

YEAR-END REPORT FOR THE 2018 FIELD SEASON AT LEVIATHAN MINE

Alpine County, California

February 2019



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 2018 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 Processes.....	4
3. 2018 POND WATER TREATMENT AND SLUDGE REMOVAL	4
3.1 2018 Spring Treatment	4
3.2 Pit Clarifier Sludge Removal and Disposal	6
3.3 2018 Summer Pond Water Treatment Plant Operation	6
3.4 Pond 3 Sludge Removal and Disposal	9
3.5 Summer Pond Water Treatment Monitoring	9
3.6 Sampling Results from Summer Pond Water Treatment Monitoring	11
3.6.1 Monitoring Objectives.....	11
3.6.2 Data Summary	11
3.6.3 Data Quality Evaluation.....	12
3.6.4 Database Format Discrepancies.....	14
4. SURFACE WATER MONITORING	14
4.1 Flow and Stage Monitoring	14
5. SITE MAINTENANCE	15
5.1 Routine Maintenance.....	15
5.2 Non-Routine Maintenance	16
5.2.1 Pond 3 Liner Leak Detection Survey.....	16
5.2.2 Pond 3 Liner Repairs	16
5.2.3 Pond 3 Piping Video Inspection	16
6. REFERENCES.....	17

FIGURES

- Figure 1: Site Location Map
- Figure 2: Bryant Creek Watershed
- Figure 3: Lahontan Water Board AMD Capture and Treatment System
- Figure 4: Leviathan Mine Pond Water Treatment System – System Layout
- Figure 5: Leviathan Mine Pond Water Treatment System – Simplified Piping & Instrumentation Diagram
- Figure 6: Flow and Stage Monitoring Locations

TABLES

- Table 1: 2018 Summer Pond Water Treatment Monitoring Program
- Table 2: USEPA Discharge Criteria
- Table 3: 2018 Flow and Stage Monitoring Locations

PHOTOS

- Photo 1: April 20, 2018, Mobilization of spring treatment equipment
- Photo 2: April 30, 2018, Spring treatment activities
- Photo 3: June 19, 2018, Pit clarifier sludge stockpile/haul activities
- Photo 4: October 5, 2018, Pit clarifier sludge
- Photo 5: July 10, 2018, Pond 3 sludge stockpile activities
- Photo 6: October 19, 2018, Reinforced silt fence along pit access road
- Photo 7: November 1, 2018, Asphalt crack sealing on the pit access road
- Photo 8: September 13, 2018, Leak location activities at Pond 3
- Photo 9: October 10, 2018, Air lance testing of a Pond 3 liner patch
- Photo 10: October 9, 2018, Pond 3 overflow piping inspection

APPENDICES

Appendix A - Data Summary for 2018 Pond Water Treatment

- Table A-1: 2018 Spring Pond Water Treatment, Discharge Dates and Volumes
- Table A-2: 2018 Spring Pond Water Treatment, Untreated Pond Water Field and Analytical Results
- Table A-3: 2018 Spring Pond Water Treatment, Effluent Field and Analytical Results
- Table A-4: 2018 Pond Water Treatment, Daily Discharge Summary
- Table A-5: 2018 Pond Water Treatment Effluent Field and Analytical Results
- Table A-6: 2018 Pond Water Treatment Influent Field and Analytical Results
- Table A-7: Summary of 2018 Pond Water Treatment Plant Operators' Logs
- Table A-8: 2018 Pond Water Treatment Sludge Analytical Results

Appendix B – 2018 Pond Water Treatment Data

Laboratory Reports (PDF format)

Analytical Laboratory Electronic Data Deliverable Files (Microsoft Excel format)

Appendix C – AECOM: Leviathan Mine Pond Water Treatment, 2018 Data Summary Report

Attachment 4 – Data Quality Summary (PDF format)

Appendix D – 2018 Water Year USGS Flow and Stage Annual Data Reports

Annual Water Data Reports for 12 Stations (Microsoft Excel format)

Appendix E – Final Completion Report

Pond Liner Leak Detection and Repairs for Leviathan Mine Pond 3

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 reissued the AAA in 2001, 2002, 2003, 2004, and 2005. In its 2005 AAA, instead of issuing the AAA every year, USEPA decided 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 2018 Field Season at Leviathan Mine (Year-End Report) has been prepared by the Water Board for the USEPA 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."

USEPA and Water Board personnel conducted the pre-certification inspection for the Leviathan Mine Site with a site walk on November 15, 2018 and a meeting at the Water Board's office on November 16, 2018.

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 2018. 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 *2018 Work Plan for Leviathan Mine, Alpine County, California* (Work Plan) prepared by the Water Board.

This Year-End Report describes the site activities performed by the Water Board in 2018, and is organized into the following sections:

- Background – provides a description of the site setting and history; collection and storage of AMD; and the treatment process;
- Pond Water Treatment and Sludge Removal – provides a description of AMD treatment and the removal and disposal of sludge in 2018;
- Surface Water Monitoring – provides a description of ongoing surface water flow monitoring in 2018; and
- Site Maintenance – provides a description of 2018 site maintenance activities.

Pond water treatment data are summarized in eight tables in Appendix A (A-1 through A-8). Laboratory reports and electronic data deliverables for pond water samples, United States Geological Survey (USGS) flow and stage data, and Pond Water Treatment Operator Logs are included as electronic files on the enclosed disc and are organized into Appendices B through D.

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 67 gpm (based on flow data collected by USGS at 15 minute intervals 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 (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 67 gpm (based on 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 11.8 acres with a cumulative holding capacity of approximately 15.4 million gallons (based on a 2012 survey conducted by Atlantic Richfield Company [ARC]). 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 referred to as the "upper ponds" and have a combined storage 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. Overflow from Pond 4 flows directly to Leviathan Creek via PVC piping. ARC is using Pond 4 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 Pond 3 to Pond 4. Any discharges from Pond 3 are routed to Leviathan Creek.

Heavy precipitation during the 2017-2018 winter (particularly during March 2018) and increasing PUD and Adit flow rates, coupled with approximately 800,000 gallons of pond water that remained in the ponds at the end of the 2017 treatment season, caused the upper ponds to fill to within three quarters of a foot of overflow before the Water Board commenced spring treatment activities to reduce the volume of water in the upper ponds. In 2018, although pond water was transferred to Pond 3 as part of spring treatment operations, Pond 3 received no overflow from any of the upper ponds. As a result of the spring treatment efforts, all AMD discharged from Pond 3 to Leviathan Creek in 2018 was treated.

2.3 Pond Water Treatment 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. 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 $\text{Ca}[\text{OH}]_2$) is mixed into the AMD from the ponds; 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.

3. 2018 POND WATER TREATMENT AND SLUDGE REMOVAL

The 2018 AMD treatment and associated activities included spring treatment of AMD at Pond 3 from late-April through early-May, sludge removal from the Pit Clarifier in June, sludge removal from Pond 3 in June and July, and AMD treatment at the pond water treatment plant adjacent to Pond 1(Plant) in July and August.

3.1 2018 Spring Treatment

Following the wet winter of 2017-2018, the Water Board implemented spring treatment of AMD to prevent untreated discharges to Leviathan Creek from the pond system. Mobilization of spring treatment equipment and supplies to Pond 3 began on April 20, 2018, and treatment commenced on April 25, 2018. Snow removal activities on Leviathan Mine Road were not required to initiate 2018 spring treatment activities. When treatment started, Ponds 1, 2 North, 2 South, and 3 were entirely free of ice.

For spring treatment, Water Board contractor TKT Consulting, LLC (TKT) assembled and operated a portable Rotating Cylinder Treatment System (RCTS) adjacent to Pond 3. A similar treatment system was used at Leviathan Mine during the spring seasons of 2005, 2006, 2011, and 2017. Unlike the Plant used for the Water Board's summer pond water treatment effort (see Section 3.3 for more information), the RCTS can be installed

and operated without the use of heavy equipment. The RCTS included two rotating cylinder mixers, a 2,000-gallon lime dosing tank, two 500-gallon lime slurry tanks, a lime delivery pump, siphon lines, and pumps to circulate water within Pond 3. The RCTS and spring treatment activities are shown in Photos 1 and 2.

TKT siphoned AMD from the upper ponds to the RCTS. Using the RCTS, TKT mixed lime solution with the AMD from the upper ponds and discharged the lime/AMD mixture to Pond 3. Circulation pumps around Pond 3 facilitated further mixing of the lime with the AMD. The addition of lime to the AMD caused an increase in pH resulting in the precipitation of dissolved metals in the AMD. Once the mixture of lime and AMD in Pond 3 was stabilized at a pH of approximately 7.5 to 8.5, the RCTS and circulation pumps were shut off to allow the precipitated metals to settle as sludge in Pond 3 overnight. After the neutralized AMD was allowed to settle in Pond 3 overnight, the liquid portion of the neutralized AMD was pumped through the Pond 3 overflow structure and associated piping to Leviathan Creek, leaving the precipitated metals (sludge) in Pond 3. TKT personnel closely monitored field parameters during discharge events to ensure that only neutralized AMD was discharged to Leviathan Creek.

The initial volume of AMD contained in Pond 3 when treatment started did not contain high levels of metals and other constituents. Most of the initial volume of water in Pond 3 was from precipitation and snowmelt that was acidified by the acid generating potential of the pond-liner-cover materials. After the RCTS neutralized the water contained in Pond 3, TKT siphoned additional AMD from the upper ponds to the RCTS for treatment. AMD was siphoned until Pond 3 was near maximum capacity. The first batch of treated water discharged from Pond 3 occurred on May 7, 2018. Following the first discharge event, the Water Board requested that TKT shut down the RCTS and standby while the upper pond levels were assessed over the following week. After a one-week assessment, the Water Board determined that adequate freeboard was available in the upper ponds to prevent untreated discharges to Leviathan Creek from the pond system. During this standby time, sludge generated in Pond 3 settled to the bottom and additional neutralized water became available for discharge. Prior to demobilizing the RCTS, the Water Board requested that TKT discharge as much neutralized water from Pond 3 as possible to expedite the drying process of sludge contained in Pond 3. The second discharge event occurred on May 15, 2018, at which time spring treatment operations ended. A final discharge of treated water from Pond 3 occurred intermittently from May 21 through May 23, 2018, by a siphon of less than five gallons per minute. Table A-1 of Appendix A presents the days and volumes of treated discharge from Pond 3. By May 23, 2018, a total of approximately 920,000 gallons of AMD had been treated and discharged to Leviathan Creek by spring treatment activities.

On April 27, 2018, an estimated 10,000 to 11,000 gallons of partially treated evaporation pond water was released to a storm water conveyance ditch from the RCTS system due to the outlet pipeline becoming clogged with chunks of gypsum scale. The partially treated evaporation pond water flowed from the stormwater conveyance system into Leviathan Creek. This discharge was preliminarily reported to the USEPA on April 27, 2018, with an official incident report being submitted to the USEPA on May 15, 2018. (Lahontan Water Board, May 15, 2018).

Treated discharge volumes were determined for each batch based on the starting and ending depths of water in Pond 3 during discharge, and the known relationship between pond depth and pond volume. The 2018 spring treatment operation consumed approximately 2.65 tons of high calcium bagged lime (approximately 90 percent calcium hydroxide by weight), 493.75 gallons of diesel fuel, and 29 gallons of gasoline.

Field measurements of pH and electro-conductivity in Pond 3 were made as needed during spring treatment operations to ensure treatment efficacy. The frequency of field pH and electro-conductivity measurements ranged from approximately two to three times per day during treatment activities when adequate Pond 3 freeboard remained, to numerous times per hour as TKT personnel prepared for discharge events. Discharge of treated AMD occurred when pH measurements at numerous locations in Pond 3 were consistently between approximately 7.5 and 8.5 standard units, which indicated treatment was complete. Treated AMD from Pond 3 was sampled once daily during each of the discharge events. During discharge events, TKT personnel measured pH, at a minimum, every hour to ensure that only treated water was discharged to Leviathan Creek. Field parameters and laboratory sample results for untreated pond water and treated effluent samples are presented in Tables A-2 and A-3 of Appendix A. All pond water treatment discharges met USEPA Maximum Discharge Criteria.

Copies of the laboratory's electronic data deliverable (EDD) files for untreated pond water and effluent samples collected as part of the 2018 spring treatment activities are provided in Appendix B on compact disc. Appendix B also includes Portable Document Format (PDF) versions of the hard copy laboratory reports.

3.2 Pit Clarifier Sludge Removal and Disposal

Approximately 2,138 tons of sludge generated during operations of the Plant in 2017 were removed from the Pit Clarifier by the Water Board's contractor AECOM Technical Services (AECOM), in June 2018. The sludge was sampled, analyzed, and characterized in the fall of 2017; the results from the fall 2017 sampling were reported in the Water Board's 2017 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 within the specified thickness, and replenishment was not necessary. Sludge removal and disposal activities are shown in Photo 3.

3.3 2018 Summer Pond Water Treatment Plant Operation

The Water Board assembled the 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 2018. The typical Water Board field season at Leviathan Mine runs from mid-June through mid-October.

The Plant has also been referred to as the Pond 1 lime treatment plant, because it is located adjacent to Pond 1 and treats AMD stored in Ponds 1, 2 North, and 2 South. 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 are used to move water from Pond 2 North and Pond 2 South 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.

The Water Board contracted with AECOM for Plant operations for the 2018 field season. AMD treatment began in mid-July, with the first treated AMD entering the Pit Clarifier on July 17, 2018. Discharge of treated AMD from the Pit Clarifier to Leviathan Creek began on July 20, 2018 and treatment ceased on August 31, 2018. AECOM chose to operate the Plant 24 hours per day, seven days per week during the treatment season, with one exception; the treatment plant was shut down on the afternoon of August 10, and treatment resumed on the afternoon of August 13, 2018.

In 2018, AECOM used dry lime delivered to the site in 50-pound bags. AECOM mixed dry lime with Leviathan Creek water from upstream of the mine while creek flow rates were sufficient and/or treated effluent from the Pit Clarifier when creek flow was insufficient. AECOM used a two-point lime addition during most of the 2018 treatment season.

Figure 4 shows the Plant system layout and Figure 5 shows a simplified piping and instrumentation diagram of the Plant. AECOM 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 2.5 to an approximate range of 3.0 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 and/or mixers were 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 slurry pumps transferred the fluid mixture from the bottom of CL-2 to the Pit Clarifier, where solids settled out in near-quiescent conditions. In 2018, AECOM used a pH probe in FF-2 to control the slurry 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 back to Pond 1 for re-treatment. 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. During drier years it has been necessary to use treated AMD discharged from the Pit Clarifier as a source of utility water at times. In 2018, the flow in Leviathan Creek was insufficient to supply an adequate volume of utility water for the entire treatment season. As has been done in recent years, 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. Based on laboratory analytical results of effluent samples and field observations, no negative impacts on treatment efficiency or compliance with USEPA discharge criteria were observed while using treated effluent as utility water.

In 2018, treated AMD was discharged from the Pit Clarifier using both the underdrain and piccolo decant structure. All treated AMD from the Pit Clarifier is routed through the Water Board's effluent weir box prior to discharging to Leviathan Creek. 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. Between July 20 and August 2, 2018, the data logger/pressure transducer system used to collect stage data at the effluent weir box malfunctioned and stage data was recorded sporadically instead of at every 15-minute interval as designed. After the pressure transducer was repaired, on August 2, 2018, stage data were recorded at 15-minute intervals using the data logger/pressure transducer system. Treated effluent volumes for the time period of July 20 to August 2, 2018 were calculated using a combination of data available from the data logger/pressure transducer system and manual measurements collected by Water Board staff. After August 2, the Water Board's stage data collected by the data logger/pressure transducer system 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 stage readings into flow rates.

Discharge of treated AMD from the Pit Clarifier to Leviathan Creek began on July 20, 2018. 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 31, 2018, treated AMD continued to be discharged from the Pit Clarifier as the accumulated sludge drained. By September 16, 2018, approximately 9.2 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-4 of Appendix A.

The 2018 Plant operation consumed approximately 222,230 pounds of high calcium hydrated lime (approximately 100 dry standard tons), 300 gallons of liquid flocculent, 5,449 gallons of diesel fuel, and 193 gallons of gasoline. The Water Board's treatment effort in 2018, combined with natural evaporation, resulted in the upper pond system having approximately 14 million gallons available capacity at the end of the treatment effort. Typically Plant operations continue until the upper pond system is essentially empty. However, in 2018, Water Board staff estimates that approximately 700,000 gallons of AMD remained in the upper pond system at the end of the treatment effort in late-August. The volume of AMD remaining in the upper pond system at Plant shutdown

was due to significant cost increases in 2017 in response to the above-average precipitation year. The 2017 season required treatment of approximately two years of AMD in one year and repairing a slope failure above Pond 4. Although this was a three-year contract intended to last through the 2019 treatment season, funds spent in 2017 and 2018 exhausted nearly all the funds allotted for this contract.

Sludge generated by the Plant in 2018 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 828 – 920 tons of sludge, generated during 2018 summer operations, will be disposed of in 2019. The Pit Clarifier and sludge generated by the Plant in 2018 are shown in Photo 4.

3.4 Pond 3 Sludge Removal and Disposal

In mid-July 2018, AECOM hauled approximately 427 tons of sludge from Pond 3 to a Class 1 hazardous waste landfill in Beatty, Nevada for disposal. The sludge removed from Pond 3 included sludge that was generated during 2017 spring treatment and too wet to haul at the end of the 2017 treatment season, and a small amount of sludge generated during 2018 spring treatment activities. Photo 5 shows sludge stockpiling activities in Pond 3 prior to sludge being hauled offsite.

3.5 Summer Pond Water Treatment Monitoring

Treatment process monitoring, sampling, and analysis were performed in accordance with the Water Board's April 2018 *Sampling and Analysis Plan for Leviathan Mine Site Pond Water Treatment (PWT SAP)*. A summary of the monitoring parameters, locations, and frequencies for the 2018 Pond Water Treatment (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 are summarized in Table 2. In 2018, there were 7 minor deviations from the PWT SAP, as explained in Section 3.6.3. Samples collected by AECOM staff were transferred under Chain of Custody for laboratory analysis by offsite laboratories, Microbac, of Marietta, Ohio, and Enthalpy Analytical (formerly Curtis and Tompkins, Ltd, Analytical Laboratories), of Berkeley, California.

To confirm the quality of treated AMD discharged to Leviathan Creek, AECOM collected grab samples of the treated AMD (effluent) twice weekly during the 2018 treatment season. AECOM collected effluent samples from the Water Board's effluent weir box located near the Pit Clarifier. As specified in the 2018 Work Plan, effluent sample collection stopped when the discharge of effluent dropped below 5 gpm, which occurred on September 16, 2018. The first effluent sample was collected on July 20, 2018, and the last effluent sample was collected on September 11, 2018. 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 AECOM on July 18 and July 19, 2018 from the Pit Clarifier. Additionally, AECOM collected Plant influent samples from the line conveying pond water to the treatment plant twice weekly during the 2018 treatment season.

In summary, the Water Board's contractor collected the following samples for analytical laboratory analysis as part of the 2018 PWT monitoring program:

- 16 effluent samples (2 per week)
- 3 effluent duplicate samples
- 2 pre-discharge samples
- 8 pre-treatment influent samples (2 per week)
- 3 field method blank samples

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, AECOM submitted to the laboratory samples of Plant influent and effluent for total dissolved solids (TDS), dissolved sulfate (SO₄), calcium (Ca), cobalt (Co), magnesium (Mg), and manganese (Mn). During influent and effluent sample collection activities, AECOM 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-5 and A-6 of Appendix A, respectively. These tables include non-detect results for effluent and influent samples, in which case the lab qualifier of a U is included in the Data Qualifier column and the method detection limit value is included in the table.

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 (effluent 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 AECOM from R-1, R-2, FF-2, the Pit Clarifier, and the weir box are summarized in Table A-7 of Appendix A. Copies of AECOM's operator logs are available for review in the Water Board's office in South Lake Tahoe.

Sludge generated during the 2018 treatment effort, and contained in the Pit Clarifier, was sampled on October 11, 2018, for waste characterization and disposal purposes. AECOM 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 15 to 29 inches.

Sludge samples were analyzed for comparisons with Total Threshold Limit Concentrations (TTLC) and Soluble Threshold Limit Concentrations (STLC) for California Code of Regulations Title 22 metals, aluminum, and iron; and percent solids. Additionally, sludge samples were analyzed pursuant to the Toxicity Characteristic Leaching Procedure (TCLP) for disposal purposes. Analytical results for the sludge samples are summarized in Table A-8 of Appendix A. Table A-8 includes non-detect

results for sludge samples, in which case the lab qualifier ND is included in the Data Qualifier column and the method detection limit value is included in the table.

3.6 Sampling Results from Summer Pond Water Treatment Monitoring

3.6.1 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.

3.6.2 Data Summary

Laboratory analytical results for effluent are summarized in Table A-5. These data are collected for comparison with the USEPA Daily Maximum Discharge Criteria, which are also included in Table A-5. All PWT effluent data met the USEPA Daily Maximum Discharge Criteria in 2018.

Table A-6 summarizes laboratory analytical results for Plant influent samples. Results are fairly consistent with previous treatment seasons. Plant influent sample pH ranged from 2.26 to 2.63 and TDS ranged from 4,690 to 7,870 mg/L with an average of 5,968 mg/L. Results of pH and temperature for data collected by Plant operators are included in Table A-7. Measurements of pH taken by Plant operators show that the discharge of effluent to Leviathan Creek met 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-4. A total of approximately 9.2 million gallons of effluent was discharged from the Pit Clarifier to Leviathan Creek in 2018. 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-8 for sludge generated during the 2018 treatment season. On October 11, 2018, AECOM collected three sludge samples from the Pit Clarifier to characterize sludge generated during the 2018 treatment season. These three sludge samples averaged 16 percent solids at the time of collection. With the exception of the TTLC analysis for arsenic, the sludge did not exceed any other TTLC or STLC limits. The total concentrations for arsenic exceeded the TTLC in the three sludge samples. The arithmetic average arsenic concentration for these three samples was 1,467 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 34 percent or greater solids by weight; therefore, it is possible the sludge could exceed the TTLC when it is disposed of in the late spring or early summer of 2019.

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.

3.6.3 Data Quality Evaluation

AECOM 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 three field method blank (FMB) 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 field duplicate sample and FMB results.

Data qualifiers from the laboratory, AECOM, and Water Board review are presented with the data in Tables A-5, A-6, and A-8. In 2018, Water Board staff assigned a data qualifier of "*" for data that did not meet Water Board field duplicate assessment (relative percent difference), a data qualifier of "***" for data that did not meet Water Board FMB analysis, and a data qualifier of "^" for data that did not have the field duplicate assessment (relative percent difference) calculated. AECOM data qualifiers are summarized in Appendix D – AECOM 2018 Data Summary Report, Attachment 4.

AECOM submitted three field duplicate samples to the laboratory to measure the precision of the entire measurement system including sampling and analytical procedures in 2018. 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 2018, the field duplicate samples were within the control limits for RPD with seven exceptions. For the sample/duplicate pair (sample 1819PWT004-EFF and duplicate 1819PWT006-EFF), the RPD for dissolved arsenic was 69 percent, the RPD for dissolved chromium was 35 percent and the RPD for dissolved iron was 40 percent. The RPD was not calculated for the sample/duplicate pair (sample 1819PWT004-EFF and duplicate 1819PWT006-EFF) for dissolved aluminum due to two different RL's and both results are non-detect. For the sample/duplicate pair (sample 1819PWT015-EFF and duplicate 1819PWT017-EFF), the RPD for dissolved aluminum was 65 percent and the RPD for dissolved iron was 30 percent. For the sample/duplicate pair (sample 1819PWT026-EFF and duplicate 1819PWT028-EFF), the RPD for dissolved chromium was 40 percent and the RPD for dissolved iron was 148 percent. Per the PWT SAP, the control limit of 25 percent is based on the analytical precision goals for the laboratory matrix spike duplicate samples.

Three FMB samples were collected and submitted for laboratory analysis of the same parameters as PWT effluent samples. The FMB sample is 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 one of the three FMB samples. For sample 1819PWT005-FMB, there was one positive detection, which is discussed, below, and concentrations are compared with sample 1819PWT004-EFF, which was taken on the same day as the FMB sample. The parameter detected in the FMB sample is total dissolved solids, which does not have discharge criteria established by the USEPA at Leviathan Mine. The total dissolved solids sample concentration was detected in the FMB sample at 32 mg/L, whereas the concentration of dissolved calcium in the effluent sample in the same batch was 3030 mg/L.

There were seven minor deviations from the PWT SAP that occurred in 2018. The first deviation was for an influent sample. The plant influent sample 1819PWT025-INF was reanalyzed past the holding time 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 not accurate as the sulfate results exceeded the total dissolved solids results. 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, sample 1819PWT025-INF was reanalyzed 11 days past the holding time. The sulfate and total dissolved solids results from the reanalysis are included in Table A-6.

The last six minor deviations from the PWT SAP are for the sludge TTLC samples. For the three sludge samples, the PWT SAP maximum reporting limits for molybdenum (at 1.0 mg/kg) and silver (at 1.0 mg/kg) was not met, as is discussed further, below. For sample 1819PWT033-PC-A, the molybdenum result was non-detect with a reporting limit of 1.3 mg/kg and silver was a non-detect with a reporting limit of 1.3 mg/kg. For sample 1819PWT034-PC-B, the molybdenum result was non-detect with a reporting limit of 1.7 mg/kg and silver was a non-detect with a reporting limit of 1.7 mg/kg. For sample 1819PWT035-PC-C, the molybdenum result was non-detect with a reporting limit of 1.7 mg/kg and silver was a non-detect with a reporting limit of 1.7 mg/kg.

3.6.4 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 2019 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. SURFACE WATER MONITORING

The Water Board continued its efforts through the 2018 water year to monitor surface water flow in the vicinity of Leviathan Mine. The Water Board also monitored the water surface elevation of Pond 1. Surface water flow data generated by Water Board monitoring activities are presented in the following section.

4.1 Flow and Stage Monitoring

Flow data are reported on the basis of water year. The 2018 water year began October 1, 2017 and ended September 30, 2018. Under contract to the Water Board, the USGS monitored water flows and pond water level stage at 14 locations during the 2018 water year. Flow monitoring locations, USGS station numbers, and equipment are detailed in Table 3 and are shown on Figure 6. As shown in Table 3, 12 of the 14 stations have continuous stage records. One of the 14 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 C-1 through C-12 (Appendix C) provide the final provisional data for the 2018 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 seven stations: Adit, PUD, Station 1, Station 15, Station 23, 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/>.

One of the stream monitoring stations is called 4L Creek Station and is a tributary to Leviathan Creek just below the mine site and has been operating since October 2003. This stream is intermittent and has been challenging to the USGS for flow measurement

when flow rates are very low. The USGS installed a V-notch weir at 4L Creek Station in October 2018 to allow for easier manual flow measurements.

5. SITE MAINTENANCE

The Water Board conducted routine and non-routine site maintenance work during the 2018 field season in accordance with the 2018 Work Plan.

5.1 Routine Maintenance

Routine maintenance activities performed in 2018 included repairing the perimeter fence, removing sediment from select storm water conveyances, installation and maintenance of Best Management Practices (BMP's) for erosion control, pond liner cover material maintenance, asphalt pavement crack sealing, and coordinating invasive weed control.

