Georgia Power Plant Branch

NPDES Permit No. GA0026051

Ash Pond Dewatering Plan

Revised March 2020

Background

Plant Branch, located on Lake Sinclair in Putnam County, began construction in 1961 and by 1969 had four units in operation. Plant Branch delivered safe, reliable and affordable energy to the community for decades. Plant Branch was retired in April 2015. Now that the plant is no longer operating, a dewatering process is necessary to facilitate permanent closure of the ash ponds.

Plant Branch will remove all four ash ponds (Ponds B, C, D & E) and consolidate the ash in a new, lined onsite landfill. One ash pond, Ash Pond A, has been removed as it was never part of the wastewater system. The remaining ponds currently contain the approximate water volumes, subject to change as result of dewatering activities and precipitation:

Ash Pond B	3,303,324 ft^3
Ash Pond C	4,798,749 ft^3
Ash Pond D	14,407 ft^3
Ash Pond E	31,108,551 ft^3

Purpose

This Ash Pond Dewatering Plan (Plan) describes the additional procedures, safeguards and enhanced wastewater treatment measures that Georgia Power Company (GPC) will implement to ensure the facility's NPDES permit effluent limitations continue to be met and the receiving waterbody continues to be protected during the ash pond dewatering process. This Plan provides an overview of the wastewater treatment system, describes the key processes, details of the major process control measurements being performed, and explains the effluent monitoring to be completed during dewatering. This Plan will be implemented upon commencement of active ash pond closure activities. Prior to the closure process beginning, ash pond discharges will not cause water levels to drop beyond normal historical operation.

Following approval of the dewatering plan by EPD, and prior to commencement of dewatering, GPC will provide EPD with notification of dewatering implementation. In addition to the requirements implemented during the dewatering process, GPC will continue to meet the effluent limitations of the plant's NPDES permit and comply with all requirements of the NPDES permit.

Wastewater Treatment System

The wastewater treatment system (Treatment System) for dewatering the ash ponds will be a physical-chemical treatment plant. The Treatment System will be in two parts, System A and System B. System A consists of sodium hypochlorite addition, equalization tank, pH adjustment, followed by solids separation by flocculation/clarification, filtration and finally monitoring. System B is similar, consisting of sodium hypochlorite addition, pH adjustment, flocculation/clarification, filtration and monitoring. Solids from the Treatment System clarifiers will be returned to the ash pond to be incorporated as part of the overall ash pond closure process. System A and B may run separately or concurrently depending on discharge flow needs and/or routine maintenance considerations. Figures 1A and 1B provide an illustration of the Treatment Systems.

Location

The Treatment System will be located adjacent to and within the drainage area of Plant Branch's ash ponds during closure. Location of the Treatment System in this area assures that, in the unlikely event of an overflow, any water from the Treatment System remains within the NPDES wastewater drainage area of the ash pond and will not be discharged except in compliance with this Plan and the NPDES permit.

The Treatment System will operate on an as-needed basis up to 24-hours per day. System A will be configured to treat 2,000 gpm (1,400 gpm discharge) and includes a modification of the existing Treatment System with the addition of multi-media and membrane filters. System B will be an additional physical-chemical system that will treat a parallel flow of 2,700 gpm (2,000 gpm discharge). The total discharge capacity of both systems will be up to 3,400 gpm. In accordance with the NPDES permit, GPC will provide EPD with advanced notice of any changes to the Treatment System.

Influent

As shown by Figure 2, wastewater from Ash Ponds C, D and E flows to Ash Pond B. Wastewater can then be pumped to the Treatment System directly from Ash Pond B. The figure also notes that the wastewater from any of the ash ponds could be pumped directly to the Treatment System and includes an option to install flow equalization storage. The potential flow equalization would be a new tank/basin that would be installed prior to flow being split to System A and System B.

The intake for the influent pump(s) are operated to minimize solids inflow to the Treatment System. As the water levels in the ash ponds drops, treatment operations may cease until the volume of water in the pond is adequate for operations, or other measures may be implemented to provide sufficient water volume for pumping to the Treatment System. Water levels in the ash ponds fluctuate based upon storm water inflows, upstream ash pond management, and dewatering activities. As overall water volumes in the ash ponds decrease, operation of the Treatment System may be intermittent and on an "as needed" basis, although continuous operation may be utilized in response to wet weather conditions.

