Georgia Power Plant McDonough-Atkinson

NPDES Permit No. GA0001431

Ash Pond Dewatering Plan

November 2016

Purpose

The following plan discusses the additional safeguards and enhanced wastewater treatment system that Georgia Power has put in place to ensure the facility's NPDES permit effluent limitations continue to be met and that the receiving waterbody continues to be protected during the ash pond dewatering process. The plan provides an overview of the wastewater treatment system, a narrative description of the key processes, details of the major process control measurements being performed, and a plan for performing additional effluent monitoring. This document intends to convey the general processes and operational controls being utilized, but also envisions that further adjustments may occur to improve performance and that such changes may not be depicted in this plan.

Wastewater Treatment Facility

The wastewater treatment system (System) that is being utilized is a physical-chemical treatment plant that consists of enhanced clarification, flocculation, equalization, and finally, filtration. A schematic of the wastewater treatment system and a discussion of major components is provided below.

Location
The System is located adjacent to and within the drainage area of the plant's ash pond system. This assures that any ash pond water remains within the NPDES wastewater permitted basin until treated for discharge.

Influent
Wastewater from the ash pond is transferred to the System via pump. The intake for the influent pump is operated to minimize solids inflow into the System. Ash Pond 4 water levels are maintained by storm water from the ash pond system and a series of ash pond dewatering wells. As overall water volumes in the ash pond decrease, operation of the wastewater system will primarily be intermittent and on an "as needed basis", although continuous operation may be utilized in response to wet weather conditions. The influent pump is controlled by a flow meter located inline. If the wastewater feed to the System gets too low or too high, the flow meter will turn the pump off and send an alarm to the controls in the office trailer to alert on-site personnel. The alarm system will also control the chemical feed pump discussed below. The flow meter is a magnetic flow meter that will feed a data logger in the office trailer.

Chemical Treatment
The chemical feed system is composed of four chemical feed pumps. Three pumps feed the clarifier and one pump feeds the Modutank. Each pump is housed in a chemical storage unit with the chemical feed container. The pumps control the volume and rate of each chemical supplied to the System. Each pump is mounted on a skid with the controls, a calibration cylinder, and the peristaltic motor. Each of the skids has leak containment and will be fed from the chemical container located in its respective chemical storage unit.

Each chemical added to the System serves a specific function in the treatment process. The first chemical addition to the System is a ferric chloride solution (ferric chloride and hydrochloric acid). The ferric chloride solution serves to begin the coagulation process to remove suspended and dissolved particles in the wastewater, initiating the flocculation process. The second chemical addition to the process is the magnesium hydroxide slurry (magnesium hydroxide and brucite). The magnesium hydroxide slurry's function is to adjust the pH, add alkalinity to the process water, and enhance flocculation and metal precipitation. In conjunction with the magnesium hydroxide slurry, a liquid polymer is added to the process. The function of the liquid polymer is to increase flocculation and add weight and size to the flocculent to increase settling. If necessary, a sodium borohydride addition option can be installed and available to provide additional wastewater treatment.

Clarification
The clarifier is a Lamella Clarifier Model LGS 2500. The influent wastewater passes through the flow meter to the rapid mixing tank. The rapid mixing tank is a 500-gallon tank where the addition of the ferric chloride solution takes place. The estimated retention time in the rapid mix tank is 60 seconds, where the ferric chloride solution will begin to coagulate the smaller particles dissolved/suspended in the wastewater. From the rapid mix tank, the wastewater is gravity fed to the slow mix tank where the magnesium hydroxide slurry and the liquid polymer addition take place. The slow mix tank has an estimated retention time of approximately three (3) minutes, and is where flocculation will begin to take place. The slow mix tank gravity feeds into the clarifier. In the clarifier, the wastewater goes through a series of inclined plates to induce settling of the flocculants. The flocculants will settle to the bottom of the clarifier as sludge, while the wastewater will flow out of the clarifier by gravity to the Modutank.