The perimeter fencing is barbed-wire and surrounds the majority of the site. In early-June 2018, 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 mid-October.

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 AECOM to remove accumulated sediment from storm water conveyance ditches in the Pond 1 area, along the Pit access road, in select areas of the Pit, and adjacent to Pond 3; and to remove and replace BMPs in the Pond 1 area and along the Pit access road. AECOM removed sediment from the storm water conveyance ditches and provided needed BMP maintenance in early to mid-September 2018. Newly installed reinforced silt fence BMP's along the pit access road can be seen in Photo 6.

Water Board staff inspected the perimeters of Ponds 1, 2 North, 2 South, and 3 approximately weekly throughout the field season and identified areas where the pond liners had become exposed due to erosion or displacement of the earthen liner cover. Water Board staff filled in minor rills in the Pond 1, Pond 2 North, Pond 2 South, and Pond 3 liner cover material on an as needed basis throughout the field season.

In 2011, portions of the road through Leviathan Mine were paved. In recent years, Water Board staff has observed some cracking of the pavement. To preserve the integrity of the pavement and prevent infiltration of water into the road subgrade, Water Board staff requested that AECOM Technical Services (AECOM) fill/seal the cracks. Pavement repairs were completed using a hot applied, polymer modified crack and joint sealant for use on asphalt and concrete pavements. Where the crack size was wider than one inch, a cold mix asphalt repair material was used to fill a portion of the crack in addition to the joint sealant. AECOM completed the asphalt pavement crack sealing on November 1, 2018. Crack sealing activities can be seen in Photo 7.

The El Dorado County, Department of Agriculture (EDCDA) visited Leviathan Mine on August 15, and October 16, 2018, and spot applied an herbicide (Telar[®]) on invasive

plants. This year, as in 2002 through 2017, the EDCDA sprayed to eradicate tall whitetop (*Lepidium latifolium*) and dyers woad (*Isatis tinctoria L.*).

5.2 Non-Routine Maintenance

5.2.1 Pond 3 Liner Leak Detection Survey

In early-June 2018, Water Board staff discovered a rip in the Pond 3 liner where liner cover material had eroded away and exposed the liner material. Water Board staff used shovels to expose the entire rip and determined that the lowest extent of the rip was slightly above the overflow elevation of Pond 3. Given the extent of work performed in and around Pond 3 during the 2017 and 2018 spring treatment efforts including significant sludge removal activities, Water Board staff determined it would be prudent to perform a leak detection survey on all of Pond 3.

Prior to the survey, AECOM electrically isolated the pond liner cover material by excavating a trench around the entire perimeter of Pond 3 to the depth of the pond liner. AECOM also electrically isolated all concrete penetrations through the liner by removing the liner cover material around the penetrations.

A dipole leak detection survey was performed in accordance with ASTM D7007-03 by Geo-Logic Associates (GLA) on the pond liner in Pond 3 on September 13 and 14, 2018. GLA located 13 locations where the Pond 3 liner was compromised by nicks, holes, or tears. Five of the 13 locations were found to be below the high-water line based on Water Board staff visual observations. Pond 3 liner leak detection activities can be seen in Photo 8.

Additional details on the dipole leak detection survey is provided in Appendix E – Final Completion Report, Pond Liner Leak Detection and Repairs for Leviathan Mine Pond 3.

5.2.2 Pond 3 Liner Repairs

Repairs to the Pond 3 liner were performed by Thunder Mountain Enterprises, Inc. (TME). TME used BTL-40 40-mil reinforced polypropylene liner and Pangofol cement adhesive to patch the nicks, holes, or tears in the liner. TME performed repairs on September 5, and October 9, 2018, patching a total of 32 locations where the Pond 3 liner was compromised, including 13 locations found during the leak location survey (three of them being covered by one patch), one location discovered by Water Board staff, and 18 locations created during the excavation of the isolation trenches. All liner repairs passed an air lance test following ASTM test method D4437 prior to being backfilled. Air lance testing of a patch in the Pond 3 liner can be seen in Photo 9. Additional details are available in Appendix E – Final Completion Report, Pond Liner Leak Detection and Repairs for Leviathan Mine Pond 3.

5.2.3 Pond 3 Piping Video Inspection

During the 2017 and 2018 spring treatment efforts at Pond 3, a combined total of approximately 15.8 million gallons of neutralized AMD was pumped from Pond 3 to Leviathan Creek via the Pond 3 overflow piping structures. To ensure the piping

integrity, Water Board staff requested that AECOM perform a video inspection of the Pond 3 overflow piping.

AECOM subcontracted with Underground Video Technology, Inc. (UVT) to perform the video inspection of the Pond 3 overflow piping. UVT performed video inspection activities on September 25, and October 9, 2018 with three different inspection apparatuses. UVT was able to inspect the overflow piping to a distance of approximately 138 feet from the Pond 3 overflow at which point friction on the inspection camera and associated cable did not allow the inspection to proceed any farther. During the video inspection Water Board staff noted that a small amount of gypsum scale was present in portions of the overflow piping. Gypsum scale was noted to be less than approximately one-eighth of an inch in thickness in the overflow piping, which is 12 inches in diameter. The Pond 3 piping video inspection indicates that the piping integrity is intact. A photograph of the Pond 3 overflow piping captured during the video inspection can be seen in Photo 10.

6. REFERENCES

Lahontan Regional Water Quality Control Board, Incident Report for Leviathan Mine April 27, 2018 Partially Treated Evaporation Pond Water Discharge from Emergency Spring Treatment System. May 15, 2018.

FIGURES

Figure 1: Site Location Map

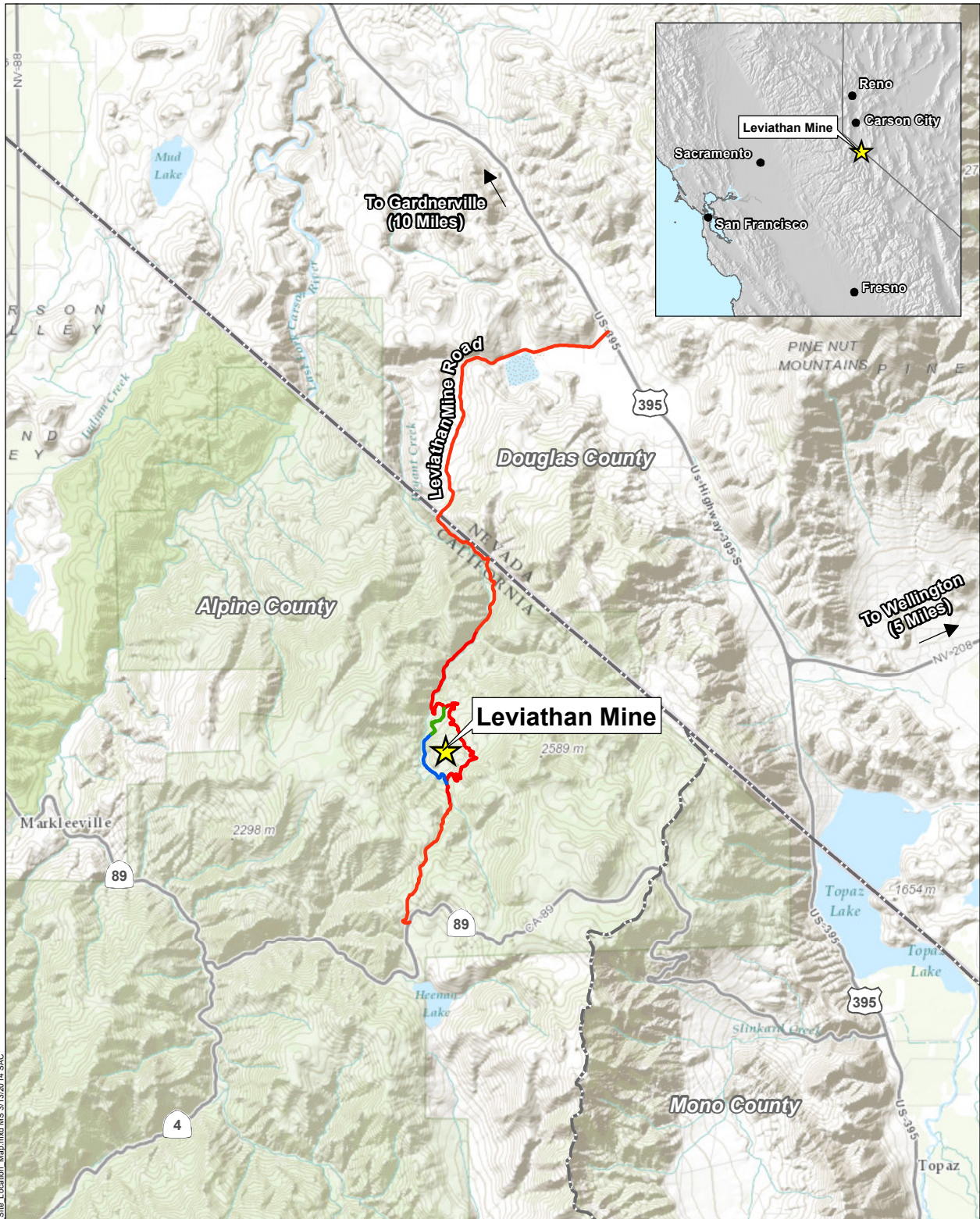
Figure 2: Bryant Creek Watershed

Figure 3: Lahontan Water Board AMD Capture and Treatment System

Figure 4: Leviathan Mine Pond Water Treatment System – System Layout

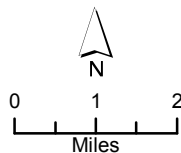
Figure 5: Leviathan Mine Pond Water Treatment System – Simplified Piping & Instrumentation Diagram

Figure 6: Flow and Stage Monitoring Locations



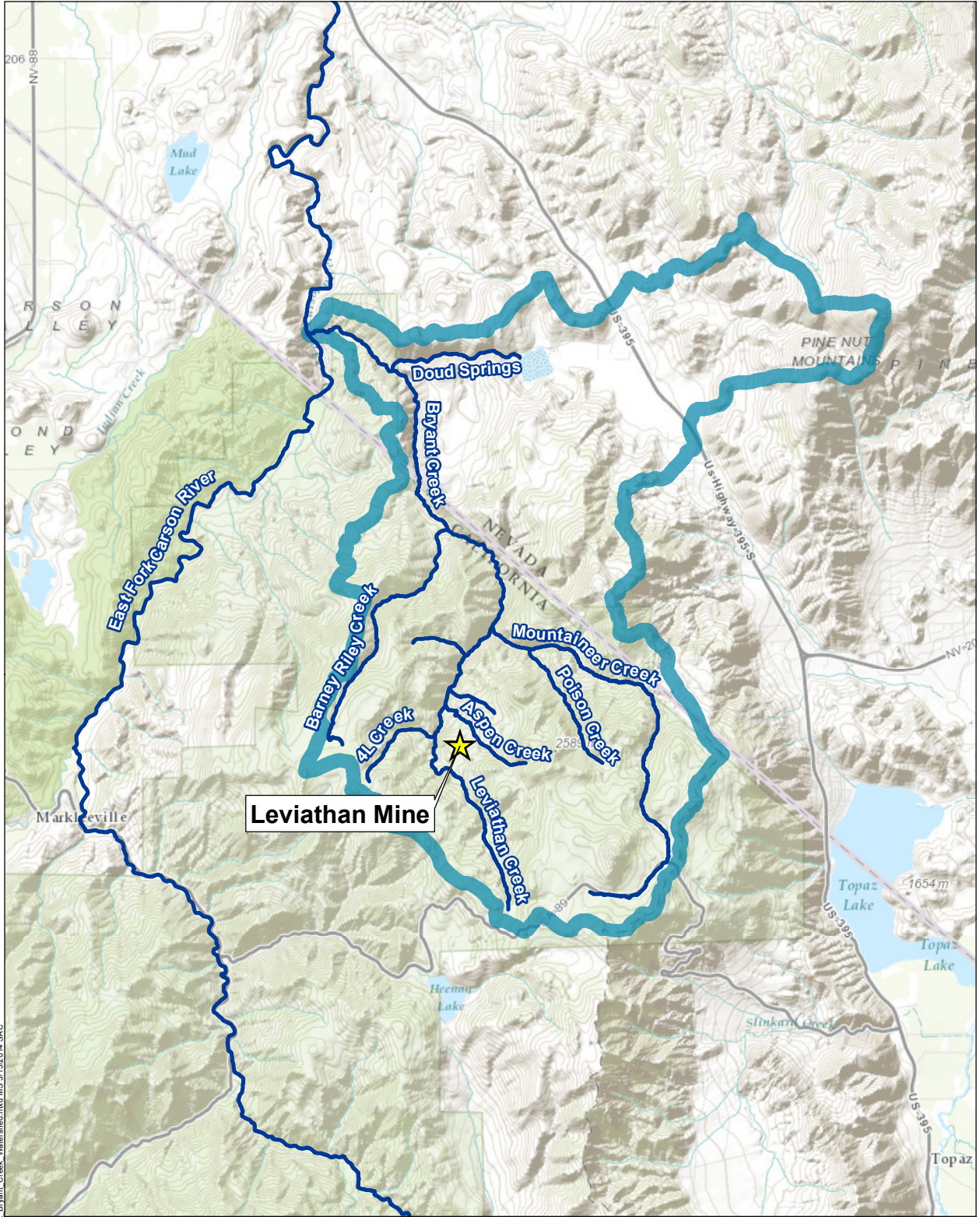
L:\Projects\Leviathan\ArcMap\Map1_Site_Location_Map.mxd MS 3/13/2014 SAC

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



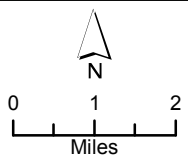
**Leviathan Mine
Site Location Map**

**Figure
1**



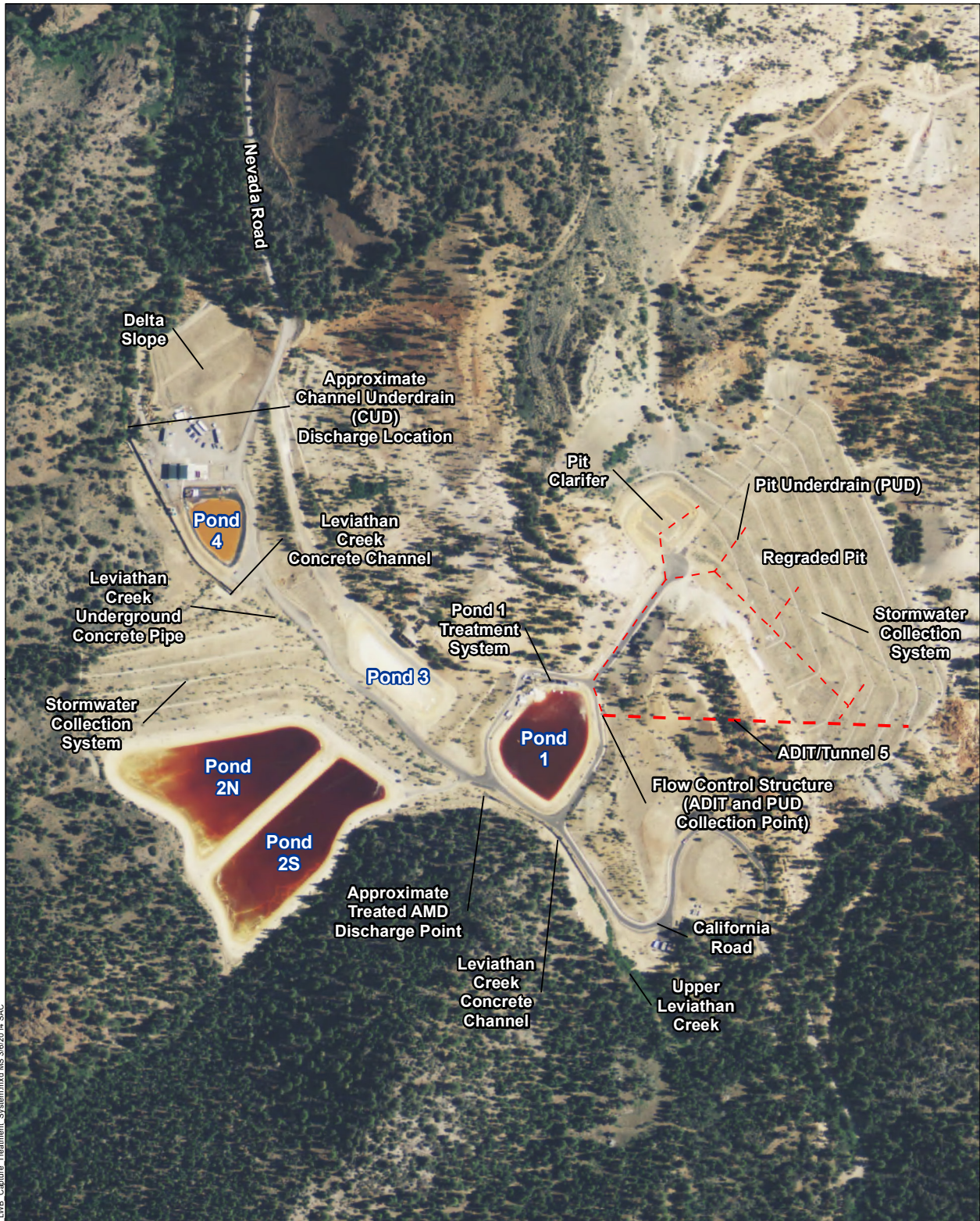
L:\Project\Leviathan\ArcMap\Fig2_Bryant_Creek_Watershed.mxd MS 3/13/2014 SAC

- Bryant Creek Watershed
- River/Creek
- National Forest

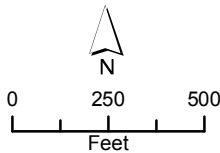


Bryant Creek Watershed

Figure 2



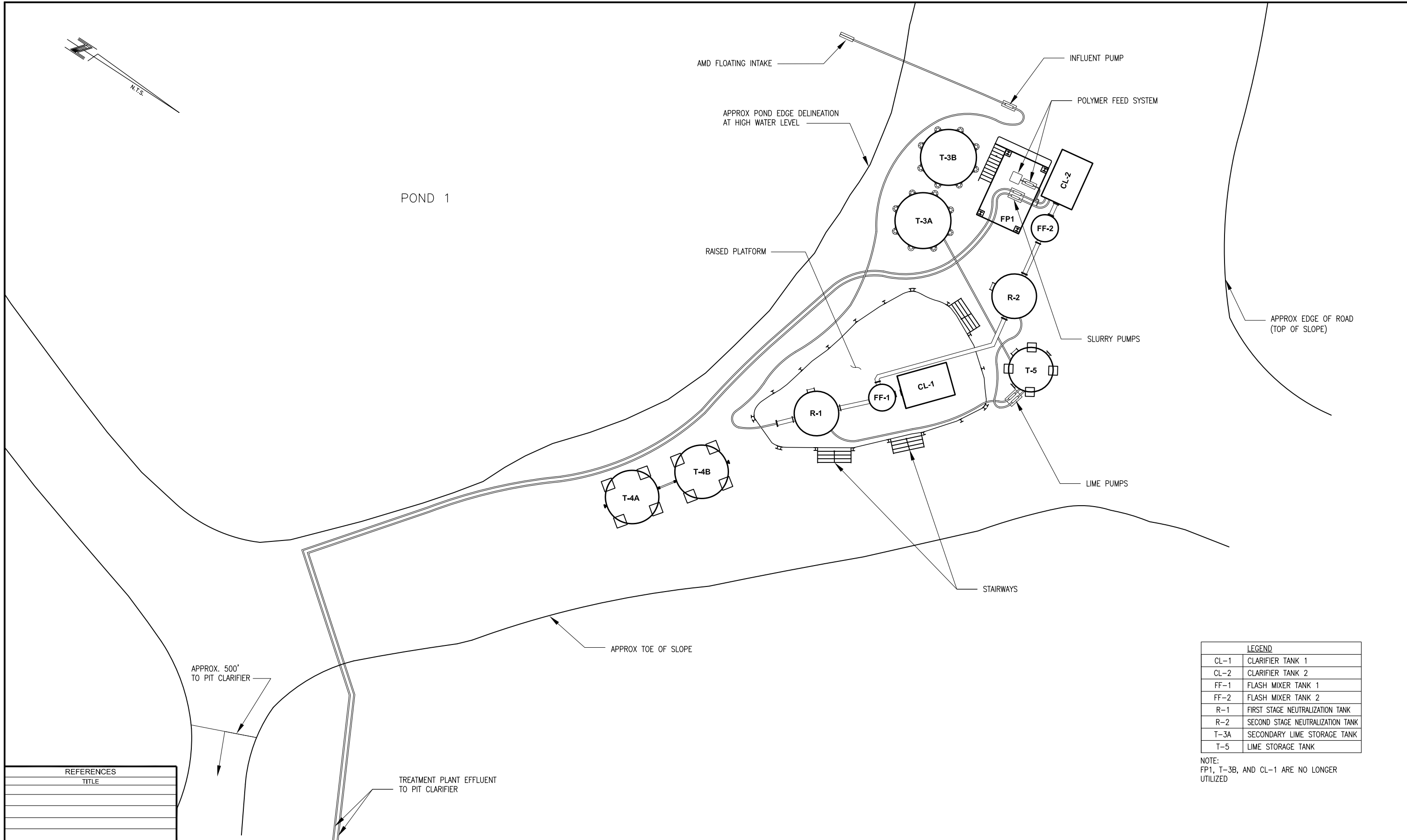
- - - ADIT/Tunnel 5
- . . . Pit Underdrain (PUD)



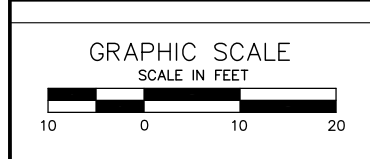
**Lahontan Water Board
AMD Capture
and Treatment System**

**Figure
3**

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



REFERENCES
TITLE



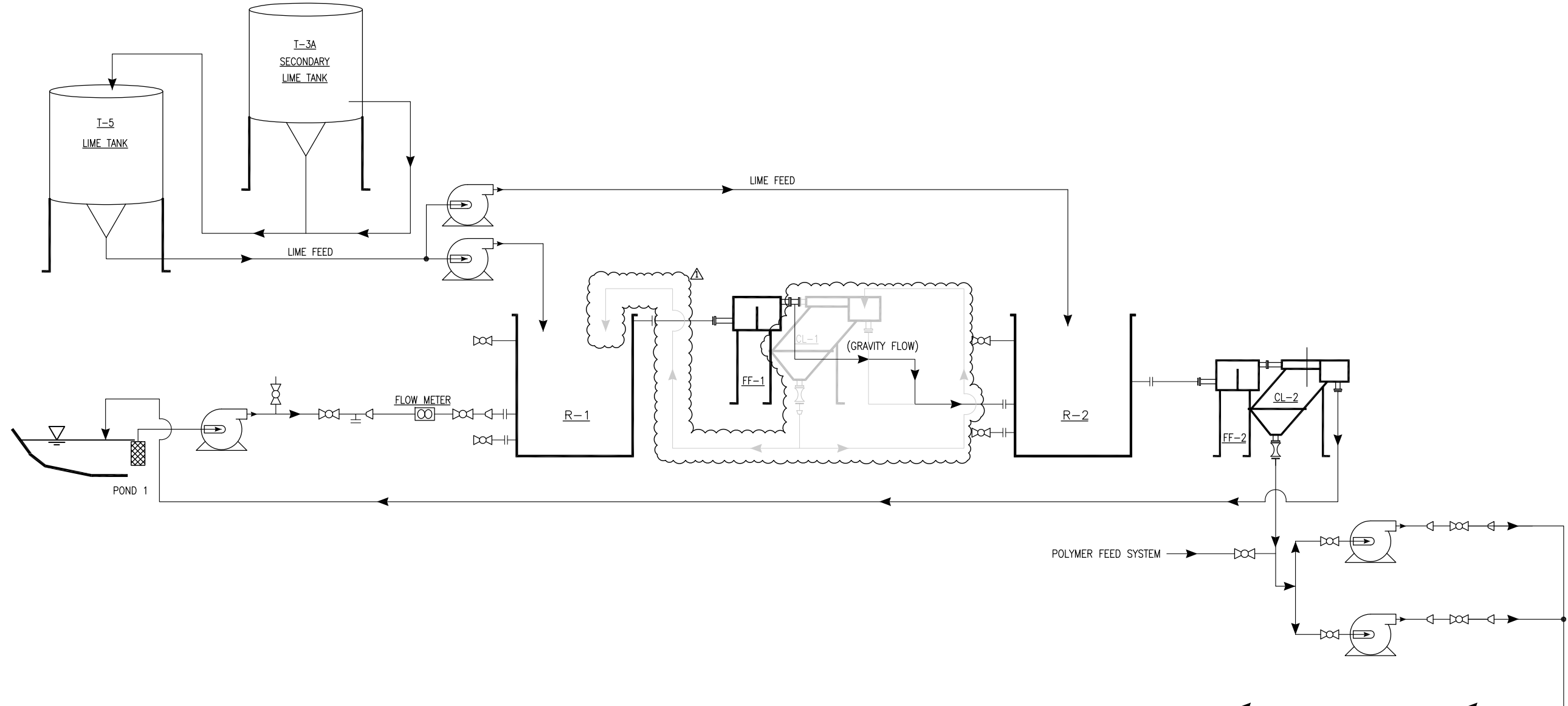
NO.	BY.	DATE	REVISIONS DESCRIPTION

NO.	BY.	DATE	REVISIONS DESCRIPTION

DRAWING SCALE	AS NOTED	DATE
DESIGNED BY:		
DRAWN BY:		
CHECKED BY:		
APPROVED BY:		

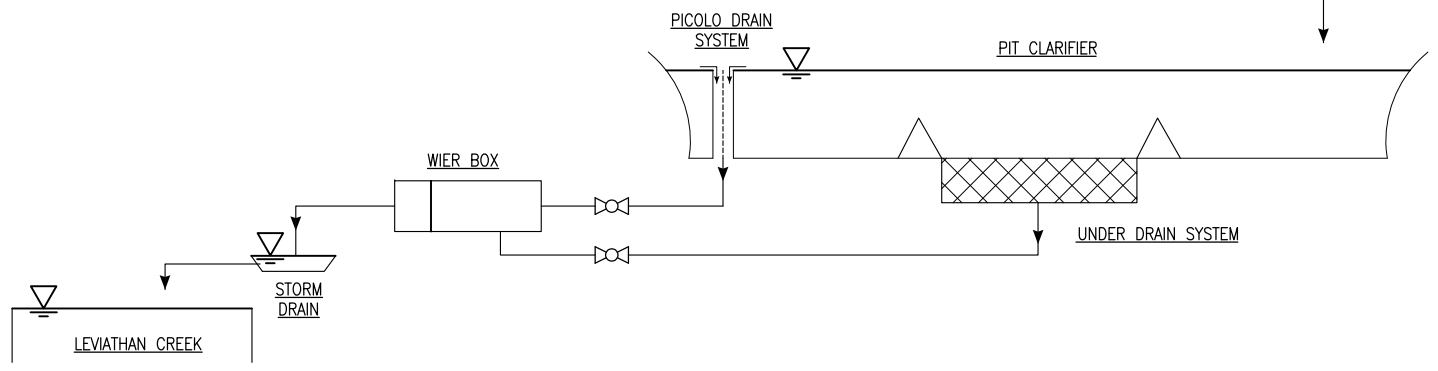


LEVIATHAN MINE POND WATER TREATMENT SYSTEM SYSTEM LAYOUT	JOB NO.
	PROJECT
SHEET NO.	Figure 4



LEGEND	
CL-1	CLARIFIER TANK 1
CL-2	CLARIFIER TANK 2
FF-1	FLASH MIXER TANK 1
FF-2	FLASH MIXER TANK 2
R-1	FIRST STAGE NEUTRALIZATION TANK
R-2	SECOND STAGE NEUTRALIZATION TANK
T-3A	SECONDARY LIME STORAGE TANK
T-5	LIME STORAGE TANK

