National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for ETEM Remediation One LLC

Public Notice No.: 187244
Public Notice Date: August 10, 2023
Comment Period Ends: September 9, 2023

Ohio EPA Permit No.: 0IB00010*PD
Application No.: OH0011525

Name and Address of Applicant:
ETEM Remediation One LLC
440 Louisiana Street, Suite 900
Houston, TX 77002

Name and Address of Facility Where Discharge Occurs:
W.H. Sammis Plant
State Route 7
Stratton, Ohio 43961
Jefferson County

Receiving Water: Ohio River

Subsequent Stream Network: Mississippi River

INTRODUCTION

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency (Ohio EPA), as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act (CWA) and Ohio Water Pollution Control Law (Ohio Revised Code [ORC] 6111). Decisions to award variances to Water Quality Standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

No antidegradation review was necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the

discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the WLA for a pollutant to a measure of the effluent quality. The measure of effluent quality is called Projected Effluent Quality (PEQ). This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

SUMMARY OF PERMIT CONDITIONS

Plant Shutdown/Demolition Phase

At the time this permit becomes effective, power generation at the facility is ceased and demolition preparation is underway. There are no future plans to continue these activities at the site. This permit reflects normal operating conditions at the plant, as no modification requests have been submitted by the permittee to reduce requirements.

Outfall 001

A lower daily maximum concentration limit is proposed for copper based on the outside mixing zone maximum criterion. The monthly average limit is proposed to be removed because the daily maximum limit is protective of the chronic water quality criteria. A 36-month compliance schedule is proposed for the facility to meet the limit.

A lower daily maximum concentration limit is proposed for total residual oxidants based on the new Tier II IMZM criterion for bromine.

Monitoring requirements are proposed to be removed for barium, cadmium, sulfate, and zinc because recent sampling data indicates that there is no reasonable potential to exceed WQS.

Fictitious Outfall 091

A lower daily maximum concentration limit is proposed for total residual oxidants based on the new Tier II IMZM criterion for bromine.

Outfall 009

New monitoring is proposed for boron because of reasonable potential to exceed WQS. A Part II tracking provision has been included to initiate reductions in boron concentrations if it is detected at levels above the applicable criteria.

Limits are proposed to be removed for mercury because comparison of recent effluent data and WQS categorize this pollutant as a Group 4 parameter in accordance with OAC 3745-2-06(B).

Monitoring requirements are proposed to be removed for cadmium, copper, lead, and zinc because recent sampling data indicates that there is no reasonable potential to exceed WQS.

Outfalls 010, 011, 012, and 013
New maximum daily effluent limits are proposed to replace the existing stormwater benchmarks for copper and zinc because sampling data indicates discharges of these pollutants in concentrations that are acutely toxic to aquatic life. A 54-month compliance schedule is proposed for the facility to meet these limits.

A new maximum daily effluent limit is proposed for cadmium at outfall 012 because the application analytical result significantly exceeds the maximum WQ criterion for this pollutant. A 54-month compliance schedule is proposed for the facility to meet this limit.

Internal Monitoring Station 605
This monitoring station is proposed to be removed from the permit. Due to coal combustion residual (CCR) requirements for unlined impoundments, the facility has discontinued use of the south coal ash pond. Stormwater from this area will be treated and discharged via outfall 009.

Internal Monitoring Stations 602 and 604
Based on updated flow values, decreased loading limits are proposed for total suspended solids and oil and grease at these stations. The established flows were calculated using the 95th percentile of monthly flow averages.

Internal Monitoring Stations 606 and 607
New final effluent limits are proposed for *Escherichia coli*. New WQS for *E. coli* became effective in April 2016. Based on recent fecal coliform data for these stations, it is expected that the facility can meet these new bacteria limits immediately.

Based on updated flow values, decreased loading limits are proposed for total suspended solids and CBOD at these stations. The established flows were calculated using the 95th percentile of monthly flow averages.

Internal Monitoring Station 608

The permit proposes monitoring and analyses for total arsenic and selenium instead of total recoverable, as required by 40 CFR 420.02(l).

Monitoring is proposed to be removed for cadmium and lead at the request of the permittee. This requirement is not necessary to determine compliance with any categorical standards or WQS.

Internal Monitoring Station 609
This monitoring station is proposed to be removed from the permit. The facility does not intend to discharge chemical metal cleaning waste in the future.

Intake Station 800

A new flow monitoring requirement is proposed for intake monitoring station 800 to characterize the volume of water withdrawn from the Ohio River.

Other Changes
The permit proposes the Hexane Extraction Method (HEM) for the sampling and analysis of oil and grease at all outfalls. This new method is proposed in accordance with 40 CFR 136.3 and shall replace the monitoring requirement for “total” oil and grease.

