

Georgia Power Plant Bowen
NPDES Permit No. GA0001449
Ash Pond Dewatering Plan

Revised August 2021



Background

Plant Bowen, located on the Etowah River in Bartow County, began commercial operation in 1975. This power plant has four coal-fired units. Plant Bowen is currently in the process of closing the site's ash pond (AP-1).

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. During ash pond closure, this dewatering plan may need to be modified to accommodate potential changes to the wastewater treatment processes and associated flow rates. This Plan addresses the dewatering of the ash pond as identified in Figure 3. The ash pond has been disconnected from the facility's wastewater system and no longer serves an operational purpose. In accordance with the NPDES permit, Georgia Power will provide further notice to EPD if changes in the overall ash pond closure trigger the need to modify the dewatering treatment system. This notification, where necessary, may include an update and submittal of a revised dewatering plan.

As explained below, in addition to the supplemental requirements implemented during the dewatering process, Georgia Power 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 pond is a physical-chemical treatment plant. The site currently uses Treatment System A, but in the future, the site will switch to using Treatment System B after providing written notification to EPD. Treatment System A was intended for the initial dewatering process of the recycle pond and other surface water features. Treatment System B is being installed as a larger capacity system capable of serving ash pond dewatering activities during the comprehensive closure process.

Treatment System A consists of sodium hypochlorite addition, equalization, pH adjustment, solids separation via flocculation/clarification, filtration, and effluent quality control monitoring. Treatment System B consists of sodium hypochlorite addition, equalization, organosulfide addition, pH adjustment, solids separation via flocculation/clarification, filtration, and effluent quality control monitoring. Solids from the clarifier will be managed consistent with the overall ash pond closure process. Figures 1A and 1B provide schematics of Treatment Systems A and B, respectively.

The Treatment System will operate on an as-needed basis up to 24 hours per day. Treatment System A is designed to operate up to 750 gpm, as depicted in Figure 1A. After submitting a written notification to EPD, the site will switch to using Treatment System B. Treatment System B has dual treatment trains and is capable of processing a maximum of 2,000 gpm, as depicted in Figure 1B.

Location

Treatment System A is located within the drainage area of the plant's ash pond. Treatment System B will be located adjacent to the ash pond with containment and a collection sump. This assures that in the event of an overflow, any treated water from the Treatment System (A or B) will remain within the NPDES wastewater system and will not be discharged to Waters of the State except in compliance with this Plan and the NPDES permit.

Influent

As shown by Figure 2, wastewater will be pumped directly to the Treatment System. Figure 2 identifies that flow path along with the other major flow paths for the Plant. The intake for the Treatment System's influent pump(s) is operated to minimize solids inflow to the Treatment System. As the water level in the ash pond 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 pond may fluctuate based upon rainfall, ash pond management, and dewatering activities. As overall water volumes in the ash pond 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 pond may generate additional volumes of water requiring management in the Treatment System. This additional water may be in the form of contact stormwater. 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 the 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.

The Treatment System influent will be monitored 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

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, the sodium hypochlorite dosage rate will be adjusted depending upon the flow rate, sediment load, and water temperature. Residence time will be provided in the equalization tank.

pH Adjustment and Organosulfide & Coagulant Addition

For Treatment System A, pH adjustment is performed after the equalization tank. The pH of the water pumped to the Treatment System will be continuously monitored before it enters the clarifier. Based upon the pH measurement, the pH will be adjusted to the optimal range for coagulation. The Treatment System can inject a coagulant and polymer into the flow to aid in flocculation prior to entering the clarifier section. The dosage rates for all chemicals will depend upon the flow rates, sediment loads, and inlet pH. Dosage rates will be documented and kept onsite.

For Treatment System B, organosulfide addition may occur following the equalization tank for enhanced solids precipitation. The Treatment System also has the ability to inject a coagulant into the flow, and pH adjustment is performed as needed. Polymer addition may also occur to aid in flocculation prior to entering the clarifier. The dosage rates for all chemicals will depend upon the flow rates, sediment loads, and inlet pH. Dosage rates will be documented and kept onsite.