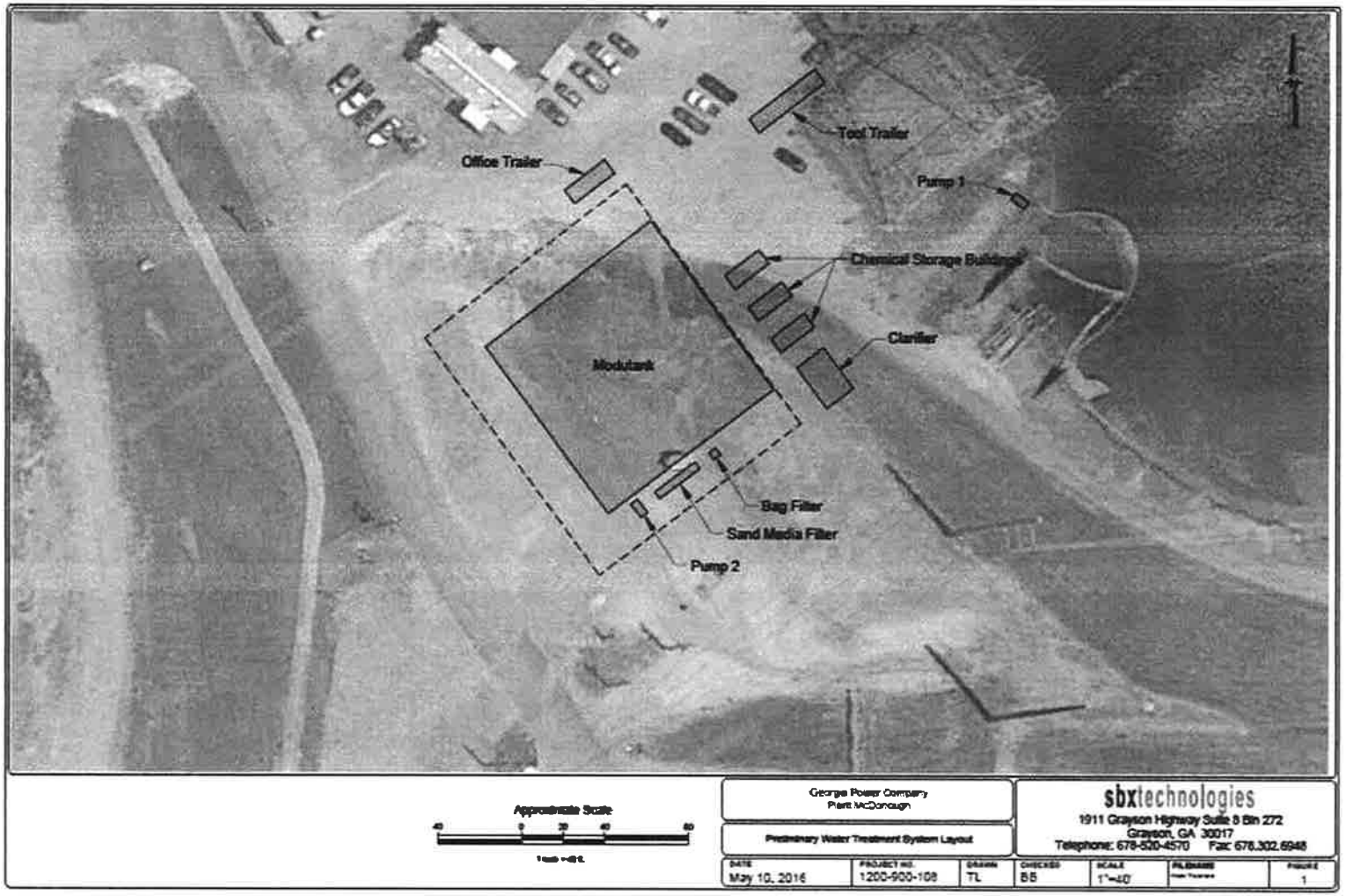
Modutank
Once the wastewater has passed through the clarifier, it is gravity fed to the Modutank. The Modutank serves as a settling area to remove additional flocculent from the wastewater prior to going to the filtering system. The Modutank has a series of adjustable baffles and other flow disruption processes. The baffles allow further settling of the flocculent prior to entering the storage area of the Modutank. Passage from the baffled section of the Modutank to the storage area is controlled by the use of a weir. The weir is located after the second baffle and placed at the top of the partition between the baffled section and the storage area. The storage area serves as the contingent final stage of the settling process prior to transfer to the sand filtering system.