In Part II of the permit, special conditions are included that address stormwater compliance; operator certification, minimum staffing and operator of record; tracking of group 5 parameters; downstream public water supply notification; Section 316(a); Section 316(b), and outfall signage.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be emailed to HClerk@epa.ohio.gov or mailed to:

Legal Records Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted by email to epa.dswcomments@epa.ohio.gov (preferred method) or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact Chris Monroe, (614) 644-2007, Christopher.monroe@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants: https://epa.ohio.gov/static/Portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf . In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to

accomplishment of the purposes of this chapter. This determination was made based on data and information available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

This public notice allows the permittee to provide to the Director for consideration during this public comment period additional site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness for achieving compliance with the proposed final effluent limitations for these parameters. The permittee shall email to epa.dswcomments@epa.ohio.gov (preferred method) or deliver or mail this information to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, a written request for any additional time shall be sent to the above address no later than 30 days after the Public Notice Date on Page 1.

Should the applicant determine that compliance with the proposed WQBELs for parameters other than the priority pollutants is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQS used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in OAC 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 3745-1-39. The permittee shall submit written notification regarding their intent to develop site specific WQS for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION

The W.H. Sammis Plant discharges to the Ohio River at Mile Point 54. Figure 1 shows the approximate location of the facility.

This segment of the Ohio River is described by Ohio EPA River Code: 25-650, U.S. EPA River Reach #: 05030106-001, County: Jefferson, Ecoregion: Pittsburgh Low Plateau. The Ohio River is designated for the following uses under Ohio's WQS (OAC 3745-1-32): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Public Water Supply (PWS), Industrial Water Supply (IWS), and Bathing Waters (BW).

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural water supply and industrial water supply.

FACILITY DESCRIPTION

The Sammis Plant is a coal-fired steam-electric generating power plant. This facility is involved in the generation, transmission, and distribution of electric power. The three remaining coal-fueled generating units have a capacity to produce total gross generating capacity of approximately 1,694 megawatts.

The process operations at the Sammis Plant are classified in the Standard Industrial Classification (SIC) category 4911, Electric Services. The process wastewaters generated from these operations are regulated under 40 CFR 423, "Steam Electric Power Generating Point Source Category."

The Sammis Plant obtains water for process use and cooling purposes from the Ohio River via a cooling water intake structure (CWIS), which is subject to the requirements in CWA Section 316(b). Wells provide potable water for the Sammis Power Plant for the sanitary system and to replenish boiler water.

DESCRIPTION OF EXISTING DISCHARGE

Table 1 highlights the primary outfalls, internal monitoring stations, wastewater sources, treatment processes, discharge/receiving streams and associated flows at the Sammis Plant. Stormwater outfalls are presented on Table 2. Figure 3 provides a flow schematic of the wastewater sources and supplies associated with the Sammis Plant.

Outfall 001 discharges directly to the Ohio River at an average rate of approximately 1,065 million gallons per day (MGD) (based on application form). The wastewater flowing from this outfall consists primarily of the once-through condenser cooling water. Some stormwater as well as boiler blowdown via internal monitoring station 603 is also discharged through this outfall. Internal monitoring station 603 consists of blowdown water to remove impurities from the plant boilers, and typically contains some copper.

Outfall 009 consists of the combined discharge from the ash ponds, flue gas desulfurization (FGD) wastewater from internal monitoring station 608 (which first flows into the ash ponds) and includes some stormwater runoff. Monitoring at the north ash pond is required at internal station 604 (north ash pond). The former south ash pond has undergone closure and internal station 605 no longer exists. Treatment in the ash ponds consists of sedimentation and neutralization. Wastewater from floor drains and stormwater runoff is discharged through outfall 602.

The FGD treatment system consists of a limestone-forced oxidation process to remove sulfur dioxide from air emissions. It produces disposal-grade gypsum. The system includes a series of clarifiers and filters to remove total suspended solids. A chemical process known as alkali/sulfide precipitation is used to reduce concentrations of dissolved heavy metals.

Leachate from the Hollow Rock landfill is proposed to be redirected around the FGD treatment system, directly to the north ash pond.

Sanitary waste is treated by two onsite systems and is represented by internal monitoring stations 606 and 601, and ultimately discharges to outfalls 011 and 013. Sludge is transported to another NPDES permit holder.

Effluent violations can be found on Table 3.

The average flow rates for the permit cycle are shown on Table 4.

Table 5 presents data compiled from the NPDES permit renewal application Form 2C.

Table 6 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2018 to December 2022, and current permit limits are provided for comparison.

