	8.35	69.20	7.40	72.30
07/29/15	12:30	154	3.70	3.75	73.40	7.95	8.10	61.50	8.28	8.86	70.00	8.54	70.40
07/29/15	13:30	NA	3.70	3.71	76.60	7.95	8.05	63.50	8.21	8.45	74.30	7.63	74.80
07/29/15	14:30	154	3.70	3.73	74.70	7.95	8.05	66.10	8.29	8.58	74.00	7.73	73.20
07/29/15	15:30	NA	3.70	3.68	79.70	7.95	8.35	69.40	8.25	8.54	74.50	7.49	73.40
07/29/15	16:30	154	3.70	3.66	80.00	7.90	8.09	71.30	8.25	8.58	75.70	7.65	75.00
07/29/15	17:30	NA	3.70	3.64	78.80	7.90	8.02	72.40	8.31	8.61	77.20	7.63	76.70
07/29/15	18:30	154	3.70	3.64	76.40	8.15	8.19	73.00	8.18	7.85	75.50	6.76	74.50
07/29/15	19:30	NA	3.70	3.76	75.30	8.00	8.18	72.40	8.24	8.63	77.20	7.82	73.40
07/29/15	20:30	154	3.70	3.98	70.90	8.00	8.42	72.40	8.21	8.71	75.10	7.80	73.30
07/29/15	21:30	NA	3.70	3.41	66.50	7.95	8.22	72.40	8.33	8.59	76.20	7.86	72.20
07/29/15	22:30	154	3.70	5.05	64.60	8.15	8.10	71.30	8.27	8.58	74.50	7.83	70.50
07/29/15	23:30	NA	3.70	5.30	61.40	8.15	8.18	70.10	8.27	8.33	72.90	7.87	69.80
07/30/15	0:30	154	3.70	4.80	61.10	8.15	8.23	68.60	8.29	8.44	73.70	7.75	71.00
07/30/15	1:30	NA	3.70	4.05	59.10	8.15	8.29	66.90	8.35	8.38	70.90	7.73	68.40
07/30/15	2:30	154	3.70	3.96	57.90	8.15	8.41	65.20	8.31	8.55	71.00	7.87	67.90
07/30/15	3:30	NA	3.70	3.97	57.00	8.15	8.28	63.40	8.23	8.50	69.50	7.86	67.60
07/30/15	4:30	155	3.70	3.87	57.30	8.15	8.22	62.10	8.30	8.30	69.90	7.86	67.30
07/30/15	5:30	NA	3.70	3.45	53.70	8.15	8.17	60.50	8.37	8.37	67.90	7.77	66.20
07/30/15	6:30	155	3.70	3.43	52.60	8.15	8.18	59.30	8.25	8.27	67.20	7.90	66.30
07/30/15	7:30	NA	3.70	3.30	52.60	8.15	8.54	58.20	8.18	8.12	60.30	7.44	59.00
07/30/15	8:30	154	3.70	4.10	58.60	8.20	8.43	57.10	8.31	8.20	64.00	7.39	66.00
07/30/15	9:30	NA	3.70	4.18	63.60	8.20	8.74	57.30	8.27	8.32	65.00	7.50	68.70
07/30/15	10:30	154	3.70	4.30	64.90	8.15	8.45	58.30	8.38	8.18	66.90	7.54	71.00
07/30/15	11:30	NA	3.70	4.47	73.30	8.15	8.70	59.60	8.14	7.88	68.70	7.49	74.80
07/30/15	12:30	154	3.70	4.51	76.50	8.25	8.62	62.10	8.23	7.99	69.00	7.47	79.00
07/30/15	13:30	NA	3.70	3.92	78.50	8.15	8.14	65.80	8.35	NA	NA	6.83	77.20
07/30/15	14:30	104	3.70	3.72	79.90	8.15	8.44	68.70	8.36	7.93	76.00	7.32	78.50
07/30/15	15:30	NA	3.70	4.01	79.10	8.15	8.18	70.30	8.31	7.55	75.50	6.63	72.90
07/30/15	16:30	104	3.70	4.71	78.90	8.25	8.31	72.50	8.36	7.78	78.30	6.86	79.60
07/30/15	17:30	NA	3.70	4.46	78.70	8.25	8.26	72.60	8.36	7.79	76.50	7.00	78.30
07/30/15	18:30	104	3.70	3.90	77.00	8.25	8.25	73.40	8.53	7.85	76.20	6.97	75.50
07/30/15	19:30	NA	3.70	3.83	76.70	8.15	8.31	73.80	8.61	8.40	76.80	7.64	73.50
07/30/15	20:30	105	3.70	5.68	72.80	8.15	8.25	73.60	8.39	8.26	78.80	7.87	69.60
07/30/15	21:30	NA	3.70	3.93	71.00	8.18	8.26	73.10	8.54	7.87	77.50	7.79	73.90
07/30/15	22:30	105	3.70	5.58	68.90	8.18	8.36	72.70	8.45	8.38	75.10	7.78	71.70
07/30/15	23:30	NA	3.70	6.38	68.20	8.18	8.49	71.70	8.57	8.39	73.30	7.84	69.90
07/31/15	0:30	105	3.70	4.62	66.40	8.18	8.14	70.60	8.41	8.26	72.60	7.84	70.50
07/31/15	1:30	NA	3.70	4.02	63.40	8.18	8.46	68.40	8.55	8.36	72.70	7.80	69.90