Activities associated with the closure of the ash ponds will generate additional volumes of water requiring management in the Treatment System. This additional water will be in the form of contact stormwater, as well as water released from the ash during excavation and dewatering. BMP's will be utilized to minimize ash-contact stormwater, provide detention of collected water (to reduce particulate loading), and to provide hydraulic control prior to treatment. BMPs employed will be varied and implemented as needed to support ash pond closure activities but will include systems for covering the ash such as rain flaps, as well as systems to hydraulically control runoff such as detention ponds.

GPC will monitor the influent for pH and turbidity. These parameters will be used as a guide for treatment requirements. Influent flow rates will be managed to limit ash pond draw-down at a rate of no greater than one foot per week or a rate to ensure structural integrity of the impoundment as determined by the Dam Safety Engineer.

Sodium Hypochlorite Addition

All water pumped to the Treatment System will be treated with sodium hypochlorite to control biological growth in the Treatment System. Treating the water for biological growth improves the Treatment System efficiency and reduces maintenance. Based upon the demand for chlorine in the water being pumped into the Treatment System, sodium hypochlorite addition will be adjusted. The dosage rate for sodium hypochlorite will depend upon the flow rate, sediment load, and water temperature. Residence time will be provided in the equalization tank for System A. For System B, residence time is provided in the clarifier.

pH & Coagulant

pH adjustment is performed as the next step in the process. The pH of the water pumped to the Treatment System will be continuously tested before it enters the clarifier. Based upon the pH measurement, the pH is adjusted to the optimal range for coagulation. Following pH adjustment, a coagulant and polymer may be injected into the flow to aid in flocculation prior to entering the clarifier process. The dosage rates for all chemicals will depend upon the flow rates, sediment loads, and inlet pH. Dosage rates will be documented and kept on-site.

Clarifier

The treated water will then flow into a clarifier and the flocculated material will settle to the bottom of the clarifier. A pump will pull the underflow at the bottom of the clarifier towards the underflow discharge point and will be pumped to a tank for return to the ash pond. Clarified water will flow in an upward direction over a set of weirs and into the clearwell tanks.

Clearwell Tanks

The clearwell tanks will gravity-fill from the weir overflows. The clearwell will be tested for oxidation reduction potential (ORP) so the free chlorine residual from the sodium hypochlorite feed on the inlet is removed before water leaves the Treatment System. As water moves through the Treatment System, some of the free chlorine will be consumed and any remaining chlorine will be neutralized in the clearwell.

Sodium bisulfite will be maintained on site, as a backup, to remove any residual chlorine. Continuous effluent monitoring will also be performed to verify the absence of total residual chlorine.

Each tank will have a set of instrumentation that checks the quality of the treated water. During operation, effluent from the clearwell will be continuously tested for flow, pH and turbidity, and this information will be used to monitor the Treatment System operation. If an inline instrument detects a reading above a quality standard set point, the effluent will not be discharged and instead will be diverted back to the ash pond.

Multi-Media Filters

Multi-media filtration is used as a pretreatment step prior to reverse osmosis membrane filtration. In both System A and System B, multi-media filtration units will operate in parallel depending on the total flow being treated. System A will be comprised of up to four treatment units that can treat a combined total flow of up to 2,000 gpm. System B will have four units that can treat a combined total of 2,700 gpm. Each unit functions as a pretreatment step to minimize scaling and fouling of the membrane filters.

Reverse Osmosis

Following the multi-media filters, both System A and System B utilize reverse osmosis membrane filtration. In System A , these membrane filters will consist of up to four treatment units with a total flow capacity of up to 2,000 gpm. In System B, these membrane filters will consist of four treatment units with a total flow capacity of up to 2,700 gpm. The membranes are designed to further polish the effluent prior to final discharge. These treatment units may be bypassed for short durations during maintenance events but will recirculate to the ash pond throughout the process. The reverse osmosis process also includes a concentrate return, whereby approximately 25% of the treated flow will be returned to the ash pond. In System A, the 1,400 gpm of treated effluent would be directed to a clearwell tanks and then the bag filters prior to monitoring and discharge via Outfall 03. In System B system, the 2,000 gpm of treated effluent from the membrane filters will be routed for monitoring and discharge via Outfall 03.