NOTE:
CL-1 IS NO LONGER UTILIZED



REFERENCES	TITLE

DRAWING SCALE	AS NOTED

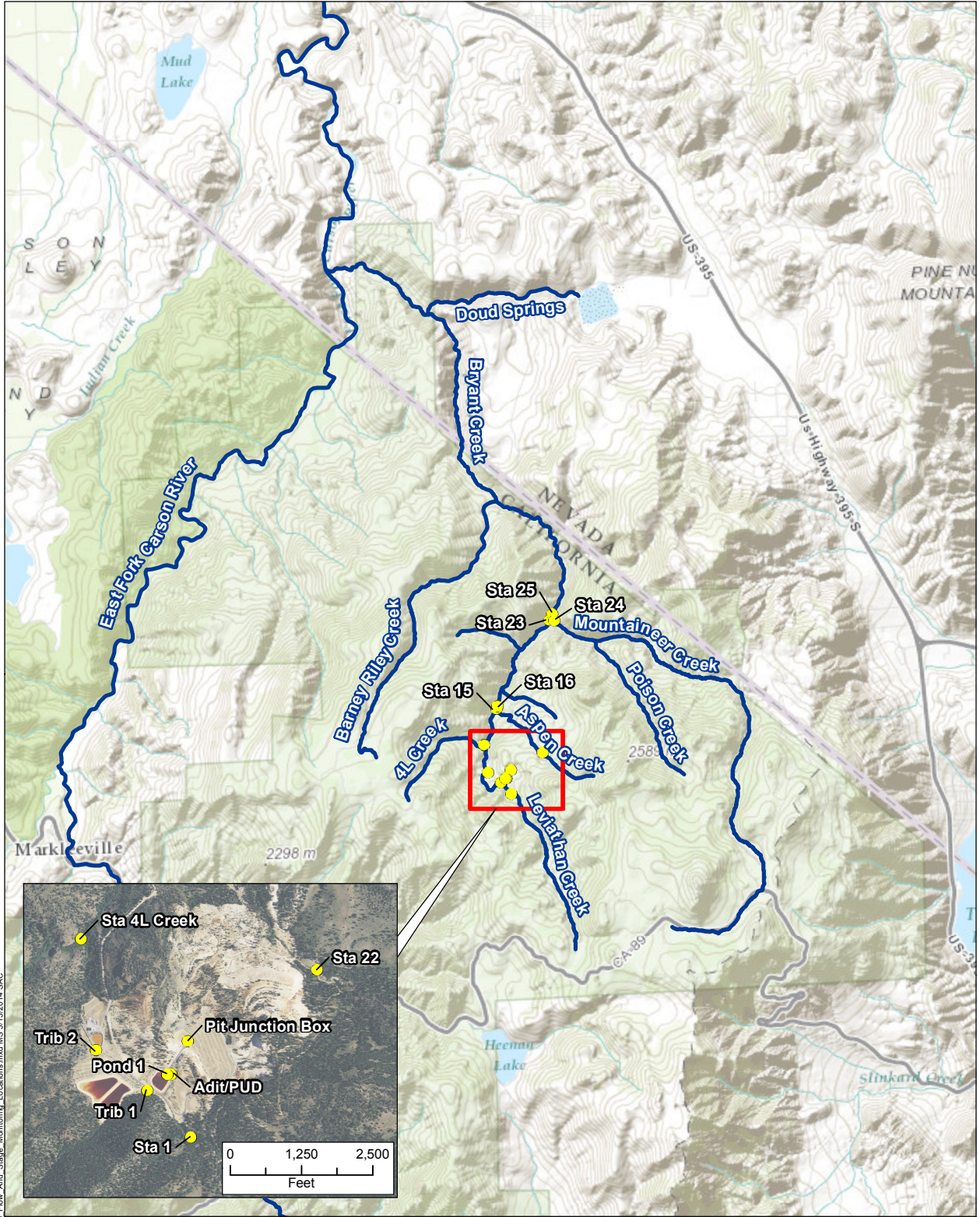
NO.	BY.	DATE	REVISIONS DESCRIPTION
△			
△			
△			
△			
△			
△	DRL	03/2013	2011/2012 SYSTEM UPGRADES

NO.	BY.	DATE	REVISIONS DESCRIPTION
△			
△			
△			
△			
△			

DRAWING SCALE	AS NOTED	DATE
DESIGNED BY:		
DRAWN BY:		
CHECKED BY:		
APPROVED BY:		

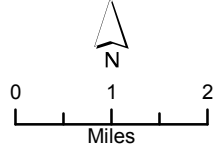


LEVIATHAN MINE POND WATER TREATMENT SYSTEM SIMPLIFIED PIPING & INSTRUMENTATION DIAGRAM	JOB NO.
	PROJECT
	SHEET NO.
Figure 5	



L:\Projects\Leavitt\ArcMap\Fig4_Flow_And_Stage_Monitoring_Locations.mxd MS 3/13/2014 SAC

- Flow and Stage Monitoring Location
- River/Creek
- National Forest



**Flow and Stage
Monitoring Locations**

**Figure
6**

TABLES

Table 1: 2018 Summer Pond Water Treatment Monitoring Program

Table 2: USEPA Discharge Criteria

Table 3: 2018 Flow and Stage Monitoring Locations

TABLE 1
2018 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
2018 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
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

PHOTOS

Photo 1: April 20, 2018, Mobilization of spring treatment equipment

Photo 2: April 30, 2018, Spring treatment activities

Photo 3: June 19, 2018, Pit clarifier sludge stockpile/haul activities

Photo 4: October 5, 2018, Pit clarifier sludge

Photo 5: July 10, 2018, Pond 3 sludge stockpile activities

Photo 6: October 19, 2018, Reinforced silt fence along pit access road

Photo 7: November 1, 2018, Asphalt crack sealing on the pit access road

Photo 8: September 13, 2018, Leak location activities at Pond 3

Photo 9: October 10, 2018, Air lance testing of a Pond 3 liner patch

Photo 10: October 9, 2018, Pond 3 overflow piping inspection



Photo 1 – April 20, 2018, Mobilization of RCTS and associated spring treatment equipment

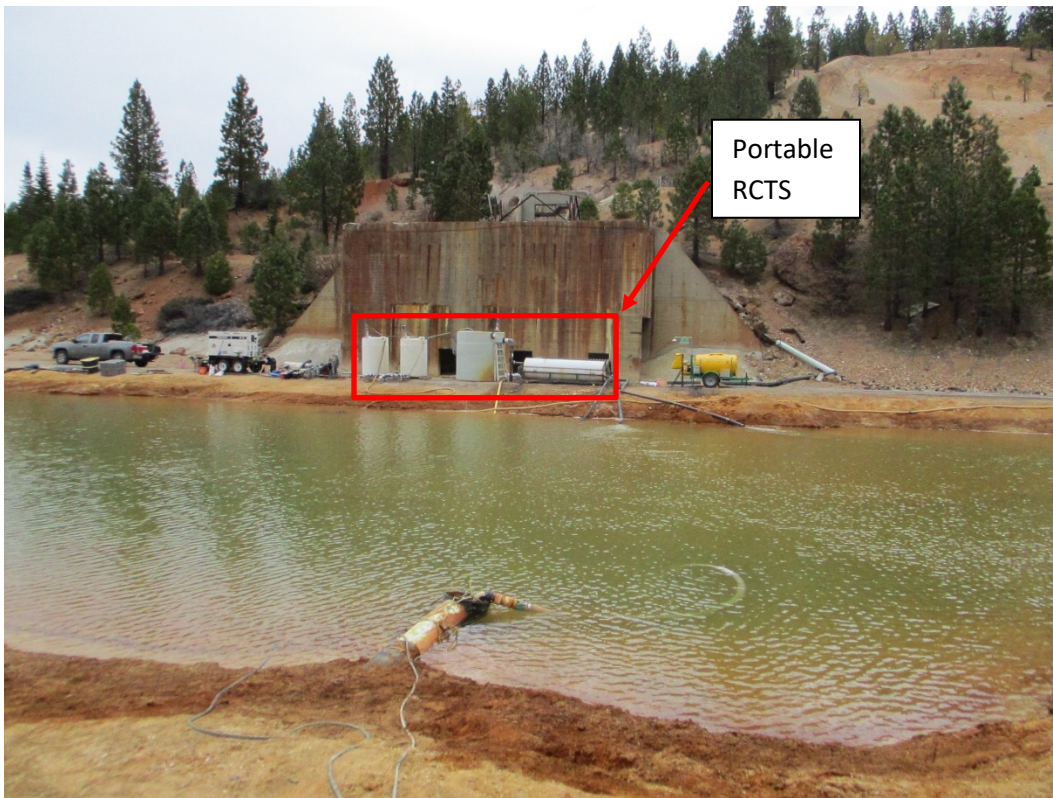


Photo 2 – April 30, 2018, Spring treatment activities at Pond 3



Photo 3 – June 19, 2018, Sludge stockpile and disposal activities at the pit clarifier



Photo 4 – October 5, 2018, Sludge generated during the 2018 treatment season is contained in the Pit Clarifier



Photo 5 – July 10, 2018, sludge stockpile activities in Pond 3



Photo 6 – October 19, 2018, Reinforced silt fence installed along the pit access road



Photo 7 – November 1, 2018, Asphalt crack sealing on the pit access road

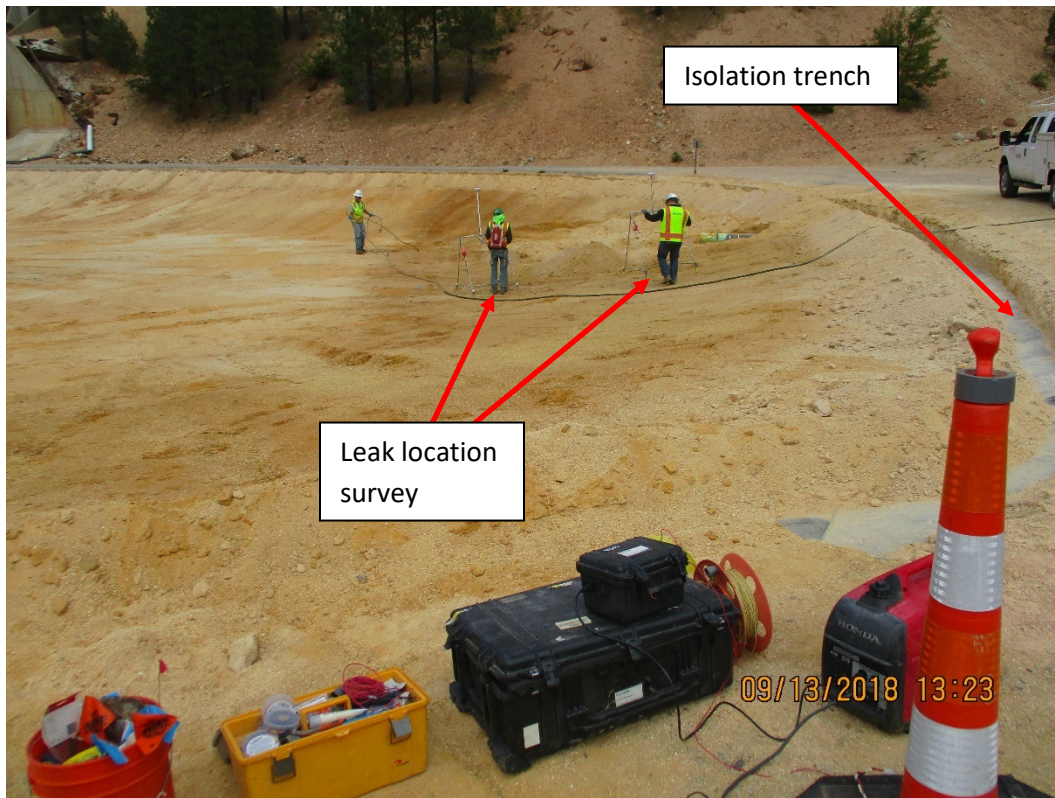


Photo 8 – September 13, 2018, Leak location activities at Pond 3



Photo 9 – October 10, 2018, Air lance testing of a Pond 3 liner patch



Photo 10 – October 9, 2018, Pond 3 overflow piping inspection

APPENDICES

Appendix A - Data Summary for 2018 Pond Water Treatment

Table A-1: 2018 Spring Pond Water Treatment, Discharge Dates and Volumes

Table A-2: 2018 Spring Pond Water Treatment, Untreated Pond Water Field and Analytical Results

Table A-3: 2018 Spring Pond Water Treatment, Effluent Field and Analytical Results

Table A-4: 2018 Pond Water Treatment, Daily Discharge Summary

Table A-5: 2018 Pond Water Treatment Effluent Field and Analytical Results

Table A-6: 2018 Pond Water Treatment Influent Field and Analytical Results

Table A-7: Summary of 2018 Pond Water Treatment Plant Operators' Logs

Table A-8: 2018 Pond Water Treatment Sludge Analytical Results

Table A-1
2018 Spring Pond Water Treatment
Discharge Dates and Volumes

Date	Estimated Discharge Volume (Gallons)	Estimated Cumulative Discharge (Gallons)
5/7/2018	644,000	644,000
5/15/2018	264,000	908,000
5/21/2018 - 5/23/2018 *	12,000	920,000

* - Siphon from pond 3 of approximately 4.5 gallons per minute

Table A-2
2018 Spring Pond Water Treatment
Untreated Pond Water Field and Analytical Results

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP (°C)	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO ₄)			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		
001P1001	Untreated water in Pond 1	4/24/2018	2.39	15.83	121	D		2.75			0.024			105			0.418			0.973			0.753			260	D		ND, 0.001			19.0			3.78	D		2.41	D		0.002			1810	D		2560	D		0.40		
001P2N002	Untreated water in Pond 2 North	4/24/2018	2.34	16.98	187	D		6.71			0.037			98.1			0.651			1.29			1.20			388	D		ND, 0.001			26.4			5.30	D		3.28	D		0.002			2750	D		3680	D		0.53		
001P2S003	Untreated water in Pond 2 South	4/24/2018	2.31	18.87	113	D		3.15			0.024			61.1			0.408			0.855			0.667			225	D		ND, 0.001			16.9			3.35	D		2.11	D		0.002			1640	D		2350	D		0.35		
001P3004	Untreated water in Pond 3	4/24/2018	4.1	14.89	7.45			0.030			0.004			317			0.006			0.132			0.057			3.18	D		ND, 0.001			275			1.87	D		0.310			0.008			2210	D		2780	D		0.07		
003P2S008	Untreated water in Pond 2 South	5/7/2018	2.30	14.80	186	D		4.64	D		0.033			93.3			0.651			1.15			0.988			#####	D		ND, 0.001			27.1			4.82			3.2			0.003			2790	D		3550	D		0.51		

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.
 All results are preliminary
 NP - Not Promulgated
 NA - Not Analyzed

Data Qualifiers (DQ) from the Laboratory:

D - Analyte reporting limit increased due to sample matrix
 L - Lowest available reporting limit for the analytical method used
 ND - Not detected at the reporting limit, number following ND represents the reporting limit
 H - Analysis performed past recommended holding time

**Table A-3
2018 Spring Pond Water Treatment
Effluent Field and Analytical Results**

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP (°C)	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO ₄)			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			0.21					
003DIS006	Pond 3 treated discharge	5/7/2018	8.14	13.68	0.17			0.002			ND, 0.001			626	D		ND, 0.005			0.008			ND, 0.005			ND, 0.02			ND, 0.001			123			0.368			0.032			0.005			2190	D		3050	D		ND, 0.01		
003DUP007	Pond 3 treated discharge, duplicate	5/7/2018	8.14	13.68	0.19			0.002			ND, 0.001			632			ND, 0.005			0.008			ND, 0.005			ND, 0.02			ND, 0.001			125			0.355			0.030			0.005			2340	D		3090	D		ND, 0.01		
004DIS010	Pond 3 treated discharge	5/15/2018	8.34	9.70	0.25			0.003			ND, 0.001			733			ND, 0.005			0.007			ND, 0.005			0.02			ND, 0.001			134			0.110			0.022			0.009	D		2430	D		3260	D		ND, 0.01		

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.
 All results are preliminary
 NP - Not Promulgated
 NA - Not Analyzed

Data Qualifiers (DQ) from the Laboratory:

D - Analyte reporting limit increased due to sample matrix
 L - Lowest available reporting limit for the analytical method used
 ND - Not detected at the reporting limit, number following ND represents the reporting limit

Table A-4
2018 Pond Water Treatment
Daily Discharge Summary

Date	Volume Discharged (Gallons)	Cumulative Discharge (Gallons)
7/20/2018	101,260	101,260
7/21/2018	175,680	276,940
7/22/2018	187,200	464,140
7/23/2018	201,600	665,740
7/24/2018	228,960	894,700
7/25/2018	260,640	1,155,340
7/26/2018	260,640	1,415,980
7/27/2018	293,760	1,709,740
7/28/2018	368,640	2,078,380
7/29/2018	228,960	2,307,340
7/30/2018	187,200	2,494,540
7/31/2018	214,560	2,709,100
8/1/2018	329,760	3,038,860
8/2/2018	329,760	3,368,620
8/3/2018	329,760	3,698,380
8/4/2018	329,760	4,028,140
8/5/2018	311,040	4,339,180
8/6/2018	276,480	4,615,660
8/7/2018	276,480	4,892,140
8/8/2018	201,600	5,093,740
8/9/2018	162,720	5,256,460
8/10/2018	162,720	5,419,180
8/11/2018	100,800	5,519,980
8/12/2018	83,520	5,603,500
8/13/2018	61,920	5,665,420
8/14/2018	76,320	5,741,740
8/15/2018	129,600	5,871,340
8/16/2018	214,560	6,085,900
8/17/2018	244,800	6,330,700
8/18/2018	244,800	6,575,500
8/19/2018	244,800	6,820,300
8/20/2018	244,800	7,065,100
8/21/2018	244,800	7,309,900
8/22/2018	244,800	7,554,700
8/23/2018	214,560	7,769,260
8/24/2018	201,600	7,970,860
8/25/2018	175,680	8,146,540
8/26/2018	151,200	8,297,740
8/27/2018	69,120	8,366,860
8/28/2018	139,680	8,506,540
8/29/2018	201,600	8,708,140
8/30/2018	92,160	8,800,300

8/31/2018	129,600	8,929,900
9/1/2018	50,400	8,980,300
9/2/2018	44,640	9,024,940
9/3/2018	40,320	9,065,260
9/4/2018	34,560	9,099,820
9/5/2018	26,755	9,126,575
9/6/2018	23,112	9,149,687
9/7/2018	19,800	9,169,487
9/8/2018	16,790	9,186,277
9/9/2018	14,098	9,200,375
9/10/2018	11,693	9,212,068
9/11/2018	9,576	9,221,644
9/12/2018	7,704	9,229,348
9/13/2018	6,091	9,235,439
9/14/2018	4,694	9,240,133
9/15/2018	4,694	9,244,827
9/16/2018	3,600	9,248,427

**Table A-5
2018 Pond Water Treatment Effluent Field and Analytical Results**

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP (°F)	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						
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		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		NP		NP		0.21													
1819PWT001-PC	Pre-Discharge	7/18/2018	7.49	77.8	0.590			0.00297	J+	0.000380	J	J	939			0.00226		J	0.00834		J	0.00446		J	0.112			0.000500	U		43.2			0.306			0.0366		J	0.00434			2500			3780			0.0100	U		
1819PWT002-PC	Pre-Discharge	7/19/2018	8.03	73.0	0.643			0.00175	J	0.000341	J	J	981		J	0.00243			0.00910			0.00535			0.0500	U		0.000500	U		36.0			0.271			0.0422			0.00344			2390			3670			0.0100	U		
1819PWT004-EFF	PWT Effluent	7/20/2018	7.59	68.7	0.100	U	^	0.00257	J,*	0.000300	U		775			0.00137	J	U,*	0.00223			0.00496			0.0500	U	*	0.000500	U		59.9			0.0280			0.0210			0.00581			1960			3030			0.0100	U		
1819PWT005-FMB	Field Method Blank	7/20/2018	N/A	N/A	0.0500	U		0.00125	U	0.000300	U		0.250	U		0.00144	J	J	0.000500	U		0.00100	U		0.0500	U		0.000500	U		0.250	U		0.00100	U		0.00200	U		0.000500	U		0.500	U		32.0	**	0.0100	U			
1819PWT006-EFF	Duplicate	7/20/2018	7.59	68.7	0.0500	U		0.00125	U	0.000300	U		741			0.00196	J	U	0.00218			0.00578			0.0752	J	J	0.000500	U		55.9			0.0281			0.0228			0.00518			2040			3010			0.0100	U		
1819PWT008-EFF	PWT Effluent	7/24/2018	6.98	67.1	0.0500	U		0.00143	J	0.000300	U		674			0.00100	U		0.00200			0.00457			0.197			0.000500	U		32.4			0.0625			0.0236			0.00328			1850			2600			0.0100	U		
1819PWT010-EFF	PWT Effluent	7/26/2018	6.94	70.4	0.0500	U		0.00371		0.000300	U		642			0.00127	J	U	0.00214			0.00474			0.167			0.000500	U		31.1			0.0588			0.0210			0.00343						0.0100	U					
1819PWT012-EFF	PWT Effluent	7/31/2018	7.62	70.4	0.266			0.00455		0.000300	U		864			0.00136	J	J	0.00677			0.00450			0.246	U		0.000500	U		34.4			0.187			0.0416			0.00386			2080			3100			0.0100	U		
1819PWT013-EFF	PWT Effluent	8/2/2018	7.68	74.3	0.529			0.00450		0.000300	U		946			0.00205			0.00537			0.00216			0.0500	U		0.000500	U		29.3			0.208			0.0334			0.00359						0.0100	U					
1819PWT015-EFF	PWT Effluent	8/7/2018	7.58	67.3	0.661	J,*		0.00643		0.000301	J	J	907			0.00149	J	J	0.00792			0.00236			0.0675	J	J,*	0.000500	U		34.3			0.319			0.0446			0.00373			2330			3420			0.0100	U		
1819PWT016-FMB	Field Method Blank	8/7/2018	N/A	N/A	0.100	U		0.00125	U	0.000300	U		0.343	J	J	0.00133	J	J	0.000500	U		0.00100	U		0.0500	U		0.000500	U		0.250	U		0.00100	U		0.00200	U		0.000500	U		0.500	U		20.0	U		0.0100	U		
1819PWT017-EFF	Duplicate	8/7/2018	7.58	67.3	0.335	J		0.00610		0.000300	J	J	876			0.00163	J	U	0.00809			0.00247			0.0500	U		0.000500	U		35.0			0.330			0.0464			0.00398			2210			3530			0.0100	U		
1819PWT018-EFF	PWT Effluent	8/9/2018	7.44	67.1	0.201			0.00499		0.000300	U		791			0.00110	J	J	0.00594			0.00383			0.0500	U		0.000500	U		38.2			0.293			0.0384			0.00398						0.0100	U					
1819PWT020-EFF	PWT Effluent	8/14/2018	7.17	74.0	0.0500	U		0.00446		0.000300	U		589			0.00100	U		0.00340			0.00362			0.299			0.000500	U		40.2			0.247			0.0242			0.00337			1540			2430			0.0100	U		
1819PWT021-EFF	PWT Effluent	8/16/2018	7.49	73.2	0.345			0.00716		0.000300	U		871			0.00139	J	J	0.00784			0.00481			0.0500	U		0.000500	U		34.8			0.348			0.0466			0.00383						0.0100	U					
1819PWT023-EFF	PWT Effluent	8/21/2018	7.74	70.8	0.471			0.0171		0.000415	J	J	902			0.00222			0.0102			0.0108			0.287			0.000500	U		35.5			0.388			0.0544			0.00455			2110			3480			0.0100	U		
1819PWT024-EFF	PWT Effluent	8/23/2018	7.46	67.8	0.296			0.0130		0.000356	J	J	832			0.00127	J	J	0.00971			0.00698			0.0500	U		0.000500	U		36.6			0.426	J-	0.0578				0.00509	J+						0.0100	U				
1819PWT026-EFF	PWT Effluent	8/28/2018	7.64	64.1	0.259			0.0149		0.000372	J	J	935			0.00127	J	U,*	0.0102			0.0146			0.337	J,*	0.000500	U		41.1			0.414			0.0573			0.00512			2430			3480			0.0100	U			
1819PWT027-FMB	Field Method Blank	8/28/2018	N/A	N/A	0.0500	U		0.00125	U	0.000300	U		0.250	U		0.00229			0.000500	U		0.00155	J	J	0.0500	U		0.000500	U		0.250	U		0.00150	J	J	0.00200	U		0.000500	U		0.695	J	J	20.0	U		0.0100	U		
1819PWT028-EFF	Duplicate	8/28/2018	7.64	64.1	0.238			0.0138		0.000470	J	J	966			0.00191	J	U	0.0102			0.0117			0.0500	U	U	0.000500	U		41.5			0.501			0.0617			0.00557			2400			3520			0.0100	U		
1819PWT029-EFF	PWT Effluent	8/30/2018	7.32	61.4	0.100	U		0.00879		0.000300	U		556			0.00282			0.00651			0.00792			0.0617	J	J	0.000500	U		47.7			0.563			0.0397			0.00312						0.0100	U					
1819PWT030-EFF	PWT Effluent	9/4/2018	6.81	66.8	0.100	U		0.00379		0.000300	U		553			0.00148	J	J	0.00343			0.00362			0.0500	U		0.000500	U		74.2			0.435			0.0159			0.00278			1720			2410			0.0100	U		
1819PWT031-EFF	PWT Effluent	9/6/2018	6.79	59.1	0.0500	U		0.0103		0.000301	J	J	548			0.00279			0.00942			0.0117			0.0567	J	J	0.000500	U		76.8			1.21			0.0460			0.00198						0.0100	U					
1819PWT032-EFF	PWT Effluent	9/11/2018	7.04	59.2	0.100	U		0.0109		0.000300	U		544			0.00289			0.00867			0.0133			0.0500	U		0.000500	U		75.8			1.10			0.0394			0.00210			1710			2490			0.0100	U		

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
 NA - Not Analyzed

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.