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 solids management. Settled sludge from Treatment System A's clarifier is collected in a solids handling tank. Solids from Treatment System B's clarifier are collected in a sludge thickening tank and will then enter filter boxes for further dewatering. The Treatment System's solids will be sent to the ash pond or to a permitted onsite or offsite landfill. Clarified water will flow in an upward direction over a set of weirs and into the clearwell tanks. However, if the water leaving the clarifier is outside of the pH or turbidity effluent quality standard (EQS) set points, then the water will be sent to the

ash pond for Treatment System A or sent to an off-spec water tank for Treatment System B before then returning to the ash pond.

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 onsite, as a backup, to remove any residual chlorine.

Filters

Following the clearwell tanks, water is then fed into the bag filtration system. The bag filtration system is comprised of housings with sock filters. Treatment System A has one housing of 18 filters. Treatment System B is initially planned to have two bag filter housings with 18 filters but may be adjusted throughout the closure process. 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 can be adjusted during the ash pond closure process to optimize solids removal. The clarified water passes through the bag filter system as 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 onsite personnel to ensure change-out of the bag filter when needed. The bag filtration system is the final treatment process prior to discharge.

During operation, effluent from the filter will be continuously tested for flow, pH, chlorine and turbidity. This information will be used to monitor the Treatment System operation. If an inline instrument detects a reading above an effluent quality standard (EQS) set point, the effluent will not be discharged, but will instead be automatically diverted to the ash pond. Treatment System B additionally has an off-spec water tank that will receive the off-spec water prior to sending this water to the ash pond. The system will remain in recirculation until the EQS set points are achieved. Only at this point will the system be allowed to resume discharging.

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 system issues are identified, the treated effluent from Treatment System A will be recycled back to the ash pond until the treatment system efficacy is established. Treatment System B additionally has an off-spec tank that receives the off-spec water before sending the water to the ash pond. Only after initial treatment efficacy is established will treated effluent be routed to the permitted discharge location as authorized under the NPDES permit.

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 Bowen Dewatering Treatment System A Schematic