Table A-4
Summary of 2015
Pond Water Treatment Plant Operator's Logs

Date	Time	Influent Flowrate (gpm)	R-1 Setpoint	R-1 pH	R-1 temp ˚F	R-2 Setpoint	R-2 pH	R-2 temp ˚F	FF-2 pH	Clarifier Pit pH	Clarifier Pit temp ˚F	Discharge Weir pH	Discharge Weir temp ˚F
07/31/15	2:30	105	3.70	3.82	61.60	8.18	8.20	67.60	8.54	8.34	74.80	7.84	70.20
07/31/15	3:30	NA	3.70	3.83	61.10	8.18	8.14	66.20	8.63	8.63	72.50	7.93	69.30
07/31/15	4:30	105	3.70	3.24	60.00	8.13	8.26	64.50	8.54	8.72	68.50	7.97	66.90
07/31/15	5:30	NA	3.70	2.85	59.40	8.10	8.06	62.90	8.51	8.62	68.30	7.94	68.20
07/31/15	6:30	105	3.70	2.49	59.80	8.10	8.03	62.10	8.34	8.41	70.80	7.83	69.00
07/31/15	7:30	NA	3.70	2.60	60.20	8.10	8.21	61.60	8.23	8.26	64.60	8.06	65.60
07/31/15	8:30	153	3.70	3.71	62.00	8.10	8.03	60.40	8.33	8.08	65.50	7.50	68.60
07/31/15	9:30	NA	3.70	3.48	65.80	8.10	8.31	60.10	8.32	8.07	65.90	7.10	69.20
07/31/15	10:30	153	3.70	3.66	66.70	8.10	8.29	60.50	8.29	8.07	67.30	7.18	71.60
07/31/15	11:30	NA	3.70	2.87	63.70	8.10	8.56	61.20	8.20	7.82	64.80	6.95	67.80
08/03/15	17:30	NA	3.60	3.70	76.90	8.15	8.21	73.20	8.40	7.56	73.30	7.29	70.50
08/03/15	18:30	140	3.60	3.78	74.80	8.15	8.29	74.10	8.37	8.50	75.90	7.40	70.00
08/03/15	19:30	NA	3.60	3.81	74.80	8.15	8.32	74.70	8.47	8.59	75.70	7.81	68.00
08/03/15	20:30	140	3.60	3.92	69.30	8.15	8.13	73.40	8.40	8.66	73.70	7.94	67.70
08/03/15	21:30	NA	3.60	3.79	68.40	8.15	8.25	71.70	8.36	8.88	70.30	8.11	67.30
08/03/15	22:30	140	3.60	4.11	61.40	8.15	8.13	64.80	8.34	8.82	68.00	8.05	66.30
08/03/15	23:30	NA	3.60	4.30	60.00	8.15	8.19	67.70	8.34	8.72	67.70	8.06	66.00
08/04/15	0:30	140	3.60	4.42	58.10	8.15	8.11	65.70	8.29	8.64	65.90	8.02	66.10
08/04/15	1:30	NA	3.60	4.37	60.60	8.15	8.25	63.80	8.33	8.46	67.90	7.91	66.60
08/04/15	2:30	140	3.60	4.34	59.80	8.15	8.12	61.80	8.29	8.35	64.10	7.89	64.50
08/04/15	3:30	NA	3.60	4.56	53.10	8.15	8.31	60.10	8.23	8.04	64.80	7.78	66.00
08/04/15	4:30	140	3.60	4.84	50.90	8.15	8.20	57.30	8.25	7.81	64.70	7.70	66.60