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 for low bias
 J+ = Estimated concentration; potential for high bias
 U = Analyte considered not detected due to external contamination
 UJ = Result not detected; potential for false negative result at the stated detection limit
 * = Failed Relative Percent Difference assessment
 ** = Failed Field Method Blank assessment
 ^ = Unable to calculate Relative Percent Difference due to two different reporting limits and both results were non-detect

**Table A-6
2018 Pond Water Treatment Influent Field and Analytical Results**

Sample ID	Sample Description	Sample Date	PH	Temp (°F)	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			
1819PWT003-INF	PWT Influent	7/20/2018	2.55	73.4	340			4.17			0.0655			270			0.975			2.43			2.09			505			0.00162			50.7			9.38			6.44			0.00449			4140			4800			0.972		
1819PWT007-INF	PWT Influent	7/24/2018	2.55	67.8	297			5.15			0.0627			254			1.15			2.33			2.00			491			0.00151			50.3			9.66			6.17			0.00459			4060			4690			0.941		
1819PWT009-INF	PWT Influent	7/26/2018	2.63	68.6	300			5.81			0.0608			237			1.07			2.42			1.99			508			0.00160			48.8			9.73			6.32			0.00450			4670			4930			0.936		
1819PWT011-INF	PWT Influent	7/31/2018	2.63	73.1	344			6.50			0.0672			255			1.12			2.39			2.09			552			0.00166			54.7			9.64			6.25			0.00479			4030			6480			1.03		
1819PWT014-INF	PWT Influent	8/7/2018	2.49	74.3	402			9.75			0.0712			232			1.42			2.77			2.41			657			0.00120			57.5			11.7			7.30			0.00506			4700			6050			1.45		
1819PWT019-INF	PWT Influent	8/14/2018	2.57	72.8	357			9.49			0.0714			245			1.42			2.80			2.40			622			0.00167			58.7			11.9			7.34			0.00510			4820			6050			1.19		
1819PWT022-INF	PWT Influent	8/21/2018	2.26	74.5	409			12.0			0.0908			238			1.64			3.43			3.16			737			0.00153			67.9			13.9			9.29			0.00873			5440			6870			1.52		
1819PWT025-INF	PWT Influent	8/28/2018	2.45	67.2	434			10.7			0.0941			319			1.78			3.53			3.23			282			0.00138			73.7			14.5			9.45			0.00813			6770			7870	H1	J	1.51		

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:

H1 = Sample analysis performed past holding time.

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.

**Table A-7
Summary of 2018
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
07/17/18	9:30	NA	8.00	2.88	65.1	8.3	8.56	72.9	8.31	NA	NA	NA	NA
07/17/18	10:30	140	8.00	3.20	64.8	9.30	8.41	72.2	8.39	8.24	72.5	NA	NA
07/17/18	11:30	NA	8.00	3.29	67.5	9.30	8.47	73.0	8.49	8.32	72.9	NA	NA
07/17/18	12:30	140	8.00	3.19	68.9	9.30	8.45	73.9	8.28	8.16	73.8	NA	NA
07/17/18	13:30	NA	8.00	3.11	68.9	9.30	8.20	75.0	8.28	8.09	74.1	NA	NA
07/17/18	14:30	140	8.00	3.14	69.4	9.30	8.48	75.5	8.41	8.26	74.3	NA	NA
07/17/18	15:30	NA	8.00	3.18	69.4	9.30	8.65	76.0	8.55	8.34	76.6	NA	NA
07/17/18	16:30	140	8.00	3.20	70.4	9.30	8.36	76.2	8.30	8.10	75.0	NA	NA
07/17/18	17:30	NA	8.00	3.18	70.6	9.30	8.55	76.5	8.66	8.51	75.4	NA	NA
07/17/18	18:30	140	8.00	3.14	71.1	10.50	8.42	75.2	8.42	8.14	75.0	NA	NA
07/17/18	19:30	NA	8.00	3.16	71.6	10.50	8.55	77.4	8.48	8.17	74.7	NA	NA
07/17/18	20:30	140	8.00	3.16	71.8	10.50	8.63	77.4	8.62	8.31	75.0	NA	NA
07/17/18	21:30	NA	8.00	3.14	71.6	10.50	8.50	78.6	8.30	8.14	74.7	NA	NA
07/17/18	22:30	140	8.00	3.16	70.6	10.50	8.31	76.7	8.24	8.15	73.6	NA	NA
07/17/18	23:30	NA	8.00	3.16	69.4	10.50	8.41	77.4	8.39	8.17	72.7	NA	NA
07/18/18	0:30	140	8.00	3.15	68.7	10.50	8.43	75.8	8.39	8.20	71.6	NA	NA
07/18/18	1:30	NA	8.00	3.15	67.0	10.50	8.41	73.9	8.40	8.22	71.1	NA	NA
07/18/18	2:30	140	8.00	3.16	65.8	10.50	8.41	72.4	8.38	8.23	70.0	NA	NA
07/18/18	3:30	NA	8.00	3.16	64.4	10.50	8.40	71.5	8.39	8.27	68.1	NA	NA
07/18/18	4:30	140	8.00	3.15	63.7	10.50	8.41	70.0	8.39	8.30	67.6	NA	NA
07/18/18	5:30	NA	8.00	3.17	63.2	10.50	8.39	69.8	8.38	8.29	66.6	NA	NA
07/18/18	6:30	140	8.00	3.15	62.8	10.50	8.38	70.0	8.36	8.12	66.7	NA	NA
07/18/18	7:30	NA	8.20	3.17	61.8	10.50	8.30	68.4	8.32	8.00	66.6	NA	NA
07/18/18	8:30	140	8.20	3.19	61.8	10.50	8.38	68.1	8.34	NA	NA	NA	NA
07/18/18	9:30	NA	8.20	3.25	62.5	10.50	8.50	68.4	8.50	8.18	67.9	NA	NA
07/18/18	10:30	140	8.20	3.20	62.80	10.50	8.35	68.6	8.33	7.98	68.7	NA	NA
07/18/18	11:30	NA	8.20	3.20	63.0	10.50	8.51	69.3	8.47	8.20	69.0	NA	NA
07/18/18	12:30	140	8.20	3.21	64.4	10.50	8.49	70.0	8.51	8.22	70.0	NA	NA
07/18/18	13:30	NA	8.20	3.21	64.7	10.50	8.48	70.8	8.45	8.18	71.8	NA	NA
07/18/18	14:30	140	8.20	3.20	65.4	10.50	8.49	71.5	8.43	8.34	71.7	NA	NA
07/18/18	15:30	NA	8.20	3.21	66.6	10.50	8.43	72.2	8.42	8.18	73.0	NA	NA
07/18/18	16:30	140	8.20	3.20	67.3	10.50	8.38	72.9	8.38	8.22	73.2	NA	NA
07/18/18	17:30	NA	8.20	3.19	68.5	10.50	8.44	73.6	8.44	8.30	73.2	NA	NA
07/18/18	18:30	140	8.20	3.45	68.7	10.50	8.35	74.3	8.50	8.29	72.9	NA	NA
07/18/18	19:30	NA	8.20	3.43	68.7	10.50	8.20	75.3	8.28	8.03	65.4	NA	NA
07/18/18	20:30	140	8.20	3.39	68.5	10.50	8.58	74.3	8.53	8.16	64.7	NA	NA
07/18/18	21:30	NA	8.20	3.38	68.5	10.50	8.38	75.0	8.63	8.21	70.5	NA	NA
07/18/18	22:30	140	8.20	3.38	68.0	10.50	8.16	75.6	8.32	8.34	75.1	NA	NA
07/18/18	23:30	NA	8.20	3.37	66.8	10.50	8.52	73.4	8.29	8.27	71.5	NA	NA
07/19/18	0:30	140	8.20	3.39	66.6	10.50	8.48	72.1	8.34	8.29	68.8	NA	NA
07/19/18	1:30	NA	8.20	3.41	66.1	10.50	8.41	71.4	8.41	8.31	66.9	NA	NA
07/19/18	2:30	140	8.20	3.42	66.3	10.50	8.32	70.2	8.36	8.28	64.7	NA	NA
07/19/18	3:30	NA	8.20	3.44	66.1	10.50	8.29	69.5	8.34	8.32	64.0	NA	NA
07/19/18	4:30	140	8.20	3.45	64.1	10.50	8.20	68.2	8.38	8.32	63.2	NA	NA
07/19/18	5:30	NA	8.20	3.48	62.7	10.50	8.14	67.9	8.40	8.30	62.1	NA	NA
07/19/18	6:30	140	8.20	3.44	61.3	10.50	8.10	67.7	8.37	8.28	60.6	NA	NA
07/19/18	7:30	NA	8.20	3.36	60.1	10.50	7.96	66.7	8.33	8.27	65.1	NA	NA
07/19/18	8:30	140	8.20	3.34	60.4	10.50	8.18	66.5	8.40	8.22	66.3	NA	NA
07/19/18	9:30	NA	8.20	3.36	60.9	10.50	8.18	66.7	8.40	8.22	67.1	NA	NA
07/19/18	10:30	140	8.20	3.39	61.8	10.50	8.14	66.9	8.40	7.92	68.5	NA	NA
07/19/18	11:30	NA	8.20	3.40	63.2	10.50	8.30	68.6	8.48	8.15	68.9	NA	NA
07/19/18	12:30	135	8.20	3.42	63.2	10.50	8.38	69.6	8.35	8.23	70.4	NA	NA
07/19/18	13:30	NA	8.20	3.40	65.1	10.50	8.23	71.0	8.42	8.20	72.3	NA	NA
07/19/18	14:30	135	8.20	3.39	65.1	10.50	8.27	71.5	8.45	8.22	72.2	NA	NA
07/19/18	15:30	NA	8.20	3.41	65.8	10.50	8.33	72.2	8.48	8.20	71.8	NA	NA
07/19/18	16:30	135	8.20	3.40	69.2	10.50	8.26	73.4	8.40	8.19	73.4	NA	NA
07/19/18	17:30	NA	8.20	3.38	71.3	10.50	7.92	75.8	8.30	8.31	73.3	NA	NA
07/19/18	18:30	135	8.20	3.09	71.3	10.50	8.41	77.2	8.40	8.54	75.0	NA	NA
07/19/18	19:30	NA	8.00	3.09	72.0	10.50	8.54	77.2	8.47	8.47	77.1	NA	NA
07/19/18	20:30	136	8.00	3.08	70.1	10.50	8.18	77.2	8.33	8.48	74.5	NA	NA
07/19/18	21:30	NA	8.00	3.08	69.2	10.50	8.39	75.8	8.56	8.68	73.0	NA	NA

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

07/19/18	22:30	138	8.00	3.07	68.9	10.50	8.24	76.0	8.44	8.61	71.6	NA	NA
07/19/18	23:30	NA	8.00	3.07	67.9	10.50	8.35	74.8	8.31	8.41	70.6	NA	NA
07/20/18	0:30	RECIRCULATING											
07/20/18	1:30	NA	8.00	3.08	66.1	10.50	8.32	73.6	8.51	8.67	69.6	NA	NA
07/20/18	2:30	136	8.00	3.07	65.1	10.50	8.44	72.2	8.42	8.22	68.5	NA	NA
07/20/18	3:30	NA	8.00	3.09	64.2	10.50	8.37	71.0	8.44	8.60	68.0	NA	NA
07/20/18	4:30	138	8.00	3.08	63.7	10.50	8.37	70.5	8.43	8.59	67.5	NA	NA
07/20/18	5:30	NA	8.00	3.07	63.0	10.50	8.22	69.8	8.34	8.59	66.6	NA	NA
07/20/18	6:30	138	8.00	3.06	62.5	10.50	8.27	68.9	8.37	8.57	66.1	NA	NA
07/20/18	7:30	NA	8.20	3.05	62.0	10.50	8.24	68.4	8.34	8.44	67.2	NA	NA
07/20/18	8:30	135	8.20	3.06	61.8	10.50	8.44	68.4	8.40	8.45	68.0	NA	NA
07/20/18	9:30	NA	8.20	3.09	62.0	10.50	8.41	68.4	8.40	8.43	68.7	NA	NA
07/20/18	10:30	135	8.20	3.13	62.5	10.50	8.50	68.6	8.51	8.51	68.6	7.59	68.7
07/20/18	11:30	NA	8.20	3.14	63.2	10.50	8.34	69.1	8.38	8.20	68.9	7.30	69.7
07/20/18	12:30	135	8.20	3.15	63.9	10.50	8.14	70	8.17	8.37	68.9	7.31	70.2
07/20/18	13:30	NA	8.20	3.14	64.9	10.50	8.49	70.5	8.34	8.3	69	7.32	70.2
07/20/18	14:30	135	8.20	3.14	66.1	10.50	8.67	71.2	8.38	NA	NA	7.22	69.7
07/20/18	15:30	NA	8.20	3.11	64.9	10.50	8.44	71.5	8.39	8.34	69.5	7.41	69.8
07/20/18	16:30	135	8.20	3.11	64.2	10.50	8.32	71.0	8.23	8.28	68.7	7.40	69.6
07/20/18	17:30	NA	8.20	3.12	63.2	10.50	8.47	70.3	8.44	8.06	68.6	6.95	68.9
07/20/18	18:30	135	8.20	3.21	63.5	10.50	8.34	69.6	8.51	7.89	68.4	6.65	69.0
07/20/18	19:30	NA	8.20	3.20	63.2	10.50	8.33	69.6	8.33	8.10	66.5	6.33	68.8
07/20/18	20:30	140	8.20	3.20	63.0	10.50	8.20	69.3	8.36	8.11	65.2	6.42	67.4
07/20/18	21:30	RECIRCULATING											
07/20/18	22:30	136	8.20	3.21	62.5	10.50	8.30	68.6	8.39	8.20	64.9	6.61	66.1
07/20/18	23:30	NA	8.20	3.21	62.8	10.50	8.25	68.4	8.32	8.22	62.7	6.63	64.9
07/21/18	0:30	140	8.20	3.19	61.6	10.50	8.28	67.7	8.30	8.19	62.1	6.67	66.0
07/21/18	1:30	NA	8.20	3.18	61.1	10.50	8.21	67.2	8.30	8.17	61.5	6.72	64.0
07/21/18	2:30	140	8.20	3.17	60.9	10.50	8.33	67.0	8.38	8.19	61.0	6.78	63.4
07/21/18	3:30	NA	8.20	3.17	60.4	10.50	8.30	67.0	8.32	8.10	60.0	6.75	62.2
07/21/18	4:30	138	8.20	3.16	59.9	10.50	8.27	66.2	8.35	7.75	60.5	6.63	60.3
07/21/18	5:30	NA	8.20	3.18	59.7	10.50	8.29	66.2	8.34	7.48	63.7	6.13	64.4
07/21/18	6:30	138	8.20	3.17	59.2	10.50	8.28	65.8	8.34	7.95	60.6	6.22	61.9
07/21/18	7:30	NA	8.20	3.19	58.9	10.50	8.29	65.3	8.35	7.08	64.3	6.38	64.9
07/21/18	8:30	135	8.20	3.19	58.9	10.50	8.26	65.3	8.34	7.67	65.3	6.03	65.6
07/21/18	9:30	NA	8.20	3.18	59.7	10.50	8.75	65.5	8.52	8.38	65.4	7.22	65.0
07/21/18	10:30	140	8.20	3.18	59.7	10.50	8.70	65.5	8.31	8.06	67.0	6.96	69.9
07/21/18	11:30	NA	8.20	3.18	61.6	10.50	8.42	67.1	8.42	8.12	69.3	7.01	72.1
07/21/18	12:30	136	8.20	3.17	62.3	10.50	8.41	68.1	8.37	8.02	69.2	7.05	71.5
07/21/18	13:30	NA	8.20	3.15	63.9	10.50	8.28	70.0	8.20	8.00	67.6	6.97	71.6
07/21/18	14:30	135	8.20	3.17	64.9	10.50	8.60	70.3	8.49	7.93	70.1	7.11	71.9
07/21/18	15:30	NA	8.20	3.17	64.4	10.50	8.49	70.3	8.38	8.13	67.9	6.99	68.7
07/21/18	16:30	135	8.20	3.17	64.2	10.50	8.51	71.3	8.39	8.11	67.7	7.11	67.7
07/21/18	17:30	NA	8.20	3.17	64.4	10.50	8.49	70.5	8.38	8.00	70.1	6.96	68.1
07/21/18	18:30	135	8.20	3.11	64.4	10.50	8.49	70.5	8.50	7.99	69.3	7.00	68.2
07/21/18	19:30	NA	8.20	3.11	64.2	10.50	8.34	70.5	8.42	8.11	67.8	6.95	66.3
07/21/18	20:30	136	8.20	3.11	64.2	10.50	8.49	70.3	8.41	8.15	67.2	7.10	66.8
07/21/18	21:30	NA	8.20	3.12	63.7	10.50	8.26	70.0	8.29	8.11	67.0	7.07	65.9
07/21/18	22:30	136	8.20	3.12	63.2	10.50	8.31	69.8	8.41	8.15	65.3	7.11	64.9
07/21/18	23:30	RECIRCULATING											
07/22/18	0:30	140	8.20	3.10	61.6	10.50	8.49	67.9	8.41	8.15	65.4	7.10	64.5
07/22/18	1:30	NA	8.20	3.10	61.1	10.50	8.39	67.7	8.40	8.13	65.1	7.10	64.8
07/22/18	2:30	136	8.20	3.11	60.6	10.50	8.48	67.2	8.46	8.11	63.5	ND	ND
07/22/18	3:30	NA	8.20	3.09	60.1	10.50	8.44	66.7	8.44	ND	ND	ND	ND
07/22/18	4:30	140	8.20	3.09	59.7	10.50	8.42	66.2	8.40	8.10	62.9	ND	62.4
07/22/18	5:30	NA	8.20	3.09	59.2	10.50	8.39	66.5	8.40	8.03	63.0	7.01	63.1
07/22/18	6:30	138	8.20	3.11	58.7	10.50	8.41	65.5	8.40	8.10	62.3	6.91	63.2
07/22/18	7:30	NA	8.20	3.01	58.5	10.50	8.45	64.8	8.41	8.05	64.5	6.77	62.1
07/22/18	8:30	135	8.20	3.10	58.6	10.50	8.37	64.6	8.33	7.65	66.4	6.77	65.4
07/22/18	9:30	NA	8.20	3.08	59.2	10.50	8.07	65.8	8.19	8.02	66.9	7.14	68.8
07/22/18	10:30	135	8.20	3.07	60.6	10.50	8.21	66.0	8.24	7.62	67.8	6.74	68.2
07/22/18	11:30	NA	8.20	3.07	60.6	10.50	8.36	66.7	8.33	7.59	71.6	7.13	68.7
07/22/18	12:30	135	8.20	3.06	61.6	10.50	8.40	ND	8.30	7.96	ND	6.80	70.8
07/22/18	13:30	NA	8.20	3.06	63.2	10.50	8.63	68.4	8.62	8.14	72.3	6.88	74.5

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

07/22/18	14:30	135	8.20	3.05	64.4	10.50	8.37	70.0	8.30	7.80	72.9	6.95	74.6
07/22/18	15:30	NA	8.20	3.06	64.4	10.50	8.44	70.3	8.44	7.93	71.1	6.94	73.1
07/22/18	16:30	135	8.20	3.04	66.0	10.50	8.35	71.2	8.36	8.07	69.4	7.21	71.5
07/22/18	17:30	NA	8.20	3.04	66.8	10.50	8.27	71.9	8.27	7.91	70.1	6.89	69.6
07/22/18	18:30	135	8.20	2.84	66.3	10.50	8.08	72.7	8.23	7.94	70.5	7.14	68.1
07/22/18	19:30	NA	8.20	2.90	65.6	10.50	8.15	72.2	8.31	7.93	68.5	7.33	67.5
07/22/18	20:30	135	8.20	2.93	64.9	10.50	8.22	71.5	8.39	8.06	71.2	7.45	67.7
07/22/18	21:30	NA	8.20	2.94	64.2	10.50	8.10	71.0	8.33	8.08	68.7	7.45	67.3
07/22/18	22:30	135	8.20	2.98	63.5	10.50	8.23	70.3	8.40	8.14	68.1	7.43	67.1
07/22/18	23:30	NA	8.20	3.02	62.0	10.50	8.18	69.3	8.37	8.12	68.0	7.41	66.8
07/23/18	0:30	136	8.20	3.04	61.3	10.50	8.22	68.4	8.33	8.13	67.7	7.44	66.8
07/23/18	1:30	NA	8.20	3.06	60.4	10.50	8.03	67.0	8.36	8.17	68.3	7.49	66.3
07/23/18	2:30	135	8.20	3.05	59.7	10.50	8.12	66.6	8.34	8.12	68.1	7.47	66.4
07/23/18	3:30	NA	8.20	3.06	59.0	10.50	8.08	66.0	8.32	8.10	67.9	7.50	66.1
07/23/18	4:30	135	8.20	3.05	58.2	10.50	8.01	65.3	8.28	8.08	68.1	7.51	66.0
07/23/18	5:30	NA	8.20	3.05	58.3	10.50	8.07	65.1	8.20	8.05	67.8	7.58	65.9
07/23/18	6:30	135	8.20	3.06	58.2	10.50	8.01	64.3	8.42	8.00	67.7	7.61	65.8
07/23/18	7:30	NA	8.20	3.06	57.3	10.50	8.06	64.0	8.36	7.97	63.9	6.87	63.0
07/23/18	8:30	138	8.20	3.05	57.5	10.50	8.05	63.9	8.28	7.73	64.2	6.63	69.4
07/23/18	9:30	OFF FOR MAINTENANCE											
07/23/18	10:30	OFF FOR MAINTENANCE											
07/23/18	11:30	OFF FOR MAINTENANCE											
07/23/18	12:30	RECIRCULATING											
07/23/18	13:30	RECIRCULATING											
07/23/18	14:30	132	8.20	3.09	63.9	8.35	8.37	69.1	8.38	7.97	69.6	6.68	72.6
07/23/18	15:30	NA	8.20	3.17	64.2	8.30	8.25	70.0	8.35	8.17	70.3	7.46	69.4
07/23/18	16:30	136	8.20	3.20	65.1	8.30	8.25	70.0	8.30	8.32	68.7	7.47	69.8
07/23/18	17:30	NA	8.20	3.15	65.6	8.30	8.27	71.0	8.30	RAIN/THUNDER			
07/23/18	18:30	133	8.20	3.16	65.1	8.25	8.10	71.5	8.31	8.22	66.5	7.37	67.9
07/23/18	19:30	NA	8.20	3.16	64.4	8.10	8.31	71.0	8.36	8.03	67.9	7.65	65.4
07/23/18	20:30	138	8.20	3.12	63.9	8.10	8.16	70.5	8.37	8.21	71.0	7.63	68.9
07/23/18	21:30	NA	8.20	3.12	63.2	8.10	8.33	69.8	8.36	8.18	70.3	7.59	67.7
07/23/18	22:30	138	8.20	3.11	62.6	8.10	8.28	68.4	8.36	8.21	68.2	7.58	66.7
07/23/18	23:30	NA	8.20	3.10	61.3	8.10	8.24	67.8	8.33	8.17	66.4	7.56	65.1
07/24/18	0:30	138	8.20	3.08	60.5	8.10	8.13	67.0	8.28	8.15	64.9	7.57	64.0
07/24/18	1:30	NA	8.20	3.08	59.9	8.10	8.25	66.5	8.32	8.13	64.3	7.56	63.5
07/24/18	2:30	138	8.20	3.09	59.7	8.10	8.31	66.3	8.37	8.12	63.9	7.55	63.3
07/24/18	3:30	NA	8.20	3.14	59.3	8.10	8.33	65.7	8.40	8.16	65.1	7.57	64.1
07/24/18	4:30	138	8.20	3.16	58.8	8.10	8.28	64.9	8.38	8.21	66.3	7.56	64.2
07/24/18	5:30	NA	8.20	3.10	58.2	8.10	8.27	64.3	8.40	8.26	67.9	7.59	65.4
07/24/18	6:30	138	8.20	3.13	58.2	8.10	8.21	64.3	8.37	8.31	68.7	7.63	66.7
07/24/18	7:30	NA	8.20	3.05	57.8	8.30	8.24	64.1	8.34	8.40	64.2	7.39	65.2
07/24/18	8:30	133	8.20	3.07	57.8	8.30	8.27	63.6	8.31	7.71	67.0	6.44	65.3
07/24/18	9:30	NA	8.20	3.10	58.5	8.30	8.29	64.3	8.30	8.19	69.6	7.06	70.7
07/24/18	10:30	133	8.20	3.02	59.9	8.35	8.22	64.9	8.39	8.15	66.5	6.98	67.1
07/24/18	11:30	NA	8.20	2.99	60.6	8.35	8.19	66.2	8.40	8.32	70.2	7.51	68.7
07/24/18	12:30	162	8.20	2.99	62.0	8.35	8.15	67.7	8.16	8.05	70.7	6.83	71.9
07/24/18	13:30	NA	8.20	3.06	63.0	8.35	8.35	68.4	8.38	8.36	74.2	7.40	76.0
07/24/18	14:30	161	8.20	3.13	63.0	8.35	8.20	69.1	8.30	8.36	70.7	7.33	70.4
07/24/18	15:30	NA	8.20	3.22	63.2	8.35	8.36	69.3	8.36	8.20	72.5	6.86	72.5
07/24/18	16:30	163	8.20	3.29	62.8	8.35	8.29	69.3	8.38	8.25	71.2	6.78	73.0
07/24/18	17:30	NA	8.20	3.30	62.9	8.35	8.15	69.1	8.38	8.26	70.6	6.82	74.0
07/24/18	18:30	161	8.20	3.30	62.8	8.35	8.39	69.1	8.35	8.32	72.0	7.42	75.4
07/24/18	19:30	NA	8.20	3.37	65.6	8.35	8.19	70.0	8.37	8.05	71.8	7.49	71.9
07/24/18	20:30	161	8.20	3.29	67.5	8.35	8.38	71.9	8.38	8.24	74.8	7.59	71.6
07/24/18	21:30	NA	8.20	3.24	67.5	8.35	8.35	72.5	8.39	8.27	74.1	7.56	70.6
07/24/18	22:30	161	8.20	3.20	66.3	8.35	8.41	72.9	8.41	8.33	70.9	7.57	69.3
07/24/18	23:30	NA	8.20	3.27	66.4	8.35	8.38	70.3	8.40	8.28	70.3	7.46	68.7
07/25/18	0:30	161	8.20	3.16	63.2	8.35	8.39	70.8	8.41	8.38	68.9	7.49	67.9
07/25/18	1:30	NA	8.20	3.15	62.4	8.35	8.29	69.8	8.37	8.34	68.6	7.51	67.9
07/25/18	2:30	161	8.20	3.16	61.6	8.35	8.22	68.4	8.36	8.30	68.8	7.49	67.7
07/25/18	3:30	NA	8.20	3.16	60.4	8.35	8.12	67.2	8.36	8.32	68.7	7.53	67.8
07/25/18	4:30	161	8.20	3.15	58.5	8.35	8.22	65.5	8.35	8.30	69.1	7.56	67.5
07/25/18	5:30	NA	8.20	3.14	58.0	8.35	8.32	64.3	8.34	8.29	68.3	7.60	67.0