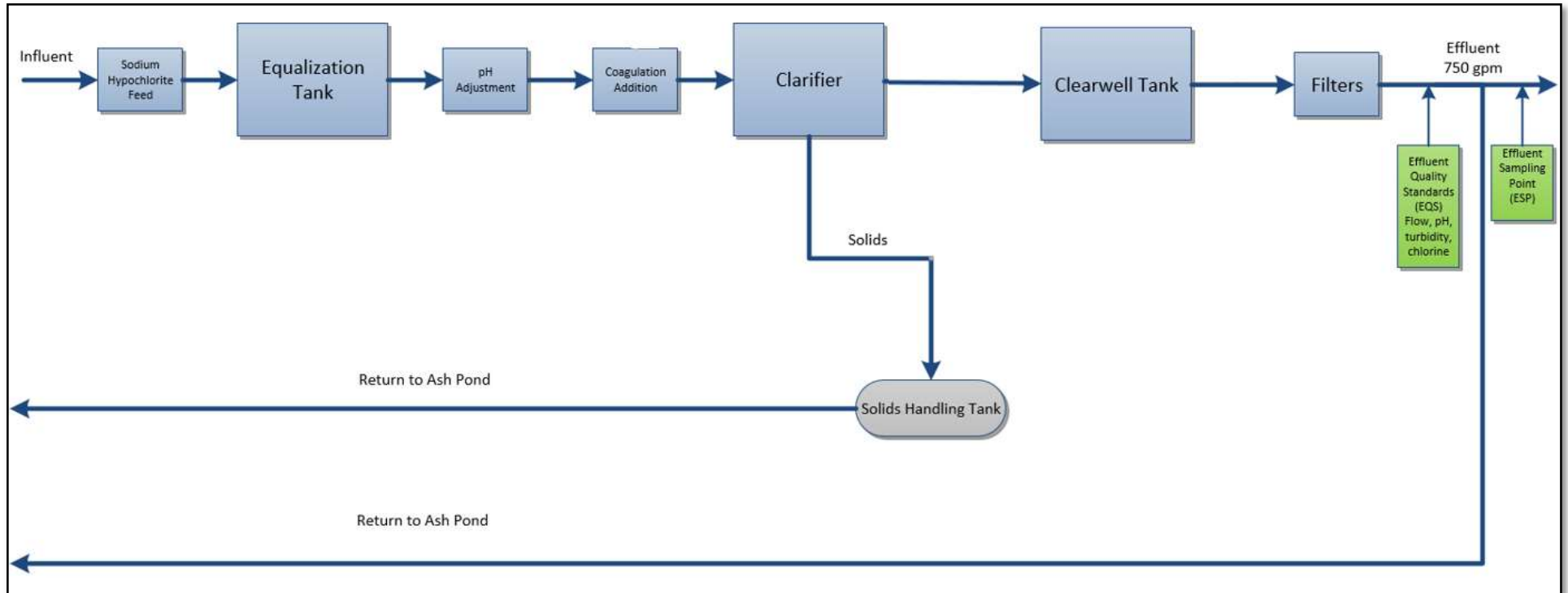


Figure 1B
Plant Bowen Dewatering Treatment