Table 7 summarizes the chemical specific data for outfalls 001, 009, 010, 011, 012, and 013 by presenting the average and maximum PEQ values.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Sammis Plant discharges directly to the Ohio River, both upstream and downstream of the New Cumberland dam. Water quality monitoring on the Ohio River is performed by the Ohio River Valley Water Sanitation Commission (ORSANCO). This information can be found in the *2022 Biennial Assessment of Ohio River Water Quality Conditions (305b) Report* and pool report.

The Biennial Report can be found at this website – https://www.orsanco.org/publications/biennial-assessment-305b-report/.

The most recent report for the Pike Island pool (downstream of the Sammis Plant) can be found here – https://www.orsanco.org/publications/pool-assessments/.

ORSANCO evaluates the river for four uses: aquatic life, contact recreation impairment, public water supply, and fish consumption. Every pool of the Ohio River has been assessed as fully supporting aquatic life use. The

segment of the Ohio River that the Sammis Plant discharges to is impaired for contact recreation due to *E. coli* and fecal coliform bacteria. ORSANCO data shows all sampling points from the headwaters to Mile Point 84.2 not supporting recreational use. The Ohio River is also classified as not supporting fish consumption due to historical PCB and dioxin data. The Sammis Plant has only reported one bacteria exceedance in the last 5 years and coal-fired power plants are not a common source of PCBs and dioxins. This indicates that the facility is likely not contributing to the impairments in the Ohio River. No new limits are recommended at this time.

DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

Parameter Selection

Effluent data for the Sammis Plant was used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA: DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	January 2018 through December 2022
NPDES application Form 2C data	2018

Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation to give a more reliable PEQ:

Outfall 001
Sulfate – 58,800 mg/L, 5/3/2018, uncharacteristically high value; zinc – 661.3 µg/L, 3/1/2018, uncharacteristically high value.

Outfall 009
Mercury – 163.33 ng/L, 4/2/2019, uncharacteristically high value.

Outfall 011
Zinc – 2.03 µg/L, 12/31/2018, uncharacteristically low value.

Outfall 012
Zinc – 113 µg/L, 2/18/2020, uncharacteristically low value.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points (see Table 7).

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 10).

Wasteload Allocation
For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. For free flowing streams, WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

Outfalls 001 and 009 were allocated together for arsenic, barium, cadmium, copper, and zinc. Average criteria for these parameters were calculated for outfall 001 by excluding the maximum allowable loadings for outfall 009 from the allowable average loadings for the outfalls combined. Only the IMZM applies to these parameters at outfall 009.

The applicable waterbody uses for this facility's discharge to the Ohio River and the associated stream design flows are as follows for outfall 001:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	100% of annual 7Q10
	Maximum	7% of annual 7Q10
Agricultural Water Supply		100% of harmonic mean flow
Human Health (carcinogens)		100% of harmonic mean flow
Human Health (non-carcinogens)		100% of 7Q10

Alternate dilution factors are applied to this outfall due to the discharge's unique interaction with the New Cumberland Dam, producing rapid mixing across the river. The maximum aquatic life dilution factor is based on the 1992 chlorine study.

The applicable waterbody uses for this facility's discharge to the Ohio River and the associated stream design flows are as follows for outfall 009:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	10% of annual 7Q10
	Maximum	1% of annual 7Q10
Agricultural Water Supply		10% of harmonic mean flow
Human Health (carcinogens)		10% of harmonic mean flow
Human Health (non-carcinogens)		100% of 7Q10

Allocations are developed using a percentage of stream design flow as specified in Table 9, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 8 and Table 9. The WLA results to maintain all applicable criteria are presented in Table 10.

Thermal Wasteload
The NPDES permit for the Sammis Plant contains alternate thermal effluent limits established in accordance with Section 316(a) of the CWA. The alternate limits of a monthly average of 10299 million BTU/Hour and a daily maximum of 10299 million BTUs/ Hour were developed as a part of the 316(a) approval given to the previous owner of this facility (Ohio Edison) as a result of their thermal loading demonstration submitted in April, 1992, showing that dye testing and the CORMIX mixing zone model were utilized. The alternate limits were continued in the permit renewals that occurred prior to this renewal with the last renewal occurring on

August 5, 2014. In September 2018, FirstEnergy submitted a new 316(a) study which supports the fact that no harm to aquatic life will result from the thermal discharge from outfall 001.