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

07/25/18	6:30	161	8.20	3.15	58.8	8.35	8.19	63.6	8.37	8.31	67.7	7.57	66.7
07/25/18	7:30	NA	8.20	3.14	57.5	8.32	8.11	63.6	8.34	8.15	63.7	6.68	64.2
07/25/18	8:30	160	8.20	3.13	57.3	8.36	8.31	63.4	8.22	8.13	63.9	6.71	64.3
07/25/18	9:30	NA	8.20	3.13	58.2	8.36	8.36	64.1	8.31	8.07	64.2	6.68	65.7
07/25/18	10:30	160	8.20	3.16	58.7	8.36	8.42	64.6	8.29	8.10	68.8	6.65	69.9
07/25/18	11:30	NA	8.20	3.20	60.9	8.36	8.28	66.0	8.27	8.07	68.0	6.60	75.0
07/25/18	12:30	160	8.20	3.20	62.3	8.36	8.24	67.7	8.28	8.03	69.4	6.60	74.8
07/25/18	13:30	NA	8.20	3.22	64.4	8.36	8.33	69.1	8.27	8.06	70.6	6.63	75.1
07/25/18	14:30	160	8.20	3.22	63.0	8.36	8.31	70.2	8.26	8.05	72.8	6.72	75.4
07/25/18	15:30	NA	8.20	3.22	64.7	8.36	8.14	70.2	8.26	8.14	73.4	6.78	75.6
07/25/18	16:30	160	8.20	3.25	65.1	8.36	8.41	71.2	8.28	8.11	73.6	6.77	75.3
07/25/18	17:30	NA	8.20	3.32	65.4	8.36	8.32	71.7	8.26	8.16	73.8	6.78	74.0
07/25/18	18:30	160	8.20	3.42	65.3	8.36	8.25	71.7	8.38	8.12	73.4	6.75	73.2
07/25/18	19:30	NA	8.20	3.43	66.1	8.32	8.43	71.9	8.38	8.34	71.9	6.53	76.2
07/25/18	20:30	150	8.20	3.43	68.0	8.32	8.41	72.9	8.40	7.42	71.0	6.36	72.0
07/25/18	21:30	NA	8.20	3.42	67.7	8.32	8.34	73.8	8.44	7.97	70.6	6.34	70.1
07/25/18	22:30	150	8.20	3.40	66.5	8.32	8.33	73.8	8.44	7.98	69.2	6.37	69.8
07/25/18	23:30	NA	8.20	3.37	65.3	8.32	8.17	72.9	8.44	8.06	69.7	6.34	68.1
07/26/18	0:30	147	8.20	3.35	64.1	8.32	8.35	71.7	8.37	7.97	69.6	6.48	68.0
07/26/18	1:30	NA	8.20	3.36	63.7	8.32	8.25	70.5	8.40	8.01	69.4	6.58	67.3
07/26/18	2:30	150	8.20	3.36	62.5	8.32	8.30	69.5	8.45	8.06	68.7	6.77	67.3
07/26/18	3:30	NA	8.20	3.35	61.5	8.32	8.27	68.8	8.44	8.05	66.3	6.50	65.4
07/26/18	4:30	145	8.20	3.33	60.6	8.32	8.32	67.6	8.45	8.23	66.8	7.32	68.1
07/26/18	5:30	NA	8.20	3.31	59.6	8.32	8.32	67.4	8.43	8.04	66.3	6.94	67.4
07/26/18	6:30	147	8.20	3.32	59.6	8.32	8.32	66.7	8.44	7.89	64.0	6.58	64.1
07/26/18	7:30	NA	8.20	3.30	58.9	8.36	8.37	64.8	8.43	8.22	64.9	6.93	66.0
07/26/18	8:30	150	8.20	3.31	58.7	8.36	8.33	65.5	8.34	8.24	68.4	6.88	67.4
07/26/18	9:30	NA	8.20	3.56	59.9	8.36	8.46	65.2	8.34	8.26	69.0	6.95	68.6
07/26/18	10:30	140	8.20	3.68	60.1	8.36	8.48	66.2	8.32	8.28	69.4	6.94	70.4
07/26/18	11:30	NA	8.20	3.95	60.6	8.36	8.25	66.7	8.38	8.29	69.8	6.97	71.0
07/26/18	12:30	210	8.20	3.42	61.8	8.36	8.26	67.6	8.26	8.18	72.1	6.97	72.0
07/26/18	13:30												
RECIRCULATING													
07/26/18	14:30	190	8.20	3.27	64.1	8.39	8.23	70.5	8.33	8.20	73.1	6.95	74.0
07/26/18	15:30	NA	8.20	3.32	66.1	8.39	8.25	71.7	8.34	8.21	74.0	6.96	74.2
07/26/18	16:30	190	8.20	3.34	66.8	8.39	8.19	72.9	8.35	8.17	74.2	6.93	74.6
07/26/18	17:30	NA	8.20	3.36	66.1	8.39	8.24	71.7	8.35	7.81	71.3	6.36	71.8
07/26/18	18:30	190	8.20	3.39	65.3	8.39	8.38	71.9	8.40	7.96	70.5	6.76	72.5
07/26/18	19:30	NA	8.20	3.39	65.3	8.39	8.44	72.1	8.39	7.91	69.7	6.70	72.4
07/26/18	20:30	190	8.20	3.37	64.6	8.39	8.44	71.2	8.42	7.43	68.3	6.49	68.2
07/26/18	21:30	NA	8.20	3.41	63.4	8.39	8.20	70.5	8.40	7.35	67.9	6.97	68.6
07/26/18	22:30	190	8.20	3.35	63.0	8.39	8.29	69.3	8.42	7.39	67.6	6.89	67.9
07/26/18	23:30	NA	8.20	3.31	61.8	8.39	8.20	68.6	8.41	7.31	63.9	6.77	67.9
07/27/18	0:30	190	8.20	3.33	60.6	8.39	8.22	67.9	8.43	7.57	65.5	6.77	66.4
07/27/18	1:30	NA	8.20	3.31	60.1	8.39	8.35	67.1	8.41	7.87	65.8	6.94	66.6
07/27/18	2:30	190	8.20	3.31	59.9	8.39	8.21	67.1	8.41	7.84	65.8	6.90	65.9
07/27/18	3:30	NA	8.20	3.26	59.4	8.39	8.29	66.0	8.43	7.88	65.2	6.87	65.5
07/27/18	4:30	190	8.20	3.26	58.9	8.39	8.37	65.5	8.40	7.69	65.0	6.78	65.4
07/27/18	5:30	NA	8.20	3.24	58.4	8.39	8.44	64.5	8.40	7.81	63.6	6.81	66.0
07/27/18	6:30	190	8.20	3.20	58.2	8.39	8.37	64.8	8.42	7.76	62.8	6.88	65.7
07/27/18	7:30	NA	8.20	3.25	57.2	8.39	8.36	64.1	8.42	8.14	64.2	7.00	65.5
07/27/18	8:30	192	8.20	3.26	57.2	8.39	8.27	63.1	8.36	8.11	65.2	7.11	66.7
07/27/18	9:30	NA	8.20	3.31	58.0	8.39	8.49	64.1	8.34	8.10	65.9	7.12	67.8
07/27/18	10:30	192	8.20	3.37	59.2	8.39	8.28	65.0	8.36	8.11	66.3	7.13	68.3
07/27/18	11:30	NA	8.20	3.40	59.2	8.39	8.43	66.2	8.35	8.10	68.0	7.12	70.1
07/27/18	12:30	192	8.20	3.41	60.8	8.39	8.54	66.9	8.35	8.11	68.4	7.18	76.0
07/27/18	13:30	NA	8.20	3.39	61.5	8.39	8.48	67.5	8.35	8.08	69.0	7.12	76.1
07/27/18	14:30	192	8.20	3.39	62.2	8.39	8.47	69.5	8.36	8.11	70.0	7.21	75.0
07/27/18	15:30	NA	8.20	3.38	63.2	8.39	8.44	69.5	8.37	8.11	70.4	7.19	77.2
07/27/18	16:30	192	8.20	3.38	63.9	8.39	8.48	69.8	8.36	8.10	70.6	7.14	77.8
07/27/18	17:30	NA	8.20	3.37	63.7	8.39	8.49	70.0	8.37	8.10	68.0	7.15	78.9
07/27/18	18:30	192	8.20	3.40	64.1	8.39	8.41	70.5	8.35	8.05	69.5	7.20	76.3
07/27/18	19:30	NA	8.20	3.39	64.6	8.39	8.22	71.2	8.34	8.00	69.7	7.17	76.2
07/27/18	20:30	190	8.20	3.34	66.8	8.39	8.17	72.4	8.34	7.76	69.5	7.37	69.6
07/27/18	21:30	NA	8.20	3.32	66.8	8.39	8.45	72.9	8.36	7.74	69.7	7.23	68.9

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

07/27/18	22:30	190	8.20	3.33	66.4	8.39	8.23	72.1	8.37	7.71	69.4	7.19	68.6
07/27/18	23:30	NA	8.20	3.28	63.2	8.39	8.41	70.7	8.38	8.48	68.2	7.97	67.7
07/28/18	0:30	195	8.20	3.26	62.2	8.39	8.40	69.3	8.38	8.29	67.3	7.08	68.1
07/28/18	1:30	NA	8.20	3.25	61.5	8.39	8.24	68.6	8.36	8.33	67.0	7.15	67.3
07/28/18	2:30	195	8.20	3.24	60.3	8.39	8.44	67.1	8.40	8.27	66.5	7.03	67.0
07/28/18	3:30	NA	8.20	3.28	59.6	8.39	8.38	66.4	8.40	8.12	65.3	7.06	68.4
07/28/18	4:30	195	8.20	3.23	58.7	8.39	8.46	65.0	8.41	8.11	62.0	7.04	65.5
07/28/18	5:30	NA	8.20	3.17	58.2	8.39	8.26	65.0	8.44	8.07	61.8	6.99	65.0
07/28/18	6:30	190	8.20	3.22	57.7	8.39	8.39	64.3	8.42	8.16	59.8	7.32	65.7
07/28/18	7:30	NA	8.20	3.22	57.0	8.39	8.21	63.6	8.44	8.15	62.3	7.22	62.2
07/28/18	8:30	192	8.20	3.23	57.0	8.39	8.50	63.3	8.42	8.16	65.0	7.23	64.7
07/28/18	9:30	NA	8.20	3.22	58.0	8.39	8.36	63.6	8.41	8.15	66.4	7.25	67.6
07/28/18	10:30	192	8.20	3.24	58.2	8.39	8.38	64.5	8.39	8.14	68.3	7.25	71.4
07/28/18	11:30	NA	8.20	3.26	60.3	8.39	8.47	65.7	8.39	8.12	68.8	7.26	72.9
07/28/18	12:30	192	8.20	3.26	60.6	8.39	8.34	66.7	8.38	8.10	69.4	7.24	73.0
07/28/18	13:30	NA	8.20	3.30	64.1	8.39	8.46	69.0	8.38	8.13	69.7	7.28	73.6
07/28/18	14:30	194	8.20	3.25	63.2	8.39	8.29	70.2	8.38	8.11	72.0	7.21	76.6
07/28/18	15:30	NA	8.20	3.24	63.9	8.39	8.32	70.7	8.39	8.10	71.4	7.24	77.2
07/28/18	16:30	192	8.20	3.24	64.6	8.39	8.45	70.5	8.41	8.11	71.5	7.20	77.5
07/28/18	17:30	NA	8.20	3.24	65.3	8.39	8.14	71.9	8.41	8.11	71.0	7.20	74.0
07/28/18	18:30	130	8.20	3.51	65.3	8.39	8.47	71.7	8.45	8.11	70.8	7.18	73.2
07/28/18	19:30	NA	8.20	3.29	65.3	8.39	8.50	71.9	8.80	8.29	70.7	6.97	72.3
07/28/18	20:30	95	8.20	3.25	66.3	8.39	RECIRCULATING						
07/28/18	21:30	RECIRCULATING											
07/28/18	22:30	95	8.20	3.37	66.8	8.39	8.43	73.1	8.22	7.91	68.3	6.75	69.0
07/28/18	23:30	NA	8.20	3.36	65.1	8.39	6.72	72.6	8.43	8.22	67.7	7.11	67.0
07/29/18	0:30	95	8.20	3.36	64.6	8.39	8.37	72.1	8.36	8.20	67.5	7.07	66.4
07/29/18	1:30	NA	8.20	3.38	63.7	8.39	8.44	70.7	8.41	8.27	67.2	7.06	66.1
07/29/18	2:30	128	8.20	3.13	61.8	8.39	8.27	70.0	8.38	8.11	66.5	7.02	63.8
07/29/18	3:30	NA	8.20	3.11	61.1	8.39	8.42	68.5	8.38	8.14	65.6	7.22	65.2
07/29/18	4:30	128	8.20	3.21	60.3	8.39	8.36	67.4	8.40	8.05	65.0	7.19	65.0
07/29/18	5:30	NA	8.20	3.22	59.4	8.39	8.34	66.9	8.37	8.00	64.7	7.07	64.3
07/29/18	6:30	129	8.20	3.32	58.7	8.39	8.38	65.5	8.37	8.12	64.4	7.21	67.3
07/29/18	7:30	NA	8.20	3.34	58.2	8.39	8.38	65.0	8.37	8.03	62.5	7.56	64.2
07/29/18	8:30	130	8.20	3.33	58.0	8.39	8.30	64.8	8.36	8.20	71.1	7.70	70.0
07/29/18	9:30	NA	8.20	3.71	58.4	8.39	8.51	64.8	8.42	8.39	68.5	7.73	70.1
07/29/18	10:30	98	8.20	3.79	59.4	8.39	8.40	65.5	8.41	8.37	69.7	7.65	69.0
07/29/18	11:30	NA	8.20	3.73	59.2	8.39	8.52	66.6	8.42	8.28	77.1	7.81	75.8
07/29/18	12:30	110	8.20	3.70	60.8	8.39	8.56	66.7	8.47	8.25	80.3	7.81	76.4
07/29/18	13:30	NA	8.20	3.72	60.4	8.39	8.25	67.1	8.42	8.21	80.7	7.84	76.2
07/29/18	14:30	108	8.20	3.64	63.2	8.39	8.44	69.0	8.40	8.23	80.3	7.75	76.4
07/29/18	15:30	NA	8.20	3.64	62.9	8.39	8.38	69.3	8.40	8.28	72.6	7.11	74.4
07/29/18	16:30	108	8.20	3.64	62.4	8.39	8.33	70.2	8.36	8.21	72.6	7.21	74.4
07/29/18	17:30	NA	8.20	3.63	63.4	8.39	8.48	70.0	8.43	8.10	79.3	7.28	76.4
07/29/18	18:30	107	8.20	3.49	63.4	8.39	8.34	70.7	8.46	7.99	72.6	6.98	75.8
07/29/18	19:30	NA	8.20	3.48	68.4	8.39	8.28	70.0	8.40	7.85	67.6	6.91	68.9
07/29/18	20:30	106	8.20	3.47	63.7	8.39	8.42	70.0	8.43	7.92	67.1	6.91	69.5
07/29/18	21:30	NA	8.20	3.43	63.9	8.39	8.44	70.5	8.43	7.90	69.0	6.77	69.8
07/29/18	22:30	106	8.20	3.41	63.7	8.39	8.29	70.0	8.44	7.90	66.6	6.84	67.6
07/29/18	23:30	NA	8.20	3.38	63.2	8.39	8.27	70.0	8.44	7.95	67.1	7.14	67.1
07/30/18	0:30	106	8.20	3.36	62.7	8.39	8.35	70.0	8.44	7.91	65.6	6.90	66.6
07/30/18	1:30	NA	8.20	3.35	61.8	8.39	8.42	69.8	8.44	7.94	65.2	6.94	65.3
07/30/18	2:30	106	8.20	3.34	60.8	8.39	8.37	68.3	8.44	7.91	65.2	6.89	66.1
07/30/18	3:30	NA	8.20	3.33	60.1	8.39	8.48	67.4	8.45	7.88	64.7	6.83	64.8
07/30/18	4:30	106	8.20	3.32	59.2	8.39	8.29	66.4	8.46	7.90	62.9	6.85	64.0
07/30/18	5:30	NA	8.20	3.32	58.7	8.39	8.28	65.7	8.46	7.86	63.3	6.86	63.8
07/30/18	6:30	106	8.20	3.29	58.0	8.39	8.43	65.2	8.46	7.90	62.3	6.90	63.9
07/30/18	7:30	NA	8.20	3.29	57.2	8.39	8.27	64.5	8.46	7.77	63.8	6.85	64.3
07/30/18	8:30	106	8.20	3.49	57.0	8.39	8.42	63.3	8.38	8.04	64.1	6.86	63.2
07/30/18	9:30	NA	8.20	3.46	57.7	8.39	8.44	63.3	8.37	7.86	67.9	7.31	69.9
07/30/18	10:30	106	8.20	3.48	58.4	8.39	8.28	64.1	8.35	7.69	73.2	7.18	69.8
07/30/18	11:30	NA	8.20	3.45	58.9	8.39	8.28	64.8	8.37	7.72	73.3	7.70	72.0
07/30/18	12:30	106	8.20	3.46	60.3	8.39	8.46	65.7	8.36	7.70	74.1	7.25	74.7
07/30/18	13:30	NA	8.20	3.57	61.8	8.39	8.30	67.4	8.36	7.68	75.7	7.24	74.1

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

07/30/18	14:30	SYSTEM DOWN FOR REPAIR											
07/30/18	15:30	SYSTEM DOWN FOR REPAIR											
07/30/18	16:30	154	8.20	3.04	63.7	8.39	8.40	69.5	8.37	7.61	76.8	6.97	74.0
07/30/18	17:30	NA	8.20	3.63	63.9	8.39	8.35	70.0	8.39	7.75	69.3	6.91	72.1
07/30/18	18:30	153	8.20	3.67	64.6	8.39	8.39	70.2	8.30	7.96	69.2	6.69	72.8
07/30/18	19:30	NA	8.20	3.68	65.6	8.39	8.39	70.2	8.34	8.25	69.7	6.90	69.8
07/30/18	20:30	154	8.20	3.23	65.6	8.39	8.16	71.7	8.36	8.12	69.2	6.88	69.7
07/30/18	21:30	NA	8.20	3.15	64.9	8.39	8.42	71.4	8.36	8.04	68.9	6.81	69.4
07/30/18	22:30	154	8.20	3.17	64.6	8.39	8.37	71.4	8.37	8.14	68.7	6.84	69.0
07/30/18	23:30	NA	8.20	3.22	63.9	8.39	8.47	70.5	8.37	8.24	69.0	6.82	68.4
07/31/18	0:30	154	8.20	3.23	63.4	8.39	8.38	70.0	8.37	8.20	67.5	6.83	68.0
07/31/18	1:30	NA	8.20	3.22	62.7	8.39	8.38	69.3	8.38	8.30	67.6	6.83	67.6
07/31/18	2:30	154	8.20	3.22	62.8	8.39	8.40	68.8	8.38	8.27	67.4	6.80	67.2
07/31/18	3:30	NA	8.20	3.21	61.1	8.39	8.42	68.1	8.38	8.36	66.9	6.97	66.8
07/31/18	4:30	154	8.20	3.18	60.6	8.39	8.28	67.5	8.40	8.26	65.3	7.05	66.4
07/31/18	5:30	NA	8.20	3.17	59.6	8.39	8.30	66.9	8.40	8.25	65.0	7.06	65.8
07/31/18	6:30	154	8.20	3.17	58.9	8.39	8.30	66.0	8.40	8.28	64.7	7.08	65.8
07/31/18	7:30	NA	8.20	3.16	58.7	8.39	8.27	65.2	8.41	8.30	63.8	7.37	65.5
07/31/18	8:30	150	8.20	3.17	59	8.39	8.43	65.2	8.42	8.33	67.9	7.69	70.0
07/31/18	9:30	NA	8.20	3.18	59.2	8.39	8.52	66.7	8.42	8.43	68.6	7.50	70.0
07/31/18	10:30	202	8.20	3.06	59.9	8.39	8.36	66.2	8.40	8.37	69.3	7.34	69.7
07/31/18	11:30	NA	8.20	3.05	61.0	8.39	8.34	67.1	8.40	8.31	80.9	7.59	77.2
07/31/18	12:30	195	8.20	3.06	61.8	8.39	8.35	68.3	8.39	8.30	80.5	7.62	70.4
07/31/18	13:30	NA	8.20	3.10	62.3	8.39	8.31	68.6	8.45	8.29	72.0	7.34	72.0
07/31/18	14:30	195	8.20	3.12	63.0	8.39	8.27	69.8	8.41	8.24	79.8	7.63	78.1
07/31/18	15:30	NA	8.20	3.09	63.9	8.39	8.16	70.1	8.08	8.04	78.6	7.59	79.8
07/31/18	16:30	197	8.20	3.07	64	8.39	8.25	70.2	8.21	8.07	73.3	7.36	76.1
07/31/18	17:30	NA	8.20	3.06	67.6	8.39	8.34	70.4	8.22	8.08	73.6	7.31	75.8
07/31/18	18:30	197	8.20	3.14	68.0	8.39	8.40	72.6	8.34	8.21	79.2	7.89	76.1
07/31/18	19:30	NA	8.20	3.15	68.7	8.39	8.43	74.3	8.38	8.25	72.2	7.25	73.0
07/31/18	20:30	198	8.20	3.17	67.5	8.39	8.49	74.5	8.41	8.26	72.4	7.23	71.7
07/31/18	21:30	NA	8.20	3.17	67.3	8.39	8.28	74.3	8.43	8.22	70.9	7.22	70.4
07/31/18	22:30	200	8.20	3.16	65.6	8.39	8.54	71.7	8.43	8.23	69.7	7.20	69.1
07/31/18	23:30	NA	8.20	3.15	64.9	8.39	8.52	71.4	8.41	8.21	69.0	7.22	69.2
08/01/18	0:30	200	8.20	3.16	63.9	8.39	8.38	71.1	8.41	8.24	68.8	7.21	69.0
08/01/18	1:30	NA	8.20	3.24	63.2	8.39	8.31	70.0	8.43	8.20	68.5	7.20	68.9
08/01/18	2:30	200	8.20	3.24	62.2	8.39	8.30	69.3	8.44	8.22	65.6	7.22	66.1
08/01/18	3:30	NA	8.20	3.23	61.8	8.39	8.33	69.0	8.46	8.20	66.0	7.24	66.5
08/01/18	4:30	200	8.20	3.23	61.3	8.39	8.46	68.1	8.48	8.25	64.8	7.22	65.9
08/01/18	5:30	NA	8.20	3.24	60.3	8.39	8.43	67.1	8.50	8.22	64.4	7.21	65.3
08/01/18	6:30	200	8.20	3.23	59.9	8.39	8.39	66.7	8.47	8.22	63.9	7.23	64.6
08/01/18	7:30	NA	8.20	3.23	59.4	8.39	8.29	66.0	8.53	8.25	63.5	7.83	65.0
08/01/18	8:30	197	8.20	3.18	59.4	8.39	8.28	65.7	8.42	8.41	67.5	7.50	65.9
08/01/18	9:30	NA	8.20	3.20	59.6	8.39	8.26	66.2	8.41	8.41	69.2	7.02	68.7
08/01/18	10:30	196	8.20	3.27	60.3	8.35	8.38	66.4	8.39	8.37	76.2	7.80	72.9
08/01/18	11:30	NA	8.20	3.29	61.1	8.35	8.38	67.4	8.38	8.36	72.8	7.85	75.3
08/01/18	12:30	197	8.20	3.28	61.8	8.35	8.35	67.6	8.48	8.39	74.2	7.67	72.9
08/01/18	13:30	NA	8.20	3.38	63.4	8.35	8.21	69.8	8.44	8.35	79.5	7.61	73.4
08/01/18	14:30	183	8.20	3.41	64.6	8.35	8.38	71.2	8.44	8.36	74.9	7.66	73.3
08/01/18	15:30	NA	8.20	3.39	65.1	8.30	8.08	71.3	8.36	8.38	75.0	7.58	72.6
08/01/18	16:30	184	8.20	3.37	67.2	8.30	8.22	72.4	8.36	8.31	75.5	7.63	75.5
08/01/18	17:30	NA	8.20	3.36	67.5	8.30	8.26	73.6	8.37	8.29	77.4	7.72	74.4
08/01/18	18:30	184	8.20	3.34	66.8	8.30	8.32	73.3	8.20	8.23	77.2	7.76	70.7
08/01/18	19:30	NA	8.20	3.31	68.0	8.36	8.25	74.0	8.25	8.28	73.0	7.64	74.6
08/01/18	20:30	186	8.20	3.30	68.0	8.36	8.33	74.3	8.25	8.25	71.8	7.41	72.4
08/01/18	21:30	NA	8.20	3.28	67.7	8.36	8.30	74.0	8.25	8.22	71.1	7.32	70.8
08/01/18	22:30	184	8.20	3.25	67.2	8.36	8.28	74.0	8.30	8.23	69.0	7.30	69.3
08/01/18	23:30	NA	8.20	3.24	66.1	8.36	8.42	72.9	8.30	8.24	68.2	7.28	68.8
08/02/18	0:30	186	8.20	3.23	64.6	8.36	8.52	72.1	8.29	8.21	67.8	7.31	70.2
08/02/18	1:30	NA	8.20	3.21	64.4	8.36	8.38	71.4	8.31	8.24	67.2	7.29	69.8
08/02/18	2:30	184	8.20	3.20	63.2	8.36	8.36	70.5	8.32	8.25	65.3	7.33	65.2
08/02/18	3:30	NA	8.20	3.22	63.3	8.36	8.35	70.9	8.31	8.24	65.1	7.32	65.1
08/02/18	4:30	184	8.20	3.21	61.5	8.36	8.51	68.6	8.38	8.27	63.8	7.32	63.9
08/02/18	5:30	NA	8.20	3.20	61.1	8.36	8.44	68.1	8.38	8.23	63.3	7.30	63.0