Filtration
The sand filtration system is composed of four vessels which contain gravel and a sand pack to remove solids in the wastewater to a size of approximately 25 microns. The filtration system is a loose media system and as such the size removal (i.e. 25 microns) by the media filter has to be an approximation. The filtration system has four separate housings for the gravel and sand packs. Each enclosure has access through 8-inch portholes for removal/replacement of the gravel and sand filter packs; removal/replacement is necessary if the pack/s lose effectiveness. The filtration system has a backwash system to allow for the removal of accumulated particulates. The frequency of the backwash operation is determined by differential pressure gauges located on the filtration system.

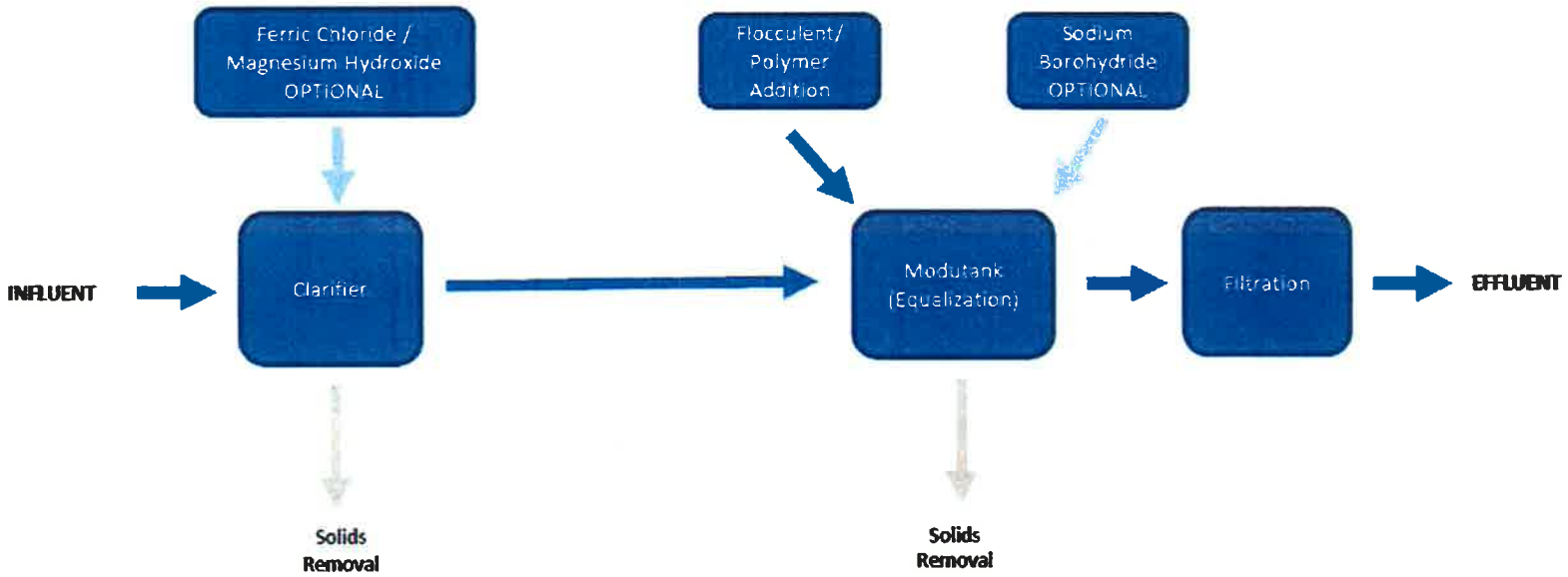
Following sand filtration, wastewater is then fed into the bag filtration system. The bag filtration system is composed of one vessel with sixteen 5-micron sock filters. The wastewater will pass through the bag filter system as an additional particulate removal step prior to discharge. The bag filter system has pressure differential gauges that will require monitoring to determine when a change of the sock filters is required. The pressure differential gauges will be monitored frequently by on-site personnel to ensure change out of the bag filter when needed. The bag filtration system is the final waste water treatment process prior to the discharge.