A WLA has been calculated for thermal loading at outfall 001, the once-through cooling water discharge for the Sammis Plant. The following equation was used to calculate the thermal WLA:

MBTU/hr= Ohio River background flow (cfs) x mixing percentage x conversion factor of cfs to MGD x conversion factor of gallons to pounds x (WQ criteria temperature – upstream temperature (°F))/ 24

The conversion of cubic feet/second (cfs) to MGD is 0.646. The conversion of gallons to pounds is 8.34. The temperature difference is the difference between the WQS seasonal averages (OAC 3745-1-32, Table 32-3) minus the upstream temperature averages. The upstream temperature monthly averages are a 75th percentile of daily temperature data collected at the Sammis Plant intake from September 2013 to August 2018. A conversion factor of 24 hours per day is also applied. The thermal WLA for the mixing zone is:

Month	**Upstream Temp. (°F)**		**WQS Temp. (°F)**		**Thermal WLA (MBTU/hr)**		**Projected Effluent Quality (PEQ)**	
	Max	*Ave*	*Max*	*Ave*	*Max*	*Ave*	*Max*	*Ave*
January	35	35.3	50	45	150	970	4281	5864
February	38	38.5	50	45	120	655	4149	5683
March	43	42.5	56	51	130	848	3928	5380
April	54	52.0	64	58	100	595	3183	4360
May	65	63.0	73	68	80	495	3184	4362
June	73.3	72.1	85	80	118	786	3663	5017
July	80	80.9	89	84	90	310	3816	5228
August	82.5	82.1	89	84	65	190	3689	5053
September	79	79.8	86	82	70	224	3561	4878
October	70	66.3	77	72	70	567	3157	4325
November	53	51.5	72	67	190	1550	3149	4314
December	44.8	43.2	57	52	123	880	3684	5046

*Thermal load for the month of August represents the critical thermal period.

The Sammis Plant therefore has reasonable potential to exceed temperature standards on the Ohio River, and relief under the Section 316(a) is proposed to be continued.

REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 10. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 7, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 11.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 12 presents the final effluent limits and monitoring requirements proposed for the Sammis Plant outfalls and internal monitoring stations and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 001/091

pH
Limits proposed for pH are based on WQS (OAC 3745-1-35).

Copper
The Ohio EPA risk assessment (Table 11) places copper in group 5. This placement, as well as the data in Table 7 and Table 10, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The daily maximum concentration limit is based on the outside mixing zone maximum aquatic life criterion. A 36-month compliance schedule to meet the new limit is proposed in Part I, C of the permit.

Total residual chlorine and total residual oxidants
The chlorine limit at outfall 001 is based on Best Technical Judgement (BTJ), based on an analysis of the inside-mixing-zone maximum (IMZM) WQS when discharges of chlorine are limited to two hours per day. This information indicates that WQS can be significantly higher for a two hour per day exposure than when organisms are exposed for 48- to 96-hours, as is typical of most acute aquatic toxicity tests. The 120-minute limit on chlorine duration regulates the exposure time so that chlorine levels will not exceed WQS.

The total residual chlorine limit for outfall 091 is proposed to continue from the previous permit and is based on the OMZM value. WQS apply because this outfall allows chlorination more frequently than 2 hours/day.

Limits on total residual oxidants reflect the use of bromine and bromine/chlorine mixtures for control of biofouling in the cooling system. The analytical method for these pollutants does not easily distinguish between bromine and chlorine, and limits are set for the total measurement (residual oxidants) as a result. The permittee shall report results for residual chlorine when only chlorine is used as a biocide, and report residual oxidants when bromine or bromine/chlorine mixtures are used.

A lower limit is proposed for total residual oxidants based on new Tier II water quality standards for bromine published on April 9, 2021. The total residual oxidants limit for outfall 001/091 is based on the WLA.

Although the current WLA would allow a slightly higher limit for total residual chlorine, anti-backsliding provisions in the OAC prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of the Sammis Plant, none of those conditions have been satisfied, so the existing limits are proposed to continue. The anti-backsliding provisions of OAC 3745-33-05 require that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.

Details regarding quantification levels for these parameters are in Part II of the permit.

Arsenic, Barium, Cadmium, Mercury, and Zinc
The Ohio EPA risk assessment (Table 11) places arsenic, barium, cadmium, mercury, and zinc in groups 2 and 3. This placement, as well as the data in Table 7 and Table 10, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Monitoring for barium, cadmium, and zinc is proposed to be removed.

Water Temperature and Flow Rate
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment plant.

Thermal discharge
Based on the updated 316(a) demonstration submitted with the renewal application, the current limit and monitoring requirement are proposed to continue. Ohio EPA believes that the alternate effluent limitations will ensure the protection and propagation of the balanced and indigenous biological community in and on the water body.

Outfall 009

pH
Limits proposed for pH are based on WQS (OAC 3745-1-35).