System B Schematic

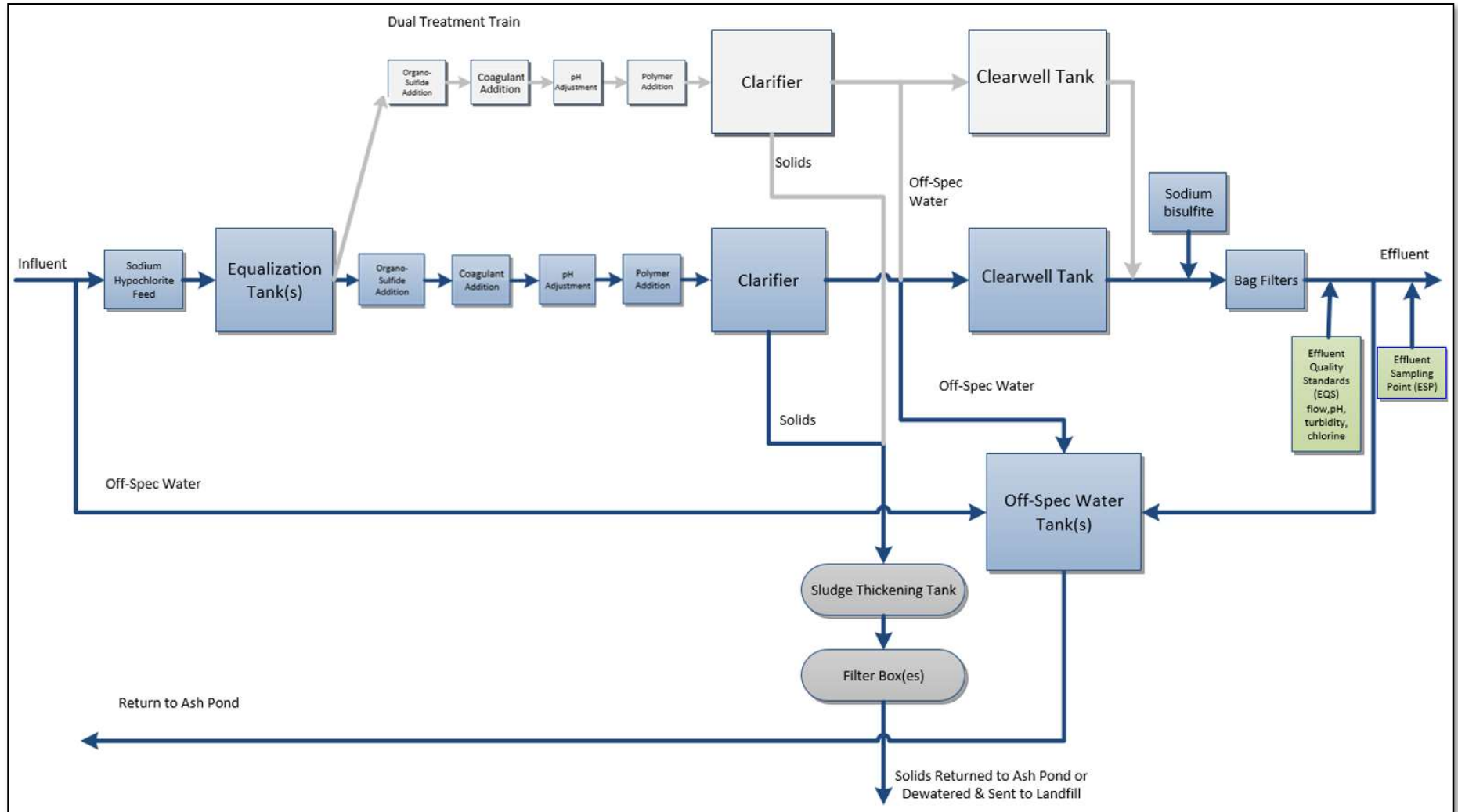


Figure 2
Plant Bowen Flow Diagram