Bag Filters

For System A, effluent from the membrane filters is fed into the bag filtration system via a clearwell tank. The bag filtration system is comprised of two housings with sixteen sock filters. Each housing is rated for 100% of the design flowrate, which allows for sock replacement without interruption of operation. The sock filters are initially planned to be 100 microns, but the size may be adjusted during the ash pond closure process to optimize solids removal and overall treatment system performance. The treated water from reverse osmosis requires a clearwell tank for pumping hydraulics. The bag filters are a safety measure in case of long-term solids accumulation in the clearwell tank. The discharge from the clear well tank passes through the bag filter system as a final particulate removal step prior to discharge. The bag filter system has pressure differential gauges that require monitoring to determine when a change of the sock filters is required. The pressure differential gauges are monitored frequently by on-site personnel to ensure change-out of the bag filter when needed. The bag filtration system is the final treatment process prior to the discharge.

During operation, both System A and System B effluent will be independently monitored for flow, pH, chlorine and turbidity on a continuous basis, and this information will be used to guide the Treatment System operation. If an inline instrument detects a reading above an effluent quality standard set point, the effluent will not be discharged and instead will be diverted back to the ash pond.

Upon initial startup of the Treatment System, samples of the treated water will be tested to verify the Treatment System is operating as designed. In the event any Treatment System issues are identified, the treated effluent will be recycled back to the ash pond until the Treatment System efficacy is established. Only after initial Treatment System efficacy is established will treated effluent will be routed to Outfall 03.

Operation

The operational oversight of the Treatment System will be performed by a certified wastewater treatment plant operator in accordance with the certification requirements of the Georgia water and wastewater treatment plant operator's and laboratory analysts rule.

FIGURE 1A

Plant Branch Treatment System Schematic (System A)