Boron
The Ohio EPA risk assessment (Table 11) places boron in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for this parameter. The PEQ values calculated for boron (Table 7) may not be representative of its actual levels in the plant effluent since they were based on one data point. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

Considering the magnitude of the reported values compared to the WLA, a tracking provision is proposed in Part II of the permit that requires the Sammis Plant to notify Ohio EPA if a sample result exceeds the preliminary effluent limit (Table 10). If certain conditions are met, the permittee is required to take steps to reduce the discharge level of this pollutant.

Mercury
The Ohio EPA risk assessment (Table 11) places mercury in group 4. This placement, as well as the data in Table 7 and Table 10, support that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Limits for mercury are proposed to be removed but monitoring will continue at the same frequency.

Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Mercury, Molybdenum, Nickel, Nitrate + Nitrite, Selenium, Thallium, and Zinc
The Ohio EPA risk assessment (Table 11) places antimony, arsenic, barium, cadmium, chromium, cobalt, copper, fluoride, iron, lead, mercury, molybdenum, nickel, nitrate + nitrite, selenium, thallium, and zinc in groups 2 and 3. This placement, as well as the data in Table 7 and Table 10, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Monitoring for cadmium, copper, lead, and zinc is proposed to be removed.

Hardness
Based on best technical judgment, monitoring is proposed for hardness in order to determine future IMZM criteria for metals.

Outfalls 010, 011, 012, and 013

Copper and zinc
Stormwater sampling at outfalls 010, 011, 012, and 013 yielded analytical results for copper and zinc that exceed the IMZM criteria for these parameters. This indicates that these discharges have the potential to contribute to acute toxicity in the immediate vicinity of the respective outfalls. Daily maximum concentration limits are proposed to be protective of the IMZM. Part I, C of the permit includes a 54-month compliance schedule to meet the new limits and a schedule to evaluate stormwater BMPs with respect to these pollutants.

Cadmium
Stormwater sampling at outfall 012 yielded analytical results for cadmium that exceed the IMZM criterion for this parameter. This indicates that this discharge has the potential to contribute to acute toxicity in the immediate vicinity of the outfall. A daily maximum concentration limit is proposed to be protective of the IMZM. Part I, C of the permit includes a 54-month compliance schedule to meet the new limit and a schedule to evaluate stormwater BMPs with respect to this pollutant.

pH, Total Suspended Solids (TSS), and Flow Rate
Monitoring is proposed to continue for these parameters based on best technical judgement. The stormwater benchmark for pH is proposed to continue.

See Parts IV, V, and VI of the permit for details on industrial stormwater compliance.

Internal Monitoring Station 600
The internal station monitors the influent to the Flue Gas Desulfurization (FGD) treatment system.

Flow Rate and Mercury
Monitoring is proposed to continue for these parameters so the facility can continue to collect data on the efficiency of the FGD treatment system with respect to mercury.

Internal Monitoring Station 602
The internal station monitors the floor drain discharge treatment system. Technology-based limits from the federal effluent guideline limitations (ELGs) found in 40 CFR 423 are applied at this internal station. ELGs are applied at this outfall to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution.

pH, TSS, and Oil & Grease
Federal effluent guideline limitations (ELGs) are based on available treatment technology. Federal and State laws and regulations require that dischargers meet ELGs. The limits recommended for pH, TSS, and oil & grease are based on the federal effluent limitation guidelines (ELGs) found in 40 CFR Part 423.12. All limits are shown in Attachment 1.

Flow Rate
Flow monitoring is proposed to continue to characterize the volume of floor drain discharge attributable to this station.

Internal Monitoring Station 603
The internal station monitors the boiler blowdown discharge. Technology-based limits from the federal effluent guideline limitations (ELGs) found in 40 CFR 423 are applied at this internal station. ELGs are applied at this outfall to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by

dilution.

TSS and Oil & Grease
Federal effluent guideline limitations (ELGs) are based on available treatment technology. Federal and State laws and regulations require that dischargers meet ELGs. Permit limits are based on the more stringent of the two. The limits recommended for TSS and oil & grease are based on the federal effluent limitation guidelines (ELGs) found in 40 CFR Part 423.12. All limits are shown in Attachment 1.

Although the current WLA would allow slightly higher loading limits for TSS and oil & grease, anti-backsliding provisions in the OAC prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of the Sammis Plant, none of those conditions have been satisfied, so the existing limits are proposed to continue. The anti-backsliding provisions of OAC 3745-33-05 require that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.

Copper
Monitoring is proposed to continue for copper to characterize the amount of copper in the final effluent (outfall 001) that is attributable to boiler blowdown.

Flow Rate
Flow monitoring is proposed to continue to characterize the volume of boiler blowdown attributable to this station.