NA = Not applicable

ND = No Data

Table A-5
2015 Pond Water Treatment Sludge Analytical Results

Regulatory Criteria	DATE	Percent Solids	Aluminum			Antimony			Arsenic			Barium			Beryllium			Cadmium			Chromium			Cobalt			Copper			Iron			Lead			Mercury			Molybdenum			Nickel			Selenium			Silver			Thallium			Vanadium			Zinc		
TTLC (mg/kg)		NP	NP			500			500			10000			75			100			2500			8000			2500			NP			1000			20			3500			2000			100			500			700			2400			5000		
STLC (mg/L)		NP	NP			15			5			100			0.75			1			560			80			25			NP			5			0.2			350			20			1			5			7			24			250		
Sample ID and Testing Procedure		**Percent Solids**	**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**	**Result**	**DQ**	**EQ**	**Result**	**DQ**	**EQ**	**Result**	**DQ**	**EQ**
1516PWT014-PC-A-(0-16")	10/7/2015	22																																																						
TTLC (mg/kg dry)			81000			0.78	ND		550		J+	4.8			3.0			6.7			170			460			360			69000			0.36	ND		0.024	ND		0.27	ND		1200			4.3			0.37	ND		0.80	ND		51			250		
STLC (mg/L)			750			0.020	ND		1.7			0.048	J	U	0.051			0.033	J	J	3.2			7.0			4.3			1100			0.012	ND		0.00020	ND		0.032	J	J	16			0.031	ND		0.010	ND		0.020	ND		0.79			4.1		
1516PWT015-PC-B-(0-14")	10/7/2015	19																																																					
TTLC (mg/kg dry)			97000			0.92	ND		660			3.9			3.4			7.7			210			550			390			77000			0.42	ND		0.024	ND		0.32	ND		1500			2.3	J	J	0.43	ND		2.7	J	J	62			290		
STLC (mg/L)			760			0.020	ND		1.7			0.068		U	0.055			0.065			3.2			7.5			4.6			1000			0.012	ND		0.00020	ND		0.066	J	J	18			0.031	ND		0.010	ND		0.020	ND		0.88			4.3		
1516PWT016-PC-C-(0-13")	10/7/2015	22																																																					
TTLC (mg/kg dry)			90000			0.66	ND		630			3.7			3.4			7.9			190			520			400			72000			0.30	ND		0.022	ND		0.23	ND		1400			5.8			0.31	ND		0.93	J	J	57			280		
STLC (mg/L)			990			0.020	ND		1.1			0.046	J	U	0.064			0.072			3.5			9.0			5.6			1000			0.012	ND		0.00020	ND		0.047	J	J	22			0.042	J	J	0.010	ND		0.020	ND		0.76			5.0		

Notes:

Sludge samples represent a homogenized section through the entire sludge blanket thickenss.

TTLC - Total Threshold Limit Concentration

STLC - Soluble Threshold Limit Concentration

NP - Not Promulgated

Data Qualifiers (DQ) from the Laboratory:

ND - Not detected at or above adjusted sample detection limit.

J - The analyte was positively identified, but the quantitation was below the reporting limit.

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

U = qualified as not detected; associated with blank contamination

J+ = estimated concentraton; potential high bias

Appendices B through F (on compact disc)

Appendix B – 2015 Pond Water Treatment Data

Laboratory Reports (PDF format)

Analytical Laboratory Electronic Data Deliverable Files (Microsoft Excel format)

Appendix C – 2015 Water Year Pond 1 Weather Station Data

Hourly Data Organized by Month (Microsoft Excel format)

Appendix D – 2015 Water Year USGS Flow and Stage Annual Data Reports

Annual Water Data Reports for 13 Stations (Microsoft Excel format)

Appendix E – URS: Leviathan Mine Pond Water Treatment, 2015 Data Summary Report

Attachment 4 – Data Quality Summary (PDF format)

Appendix F – Leviathan Mine Revegetation Evaluation Report (PDF format)