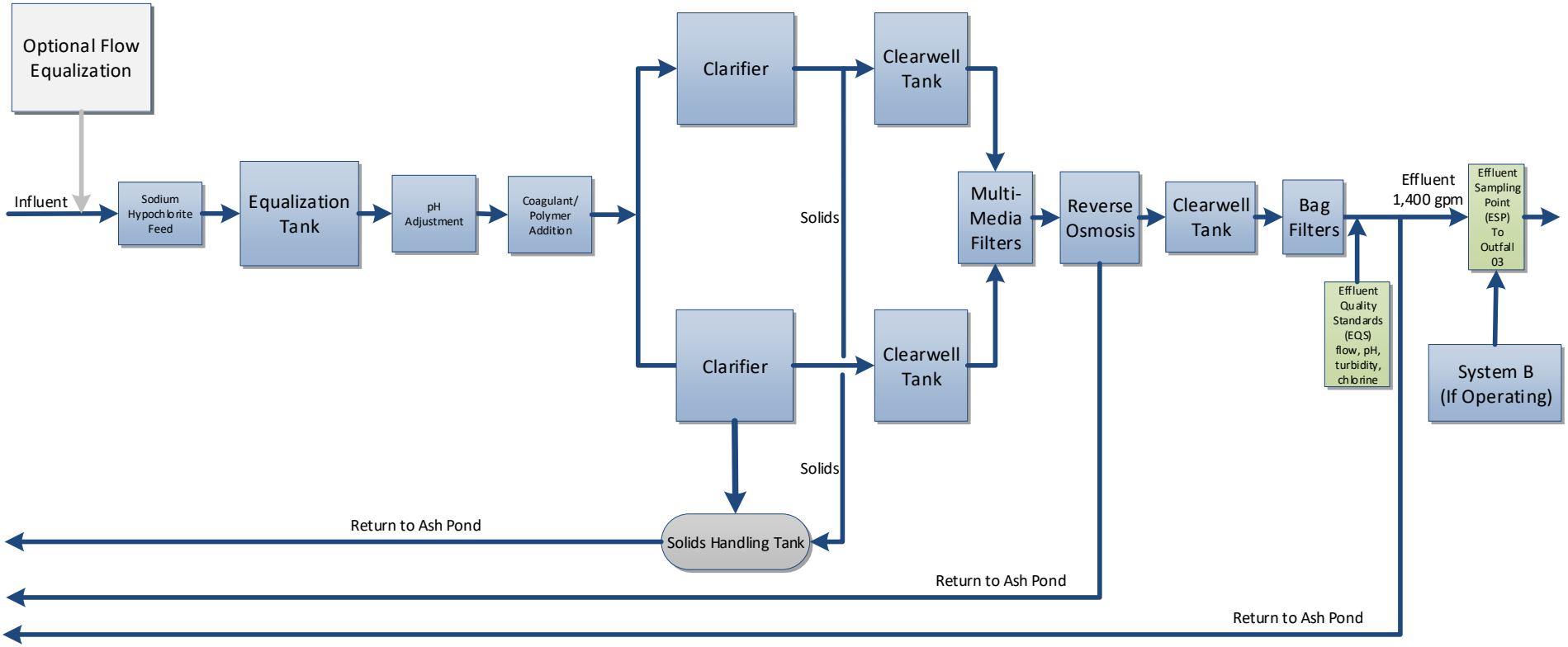


FIGURE 1B

Plant Branch Treatment System Schematic (System B)