Internal Monitoring Station 604
The internal station monitors the North ash pond discharge. Technology-based limits from the federal effluent guideline limitations (ELGs) found in 40 CFR 423 are applied at this internal station. ELGs are applied at this outfall to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution.

TSS and Oil & Grease
Federal effluent guideline limitations (ELGs) are based on available treatment technology. Federal and State laws and regulations require that dischargers meet ELGs. Permit limits are based on the more stringent of the two. The limits recommended for TSS and oil & grease are based on the federal effluent limitation guidelines (ELGs) found in 40 CFR Part 423.12. All limits are shown in Attachment 1.

Flow Rate
Flow monitoring is proposed to continue to characterize the volume of wastewater attributable to this station.

Internal Monitoring Station 606
The internal station monitors the South sewage treatment plant discharge.

pH, TSS, and 5-Day Carbonaceous Biochemical Oxygen Demand (CBOD5)
The limits recommended for pH, total suspended solids, and CBOD5 are Best Professional Judgement (BPJ) limits based on technology-based treatment standards included in 40 CFR Part 133, Secondary Treatment Regulation. Secondary treatment is defined by the Best Practicable Waste Treatment Technology criteria, which are minimum standards required of all publicly owned treatment works.

Copper and Zinc

Monitoring for these parameters is proposed to continue to characterize the amount of these pollutants discharged to the Ohio River (outfall 011) that is attributable to the sanitary system.

E. coli and Fecal Coliform
New summer WQS for *E. coli* became effective in April 2016. Based on best technical judgment (BTJ), it is expected the plant can comply with the new limits at the start of the next disinfection season and does not require a compliance schedule. Fecal coliform monitoring and limits are proposed to continue during the winter months.

Total Residual Chlorine
The existing daily effluent limit for total residual chlorine is proposed to continue as a plant design value which is based on protection of the inside mixing zone maximum (IMZM) PEL. The limit is protective of WQS for chlorine toxicity at the final outfall.

Turbidity Severity and Flow Rate
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment system.

Internal Monitoring Station 607
The internal station monitors the North sewage treatment plant discharge.

pH, TSS, and 5-Day Carbonaceous Biochemical Oxygen Demand (CBOD5)
The limits recommended for pH, total suspended solids, and CBOD5 are Best Professional Judgement (BPJ) limits based on technology-based treatment standards included in 40 CFR Part 133, Secondary Treatment Regulation. Secondary treatment is defined by the Best Practicable Waste Treatment Technology criteria, which are minimum standards required of all publicly owned treatment works.

Copper and Zinc
Monitoring for these parameters is proposed to continue to characterize the amount of these pollutants discharged to the Ohio River (outfall 013) that is attributable to the sanitary system.

E. coli and Fecal Coliform
New summer WQS for *E. coli* became effective in April 2016. Based on best technical judgment (BTJ), it is expected the plant can comply with the new limits at the start of the next disinfection season and does not require a compliance schedule. Fecal coliform monitoring and limits are proposed to continue during the winter months.

Total Residual Chlorine
The existing daily effluent limit for total residual chlorine is proposed to continue as a plant design value which is based on protection of the inside mixing zone maximum (IMZM) PEL. The limit is protective of WQS for chlorine toxicity at the final outfall.

Turbidity Severity and Flow Rate
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment system.

Internal Monitoring Station 608
The internal station monitors the FGD wastewater treatment system discharge. Technology-based limits from the federal effluent guideline limitations (ELGs) found in 40 CFR 423 are applied at this internal station. ELGs are applied at this outfall to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify

compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution.

pH, TSS, and Oil & Grease
Federal effluent guideline limitations (ELGs) are based on available treatment technology. Federal and State laws and regulations require that dischargers meet ELGs. Permit limits are based on the more stringent of the two. The limits recommended for pH, TSS, and oil & grease are based on the federal effluent limitation guidelines (ELGs) found in 40 CFR Part 423.12. All limits are shown in Attachment 1.

Conductivity, Alkalinity, Nitrate + Nitrite, Chloride, Sulfate, Fluoride, Arsenic, Iron, Selenium, Barium, Boron, Manganese, Zinc, Chromium, Copper, Mercury, and Total Filterable Residue
Monitoring is proposed for these parameters based on best technical judgement. The purpose of the monitoring is to collect data on the effectiveness of FGD treatment system. Monitoring is proposed to be removed for cadmium and lead at the request of the permittee.

Temperature and Flow Rate
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment system.

Additional Monitoring Requirements
A new flow monitoring requirement is proposed for intake monitoring station 800 to characterize the volume of water withdrawn from the Ohio River.

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

Sludge
Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: transfer to another facility with an NPDES permit.