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/02/18	6:30	184	8.20	3.20	60.8	8.36	8.49	67.6	8.40	8.23	62.1	7.31	62.2
08/02/18	7:30	NA	8.20	3.21	60.1	8.42	8.43	66.7	8.42	8.57	65.0	7.77	64.5
08/02/18	8:30	184	8.20	3.17	59.6	8.42	8.48	66.2	8.44	8.42	66.9	7.61	64.6
08/02/18	9:30	NA	8.20	3.19	59.6	8.35	8.36	66.2	8.41	8.46	68.6	7.73	67.9
08/02/18	10:30	182	8.20	3.28	61.1	8.40	8.34	66.9	8.15	8.29	71.4	7.65	71.7
08/02/18	11:30	NA	8.20	3.29	62.7	8.40	8.24	67.9	8.18	8.46	70.6	7.78	74.4
08/02/18	12:30	184	8.20	3.34	63.7	8.40	8.47	69.3	8.20	8.32	72.5	7.68	74.3
08/02/18	13:30	NA	8.20	2.93	63.4	8.35	8.39	70.5	8.33	8.08	71.8	7.63	72.9
08/02/18	14:30	183	8.20	2.92	63.7	8.35	8.33	70.2	8.31	8.02	72.0	7.57	72.7
08/02/18	15:30	NA	8.20	2.92	64.6	8.37	8.33	70.5	8.32	7.99	73.1	7.50	74.4
08/02/18	16:30	182	8.20	2.89	65.1	8.37	8.33	71.4	8.34	7.99	73.3	7.45	73.4
08/02/18	17:30	NA	8.20	2.90	66.8	8.40	8.36	72.1	8.35	8.06	74.0	7.47	75.3
08/02/18	18:30	182	8.20	2.91	67.0	8.40	8.25	73.1	8.37	8.00	73.4	7.42	74.0
08/02/18	19:30	NA	8.20	2.83	66.8	8.40	8.45	73.3	8.37	8.01	71.3	7.20	72.6
08/02/18	20:30	184	8.20	2.85	66.5	8.40	8.35	73.9	8.40	7.99	71.1	7.04	71.2
08/02/18	21:30	NA	8.20	3.26	66.1	8.40	8.15	72.9	8.37	7.96	70.8	7.01	71.0
08/02/18	22:30	184	8.20	3.22	65.1	8.40	8.20	71.9	8.38	8.03	68.0	7.22	68.3
08/02/18	23:30	NA	8.20	3.11	64.1	8.40	8.44	71.0	8.37	8.06	67.2	7.43	66.9
08/03/18	0:30	184	8.20	3.12	63.7	8.40	8.46	70.0	8.37	8.04	66.9	7.44	66.7
08/03/18	1:30	NA	8.20	3.11	62.7	8.40	8.46	69.5	8.39	7.99	66.5	7.40	66.3
08/03/18	2:30	184	8.20	3.09	61.0	8.40	8.35	68.1	8.39	8.02	63.8	7.18	63.6
08/03/18	3:30	NA	8.20	3.08	60.6	8.40	8.51	67.4	8.38	8.09	63.6	7.02	64.6
08/03/18	4:30	184	8.20	3.07	60.1	8.40	8.41	66.7	8.36	8.11	63.0	7.07	64.3
08/03/18	5:30	NA	8.20	3.07	59.4	8.40	8.45	65.7	8.38	8.00	60.1	6.99	63.8
08/03/18	6:30	185	8.20	3.06	58.2	8.40	8.43	64.9	8.37	7.98	61.2	7.22	62.4
08/03/18	7:30	NA	8.20	3.05	57.5	8.40	8.32	64.1	8.39	8.06	62.8	7.80	61.0
08/03/18	8:30	182	8.20	3.07	57.0	8.35	8.26	63.6	8.26	7.90	63.5	7.40	63.6
08/03/18	9:30	NA	8.20	3.12	57.0	8.38	8.41	63.6	8.31	7.93	65.0	7.52	66.5
08/03/18	10:30	182	8.20	3.11	58.0	8.38	8.40	63.1	8.32	7.90	65.4	7.45	68.2
08/03/18	11:30	NA	8.20	3.08	58.7	8.38	8.32	65.0	8.35	8.03	67.9	7.55	68.9
08/03/18	12:30	181	8.20	3.15	60.3	8.38	8.42	66.4	8.33	8.05	68.4	7.52	69.1
08/03/18	13:30	NA	8.20	3.21	62.0	8.38	8.31	66.9	8.33	8.03	68.6	7.46	69.1
08/03/18	14:30	182	8.20	3.20	62.5	8.38	8.23	68.6	8.35	8.05	71.3	7.55	72.1
08/03/18	15:30	NA	8.20	3.21	63.90	8.38	8.33	69.5	8.34	8.14	73.8	7.62	73.0
08/03/18	16:30	182	8.20	3.22	65.1	8.38	8.30	70.2	8.36	8.04	72.2	7.52	72.8
08/03/18	17:30	NA	8.20	3.21	66.1	8.38	8.36	71.4	8.35	8.12	73.1	7.63	74.6
08/03/18	18:30	181	8.20	3.50	65.1	8.40	8.37	72.1	8.30	8.09	72.4	7.61	71.3
08/03/18	19:30	NA	8.20	3.48	65.6	8.44	8.43	72.4	8.28	8.12	69.1	7.18	69.3
08/03/18	20:30	184	8.20	3.51	65.1	8.44	8.28	71.9	8.33	8.16	68.7	7.22	68.6
08/03/18	21:30	NA	8.20	3.56	64.1	8.44	8.51	71.2	8.31	8.12	66.7	7.17	65.6
08/03/18	22:30	182	8.20	3.60	63.7	8.44	8.26	70.7	8.33	8.11	66.6	7.06	65.4
08/03/18	23:30	NA	8.20	3.56	62.0	8.44	8.32	69.5	8.35	8.12	65.8	7.06	65.5
08/04/18	0:30	182	8.20	3.54	61.5	8.44	8.37	68.6	8.33	8.10	65.4	7.09	65.1
08/04/18	1:30	NA	8.20	3.59	60.3	8.44	8.51	67.1	8.27	8.07	64.8	7.05	64.9
08/04/18	2:30	183	8.20	3.57	59.2	8.44	8.53	66.7	8.32	7.97	62.6	6.99	63.7
08/04/18	3:30	NA	8.20	3.59	58.4	8.44	8.33	65.2	8.34	8.00	62.4	7.21	63.7
08/04/18	4:30	183	8.20	3.59	57.7	8.44	8.31	64.1	8.36	8.06	62.0	7.23	63.0
08/04/18	5:30	NA	8.20	3.60	56.8	8.44	8.37	63.3	8.39	7.99	61.7	7.15	62.4
08/04/18	6:30	182	8.20	3.58	55.6	8.44	8.51	62.3	8.38	7.88	60.6	6.93	63.5
08/04/18	7:30	NA	8.20	3.42	54.9	8.44	8.32	61.9	8.41	8.07	61.0	7.26	61.1
08/04/18	8:30	182	8.20	3.37	54.6	8.40	8.44	61.0	8.35	8.06	62.1	7.39	64.4
08/04/18	9:30	NA	8.20	3.30	55.1	8.40	8.42	61.2	8.32	7.96	62.4	7.47	64.9
08/04/18	10:30	182	8.20	3.23	55.3	8.40	8.33	61.7	8.37	8.11	63.9	7.64	67.2
08/04/18	11:30	NA	8.20	3.18	56.3	8.40	8.41	62.1	8.35	8.13	64.3	7.64	67.5
08/04/18	12:30	180	8.20	3.16	58.0	8.38	8.30	63.8	8.28	8.13	67.4	7.60	67.1
08/04/18	13:30	NA	8.20	3.12	59.4	8.38	8.31	64.8	8.26	8.12	67.4	7.51	69.3
08/04/18	14:30	180	8.20	3.11	60.8	8.38	8.48	66.7	8.29	8.01	68.7	7.41	69.8
08/04/18	15:30	NA	8.20	3.07	60.8	8.38	8.33	67.4	8.27	7.98	68.9	7.35	69.2
08/04/18	16:30	180	8.20	3.07	63.0	8.38	8.44	68.6	8.32	7.97	70.0	7.29	70.3
08/04/18	17:30	NA	8.20	3.07	63.7	8.38	8.28	69.5	8.36	7.97	69.5	7.20	69.7
08/04/18	18:30	180	8.20	3.02	64.6	8.38	8.30	70.2	8.22	7.90	69.0	7.18	68.6
08/04/18	19:30	NA	8.20	3.04	64.6	8.38	8.32	70.7	8.29	8.03	68.7	7.30	69.7
08/04/18	20:30	183	8.20	3.03	63.9	8.38	8.33	70.5	8.25	8.02	67.4	7.00	67.7
08/04/18	21:30	NA	8.20	3.06	63.0	8.38	8.33	70.0	8.19	8.04	66.6	7.02	66.5

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/04/18	22:30	170	8.20	3.14	62.5	8.38	8.35	69.1	8.19	8.03	66.2	6.97	66.1
08/04/18	23:30	NA	8.20	3.19	61.3	8.38	8.24	68.1	8.23	8.10	64.8	6.94	64.9
08/05/18	0:30	170	8.20	3.17	61.1	8.38	8.33	67.2	8.23	8.13	66.7	6.95	66.8
08/05/18	1:30	NA	8.20	3.18	60.6	8.38	8.43	66.2	8.25	8.07	65.5	7.02	65.3
08/05/18	2:30	172	8.20	3.17	58.9	8.38	8.42	65.3	8.23	7.93	62.0	7.04	65.0
08/05/18	3:30	NA	8.20	3.16	58.0	8.38	8.35	64.1	8.25	7.92	61.4	7.03	65.1
08/05/18	4:30	171	8.20	3.16	57.0	8.38	8.33	63.8	8.27	7.90	60.3	6.97	64.7
08/05/18	5:30	NA	8.20	3.17	56.3	8.38	8.41	61.9	8.32	7.97	59.4	6.99	62.8
08/05/18	6:30	170	8.20	3.16	54.9	8.38	8.38	61.0	8.34	8.01	58.5	7.01	63.4
08/05/18	7:30	NA	8.20	3.17	54.4	8.38	8.35	60.0	8.37	8.07	59.1	7.44	60.5
08/05/18	8:30	170	8.20	3.10	53.4	8.38	8.37	59.6	8.41	8.20	60.3	7.63	64.4
08/05/18	9:30	NA	8.20	3.15	53.7	8.38	8.22	59.8	8.42	8.15	60.9	7.72	68.1
08/05/18	10:30	169	8.20	3.15	54.4	8.38	8.47	60.0	8.39	8.16	70.7	7.68	68.6
08/05/18	11:30	NA	8.20	3.15	55.8	8.38	8.41	61.0	8.39	8.26	68.7	7.81	68.3
08/05/18	12:30	169	8.20	3.14	56.3	8.38	8.26	61.9	8.42	8.28	72.5	7.91	69.5
08/05/18	13:30	NA	8.20	3.13	58.9	8.38	8.24	62.9	8.40	8.27	69.9	7.86	67.0
08/05/18	14:30	169	8.20	3.11	61.8	8.38	8.35	66.5	8.37	8.20	73.2	7.90	73.1
08/05/18	15:30	NA	8.20	3.11	62.1	8.38	8.40	67.9	8.35	8.17	73.4	7.64	75.2
08/05/18	16:30	160	8.20	3.15	61.1	8.38	8.50	68.1	8.37	7.97	70.0	7.54	69.0
08/05/18	17:30	NA	8.20	3.21	62.0	8.38	8.42	68.1	8.39	8.19	69.7	7.65	67.2
08/05/18	18:30	161	8.20	3.25	62.7	8.38	8.54	68.6	8.36	8.27	69.6	7.68	67.1
08/05/18	19:30	NA	8.20	3.22	63.2	8.38	8.47	68.8	8.38	8.10	66.5	7.20	66.7
08/05/18	20:30	155	8.20	3.19	63.0	8.38	8.45	69.3	8.36	8.16	66.1	7.26	65.4
08/05/18	21:30	NA	8.20	3.17	62.5	8.38	8.42	68.6	8.39	8.10	64.0	7.25	63.9
08/05/18	22:30	158	8.20	3.18	61.5	8.38	8.41	68.6	8.41	8.10	62.8	7.23	62.7
08/05/18	23:30	NA	8.20	3.18	60.6	8.38	8.41	67.4	8.43	8.12	61.7	7.26	62.4
08/06/18	0:30	154	8.20	3.17	59.9	8.38	8.48	66.5	8.42	8.08	62.5	7.12	61.7
08/06/18	1:30	NA	8.20	3.16	58.9	8.38	8.42	65.0	8.43	8.04	61.9	7.15	61.1
08/06/18	2:30	155	8.20	3.15	58.2	8.38	8.45	64.8	8.45	8.00	61.0	7.17	60.4
08/06/18	3:30	NA	8.20	3.16	57.2	8.38	8.36	63.8	8.48	8.01	59.8	7.13	58.9
08/06/18	4:30	160	8.20	3.14	56.3	8.38	8.38	62.9	8.47	8.00	59.1	7.15	58.7
08/06/18	5:30	NA	8.20	3.12	55.6	8.38	8.38	62.2	8.41	7.95	58.4	7.15	58.5
08/06/18	6:30	156	8.20	3.13	54.9	8.38	8.41	61.2	8.46	7.93	57.6	7.14	57.9
08/06/18	7:30	NA	8.20	3.13	54.7	8.38	8.37	60.3	8.46	7.95	60.2	7.11	58.4
08/06/18	8:30	155	8.20	3.14	54.4	8.38	8.47	60.0	8.45	8.13	62.5	7.62	63.4
08/06/18	9:30	NA	8.20	3.14	54.9	8.38	8.42	60.7	8.43	8.09	61.8	7.37	62.9
08/06/18	10:30	155	8.20	3.19	54.9	8.38	8.23	61.9	8.18	7.96	62.8	7.28	64.6
08/06/18	11:30	NA	8.20	3.21	55.1	8.38	8.36	61.2	8.21	7.98	62.5	7.39	65.4
08/06/18	12:30	155	8.20	3.21	57.0	8.38	8.44	62.6	8.19	8.03	64.2	7.53	66.3
08/06/18	13:30	NA	8.20	3.22	57.7	8.38	8.49	63.1	8.22	7.72	67.3	7.55	68.9
08/06/18	14:30	155	8.20	3.23	59.6	8.38	8.49	64.6	8.23	7.90	70.4	7.71	71.0
08/06/18	15:30	NA	8.20	3.30	60.8	8.38	8.35	66.7	8.25	7.91	69.6	7.73	69.3
08/06/18	16:30	155	8.20	3.32	61.8	8.38	8.43	66.7	8.26	8.06	68.7	7.53	64.2
08/06/18	17:30	NA	8.20	3.32	64.1	8.38	8.31	68.6	8.29	8.05	67.4	7.67	67.4
08/06/18	18:30	155	8.20	3.22	63.0	8.38	8.43	69.3	8.31	8.09	70.3	7.07	67.4
08/06/18	19:30	NA	8.20	3.21	64.1	8.38	8.31	69.8	8.35	8.11	67.5	7.20	67.5
08/06/18	20:30	156	8.20	3.18	63.7	8.38	8.37	70.0	8.37	8.07	66.9	7.11	67.1
08/06/18	21:30	NA	8.20	3.17	63.0	8.38	8.29	69.3	8.35	8.11	65.0	7.15	64.2
08/06/18	22:30	156	8.20	3.14	61.5	8.38	8.49	68.8	8.34	8.09	64.6	7.10	64.0
08/06/18	23:30	NA	8.20	3.14	60.3	8.38	8.22	66.4	8.34	8.07	64.0	7.12	63.2
08/07/18	0:30	154	8.20	3.14	58.9	8.38	8.39	65.7	8.34	8.02	61.2	6.93	61.5
08/07/18	1:30	NA	8.20	3.13	58.0	8.38	8.41	63.9	8.33	8.00	60.4	7.10	60.5
08/07/18	2:30	156	8.20	3.13	57.2	8.38	8.23	63.8	8.33	7.96	59.8	7.12	60.4
08/07/18	3:30	NA	8.20	3.12	56.5	8.38	8.35	63.1	8.33	7.90	59.1	7.12	58.4
08/07/18	4:30	156	8.20	3.11	55.6	8.38	8.47	62.2	8.33	7.96	58.2	7.12	58.9
08/07/18	5:30	NA	8.20	3.12	54.6	8.38	8.32	61.5	8.34	7.78	51.9	7.06	55.1
08/07/18	6:30	156	8.20	3.12	53.7	8.38	8.19	60.5	8.34	7.92	57.6	7.14	57.7
08/07/18	7:30	NA	8.20	3.11	53.4	8.38	8.27	59.6	8.36	7.83	58.0	7.36	61.7
08/07/18	8:30	156	8.20	3.11	53.4	8.38	8.44	59.3	8.34	7.85	59.4	7.39	63.2
08/07/18	9:30	NA	8.20	3.15	53.7	8.38	8.23	59.1	8.36	8.11	60.8	7.14	63.2
08/07/18	10:30	155	8.20	3.25	54.2	8.38	8.21	60.0	8.37	8.15	64.3	7.64	64.1
08/07/18	11:30	NA	8.20	3.33	56.1	8.38	8.30	61.2	8.39	8.19	63.7	7.55	68.8
08/07/18	12:30	155	8.20	3.36	59.2	8.38	8.40	62.9	8.39	8.23	68.1	7.73	65.8
08/07/18	13:30	NA	8.20	3.36	62.2	8.38	8.30	66.2	8.31	8.17	72.0	7.58	67.3

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/07/18	14:30	155	8.20	3.34	63.4	8.38	8.25	68.1	8.32	8.24	73.3	7.75	67.8
08/07/18	15:30	NA	8.20	3.35	63.0	8.38	8.45	69.5	8.34	8.15	76.4	7.73	74.2
08/07/18	16:30	155	8.20	3.36	64.9	8.38	8.34	68.8	8.32	8.21	73.5	7.79	72.8
08/07/18	17:30	NA	8.20	3.36	64.1	8.38	8.39	70.7	8.31	8.24	74.9	7.83	71.3
08/07/18	18:30	155	8.20	3.34	64.4	8.38	8.46	70.5	8.33	8.23	74.6	7.78	70.5
08/07/18	19:30	NA	8.20	3.39	64.4	8.38	8.38	70.5	8.37	8.15	69.5	7.46	70.4
08/07/18	20:30	140	8.20	3.38	65.1	8.38	8.37	71.2	8.38	8.22	69.3	7.42	70.1
08/07/18	21:30	NA	8.20	3.40	64.9	8.38	8.40	71.0	8.40	8.12	67.8	7.29	69.0
08/07/18	22:30	102	8.20	3.18	64.1	8.38	8.36	70.7	8.43	8.13	66.1	7.33	65.3
08/07/18	23:30	NA	8.20	3.05	63.2	8.38	8.42	70.5	8.44	8.11	65.6	7.38	64.9
08/08/18	0:30	12	8.20	3.13	62.0	8.38	8.44	69.3	8.44	8.12	64.2	7.21	64.0
08/08/18	1:30	NA	8.20	3.13	61.3	8.38	8.50	68.4	8.42	8.10	63.6	7.20	63.1
08/08/18	2:30	RECIRCULATING											
08/08/18	3:30	NA	8.20	3.09	58.9	8.38	8.24	65.5	8.41	7.96	62.1	7.18	61.4
08/08/18	4:30	102	8.20	3.17	57.5	8.38	8.44	65.0	8.41	7.90	61.9	7.21	59.6
08/08/18	5:30	NA	8.20	3.18	56.6	8.38	8.37	63.8	8.42	7.94	60.2	7.20	59.8
08/08/18	6:30	100	8.20	3.13	55.6	8.38	8.49	62.9	8.42	7.93	59.3	7.23	57.6
08/08/18	7:30	NA	8.20	3.10	55.1	8.35	8.36	62.2	8.41	7.96	61.4	7.40	63.5
08/08/18	8:30	102	8.20	3.09	54.4	8.35	8.33	61.7	8.42	7.92	63.4	7.31	63.3
08/08/18	9:30	NA	8.20	3.10	55.3	8.32	8.36	61.5	8.32	7.90	68.2	7.42	68.9
08/08/18	10:30	94	8.20	3.16	55.1	8.32	8.35	62.2	8.36	8.00	68.7	7.49	69.8
08/08/18	11:30	NA	8.20	3.54	57.0	8.30	8.25	62.4	8.39	7.92	66.2	7.48	67.7
08/08/18	12:30	91	8.20	3.41	59.6	8.30	8.48	63.8	8.38	7.89	73.5	7.53	72.8
08/08/18	13:30	NA	8.20	3.12	59.6	8.30	8.30	64.8	8.31	8.12	70.9	7.57	73.9
08/08/18	14:30	88	8.20	3.00	60.3	8.32	8.41	66.2	8.38	8.07	70.6	7.51	74.1
08/08/18	15:30	NA	8.20	3.12	60.3	8.32	8.33	66.2	8.33	7.77	71.0	7.41	74.0
08/08/18	16:30	88	8.20	3.20	61.3	8.32	8.32	67.4	8.29	7.93	70.5	7.45	74.4
08/08/18	17:30	NA	8.20	3.19	62.0	8.32	8.38	67.9	8.27	7.90	71.0	7.44	74.5
08/08/18	18:30	94	8.20	3.12	62.7	8.32	8.33	68.4	8.25	8.01	70.0	7.41	72.7
08/08/18	19:30	NA	8.20	3.08	63.7	8.32	8.43	69.1	8.17	8.13	71.3	7.38	73.7
08/08/18	20:30	94	8.20	3.07	64.1	8.32	8.52	70.0	8.21	7.79	67.9	6.96	68.8
08/08/18	21:30	NA	8.20	3.07	64.1	8.32	8.55	70.3	8.21	7.84	67.4	7.02	67.8
08/08/18	22:30	94	8.20	3.14	63.4	8.32	8.51	70.3	8.23	7.86	67.2	7.05	65.9
08/08/18	23:30	NA	8.20	3.16	62.5	8.32	8.60	69.8	8.21	7.84	66.3	7.10	65.5
08/09/18	0:30	95	8.20	3.17	61.8	8.32	8.39	69.1	8.27	7.82	66.1	7.13	65.7
08/09/18	1:30	NA	8.20	3.24	61.1	8.32	8.42	68.4	8.23	7.85	65.7	7.11	65.1
08/09/18	2:30	93	8.20	3.20	59.1	8.32	8.42	67.4	8.22	7.82	64.8	7.02	65.3
08/09/18	3:30	NA	8.20	3.18	58.9	8.32	8.24	66.7	8.23	7.71	64.4	7.08	64.9
08/09/18	4:30	93	8.20	3.17	58.2	8.32	8.54	65.7	8.22	7.74	64.0	7.03	64.5
08/09/18	5:30	NA	8.20	2.93	57.0	8.32	8.34	64.6	8.21	7.68	63.5	6.98	63.9
08/09/18	6:30	121	8.20	2.98	56.3	8.32	8.59	63.6	8.23	7.83	62.3	7.03	64.2
08/09/18	7:30	NA	8.20	3.05	55.6	8.35	8.23	62.6	8.23	7.90	59.9	7.53	63.8
08/09/18	8:30	87	8.20	3.37	55.3	8.45	8.47	62.2	8.31	7.74	64.1	7.08	64.7
08/09/18	9:30	NA	8.20	3.65	55.6	8.45	8.49	62.2	8.33	7.98	63.2	7.44	67.1
08/09/18	10:30	88	8.20	3.73	56.1	8.45	8.53	62.4	8.31	8.13	64.7	7.64	69.2
08/09/18	11:30	NA	8.20	3.23	56.5	8.45	8.49	62.4	8.31	7.95	66.0	7.41	67.2
08/09/18	12:30	93	8.20	3.02	59.4	8.45	8.47	66.0	8.29	7.89	67.9	7.39	71.7
08/09/18	13:30	NA	8.20	3.01	60.3	8.45	8.37	65.0	8.30	8.26	68.7	7.70	72.3
08/09/18	14:30	RECIRCULATING											
08/09/18	15:30	NA	8.20	3.32	62.0	8.38	8.53	67.6	8.46	8.00	72.1	7.19	72.0
08/09/18	16:30	93	8.20	3.15	63.0	8.38	8.39	68.9	8.38	8.23	70.0	7.61	67.1
08/09/18	17:30	NA	8.20	3.08	64.1	8.35	8.49	69.3	8.38	7.79	70.3	7.35	69.4
08/09/18	18:30	93	8.20	3.05	63.7	8.32	8.29	70.0	8.36	8.23	70.4	7.66	72.3
08/09/18	19:30	NA	8.20	3.02	63.7	8.35	8.27	70.3	8.37	8.15	70.3	7.60	72.1
08/09/18	20:30	94	8.20	3.00	65.1	8.32	8.22	70.0	8.37	7.81	69.3	6.90	69.5
08/09/18	21:30	NA	8.20	3.01	64.6	8.32	8.27	71.2	8.37	7.80	68.7	6.74	69.5
08/09/18	22:30	93	8.20	3.20	63.7	8.32	8.22	71.0	8.39	7.80	68.5	6.76	68.7
08/09/18	23:30	NA	8.20	3.02	63.0	8.32	8.32	70.5	8.39	7.83	68.1	6.81	68.3
08/10/18	0:30	93	8.20	3.00	65.1	8.32	8.37	69.8	8.36	7.80	68.5	6.86	68.0
08/10/18	1:30	NA	8.20	3.03	64.1	8.32	8.21	68.6	8.36	7.63	63.7	6.89	63.0
08/10/18	2:30	93	8.20	3.02	61.3	8.32	8.28	67.6	8.38	7.62	64.6	6.81	64.7
08/10/18	3:30	NA	8.20	3.01	60.6	8.32	8.38	66.7	8.38	7.64	64.4	6.77	64.0
08/10/18	4:30	93	8.20	3.01	59.9	8.32	8.28	65.7	8.41	7.67	64.1	6.73	63.5
08/10/18	5:30	NA	8.20	3.02	59.2	8.32	8.29	64.8	8.40	7.63	63.8	6.78	63.8