Operation
The operational oversight of the wastewater treatment system is performed by a certified wastewater treatment plant operator in accordance with the certification requirements of the water and wastewater treatment plant operator's and lab analyst's rules.

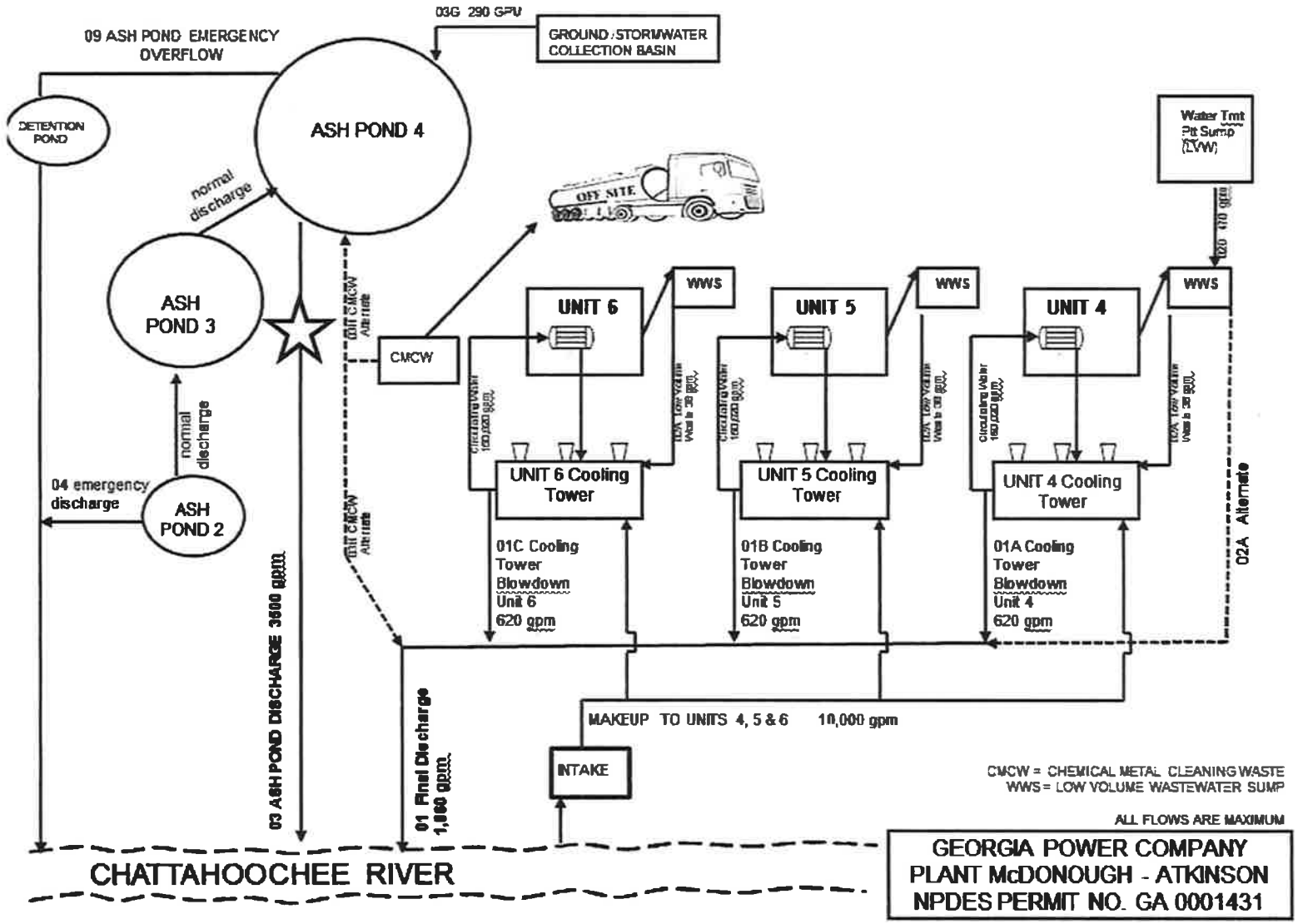
Treatment System Schematic



Plant McDonough Wastewater Treatment System Schematic



Treatment System Location



☆ Treatment System Location

Process Control Monitoring

Control System

The System has a master control panel (referred to as the Motor Control Unit) where the main electrical feed is supplied. From the Motor Control Unit, all processes have the ability to be isolated at each individual component. Alarms are placed on each of the pumps to alert on-site personnel of equipment failures so that shutdown procedures can be initiated and maintenance performed. Each alarm is routed to the Motor Control Unit and the office trailer.

Each of the monitoring devices' (flow meters, TSS meter, pH meter) output will be routed to the office trailer where a data logger is housed. Field sampling data is maintained in the office trailer in the daily log and in a spreadsheet. Field sampling parameters include pH, turbidity, and other site-specific parameters as needed. The field sampling parameters are used to determine the effective rates of chemical addition and treatment efficiency. Field monitoring also takes place at Ash Pond 4.

Maintenance

Instrumentation for use on the site is maintained to ensure optimal performance and provide accurate results. Each piece of technical equipment is calibrated at the manufacturer's recommended intervals and potentially more often if measurements are thought to be inaccurate due to on-site personnel experience. The instrumentation includes a portable turbidity meter, a pH meter, a TSS meter, flow meters, and the chemical feed pumps.

Turbidity Meter