OTHER REQUIREMENTS

Compliance Schedule

New Limit at Outfall 001
A 36-month compliance schedule is proposed for the Sammis Plant to meet the new daily maximum concentration limit for copper. Details are in Part I, C of the permit.

New Limits at Outfalls 010, 011, 012, and 013
A 54-month compliance schedule is proposed for the Sammis Plant to meet the new daily maximum concentration limits for cadmium (012), copper (010, 011, 012, and 013), and zinc (010, 011, 012, and 013). Details are in Part I, C of the permit.

Operator Certification and Operator of Record
Operator certification requirements have been included in Part II of the permit in accordance with rules adopted in December 2006 (OAC 3745-7-02). These rules require the Sammis Plant to have a Class A wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfalls 606 and 607. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the sewerage system.

Cooling Water Intake Structure Compliance

Under Section 316(b) of the federal CWA, cooling water intake structures (CWISs) are required to use best technology available (BTA) to minimize adverse environmental impact resulting from the operation of the intake. New rules were promulgated on October 14, 2014, and facilities with permits that expire after July 18, 2018 must be in compliance with the new rules. The CWIS is considered an existing unit at an existing facility and therefore must comply with 40 CFR 125, Subpart J. Information supplied from the permittee regarding the CWIS and other pertinent data are located in Attachment 3.

Ohio EPA has evaluated this information and at this time has determined that the existing CWIS represents BTA for entrainment in accordance with Section 316(b) of the CWA, and no additional technologies and/or system retrofits are necessary to achieve compliance. This BTJ conclusion has been reached based on the anticipated cessation of operations at the facility.

The permittee had originally elected to defer the impingement BTA determination until after a site-specific determination has been established for entrainment. At this time, Ohio EPA does not anticipate that it will be necessary to follow-up this entrainment determination with a subsequent impingement compliance decision. A special reopener condition has been included in Part II of the permit, requiring the permittee to request an updated BTA determination for impingement and entrainment, should they decide to continue operation of the once-through cooling system into the future.

In order to ensure that the facility remains compliant with Section 316(b), special conditions are included in Part II of the permit.

Steam-Electric ELG Compliance

Revisions to the Effluent Limitations Guidelines and Standards (ELGs) for the Steam Electric Power Generating Point Source Category were finalized on September 30, 2015, published in the Federal Register on November 3, 2015 (80 Fed. Reg. 67,838), and became effective on January 4, 2016.

The rule required implementation as soon as possible beginning November 1, 2018, but no later than December 31, 2023. However, on April 25, 2017, the U.S. EPA published a stay in the federal register of compliance dates that have not yet passed. On September 17, 2017, U.S. EPA published another final rule that extended as soon as possible two years, or November 1, 2020, for bottom ash transport water and flue gas desulfurization waste streams. Within the preamble of the rule, the U.S. EPA included a footnote which indicated that the rule was being reconsidered and that if a new rule is not promulgated prior to November 1, 2020, that U.S. EPA would postpone the compliance dates again. On August 31, 2020, U.S. EPA finalized the reconsideration rule, which established new compliance dates for bottom ash transport water and FGD wastewater. The rule requires implementation as soon as possible beginning October 13, 2021, but no later than December 31, 2025.

U.S. EPA has executed a review of the 2020 reconsideration rule under Executive Order 13990 and has decided to initiate a notice-and-comment rulemaking in which they will determine whether more stringent limitations and standards are appropriate consistent with the technology-forcing statutory scheme and the goals of the Clean Water Act. In the meantime, U.S. EPA expects permitting authorities to continue to implement the current regulations while they undertake a new rulemaking.

The new requirements that apply to the Sammis Plant include:

1. A "no discharge" requirement for bottom ash transport water, except as provided for in 40 CFR 423.13(k)(2); and
2. Arsenic, mercury, selenium, and nitrate/nitrite limits based on physical/chemical and biological

treatment for FGD wastewater.

On October 12, 2021, the Sammis Plant submitted a Notice of Planned Participation (NOPP) in accordance with 40 CFR 423.19(f), indicating that the facility will cease coal combustion at Units 5-7 by December 31, 2028. 40 CFR 423.13(g)(2)(i) and (k)(2)(ii) establish the total suspended solids limitations in 40 CFR 423.12 as Best Available Technology Economically Achievable (BAT) for bottom ash transport water and FGD wastewater at facilities planning to cease operation by the compliance date. Should the facility decide to continue coal combustion, the NPDES permit shall be revised to include the applicable BAT limitations for these wastestreams.

If the Steam Electric Power Generating ELG compliance dates or requirements for pollutants in bottom ash transport water and FGD wastewater are modified, the permittee shall comply with the ELGs as soon as possible, but no later than the timeline established in 40 CFR 423.