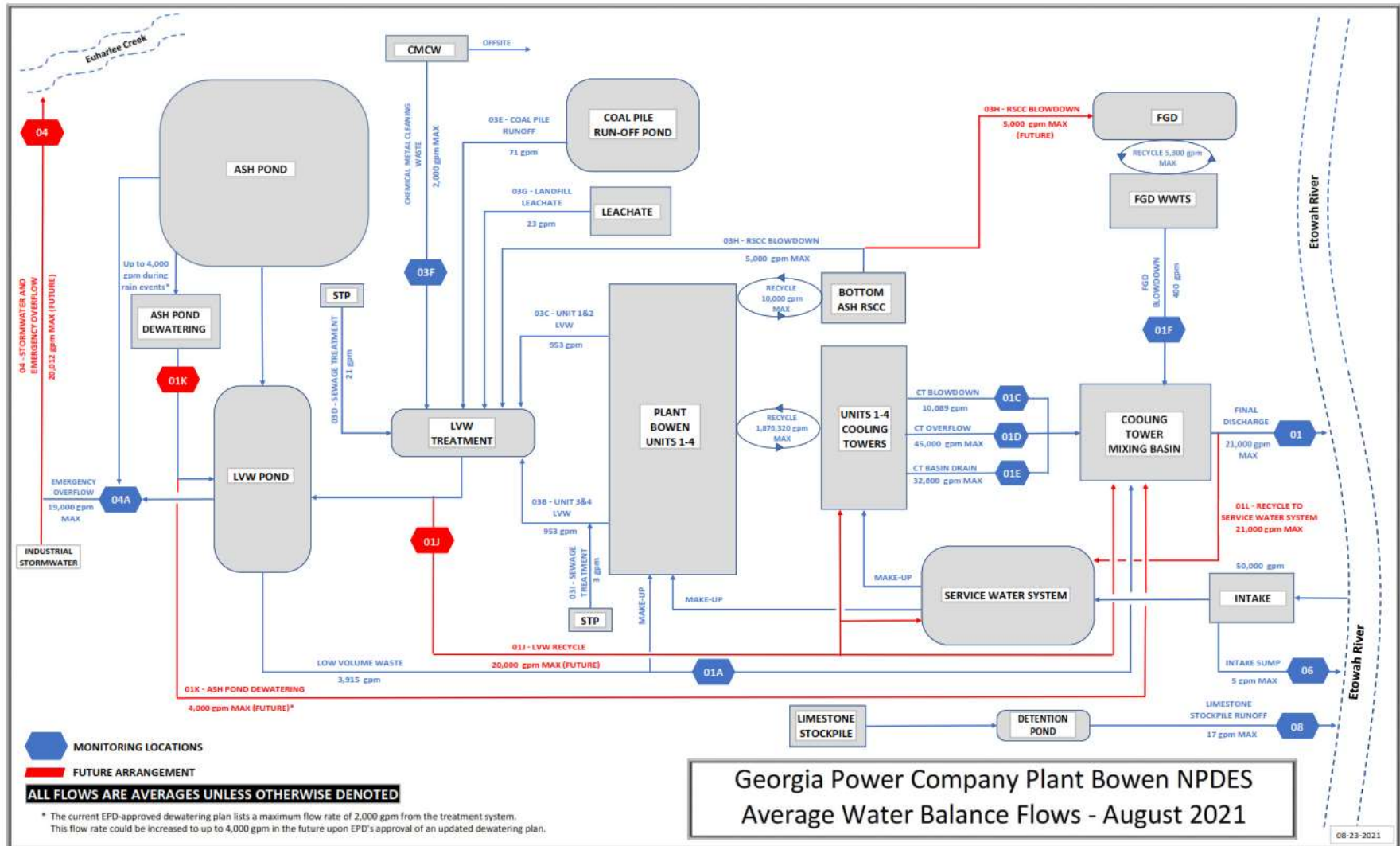
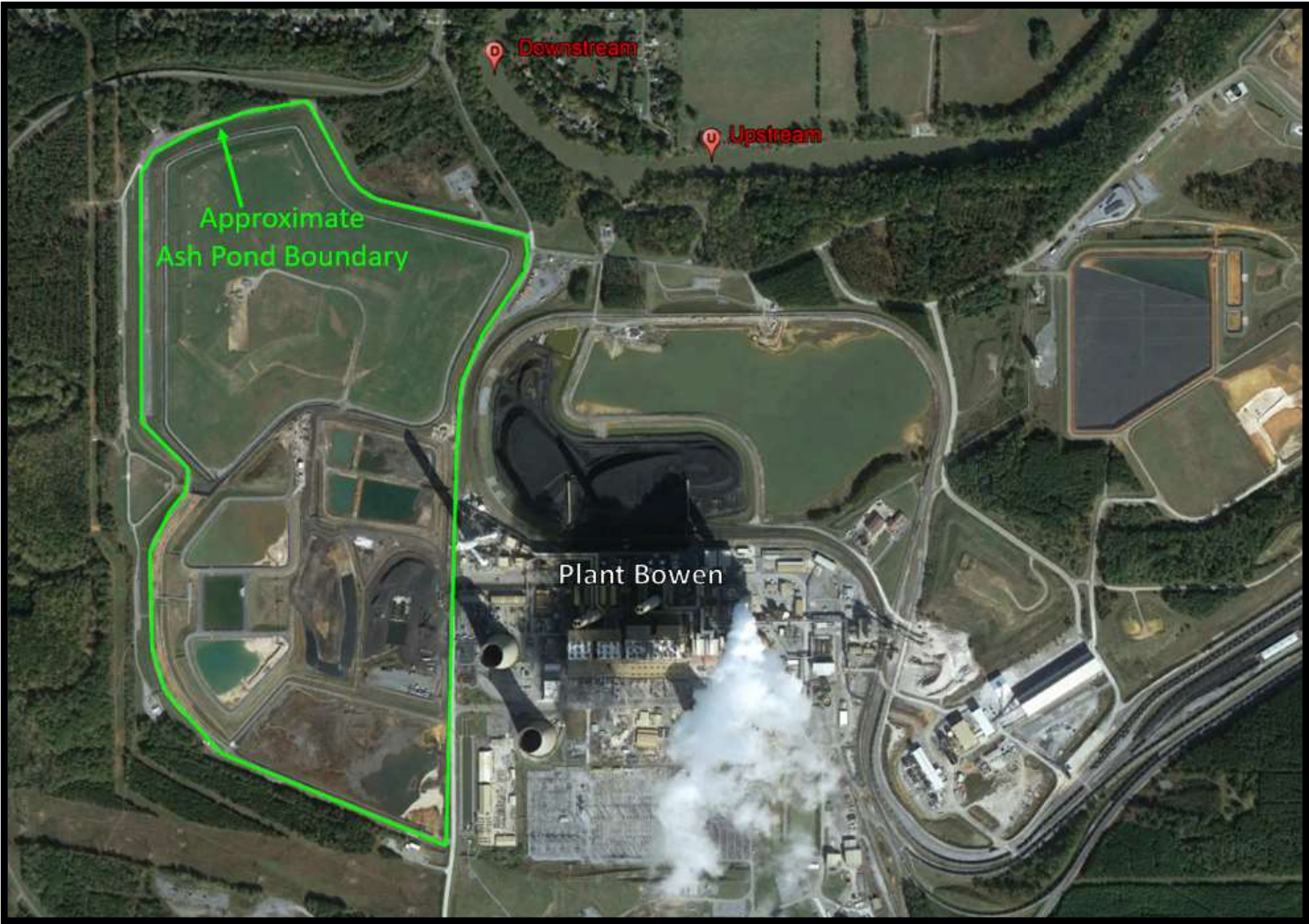