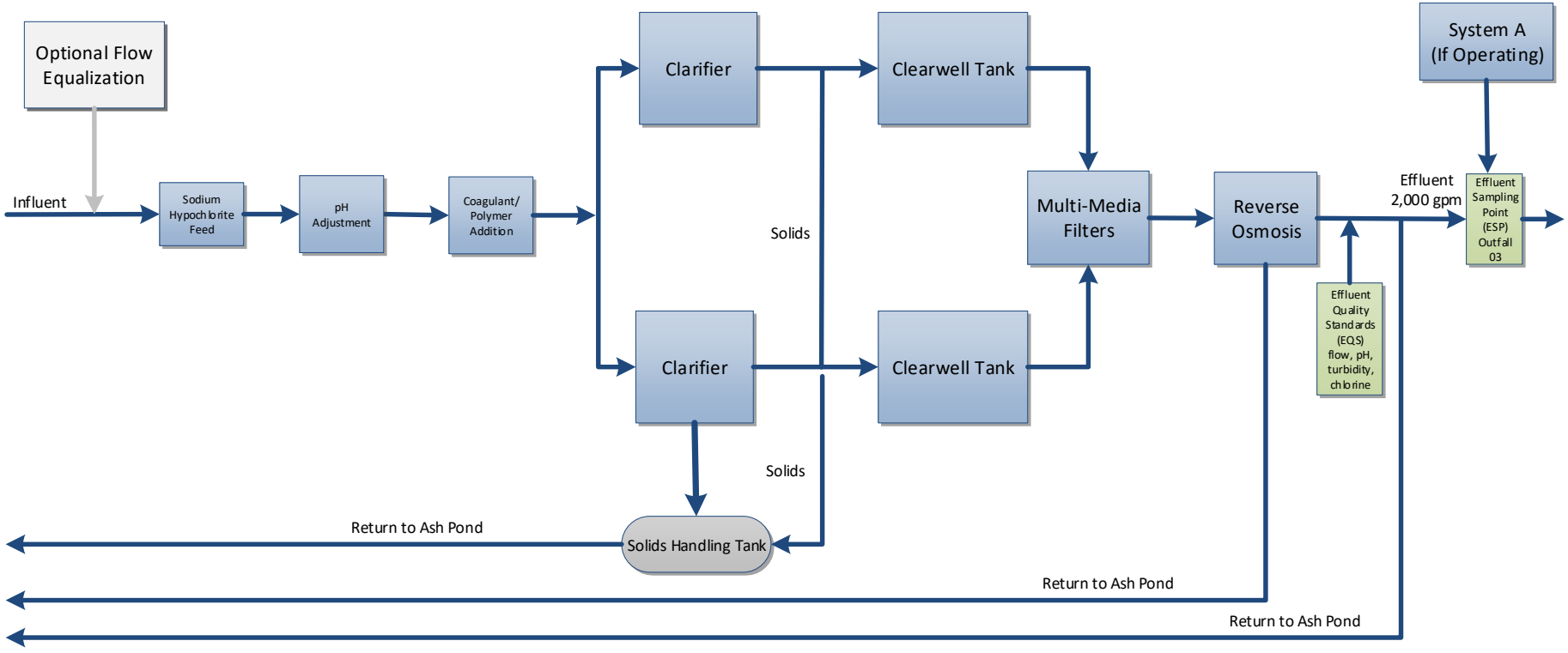
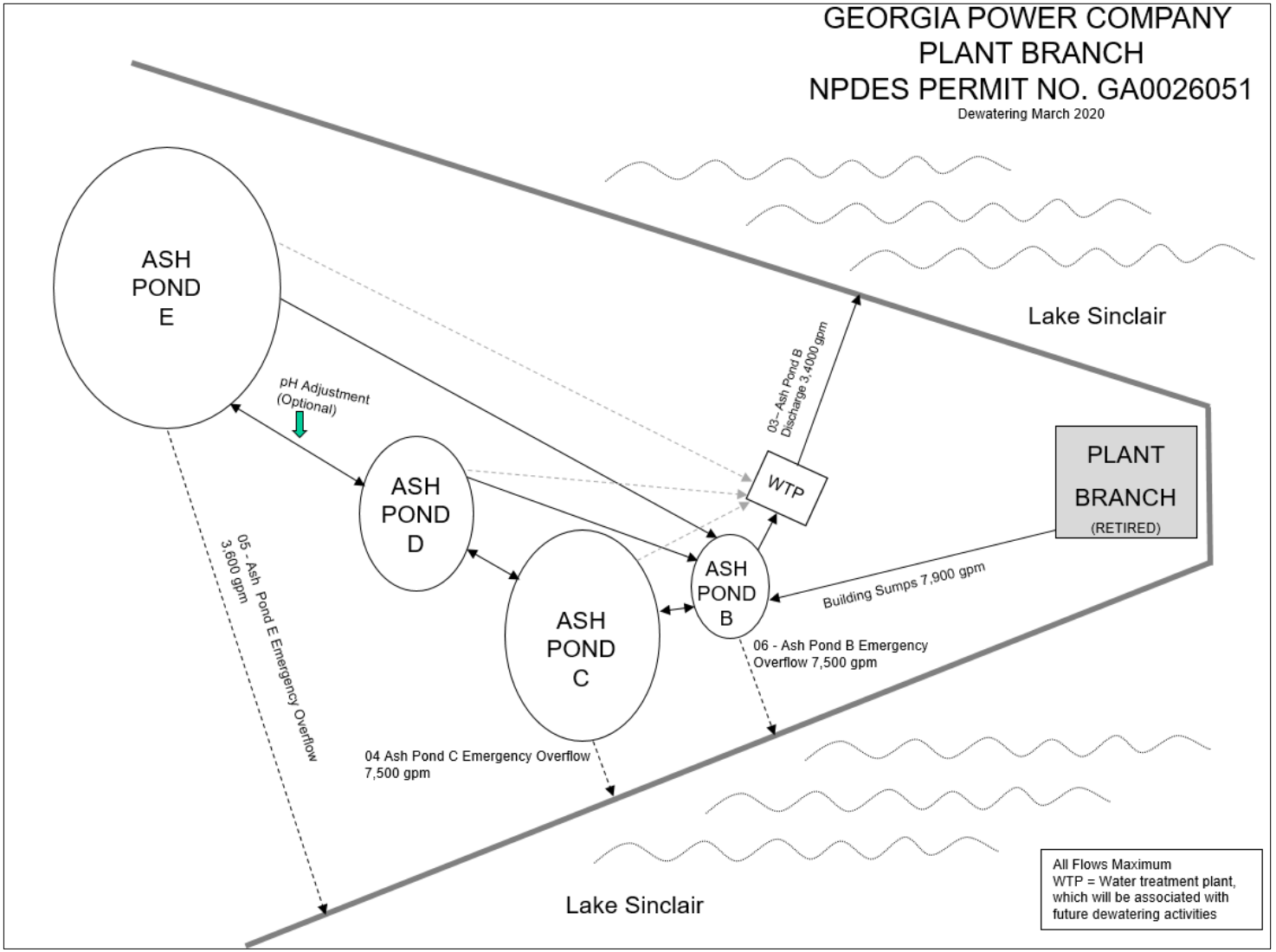


FIGURE 2



Note: Wastewater from any of the ash ponds can be pumped directly to the Treatment System which includes an option to install flow equalization storage (Figures 1A and 1B).