The turbidity meter is a LaMotte 2020 portable turbidity meter for use during the daily sampling to determine the clarity of the water. The turbidity meter comes with standard solutions that includes a 10 NTU and 0 NTU calibration vials. The meter will be calibrated daily and checked prior to any sampling. The check will include the measuring of the 0 NTU calibration vial. Each sample will also be analyzed with the manufacturer supplied blank sample for further measurement accuracy. This system is for information purposes only to determine optimal performance.

pH Meters

Two (2) pH meters are used in the daily operations of the system. The first pH meter is a Hach portable/benchtop pH meter used for the daily sample collections during operation. The second pH meter is a pH probe supplied by Insite IG and is permanently installed in the Modutank effluent. The pH meters are for daily sampling to determine the initial pH of the water into the system and at the effluent from the Modutank for pH treatment requirements. The pH meters utilize a three-point calibration of 4.00, 7.00, and 10.00 standard units. Prior to each sampling event, the pH meter is checked against each calibration solution. If the meter is outside +/- 0.10 pH units from the calibration solution, the meter will be recalibrated to ensure accurate measurements. The permanent pH meter installed in the Modutank for operational observations of the process and accuracy will be checked by a grab sample collected from the effluent area of the Modutank when necessary. At a minimum, one sample is collected each day to check the calibration of the permanently installed meter. The grab sample is analyzed by the meter in the office trailer and if the measurements are outside of the accepted range (+/-0.10 units), the meter will be recalibrated. pH monitoring is for information purposes only to determine system performance and pH adjustment needs.