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/10/18	6:30	93	8.20	3.02	58.4	8.32	8.21	64.1	8.39	7.66	62.2	6.77	63.8
08/10/18	7:30	NA	8.20	3.00	56.5	8.32	8.37	63.4	8.39	8.15	62.5	7.52	61.4
08/10/18	8:30	93	8.20	3.09	56.3	8.32	8.20	62.9	8.36	8.04	64.0	7.33	64.3
08/10/18	9:30	NA	8.20	3.21	56.5	8.32	8.45	62.6	8.34	8.00	64.7	7.27	65.5
08/10/18	10:30	93	8.20	3.25	56.8	8.32	8.35	62.6	8.34	8.03	65.9	7.23	67.1
08/10/18	11:30	NA	8.20	3.18	57.2	8.32	8.33	63.1	8.34	7.52	65.1	7.13	69.0
08/10/18	12:30	93	8.20	3.16	58.0	8.32	8.34	63.1	8.34	8.03	65.8	7.09	70.8
08/10/18	13:30	NA	8.20	3.14	59.4	8.32	8.38	64.8	8.32	8.06	70.0	7.53	72.5
08/10/18	14:30	93	8.20	3.12	61.8	8.32	8.33	65.7	8.35	8.05	69.1	7.32	71.9
08/10/18	15:30	SHUTDOWN											
08/13/18	13:30	RESTART											
08/13/18	14:30	135	8.20	3.29	65.1	8.32	8.39	69.1	8.31	7.83	70.5	7.42	69.7
08/13/18	15:30	NA	8.20	3.41	68.2	8.32	8.41	70.5	8.29	8.02	78.4	7.28	72.6
08/13/18	16:30	150	8.20	3.41	70.3	8.32	8.35	72.4	8.30	8.07	76.5	7.40	67.8
08/13/18	17:30	NA	8.20	3.41	70.1	8.32	8.36	73.4	8.30	8.19	76.6	7.59	68.5
08/13/18	18:30	149	8.20	3.38	70.3	8.32	8.50	73.6	8.31	8.16	74.0	7.54	68.9
08/13/18	19:30	NA	8.20	3.41	71.3	8.32	8.38	74.5	8.31	7.96	72.1	6.90	71.5
08/13/18	20:30	148	8.20	3.42	70.6	8.32	8.35	74.5	8.31	8.04	72.0	6.93	71.6
08/13/18	21:30	NA	8.20	3.42	69.9	8.32	8.31	74.5	8.31	8.03	69.5	6.85	66.8
08/13/18	22:30	148	8.20	3.41	69.1	8.32	8.39	73.6	8.30	8.01	68.8	6.88	66.1
08/13/18	23:30	NA	8.20	3.41	68.0	8.32	8.28	72.9	8.32	7.96	67.8	6.77	66.4
08/14/18	0:30	148	8.20	3.40	67.0	8.32	8.24	71.7	8.32	7.94	67.0	6.80	66.0
08/14/18	1:30	NA	8.20	3.41	66.1	8.32	8.41	70.0	8.32	7.95	66.9	6.75	65.5
08/14/18	2:30	148	8.20	3.43	64.6	8.32	8.29	69.1	8.32	7.99	66.8	6.78	64.9
08/14/18	3:30	NA	8.20	3.42	64.1	8.32	8.33	68.4	8.31	7.97	66.6	6.75	65.5
08/14/18	4:30	148	8.20	3.40	63.0	8.32	8.27	67.2	8.32	7.98	66.2	6.77	65.3
08/14/18	5:30	NA	8.20	3.38	62.0	8.32	8.46	66.7	8.31	7.96	63.0	6.77	65.0
08/14/18	6:30	148	8.20	3.38	61.5	8.32	8.28	65.7	8.33	7.91	63.2	6.58	63.3
08/14/18	7:30	NA	8.20	3.38	60.1	8.32	8.23	64.6	8.33	7.94	62.4	7.28	65.8
08/14/18	8:30	150	8.20	3.36	60.8	8.32	8.18	70.5	8.69	7.95	63.8	7.28	66.8
08/14/18	9:30	SHUTDOWN FOR MAINTENANCE											
08/14/18	10:30	SHUTDOWN FOR MAINTENANCE											
08/14/18	11:30	NA	8.20	3.37	62.7	8.28	8.15	74.3	8.33	8.07	67.2	7.38	67.1
08/14/18	12:30	150	8.20	3.53	66.5	8.28	8.16	76.7	8.34	8.19	69.1	7.17	74.0
08/14/18	13:30	NA	8.20	3.53	66.5	8.28	8.26	78.8	8.37	8.12	71.3	7.42	70.9
08/14/18	14:30	148	8.20	3.52	66.1	8.28	8.20	79.3	8.37	8.22	67.4	7.01	67.0
08/14/18	15:30	NA	8.20	3.39	65.6	8.28	8.20	78.4	8.34	8.26	72.3	7.91	70.9
08/14/18	16:30	148	8.20	3.49	66.1	8.28	8.48	77.9	8.40	8.23	71.8	7.86	71.4
08/14/18	17:30	NA	8.20	3.46	65.8	8.28	8.29	78.9	8.38	8.33	68.6	7.57	67.4
08/14/18	18:30	147	8.20	3.52	65.6	8.28	8.31	78.1	8.38	8.38	67.6	7.45	67.6
08/14/18	19:30	NA	8.20	3.31	64.6	8.28	8.34	77.9	8.35	8.02	67.1	6.95	66.1
08/14/18	20:30	146	8.20	3.23	64.6	8.28	8.36	77.6	8.33	8.00	66.1	6.90	65.5
08/14/18	21:30	NA	8.20	3.20	63.9	8.28	8.41	77.2	8.32	8.03	65.4	7.01	65.2
08/14/18	22:30	148	8.20	3.18	63.7	8.28	8.38	76.7	8.32	7.92	64.7	6.80	64.2
08/14/18	23:30	NA	8.20	3.17	62.7	8.28	8.27	76.0	8.32	7.92	64.2	6.85	64.0
08/15/18	0:30	150	8.20	3.14	62.0	8.28	8.39	75.3	8.32	7.92	63.0	6.80	63.0
08/15/18	1:30	NA	8.20	3.15	61.1	8.28	8.38	74.5	8.31	7.95	62.4	6.86	62.9
08/15/18	2:30	150	8.20	3.16	60.3	8.28	8.48	73.6	8.29	7.94	61.8	6.86	62.2
08/15/18	3:30	NA	8.20	3.14	59.6	8.28	8.15	72.6	8.31	7.94	61.2	6.90	62.3
08/15/18	4:30	148	8.20	3.13	58.7	8.28	8.20	72.2	8.30	8.01	59.8	7.00	60.3
08/15/18	5:30	NA	8.20	3.14	57.0	8.28	8.21	71.5	8.32	8.01	59.7	7.10	59.6
08/15/18	6:30	146	8.20	3.17	57.2	8.28	7.61	70.5	8.27	RECIRCULATING		7.15	59.9
08/15/18	7:30	NA	8.20	3.39	57.1	8.28	8.44	69.8	8.02	RECIRCULATING		6.98	60.0
08/15/18	8:30	135	8.20	3.68	56.8	8.28	8.45	69.5	8.26	8.45	63.3	7.65	65.4
08/15/18	9:30	NA	8.20	3.62	58.9	8.28	8.46	69.8	8.34	8.43	64.4	7.78	66.0
08/15/18	10:30	130	8.20	3.60	58.0	8.28	8.18	70.4	8.34	8.42	64.0	7.68	70.0
08/15/18	11:30	NA	8.20	3.61	60.3	8.28	8.24	70.0	8.32	8.45	66.2	7.75	66.8
08/15/18	12:30	145	8.20	3.50	61.3	8.28	8.37	72.9	8.33	8.45	66.0	7.74	67.0
08/15/18	13:30	NA	8.20	3.38	61.5	8.28	8.26	73.6	8.31	8.42	66.1	7.73	66.8
08/15/18	14:30	145	8.20	3.31	63.0	8.28	8.36	75.0	8.36	8.22	68.4	7.72	70.1
08/15/18	15:30	NA	8.20	3.30	63.4	8.28	8.22	75.3	8.31	8.23	69.6	7.80	70.7
08/15/18	16:30	145	8.20	3.28	64.4	8.28	8.30	76.4	8.34	8.21	70.4	7.71	72.2
08/15/18	17:30	NA	8.20	3.28	64.9	8.28	8.47	76.9	8.34	8.17	70.8	7.63	72.8
08/15/18	18:30	145	8.20	3.31	66.1	8.28	8.37	77.4	8.22	8.23	69.4	7.58	73.5

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/15/18	19:30	NA	8.20	3.23	67.2	8.28	8.23	78.4	8.30	8.12	69.2	7.25	69.9
08/15/18	20:30	140	8.20	3.13	68.2	8.28	8.18	79.1	8.29	8.14	69.1	7.27	69.7
08/15/18	21:30	NA	8.20	3.12	68.2	8.28	8.21	79.8	8.29	8.11	67.4	7.20	66.1
08/15/18	22:30	140	8.20	3.10	67.7	8.28	8.40	79.3	8.29	8.10	67.8	7.22	66.4
08/15/18	23:30	NA	8.20	3.09	66.1	8.28	8.32	78.4	8.29	8.11	65.2	7.16	63.6
08/16/18	0:30	140	8.20	3.08	64.9	8.28	8.40	77.2	8.27	8.11	64.9	7.11	63.1
08/16/18	1:30	NA	8.20	3.07	63.7	8.28	8.09	75.3	8.27	8.05	63.6	7.12	62.6
08/16/18	2:30	142	8.20	3.11	62.2	8.28	8.23	74.1	8.26	7.98	63.5	7.08	61.6
08/16/18	3:30	NA	8.20	3.11	61.1	8.28	8.41	73.4	8.27	8.02	62.1	7.13	61.3
08/16/18	4:30	144	8.20	3.11	60.1	8.28	8.17	71.9	8.28	8.05	60.7	7.15	60.3
08/16/18	5:30	NA	8.20	3.12	59.6	8.34	8.29	70.7	8.33	8.00	60.4	7.11	60.0
08/16/18	6:30	142	8.20	3.14	58.7	8.34	8.22	70.0	8.33	8.02	60.0	7.09	59.8
08/16/18	7:30	NA	8.20	3.15	58.0	8.28	8.42	69.1	8.33	8.20	59.8	7.00	59.8
08/16/18	8:30	142	8.20	3.14	57.2	8.34	8.19	68.4	8.35	8.15	62.1	7.39	63.8
08/16/18	9:30	NA	8.20	3.19	57.2	8.34	8.50	68.1	8.35	8.23	63.4	7.20	61.5
08/16/18	10:30	140	8.20	3.09	58.7	8.34	8.33	68.8	8.32	8.18	64.3	7.62	67.8
08/16/18	11:30	NA	8.20	3.07	59.2	8.34	8.44	69.3	8.39	8.21	66.5	7.56	71.2
08/16/18	12:30	150	8.20	3.10	60.8	8.34	8.29	71.2	8.34	8.15	66.2	7.47	72.7
08/16/18	13:30	NA	8.20	3.12	62.7	8.34	8.23	71.9	8.31	7.92	68.2	7.49	73.2
08/16/18	14:30	150	8.20	3.10	65.1	8.34	8.35	73.5	8.33	8.02	66.5	7.46	76.1
08/16/18	15:30	NA	8.20	3.10	65.1	8.34	8.21	75.3	8.35	7.74	68.6	7.30	71.2
08/16/18	16:30	150	8.20	3.09	67.2	8.34	8.28	76.4	8.33	7.71	69.8	7.25	74.8
08/16/18	17:30	NA	8.20	3.09	68.7	8.34	8.29	78.1	8.34	7.75	70.5	7.30	72.8
08/16/18	18:30	150	8.20	2.85	66.5	8.34	8.21	79.3	8.42	7.56	69.9	7.20	70.7
08/16/18	19:30	NA	8.20	2.83	67.0	8.34	8.38	79.8	8.41	7.78	69.2	6.65	71.3
08/16/18	20:30	150	8.20	2.81	66.3	8.34	8.25	79.5	8.43	7.64	69.4	6.76	68.1
08/16/18	21:30	NA	8.20	2.84	66.1	8.34	8.28	79.3	8.43	7.71	69.7	6.74	67.1
08/16/18	22:30	150	8.20	3.92	64.9	8.34	8.33	78.6	8.41	7.55	68.4	6.93	65.5
08/16/18	23:30	NA	8.20	2.97	64.1	8.34	8.21	77.9	8.38	7.63	68.0	6.88	65.6
08/17/18	0:30	150	8.20	3.01	63.0	8.34	8.16	76.7	8.37	7.73	66.5	6.76	65.6
08/17/18	1:30	NA	8.20	3.05	61.8	8.34	8.35	75.5	8.40	7.48	66.0	6.83	65.7
08/17/18	2:30	150	8.20	3.04	60.8	8.34	8.38	74.8	8.40	6.99	64.5	7.74	64.9
08/17/18	3:30	NA	8.20	3.03	59.4	8.34	8.45	73.4	8.37	6.97	64.3	7.70	64.5
08/17/18	4:30	150	8.20	3.04	58.2	8.34	8.18	71.9	8.38	6.93	63.8	7.73	63.9
08/17/18	5:30	NA	8.20	3.04	56.8	8.34	8.20	71.0	8.39	7.47	62.9	6.90	65.9
08/17/18	6:30	150	8.20	3.13	56.1	8.34	8.36	69.8	8.40	7.61	61.3	6.97	65.9
08/17/18	7:30	NA	8.20	3.18	55.1	8.34	8.33	68.8	8.40	7.86	60.5	7.16	59.0
08/17/18	8:30	149	8.20	3.16	54.9	8.34	8.29	68.1	8.37	7.88	61.1	7.18	61.7
08/17/18	9:30	NA	8.20	3.18	55.6	8.34	8.34	68.1	8.38	7.94	61.6	7.23	63.0
08/17/18	10:30	150	8.20	3.16	56.8	8.34	8.35	68.8	8.37	7.95	63.4	7.34	66.1
08/17/18	11:30	NA	8.20	3.20	58.2	8.34	8.43	69.3	8.38	7.98	64.9	7.40	68.5
08/17/18	12:30	150	8.20	3.20	59.9	8.34	8.25	71.7	8.36	7.99	66.9	7.43	71.0
08/17/18	13:30	NA	8.20	3.18	61.5	8.34	8.21	73.4	8.40	7.99	68.1	7.43	72.1
08/17/18	14:30	142	8.20	3.21	63.4	8.34	8.31	75.0	8.40	7.98	72.8	7.41	72.8
08/17/18	15:30	NA	8.20	3.28	65.3	8.34	8.20	76.7	8.43	7.96	70.3	7.40	71.8
08/17/18	16:30	142	8.20	3.16	67.2	8.34	8.38	78.6	8.39	7.90	71.3	7.39	72.3
08/17/18	17:30	NA	8.20	3.13	68.9	8.34	8.42	80.0	8.37	7.88	71.8	7.35	73.7
08/17/18	18:30	142	8.20	3.15	69.6	8.34	8.23	81.2	8.35	7.75	71.4	7.20	70.3
08/17/18	19:30	NA	8.20	3.07	69.4	8.34	8.30	81.7	8.32	8.05	72.5	7.18	73.6
08/17/18	20:30	143	8.20	3.04	68.7	8.34	8.20	81.4	8.32	8.01	71.3	6.85	68.4
08/17/18	21:30	NA	8.20	3.04	67.5	8.34	8.33	80.7	8.32	7.87	69.8	6.98	66.4
08/17/18	22:30	165	8.20	2.95	66.3	8.34	8.29	79.5	8.32	7.88	69.5	6.95	66.0
08/17/18	23:30	NA	8.20	2.91	65.1	8.34	8.25	78.1	8.30	7.83	69.1	6.97	65.7
08/18/18	0:30	160	8.20	2.90	63.2	8.34	8.24	76.7	8.28	7.90	66.2	7.17	64.9
08/18/18	1:30	NA	8.20	3.02	61.8	8.34	8.21	75.0	8.30	8.02	64.6	7.12	63.0
08/18/18	2:30	140	8.20	3.29	60.1	8.34	8.39	74.1	8.28	7.99	64.0	7.09	62.7
08/18/18	3:30	NA	8.20	3.42	58.7	8.34	8.35	72.9	8.31	8.03	63.6	7.11	62.3
08/18/18	4:30	140	8.20	3.41	52.7	8.34	8.38	70.7	8.30	7.93	61.4	7.04	63.4
08/18/18	5:30	NA	8.20	3.44	56.5	8.34	8.24	69.8	8.30	7.80	61.5	6.82	65.0
08/18/18	6:30	140	8.20	3.43	55.6	8.34	8.35	68.8	8.32	7.77	60.3	6.79	64.3
08/18/18	7:30	NA	8.20	3.26	54.6	8.34	8.44	67.6	8.30	8.01	60.0	7.14	57.7
08/18/18	8:30	140	8.20	3.08	53.9	8.34	8.29	66.7	8.29	8.00	60.0	7.15	58.2
08/18/18	9:30	NA	8.20	3.10	54.4	8.34	8.22	66.9	8.26	8.03	61.3	7.18	61.9
08/18/18	10:30	142	8.20	3.13	55.8	8.38	8.45	67.6	8.29	8.05	63.9	7.46	66.9

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/18/18	11:30	NA	8.20	3.12	57.0	8.38	8.33	68.1	8.30	8.05	63.5	7.48	66.9
08/18/18	12:30	140	8.20	3.10	58.4	8.38	8.40	70.0	8.31	8.00	65.5	7.35	67.6
08/18/18	13:30	NA	8.20	3.09	61.5	8.38	8.40	71.9	8.31	8.01	67.0	7.21	69.0
08/18/18	14:30	140	8.20	3.08	62.5	8.38	8.32	73.8	8.32	8.00	69.7	7.20	72.5
08/18/18	15:30	NA	8.20	3.07	64.4	8.38	8.45	75.7	8.30	8.00	70.0	7.13	70.1
08/18/18	16:30	140	8.20	3.06	65.6	8.38	8.31	76.9	8.31	8.00	70.7	7.10	71.6
08/18/18	17:30	NA	8.20	3.05	67.0	8.38	8.42	78.4	8.35	8.00	71.9	7.08	72.1
08/18/18	18:30	140	8.20	2.99	67.5	8.38	8.41	79.3	8.35	7.85	72.2	7.03	72.9
08/18/18	19:30	NA	8.20	3.11	67.7	8.38	8.41	79.8	8.36	7.95	72.4	7.10	72.7
08/18/18	20:30	148	8.20	3.05	67.7	8.38	8.41	80.0	8.35	8.09	70.9	6.75	69.2
08/18/18	21:30	NA	8.20	3.03	67.5	8.38	8.41	80.0	8.31	8.06	70.1	6.96	68.1
08/18/18	22:30	149	8.20	3.03	66.3	8.38	8.38	78.8	8.35	8.04	69.8	6.92	68.0
08/18/18	23:30	NA	8.20	3.06	65.8	8.38	8.40	78.4	8.36	8.00	69.5	6.90	67.8
08/19/18	0:30	127	8.20	3.17	64.4	8.38	8.33	77.4	8.41	8.08	66.9	6.81	65.1
08/19/18	1:30	NA	8.20	3.33	63.4	8.38	8.31	76.4	8.35	7.92	66.5	6.98	64.7
08/19/18	2:30	125	8.20	3.34	62.5	8.38	8.44	75.5	8.36	7.89	66.0	6.94	64.0
08/19/18	3:30	NA	8.20	3.33	61.8	8.38	8.36	74.3	8.39	7.84	65.3	6.89	63.8
08/19/18	4:30	137	8.20	3.31	60.3	8.38	8.40	73.1	8.38	7.94	64.5	6.83	63.5
08/19/18	5:30	NA	8.20	3.20	59.9	8.38	8.42	72.4	8.36	8.03	63.5	6.84	64.5
08/19/18	6:30	136	8.20	3.19	58.4	8.38	8.40	71.5	8.38	7.97	64.4	6.60	65.5
08/19/18	7:30	NA	8.20	3.11	57.2	8.38	8.25	70.3	8.37	7.98	62.2	6.98	62.6
08/19/18	8:30	140	8.20	3.16	57.0	8.38	8.36	69.3	8.40	8.07	64.3	7.10	64.1
08/19/18	9:30	NA	8.20	3.20	57.5	8.38	8.41	69.8	8.39	8.08	64.4	7.09	66.1
08/19/18	10:30	140	8.20	3.19	58.2	8.38	8.39	69.5	8.37	8.04	66.9	7.43	67.8
08/19/18	11:30	NA	8.20	3.23	59.2	8.38	8.38	70.0	8.38	8.08	68.9	7.65	70.0
08/19/18	12:30	140	8.20	3.36	60.8	8.38	8.22	71.9	8.43	8.10	70.4	7.59	71.3
08/19/18	13:30	NA	8.20	3.34	62.2	8.38	8.25	74.1	8.39	8.12	69.5	7.36	74.2
08/19/18	14:30	140	8.20	3.21	63.4	8.38	8.35	74.3	8.37	8.13	69.9	7.44	74.6
08/19/18	15:30	NA	8.20	3.15	63.7	8.38	8.27	70.5	8.39	8.15	71.1	7.47	75.7
08/19/18	16:30	140	8.20	3.18	65.8	8.38	8.40	73.7	8.39	8.14	70.8	7.61	71.5
08/19/18	17:30	NA	8.20	3.20	66.3	8.38	8.42	76.4	8.37	8.18	71.2	7.61	76.9
08/19/18	18:30	140	8.20	3.19	65.2	8.38	8.41	75.8	8.37	8.12	70.6	7.55	75.7
08/19/18	19:30	NA	8.20	3.29	67.2	8.38	8.37	77.6	8.33	7.95	70.6	7.11	70.0
08/19/18	20:30	136	8.20	3.30	67.5	8.38	8.43	78.1	8.33	7.98	70.9	7.14	70.3
08/19/18	21:30	NA	8.20	3.30	67.5	8.38	8.39	78.1	8.30	7.97	70.7	7.11	67.2
08/19/18	22:30	136	8.20	3.28	66.1	8.38	8.32	77.9	8.29	7.95	70.0	7.08	66.8
08/19/18	23:30	NA	8.20	3.27	65.3	8.38	8.25	77.2	8.27	7.95	67.3	7.11	65.8
08/20/18	0:30	136	8.20	3.27	64.1	8.38	8.42	76.2	8.27	7.94	67.0	7.08	64.9
08/20/18	1:30	NA	8.20	3.27	63.2	8.38	8.44	75.5	8.29	7.95	65.6	7.13	64.2
08/20/18	2:30	136	8.20	3.27	62.2	8.38	8.41	74.1	8.31	7.98	65.1	7.10	64.0
08/20/18	3:30	NA	8.20	3.25	61.8	8.38	8.43	73.4	8.31	7.94	63.4	7.14	62.9
08/20/18	4:30	136	8.20	3.25	60.6	8.38	8.31	72.2	8.30	7.94	61.4	7.18	61.2
08/20/18	5:30	NA	8.20	3.22	59.6	8.38	8.42	71.2	8.29	7.97	61.8	7.22	60.6
08/20/18	6:30	136	8.20	3.24	58.9	8.38	8.41	68.8	8.29	8.00	61.0	7.29	59.8
08/20/18	7:30	NA	8.20	3.23	58.0	8.38	8.54	69.8	8.29	8.01	60.0	7.74	61.5
08/20/18	8:30	135	8.20	3.24	57.5	8.38	8.41	68.6	8.29	8.04	62.6	7.76	64.0
08/20/18	9:30	NA	8.20	3.25	57.5	8.38	8.48	68.4	8.29	8.05	65.8	7.73	68.2
08/20/18	10:30	135	8.20	3.32	58.9	8.38	8.41	69.1	8.32	8.14	67.7	7.87	67.1
08/20/18	11:30	NA	8.20	3.38	59.4	8.38	8.47	69.8	8.34	8.30	70.1	7.92	66.9
08/20/18	12:30	135	8.20	3.40	61.5	8.38	8.25	71.2	8.33	8.15	67.6	7.78	70.5
08/20/18	13:30	NA	8.20	3.41	62.0	8.40	8.48	71.5	8.35	8.25	69.3	7.58	71.3
08/20/18	14:30	135	8.20	3.30	65.1	8.40	8.32	74.1	8.36	8.23	70.1	7.32	71.8
08/20/18	15:30	NA	8.20	3.28	66.5	8.40	8.36	75.5	8.35	8.28	70.9	7.55	72.7
08/20/18	16:30	135	8.20	3.26	69.1	8.38	8.23	78.1	8.35	8.25	74.0	7.57	71.1
08/20/18	17:30	NA	8.20	3.26	69.4	8.38	8.43	78.4	8.34	8.25	73.1	7.51	73.2
08/20/18	18:30	135	8.20	2.96	70.1	8.38	8.42	79.5	8.45	8.18	72.4	7.43	71.2
08/20/18	19:30	NA	8.20	3.03	69.9	8.38	8.26	79.8	8.45	7.96	73.4	7.35	72.3
08/20/18	20:30	136	8.20	3.03	69.6	8.38	8.36	80.0	8.40	8.10	69.7	7.21	68.7
08/20/18	21:30	NA	8.20	3.02	68.9	8.38	8.41	79.5	8.40	8.00	69.5	7.30	69.1
08/20/18	22:30	136	8.20	3.00	67.7	8.38	8.26	78.8	8.39	8.05	68.4	7.32	65.6
08/20/18	23:30	NA	8.20	2.99	66.8	8.38	8.26	77.9	8.37	8.01	68.0	7.28	66.3
08/21/18	0:30	136	8.20	3.12	65.8	8.38	8.33	76.9	8.41	8.05	65.8	7.29	63.8
08/21/18	1:30	NA	8.20	3.15	64.9	8.38	8.30	73.7	8.38	8.00	64.9	7.24	63.0
08/21/18	2:30	136	8.20	3.12	63.7	8.38	8.26	74.8	8.36	8.05	64.1	7.25	62.2

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/21/18	3:30	NA	8.20	3.10	63.0	8.38	8.29	73.8	8.37	8.02	63.6	7.22	62.0
08/21/18	4:30	136	8.20	3.13	61.5	8.38	8.29	72.6	8.39	8.05	63.1	7.25	61.4
08/21/18	5:30	NA	8.20	3.10	60.8	8.38	8.34	71.9	8.37	8.00	62.4	7.18	59.2
08/21/18	6:30	136	8.20	3.10	59.9	8.38	8.43	71.0	8.37	8.04	61.2	7.20	59.6
08/21/18	7:30	NA	8.20	3.10	59.2	8.35	8.31	70.0	8.37	8.04	62.3	7.76	62.6
08/21/18	8:30	130	8.20	3.09	58.7	8.35	8.30	69.3	8.38	8.18	63.2	7.57	62.0
08/21/18	9:30	NA	8.20	3.28	58.9	8.35	8.39	69.1	8.39	8.19	65.4	7.58	65.2
08/21/18	10:30	120	8.20	3.33	59.4	8.35	8.33	69.5	8.39	8.16	66.3	7.87	66.8
08/21/18	11:30	NA	8.20	3.41	60.1	8.35	8.31	70.0	8.39	8.27	67.2	7.83	68.1
08/21/18	12:30	122	8.20	3.50	61.5	8.35	8.45	71.0	8.45	8.39	70.3	7.77	69.0
08/21/18	13:30	NA	8.20	3.48	63.4	8.35	8.37	71.9	8.46	8.40	69.4	7.72	69.6
08/21/18	14:30	122	8.20	3.43	65.1	8.30	8.33	73.4	8.40	8.33	68.2	7.71	70.3
08/21/18	15:30	NA	8.20	3.33	66.8	8.30	8.26	74.8	8.41	8.32	74.4	7.80	72.2
08/21/18	16:30	122	8.20	3.28	68.0	8.30	8.27	76.7	8.39	8.32	74.2	7.74	70.8
08/21/18	17:30	NA	8.20	3.25	68.9	8.30	8.35	77.2	8.41	8.28	73.7	7.81	70.7
08/21/18	18:30	122	8.20	3.38	69.1	8.30	8.29	78.1	8.30	8.31	71.4	7.64	72.4
08/21/18	19:30	NA	8.20	3.35	68.9	8.30	8.26	78.8	8.32	8.31	70.5	7.62	69.8
08/21/18	20:30	120	8.20	3.33	68.9	8.30	8.32	79.1	8.29	8.39	67.0	7.41	66.5
08/21/18	21:30	NA	8.20	3.31	68.0	8.30	8.38	78.4	8.26	8.32	66.0	7.56	65.8
08/21/18	22:30	122	8.20	3.29	66.5	8.32	8.29	77.6	8.26	8.40	65.3	7.44	63.8
08/21/18	23:30	NA	8.20	3.27	65.1	8.32	8.37	76.7	8.26	8.36	64.0	7.52	61.9
08/22/18	0:30	126	8.20	3.24	64.1	8.32	8.37	75.3	8.28	8.40	63.3	7.38	61.5
08/22/18	1:30	NA	8.20	3.25	62.7	8.32	8.41	74.1	8.25	8.38	61.2	7.42	58.9
08/22/18	2:30	124	8.20	3.26	61.5	8.32	8.20	72.9	8.25	8.36	60.5	7.40	60.7
08/22/18	3:30	NA	8.20	3.25	60.3	8.32	8.40	71.2	8.26	8.40	60.0	7.54	59.5
08/22/18	4:30	124	8.20	3.25	59.4	8.32	8.15	70.5	8.28	8.30	58.9	7.44	59.2
08/22/18	5:30	NA	8.20	3.23	58.2	8.32	8.38	69.3	8.31	8.38	58.1	7.49	58.6
08/22/18	6:30	126	8.20	3.24	57.5	8.32	8.39	68.4	8.31	8.28	57.7	7.39	59.1
08/22/18	7:30	NA	8.20	3.22	56.5	8.32	8.40	67.4	8.35	8.39	60.3	7.54	59.5
08/22/18	8:30	122	8.20	3.22	55.1	8.32	8.45	66.7	8.35	8.42	62.3	7.57	63.0
08/22/18	9:30	NA	8.20	3.23	56.3	8.32	8.41	66.5	8.33	8.26	62.9	7.54	63.8
08/22/18	10:30	122	8.20	3.22	56.8	8.32	8.46	66.7	8.30	8.25	63.1	7.56	65.1
08/22/18	11:30	NA	8.20	3.21	57.7	8.32	8.37	67.4	8.32	8.20	64.1	7.61	67.7
08/22/18	12:30	122	8.20	3.20	59.9	8.32	8.36	68.8	8.30	8.19	65.3	7.60	68.0
08/22/18	13:30	NA	8.20	3.20	60.6	8.32	8.25	70.0	8.31	8.19	67.9	7.55	68.1
08/22/18	14:30	122	8.20	3.19	62.0	8.32	8.37	71.7	8.31	8.15	68.4	7.54	70.6
08/22/18	15:30	NA	8.20	3.18	63.7	8.32	8.32	72.6	8.32	8.16	69.0	7.45	70.9
08/22/18	16:30	121	8.20	3.17	65.6	8.32	8.22	73.8	8.32	8.14	68.7	7.49	70.9
08/22/18	17:30	NA	8.20	3.18	65.6	8.32	8.33	75.3	8.31	8.12	70.5	7.57	71.3
08/22/18	18:30	122	8.20	3.13	66.5	8.32	8.32	76.0	8.31	8.11	70.1	7.49	68.7
08/22/18	19:30	NA	8.20	3.11	66.5	8.32	8.40	76.2	8.30	8.10	68.9	7.58	69.5
08/22/18	20:30	124	8.20	3.09	66.3	8.32	8.23	76.4	8.30	8.12	67.7	7.30	65.5
08/22/18	21:30	NA	8.20	3.12	65.8	8.32	8.26	76.2	8.30	8.16	67.6	7.15	65.3
08/22/18	22:30	123	8.20	3.16	64.4	8.32	8.36	75.7	8.28	8.06	66.1	7.24	64.5
08/22/18	23:30	NA	8.20	3.18	63.9	8.32	8.32	74.8	8.25	8.01	65.6	7.29	63.9
08/23/18	0:30	124	8.20	3.25	62.7	8.32	8.30	73.6	8.29	8.11	65.7	7.31	63.9
08/23/18	1:30	NA	8.20	3.23	62.0	8.32	8.31	72.9	8.29	8.07	65.1	7.30	63.5
08/23/18	2:30	125	8.20	3.26	61.1	8.32	8.43	71.9	8.29	7.98	66.7	7.24	63.3
08/23/18	3:30	NA	8.20	3.24	60.3	8.32	8.24	71.2	8.28	8.06	63.1	7.31	63.3
08/23/18	4:30	123	8.20	3.23	59.4	8.32	8.36	70.3	8.29	8.12	61.3	7.13	62.5
08/23/18	5:30	NA	8.20	3.24	58.7	8.32	8.26	69.3	8.30	8.09	61.0	7.14	62.4
08/23/18	6:30	124	8.20	3.25	58.0	8.32	8.36	68.8	8.28	8.11	60.2	7.12	62.0
08/23/18	7:30	NA	8.20	3.24	57.0	8.32	8.18	67.9	8.28	8.24	60.7	7.67	58.6
08/23/18	8:30	108	8.20	3.27	56.8	8.32	8.37	67.2	8.30	RECIRCULATING		7.62	61.7
08/23/18	9:30	NA	8.20	3.22	57.0	8.32	8.21	67.2	8.30	8.18	63.3	7.49	63.8
08/23/18	10:30	118	8.20	3.08	58.0	8.32	8.26	67.4	8.27	8.16	65.2	7.54	65.7
08/23/18	11:30	NA	8.20	3.14	58.4	8.32	8.35	68.4	8.30	8.18	66.4	7.59	64.5
08/23/18	12:30	116	8.20	3.29	59.9	8.32	8.22	69.3	8.30	8.20	66.2	7.59	65.8
08/23/18	13:30	NA	8.20	3.36	59.9	8.32	8.35	70.0	8.28	8.23	67.4	7.46	67.8
08/23/18	14:30	110	8.20	3.23	61.1	8.32	8.45	70.7	8.31	8.24	68.1	7.47	68.8
08/23/18	15:30	NA	8.20	3.16	64.4	8.32	8.33	72.2	8.31	8.20	69.1	7.49	71.5
08/23/18	16:30	110	8.20	3.13	65.1	8.32	8.44	73.6	8.30	8.17	70.2	7.47	70.8
08/23/18	17:30	NA	8.20	3.10	65.1	8.32	8.39	75.3	8.33	8.21	69.8	7.51	69.6
08/23/18	18:30	109	8.20	3.07	64.9	8.32	8.42	76.7	8.37	8.21	68.6	7.51	67.9