Process Control Monitoring

Each day following Treatment System startup, pH and turbidity of the influent and effluent of the Treatment System will be verified prior to discharge of treated water to the permitted outfall. Upon verification the Treatment System performs as expected, the discharge will be routed to Outfall 03.

During discharge operations, pH, chlorine and turbidity are continuously measured at both the System A and System B Effluent Quality Standards (EQS) sampling points and the discharge will be visually inspected. If the treated effluent indicates a significant change during operations, discharge to the permitted outfall will be automatically diverted and the treated water will be recycled to the ash pond while adjustments are made. Inline monitoring for the EQS will occur on both System A and System B and recirculation may occur on each system independently. After any issues are resolved, the Treatment System will be returned to normal operation with discharge to Outfall 03 following verification the system performs as expected.

Maintenance

Instrumentation for use on the site will be maintained to ensure optimal performance and provide accurate results. Each piece of technical equipment will be calibrated at the manufacturer's recommended intervals and more often if deemed necessary by on-site personnel. The instrumentation includes a turbidity meter, a pH meter, flow meters, and the chemical feed pumps.

Testing

Samples are collected from both the influent (ash pond or optional flow equalization storage) and the combined (System A and System B) Treatment System Effluent Sampling Point (ESP) to guide system operation and compare against the continuous monitoring results for the EQS listed below. The results will be used to verify that the Treatment System is performing optimally, as well as to obtain data to establish and update the correlation between the total suspended solids (TSS) and turbidity of the Treatment System effluent. TSS/turbidity curves will be developed for both System A and System B. TSS/turbidity control is an indicator of treatment system efficient operation that is correlated to metals removal efficiencies as further confirmed by weekly monitoring results. The initial TSS vs turbidity correlation curve and EQS results will be provided to EPD prior to commencement of dewatering activities and updated quarterly or more frequently on an as needed basis. Furthermore, the TSS vs Turbidity correlation will be updated in the event that the EQS for TSS is exceeded. All EQS results including TSS vs turbidity correlation curves will be available onsite for EPD review. TSS correlation to turbidity will be used to establish a turbidity set-point for the effluent. Effluent reaching this set-point will be recycled back to the ash pond for additional treatment.

Effluent Quality Standards (EQS)

- **pH**: 6.4 to 8.6 operational limits (S.U.)
- **Turbidity**: Determined by TSS correlation (NTU)
- **Effluent Flow rate**:
    - System A - 1,400 gpm
    - System B - 2,000 gpm
- **Total Suspended Solids** (TSS): <26 mg/L; determined by turbidity correlation
- **Oil & Grease**: <15 mg/L daily average with 20 mg/L daily maximum over a monthly period
- **Total Residual Chlorine:** Non-Detect (mg/L)

Analytical Instrument Description

The following instrumentation (or equivalent) will be used:

- **pH**: Hach DPD1P1 pH probe with a Hach SC200 transmitter
- **Turbidity**: Hach 1720E Turbidimeter with a Hach SC200 transmitter
- **Chlorine**: Wallace and Tiernan SFC/ Analyzer with a Hach SC200 transmitter
- **Flow rate**: Siemens Mag 5100 W 8" magnetic flow meter with Siemens Mag5000 transmitter