TSS Meter

An in-line TSS meter is utilized for effluent wastewater monitoring prior to final discharge at the permit compliance monitoring location. The calibration of the meter is performed in accordance with manufacturer's recommendations. The TSS meter is set to reject the effluent discharge and recycle water to the ash pond if the monitoring of the effluent indicates a TSS concentration $\geq$ 26 mg/L.

Effluent Monitoring and Reporting

Stream Monitoring

Effluent Characteristics mg/L or (Units)	Requirement	Measurement Frequency	Sample Type	Sample Location
pH (s.u.)	Report	1/Month	Grab	Upstream & Downstream*
TSS	Report	1/Month	Grab	Upstream & Downstream*
Oil & Grease	Report	1/Month	Grab	Upstream & Downstream*
Turbidity (NTU)	Report	1/Month	Grab	Upstream & Downstream*
TDS	Report	1/Month	Grab	Upstream & Downstream*
Copper, total	Report	1/Month	Grab	Upstream & Downstream*
Selenium, total	Report	1/Month	Grab	Upstream & Downstream*
Arsenic, total	Report	1/Month	Grab	Upstream & Downstream*
Mercury, total	Report	1/Month	Grab	Upstream & Downstream*
Chromium, total	Report	1/Month	Grab	Upstream & Downstream*
Lead, total	Report	1/Month	Grab	Upstream & Downstream*
Cadmium, total	Report	1/Month	Grab	Upstream & Downstream*
Zinc, total	Report	1/Month	Grab	Upstream & Downstream*
Nickel, total	Report	1/Month	Grab	Upstream & Downstream*
Ammonia	Report	1/Month	Grab	Upstream & Downstream*
TKN	Report	1/Month	Grab	Upstream & Downstream*
Organic Nitrogen	Report	1/Month	Grab	Upstream & Downstream*
Nitrate/Nitrite	Report	1/Month	Grab	Upstream & Downstream*
Phosphorus	Report	1/Month	Grab	Upstream & Downstream*
Ortho-phosphorus	Report	1/Month	Grab	Upstream & Downstream*
Hardness	Report	1/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 500ft upstream and downstream of the final discharge to the Chattahoochee River.

Effluent Monitoring

Effluent Characteristics mg/L or (Units)	Monthly Average	Daily Maximum	Measure Frequency	Sample Type	Sample Location
Flow (MGD)	Report	Report	Daily	Continuous	Final Effluent
pH (s.u.)	Report	Report	Daily	Continuous	Final Effluent
TSS	Report	Report	2/month	Grab	Final Effluent
Oil & Grease	Report	Report	2/month	Grab	Final Effluent
Turbidity (NTU)	Report	Report	2/month	Grab	Final Effluent
TDS	Report	Report	2/month	Grab	Final Effluent
Copper, total	Report	Report	2/month	Grab	Final Effluent
Selenium, total	Report	Report	2/month	Grab	Final Effluent
Arsenic, total	Report	Report	2/month	Grab	Final Effluent
Mercury, total	Report	Report	2/month	Grab	Final Effluent
Chromium, total	Report	Report	2/month	Grab	Final Effluent
Lead, total	Report	Report	2/month	Grab	Final Effluent
Cadmium, total	Report	Report	2/month	Grab	Final Effluent
Zinc, total	Report	Report	2/month	Grab	Final Effluent
Nickel, total	Report	Report	2/month	Grab	Final Effluent
Ammonia	Report	Report	2/month	Grab	Final Effluent
TKN	Report	Report	2/month	Grab	Final Effluent
Organic Nitrogen	Report	Report	2/month	Grab	Final Effluent
Nitrate/Nitrite	Report	Report	2/month	Grab	Final Effluent
Phosphorus	Report	Report	2/month	Grab	Final Effluent
Ortho-phosphorus	Report	Report	2/month	Grab	Final Effluent
Hardness	Report	Report	2/month	Grab	Final Effluent

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

Reporting

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. A mailed copy will also be sent to the EPD compliance office. Laboratory analysis and data sheets shall be retained on site. The first report will be submitted January 15, 2017