Figure 3
Plant Bowen Location Map



Process Control Monitoring

Each day that the Treatment System starts up, pH and turbidity of the influent and effluent of the Treatment System will be verified prior to discharge/commingling with other wastestreams. Discharge will occur to the permitted discharge location as authorized under the NPDES permit.

During discharge operations, pH, chlorine and turbidity are continuously measured, and the discharge visually inspected, to ensure the Effluent Quality Standards (EQSs) listed below are met. 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 returned to the ash pond while adjustments are made. The Treatment System will be returned to normal operation with discharge to the permitted discharge location once quality control checks demonstrate adherence to treatment standards.

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 onsite personnel. The instrumentation includes a turbidity meter, a pH meter, residual chlorine meter, flow meters, and the chemical feed pumps.

Testing

Samples are collected from both the influent (ash pond) and the Treatment System Effluent Sampling Point (ESP) to guide system operation and compare against the EQSs 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 TSS and turbidity of the Treatment System effluent. 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. Updated TSS and turbidity correlation curves will be provided to EPD at a minimum of once per quarter or more frequently as needed. All EQSs results including TSS/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 (EQSs)

- **pH:** 6.4 to 8.6 SU operational limits
- **Turbidity:** Determined by TSS correlation (NTU)
- **Treatment System A Flow rate:** ≤ 750 gpm
- **Treatment System B Flow rate:** ≤ 2,000 gpm
- **Total Suspended Solids (TSS):** ≤ 26 mg/L; monitored by turbidity correlation
- **Oil & Grease:** ≤ 15 mg/L daily average with 20 mg/L daily maximum over a monthly period
- **Total Residual Chlorine:** 0 mg/L (Non-Detect)

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

Stream 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-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*
Antimony, total	Report	2/Month	Grab	Upstream & Downstream*
Thallium, 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.

* Instream sampling shall occur at approximately 1,000ft upstream and downstream of the final discharge (Outfall 01) to the Etowah River, and as depicted on Figure 3.

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-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
Antimony, total	Report	Report	Weekly	Grab	ESP
Thallium, 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. ESP is the discharge from the dewatering treatment system prior to the permitted discharge location and prior to mixing with any other wastestreams.

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 Industrial Permitting Unit. Laboratory analysis and data sheets shall be retained onsite. 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 if any of the EQSs for pH, total residual chlorine, or turbidity are not achieved, and the automatic recirculation system fails.