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/23/18	19:30	NA	8.20	3.07	64.9	8.32	8.17	76.0	8.36	8.29	65.9	7.76	63.1
08/23/18	20:30	110	8.20	3.05	64.6	8.32	8.30	75.7	8.39	8.22	69.8	7.77	63.0
08/23/18	21:30	NA	8.20	3.03	64.4	8.32	8.33	76.0	8.37	8.25	69.6	7.69	62.7
08/23/18	22:30	118	8.20	3.01	63.2	8.32	8.28	75.3	8.37	8.12	64.9	6.99	62.4
08/23/18	23:30	NA	8.20	2.89	61.8	8.32	8.34	74.1	8.30	8.12	64.8	7.02	65.3
08/24/18	0:30	110	8.20	2.87	61.1	8.32	8.22	73.6	8.30	8.07	64.2	6.98	65.0
08/24/18	1:30	NA	8.20	2.95	59.9	8.32	8.37	72.4	8.35	7.99	68.7	6.95	64.7
08/24/18	2:30	110	8.20	2.96	59.4	8.32	8.40	71.7	8.38	8.18	62.5	7.02	62.0
08/24/18	3:30	NA	8.20	2.97	58.7	8.32	8.42	70.7	8.37	8.15	61.8	7.07	62.3
08/24/18	4:30	110	8.20	2.97	57.7	8.32	8.20	69.3	8.40	8.11	61.0	7.04	62.1
08/24/18	5:30	NA	8.20	2.99	57.0	8.32	8.35	68.8	8.40	8.07	59.9	6.99	61.8
08/24/18	6:30	110	8.20	3.00	55.8	8.32	8.43	68.1	8.41	7.99	58.9	6.93	60.7
08/24/18	7:30	NA	8.20	3.04	54.6	8.32	8.41	66.0	8.39	8.23	58.6	7.75	58.0
08/24/18	8:30	110	8.20	3.23	53.7	8.32	8.46	65.6	8.31	8.15	61.4	7.64	60.3
08/24/18	9:30	NA	8.20	3.28	53.9	8.32	8.33	65.5	8.32	8.32	61.4	7.70	61.1
08/24/18	10:30	110	8.20	3.27	54.9	8.32	8.37	65.7	8.32	8.26	61.8	7.61	62.8
08/24/18	11:30	NA	8.20	3.24	57.0	8.32	8.43	67.6	8.36	8.29	64.6	7.62	70.6
08/24/18	12:30	110	8.20	3.22	58.2	8.32	8.45	68.1	8.33	8.27	64.5	7.66	64.3
08/24/18	13:30	NA	8.20	3.20	60.3	8.32	8.45	69.8	8.34	8.27	65.6	7.66	68.5
08/24/18	14:30	110	8.20	3.19	61.1	8.32	8.39	71.0	8.35	8.25	68.5	7.61	68.0
08/24/18	15:30	NA	8.20	3.20	61.8	8.32	8.45	72.2	8.35	8.24	67.2	7.54	67.9
08/24/18	16:30	110	8.20	3.19	63.4	8.32	8.31	73.1	8.32	8.23	68.4	7.57	67.4
08/24/18	17:30	NA	8.20	3.18	63.2	8.32	8.29	74.1	8.35	8.21	67.6	7.60	68.1
08/24/18	18:30	109	8.20	3.17	63.0	8.32	8.30	74.5	8.27	8.30	68.3	7.64	65.9
08/24/18	19:30	NA	8.20	3.17	63.2	8.32	8.38	74.3	8.27	8.28	67.5	7.48	68.0
08/24/18	20:30	110	8.20	3.17	62.5	8.32	8.18	74.1	8.30	8.27	66.4	7.15	65.9
08/24/18	21:30	NA	8.20	3.15	62.0	8.32	8.27	73.4	8.32	8.23	66.1	7.19	65.4
08/24/18	22:30	110	8.20	3.13	61.3	8.32	8.34	73.1	8.38	8.17	65.5	7.11	65.0
08/24/18	23:30	NA	8.20	3.11	60.1	8.32	8.42	72.2	8.35	8.26	63.6	7.06	63.5
08/25/18	0:30	110	8.20	3.10	59.4	8.32	8.28	71.7	8.28	8.24	63.8	7.22	64.9
08/25/18	1:30	NA	8.20	3.09	59.4	8.32	8.31	70.3	8.29	8.20	63.2	7.15	64.2
08/25/18	2:30	110	8.20	3.19	57.0	8.32	8.36	69.1	8.30	8.22	63.0	7.16	63.9
08/25/18	3:30	NA	8.20	3.12	56.3	8.32	8.40	68.4	8.25	8.15	58.9	7.01	61.0
08/25/18	4:30	111	8.20	3.10	55.3	8.32	8.26	67.4	8.32	8.16	60.0	7.11	63.6
08/25/18	5:30	NA	8.20	3.13	54.2	8.32	8.37	66.2	8.29	8.18	59.4	7.03	63.0
08/25/18	6:30	111	8.20	3.12	53.2	8.32	8.40	65.7	8.29	8.12	58.9	7.07	62.3
08/25/18	7:30	NA	8.20	3.11	52.5	8.32	8.22	64.6	8.29	8.34	56.5	7.64	56.9
08/25/18	8:30	110	8.20	3.11	51.8	8.32	8.38	63.6	8.25	8.25	58.1	7.72	58.9
08/25/18	9:30	NA	8.20	3.11	52.0	8.32	8.46	63.4	8.26	8.17	60.6	7.56	60.6
08/25/18	10:30	RECIRCULATING											
08/25/18	11:30	RECIRCULATING											
08/25/18	12:30	110	8.20	3.22	54.6	8.32	8.40	65.7	8.28	8.13	63.6	7.19	66.0
08/25/18	13:30	NA	8.20	3.21	56.1	8.32	8.31	66.0	8.26	8.18	63.3	7.44	64.2
08/25/18	14:30	110	8.20	3.22	57.2	8.32	8.41	67.4	8.27	8.14	65.6	7.42	65.6
08/25/18	15:30	NA	8.20	3.22	58.9	8.32	8.39	68.4	8.27	8.13	66.2	7.41	66.6
08/25/18	16:30	110	8.20	3.20	60.8	8.32	8.33	70.3	8.26	8.12	66.6	7.35	68.1
08/25/18	17:30	NA	8.20	3.20	60.8	8.32	8.31	71.5	8.25	8.09	65.9	7.36	67.2
08/25/18	18:30	110	8.20	3.21	67.5	8.32	8.28	71.7	8.30	8.10	66.3	7.37	67.7
08/25/18	19:30	NA	8.20	3.11	61.1	8.32	8.20	72.2	8.21	8.15	66.2	7.40	67.3
08/25/18	20:30	111	8.20	3.10	61.1	8.32	8.24	72.2	8.24	8.19	64.6	7.08	66.2
08/25/18	21:30	NA	8.20	3.08	60.6	8.32	8.43	72.2	8.29	8.17	64.2	7.12	66.0
08/25/18	22:30	111	8.20	3.05	60.1	8.32	8.29	71.5	8.31	8.14	64.3	7.14	65.8
08/25/18	23:30	NA	8.20	3.03	59.9	8.32	8.37	71.2	8.33	8.18	63.0	6.97	63.3
08/26/18	0:30	111	8.20	3.02	58.0	8.32	8.29	70.0	8.30	8.21	62.1	7.25	62.7
08/26/18	1:30	NA	8.20	3.00	57.2	8.32	8.36	69.3	8.17	8.22	62.0	7.22	64.7
08/26/18	2:30	111	8.20	3.01	56.3	8.32	8.22	68.4	8.25	8.17	61.8	7.17	62.5
08/26/18	3:30	NA	8.20	3.07	55.9	8.32	8.22	67.4	8.28	8.11	60.9	7.13	62.0
08/26/18	4:30	110	8.20	3.01	54.9	8.32	8.24	65.0	8.33	8.19	59.3	7.18	62.5
08/26/18	5:30	NA	8.20	3.02	53.7	8.32	8.33	65.7	8.30	8.18	58.4	7.19	61.1
08/26/18	6:30	111	8.20	3.01	53.0	8.32	8.39	65.3	8.30	8.12	58.0	7.15	60.7
08/26/18	7:30	NA	8.20	3.02	51.3	8.32	8.32	63.6	8.32	8.17	54.6	7.60	56.6
08/26/18	8:30	111	8.20	3.01	51.1	8.32	8.35	63.1	8.30	8.10	57.7	7.61	57.3
08/26/18	9:30	NA	8.20	3.02	52.0	8.32	8.39	62.6	8.23	8.19	62.5	7.57	60.2
08/26/18	10:30	111	8.20	3.12	55.6	8.37	8.30	62.9	8.32	8.05	68.3	7.51	65.8

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/26/18	11:30	NA	8.20	3.11	57.2	8.37	8.41	63.7	8.30	8.02	73.0	7.52	63.3
08/26/18	12:30	11	8.20	3.11	58.4	8.37	8.25	64.6	8.32	ND			
08/26/18	13:30	NA	8.20	3.13	59.4	8.37	8.33	66.0	8.37	8.13	76.0	7.44	65.2
08/26/18	14:30	SHUT DOWN											
08/27/18	8:30	Arrive & Fix											
08/27/18	9:30	Stabilizing System											
08/27/18	10:30	100	8.20	3.06	58.0	8.32	8.38	65.2	8.36	8.08	71.8	7.29	64.3
08/27/18	11:30	NA	8.20	3.11	58.2	8.32	8.18	65.5	8.28	8.06	71.9	7.12	66.8
08/27/18	12:30	Shut Down - Section of pipeline replaced											
08/27/18	13:30												
08/27/18	14:30												
08/27/18	15:30	NA	8.20	3.04	61.1	8.37	8.22	66.9	8.30	8.11	70.9	7.37	65.7
08/27/18	16:30	15	8.20	3.04	62.7	8.40	8.37	68.4	8.25	8.08	69.8	7.41	63.4
08/27/18	17:30	NA	8.20	3.04	64.1	8.37	8.41	69.4	8.37	8.38	69.8	7.53	62.9
08/27/18	18:30	155	8.20	3.01	65.1	8.37	8.38	70.5	8.32	8.14	70.1	7.46	62.5
08/27/18	19:30	NA	8.20	3.01	64.6	8.37	8.24	71.5	8.32	8.17	64.4	6.97	63.2
08/27/18	20:30	156	8.20	3.01	64.6	8.37	8.28	71.9	8.38	8.26	63.2	7.01	62.4
08/27/18	21:30	NA	8.20	3.03	64.4	8.37	8.25	71.7	8.38	8.22	62.4	7.04	61.8
08/27/18	22:30	156	8.20	3.02	63.9	8.37	8.13	71.5	8.39	8.30	61.1	6.97	60.2
08/27/18	23:30	NA	8.20	3.01	62.2	8.37	8.33	70.7	8.36	8.27	60.0	6.99	58.9
08/28/18	0:30	156	8.20	3.01	62.2	8.37	8.26	69.8	8.37	8.28	59.7	7.00	59.0
08/28/18	1:30	NA	8.20	3.01	61.8	8.37	8.31	69.1	8.37	8.24	59.0	6.96	58.1
08/28/18	2:30	156	8.20	3.01	60.6	8.37	8.31	68.4	8.31	8.22	57.2	7.16	56.4
08/28/18	3:30	NA	8.20	3.00	60.2	8.37	8.30	68.1	8.31	8.23	57.2	7.23	56.0
08/28/18	4:30	158	8.20	3.00	59.2	8.37	8.49	66.5	8.30	8.19	57.1	7.31	54.6
08/28/18	5:30	NA	8.20	2.99	58.4	8.37	8.30	66.0	8.31	8.22	56.5	7.33	55.1
08/28/18	6:30	156	8.20	3.00	58.2	8.37	8.47	65.0	8.27	8.16	56.4	7.35	54.7
08/28/18	7:30	NA	8.20	3.02	57.3	8.39	8.48	64.6	8.25	8.14	54.4	7.59	55.8
08/28/18	8:30	155	8.20	3.06	57.0	8.39	8.44	64.2	8.30	8.12	57.6	7.66	57.9
08/28/18	9:30	NA	8.20	3.07	57.3	8.39	8.35	63.8	8.30	8.12	59.9	7.74	58.9
08/28/18	10:30	155	8.20	3.08	58.7	8.39	8.38	64.3	8.30	8.14	61.6	7.64	59.9
08/28/18	11:30	NA	8.20	3.10	60.1	8.39	8.42	65.0	8.33	8.14	64.2	7.65	61.4
08/28/18	12:30	155	8.20	3.07	61.3	8.39	8.49	67.2	8.31	8.20	66.9	7.64	64.1
08/28/18	13:30	NA	8.20	3.08	63.7	8.39	8.39	69.8	8.30	8.23	69.3	7.62	68.9
08/28/18	14:30	155	8.20	3.08	64.4	8.39	8.48	71.0	8.32	8.22	70.7	7.72	66.4
08/28/18	15:30	NA	8.20	3.09	63.9	8.39	8.42	71.2	8.30	8.16	73.1	7.54	71.3
08/28/18	16:30	155	8.20	3.09	65.1	8.39	8.24	71.7	8.28	8.19	72.1	7.41	71.2
08/28/18	17:30	NA	8.20	2.99	64.1	8.39	8.34	72.6	8.35	8.14	75.7	7.67	69.1
08/28/18	18:30	155	8.20	2.96	62.5	8.39	8.37	73.4	8.34	8.19	71.1	7.55	69.8
08/28/18	19:30	NA	8.20	3.01	63.2	8.36	8.54	73.1	8.39	8.30	67.0	7.43	67.8
08/28/18	20:30	124	8.20	3.11	64.4	8.36	8.38	73.6	8.39	8.28	66.1	7.39	67.1
08/28/18	21:30	NA	8.20	3.13	64.1	8.36	8.34	73.8	8.42	8.32	64.6	7.37	63.7
08/28/18	22:30	124	8.20	3.16	63.4	8.36	8.58	73.8	8.42	8.31	63.6	7.39	64.0
08/28/18	23:30	NA	8.20	3.14	62.0	8.32	8.22	72.9	8.38	8.23	62.5	7.37	61.0
08/29/18	0:30	124	8.20	3.16	60.6	8.32	8.21	71.5	8.36	8.29	61.1	7.38	60.0
08/29/18	1:30	NA	8.20	3.12	59.4	8.32	8.44	70.5	8.37	8.24	60.0	7.38	58.7
08/29/18	2:30	124	8.20	3.13	58.2	8.32	8.35	69.3	8.37	8.26	59.1	7.35	58.0
08/29/18	3:30	NA	8.20	3.12	57.2	8.32	8.58	67.9	8.33	8.22	58.7	7.37	57.7
08/29/18	4:30	RECIRCULATING											
08/29/18	5:30	NA	8.20	3.12	55.3	8.32	8.16	66.0	8.32	8.22	57.0	7.35	56.6
08/29/18	6:30	RECIRCULATING											
08/29/18	7:30	NA	8.20	2.94	53.7	8.32	8.36	64.6	8.35	7.92	56.0	7.64	56.0
08/29/18	8:30	145	8.20	3.01	53.0	8.32	8.35	63.4	8.34	8.06	58.4	7.61	59.4
08/29/18	9:30	NA	8.20	3.00	53.2	8.32	8.41	63.1	8.31	8.17	60.5	7.66	62.9
08/29/18	10:30	150	8.20	2.95	54.5	8.40	8.43	63.6	8.25	8.02	62.2	7.41	63.9
08/29/18	11:30	Lime Problems - Recirculating											
08/29/18	12:30												
08/29/18	13:30												
08/29/18	14:30	150	8.20	3.42	58.7	8.40	8.53	67.2	8.34	8.29	75.5	7.65	69.9
08/29/18	15:30	NA	8.20	3.48	61.3	8.40	8.41	68.8	8.36	8.30	73.3	7.77	66.5
08/29/18	16:30	145	8.20	2.88	61.2	8.43	8.39	69.8	8.31	8.15	68.7	7.74	65.3
08/29/18	17:30	NA	8.20	2.93	62.2	8.43	8.45	71.0	8.35	8.22	69.9	7.77	65.7
08/29/18	18:30	SHUT DOWN - Overnight											
08/30/18	7:30	Start Up											

**Table A-7
Summary of 2018
Pond Water Treatment Plant Operator's Logs**

08/30/18	8:30	105	8.20	3.09	54.5	8.40	8.43	66.9	8.41	7.99	60.6	7.66	59.0
08/30/18	9:30	NA	8.20	3.33	53.8	8.35	8.34	65.0	8.39	8.01	61.2	7.65	59.7
08/30/18	10:30	110	8.20	3.16	53.7	8.32	8.31	64.3	8.36	8.12	62.3	7.35	61.4
08/30/18	11:30	NA	8.20	3.17	54.4	8.32	8.29	64.3	8.37	8.11	65.4	7.32	65.0
08/30/18	12:30	Lime Clog - Recirculating											
08/30/18	13:30	NA	8.20	3.18	56.3	8.32	8.31	65.7	8.36	8.01	68.1	7.33	64.2
08/30/18	14:30	110	8.20	3.57	57.7	8.30	8.37	66.7	8.36	8.00	68.7	7.42	64.1
08/30/18	15:30	NA	8.20	3.22	59.4	8.30	8.38	67.4	8.36	8.11	65.7	7.46	66.7
08/30/18	16:30	110	8.20	3.10	60.1	8.30	8.31	68.6	8.35	8.27	65.6	7.62	64.4
08/30/18	17:30	NA	8.20	3.08	60.6	8.30	8.22	69.5	8.34	8.17	66.7	7.50	66.3
08/30/18	18:30	108	8.20	3.02	60.8	8.30	8.29	71.0	8.26	8.19	64.9	7.55	65.6
08/30/18	19:30	NA	8.20	3.02	61.5	8.32	8.33	71.9	8.29	8.25	64.3	7.32	64.7
08/30/18	20:30	108	8.20	3.05	61.3	8.32	8.36	71.7	8.29	8.21	63.9	7.29	64.2
08/30/18	21:30	NA	8.20	3.03	60.8	8.32	8.38	71.7	8.27	8.25	61.5	7.36	60.9
08/30/18	22:30	110	8.20	3.03	60.1	8.32	8.35	71.2	8.29	8.24	59.6	7.41	58.4
08/30/18	23:30	NA	8.20	3.00	59.2	8.32	8.33	70.7	8.29	8.22	57.9	7.35	57.2
08/31/18	0:30	110	8.20	3.01	58.0	8.32	8.34	69.5	8.28	8.22	57.2	7.38	55.6
08/31/18	1:30	NA	8.20	3.01	56.8	8.32	8.36	69.1	8.28	8.18	56.4	7.47	53.6
08/31/18	2:30	108	8.20	3.01	55.8	8.32	8.39	67.4	8.28	8.26	55.3	7.44	52.8
08/31/18	3:30	NA	8.20	3.00	54.2	8.32	8.36	66.7	8.27	8.19	55.0	7.49	50.3
08/31/18	4:30	110	8.20	3.00	53.0	8.32	8.29	65.3	8.29	8.24	52.7	7.44	50.8
08/31/18	5:30	NA	8.20	3.00	51.5	8.32	8.29	63.8	8.28	8.07	52.4	7.43	49.8
08/31/18	6:30	110	8.20	2.98	50.6	8.32	8.39	62.4	8.30	8.25	50.2	7.46	49.4
08/31/18	7:30	SHUT DOWN - END OF OPERATIONS											

NA = Not applicable

ND = No Data

**Table A-8
2018 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								
TTL (mg/kg)		NP	NP			500			500			10000			75			100			2500			8000			2500			NP			1000			20			3500			2000			100			500			700			2400			5000								
STL (mg/L)		NP	NP			15			5			100			0.75			1			5			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	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ
1819PWT033-PC-A (0 - 15")	10/11/2018	18																																																															
TTL (mg/kg dry)			58000			0.68	ND	UJ	1300			4.8			1.8			15	J+		200			360			330			100000			2.7			0.015	ND		0.28	ND		900			1.2	ND		0.26	ND		4.4			63			160								
STL (mg/L)			440			0.038	J	J	0.60			0.079	J	J	0.029	J	J	0.11			1.5			5.4			3.8			310			0.011	J	J	0.00020	ND		0.0077	ND		14			0.023	ND		0.0079	ND		0.046	ND		0.13	J	J	2.5								
TCLP (mg/L)			6.7			0.051	J	U	0.029	J	J	0.028	J	J	0.0014	ND		0.040	J	J+	0.036	J	J	0.87			0.097			0.25	ND		0.013	ND		0.00020	ND		0.0086	ND		2.4			0.024	ND		0.0066	ND		0.030	ND		0.040	J	J+	0.18	J	J						
1819PWT034-PC-B (0 - 28")	10/11/2018	14																																																															
TTL (mg/kg dry)			84000			0.91	ND		1700			6.1			2.6			20			280			520			470			150000			4.0			0.021	ND		0.38	ND		1300			1.6	ND		0.35	ND		11			74			230								
STL (mg/L)			430			0.010	J	J	0.50			0.060	J	J+	0.026	J	J	0.12			1.8			5.4			3.4			390			0.011	J	J	0.00020	ND		0.0077	ND		14			0.023	ND		0.0079	ND		0.086	J	J	0.10	J	J	2.4								
TCLP (mg/L)			3.7			0.040	J	U	0.025	ND		0.024	J	J	0.0014	ND		0.042	J	J+	0.025	J	J	0.75			0.064			0.25	ND		0.013	ND		0.00020	ND		0.0086	ND		2.9			0.024	ND		0.0066	ND		0.030	ND		0.045	J	J+	0.13	J	J						
1819PWT035-PC-C (0 - 29")	10/11/2018	16																																																															
TTL (mg/kg dry)			74000			0.88	ND		1400			8.6			2.3			14			240			470			430			120000			4.0			0.060	J	J	0.37	ND		1200			1.5	ND		0.34	ND		11			52			210								
STL (mg/L)			440			0.0064	J	J	0.45			0.080	J	J	0.024	J	J	0.12			1.8			5.4			3.3			400			0.011	J	J	0.00020	ND		0.0077	ND		13			0.023	ND		0.0079	ND		0.088	J	J	0.095	J	J	2.4								
TCLP (mg/L)			2.1			0.030	ND		0.029	J	J	0.035	J	J	0.0014	ND		0.041	J	J+	0.016	J	J+	0.51			0.032	J	J	0.25	ND		0.013	ND		0.00020	ND		0.0086	ND		2.8			0.024	ND		0.0066	ND		0.030	ND		0.052			0.079	J	J						

Notes:
 Sludge samples represent a homogenized section through the entire sludge blanket thickness.
 TTL - Total Threshold Limit Concentration
 STL - Soluble Threshold Limit Concentration
 TCLP - Toxicity Characteristic Leaching Procedure
 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
 J+ = Estimated concentration; potential for high bias
 U = Qualified as not detected; associated with blank contamination
 UJ = result not detected; qualified as having an estimated reporting limit with potential for false negative result

Appendices B through D (on compact disc)

Appendix B – 2018 Pond Water Treatment Data

Laboratory Reports (PDF format)

Analytical Laboratory Electronic Data Deliverable Files (Microsoft Excel format)

Appendix C – AECOM: Leviathan Mine Pond Water Treatment, 2018 Data Summary Report

Attachment 4 – Data Quality Summary (PDF format)

Appendix D – 2018 Water Year USGS Flow and Stage Annual Data Reports

Annual Water Data Reports for 12 Stations (Microsoft Excel format)

Appendix E – Final Completion Report

Pond Liner Leak Detection and Repairs for Leviathan Mine Pond 3