Monitoring and Reporting

Lake Monitoring

Effluent Characteristics mg/L or (Units)	Requirement	Measurement Frequency	Sample Type	Sample Location
pH (s.u.)	Report	2/Month	Grab	Upstream & Downstream*
TSS	Report	2/Month	Grab	Upstream & Downstream*
Oil & Grease	Report	2/Month	Grab	Upstream & Downstream*
Turbidity (NTU)	Report	2/Month	Grab	Upstream & Downstream*
TDS	Report	2/Month	Grab	Upstream & Downstream*
$BOD_{5\text{-day}}$	Report	2/Month	Grab	Upstream & Downstream*
Copper, total	Report	2/Month	Grab	Upstream & Downstream*
Selenium, total	Report	2/Month	Grab	Upstream & Downstream*
Arsenic, total	Report	2/Month	Grab	Upstream & Downstream*
Mercury, total	Report	2/Month	Grab	Upstream & Downstream*
Chromium, total	Report	2/Month	Grab	Upstream & Downstream*
Lead, total	Report	2/Month	Grab	Upstream & Downstream*
Cadmium, total	Report	2/Month	Grab	Upstream & Downstream*
Zinc, total	Report	2/Month	Grab	Upstream & Downstream*
Nickel, total	Report	2/Month	Grab	Upstream & Downstream*
Ammonia-N	Report	2/Month	Grab	Upstream & Downstream*
TKN	Report	2/Month	Grab	Upstream & Downstream*
Nitrate/Nitrite	Report	2/Month	Grab	Upstream & Downstream*
Organic Nitrogen	Report	2/Month	Grab	Upstream & Downstream*
Phosphorus, total	Report	2/Month	Grab	Upstream & Downstream*
Orthophosphate-P	Report	2/Month	Grab	Upstream & Downstream*
Hardness	Report	2/Month	Grab	Upstream & Downstream*

Sampling and monitoring to be performed using standard methods as provided for in 40 CFR Part 136, which will be sufficiently sensitive.

* Downstream lake sampling shall occur near Latitude: 33.196636 and Longitude: -83.295389; Upstream (background) lake sampling shall occur near Longitude: 33.180392 and Longitude: -83.322964.

Effluent Monitoring

Effluent Characteristics mg/L or (Units)	Monthly Average	Daily Maximum	Measure Frequency	Sample Type	Sample Location
Flow (MGD)	Report	Report	Daily	Continuous	EQS
pH (s.u.)	Report	Report	Daily	Continuous	EQS
TSS	Report	Report	Weekly	Grab	ESP
Oil & Grease	Report	Report	Weekly	Grab	ESP
Turbidity (NTU)	Report	Report	Daily	Continuous	EQS
TDS	Report	Report	Weekly	Grab	ESP
TRC	Report	Report	Daily	Continuous	EQS
$BOD_{5\text{-day}}$	Report	Report	Weekly	Grab	ESP
Copper, total	Report	Report	Weekly	Grab	ESP
Selenium, total	Report	Report	Weekly	Grab	ESP
Arsenic, total	Report	Report	Weekly	Grab	ESP
Mercury, total	Report	Report	Weekly	Grab	ESP
Chromium, total	Report	Report	Weekly	Grab	ESP
Lead, total	Report	Report	Weekly	Grab	ESP
Cadmium, total	Report	Report	Weekly	Grab	ESP
Zinc, total	Report	Report	Weekly	Grab	ESP
Nickel, total	Report	Report	Weekly	Grab	ESP
Ammonia-N	Report	Report	Weekly	Grab	ESP
TKN	Report	Report	Weekly	Grab	ESP
Nitrate/Nitrite	Report	Report	Weekly	Grab	ESP
Organic Nitrogen	Report	Report	Weekly	Grab	ESP
Phosphorus, total	Report	Report	Weekly	Grab	ESP
Orthophosphate-P	Report	Report	Weekly	Grab	ESP
Hardness	Report	Report	Weekly	Grab	ESP

Sampling and monitoring to be performed using standard methods as provided for in 40 CFR Part 136, which will be sufficiently sensitive.

Reporting and Notification

Effluent and instream monitoring results will be submitted to EPD via e-mail by the 15th day of the month following the sampling period. Results shall be submitted in an Excel spreadsheet to both the EPD compliance office and the EPD industrial permitting unit. Laboratory analysis and data sheets shall be retained on site. The first report will be submitted the month following Treatment System startup. In addition, quarterly updates of the TSS vs. Turbidity correlation curve and other updates based on an exceedance of the EQS for TSS, will also be submitted to EPD via e-mail by the 15th of the month following the end of the quarter or the month after the EQS exceedance.

Immediate (within 24 hours) notification to both the EPD compliance office and industrial permitting unit will occur and a corrective action plan implemented if any of the EQS for pH, total residual chlorine, or turbidity are not achieved, and the automatic recirculation system fails.