Outfall Signage
Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the Ohio River providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Public Water Supply Notification
An addition to OAC 3745-33-08 requires that permittees discharging wastewater within ten miles of a downstream public water supply intake located on the same waterway must develop and implement notification procedures in conjunction with the downstream public water supply operator in the event of a spill, separate sewer overflow, bypass or upset that reaches waters of the state. Since the City of Toronto operates a public water supply intake ten miles downstream from the Sammis Plant, an item in Part II of the permit requires the development of notification procedures within six months after the effective date of the permit.

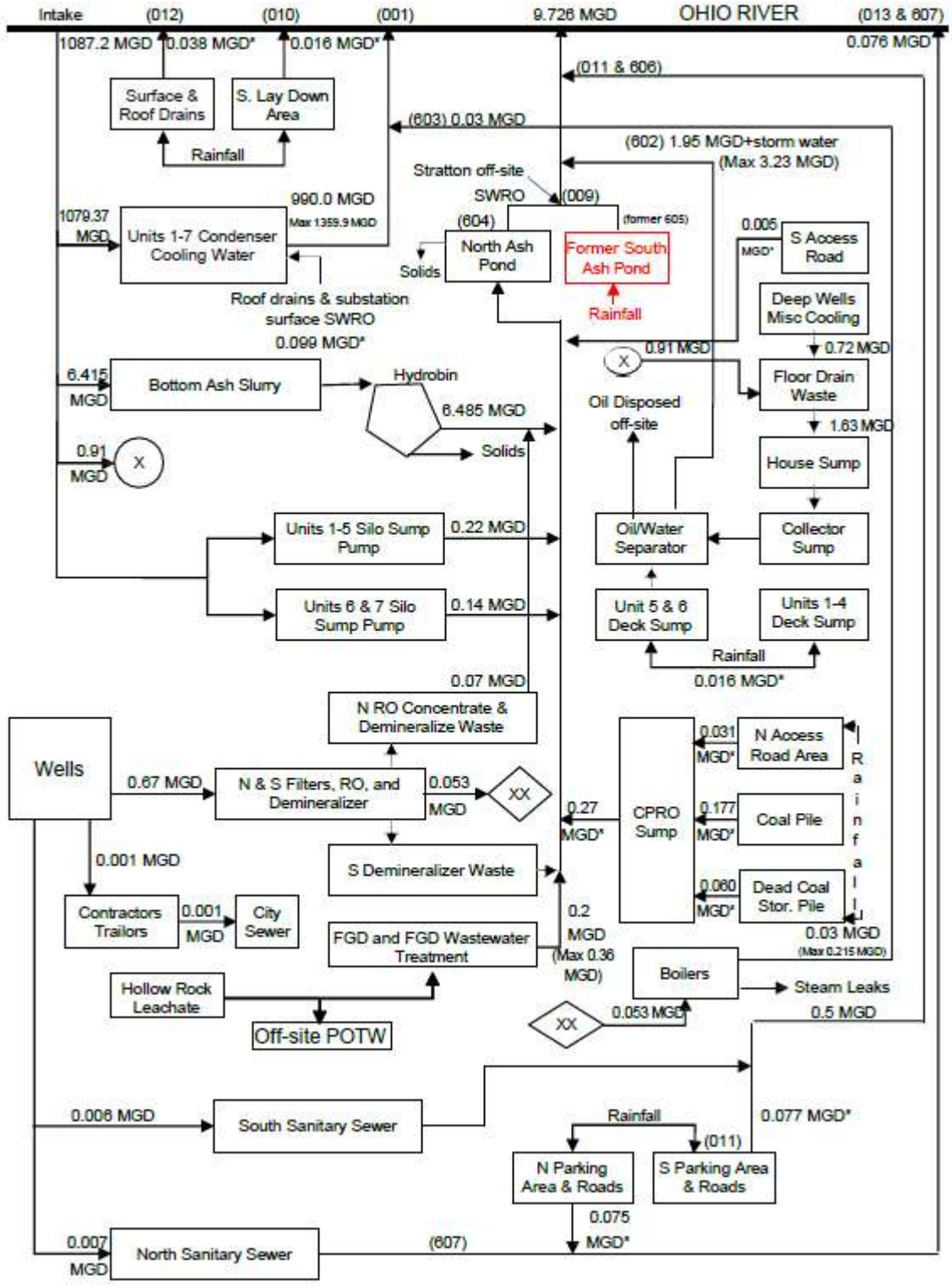
Part III
Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

Stormwater Compliance
Parts IV, V, and VI have been included with the draft permit to ensure that any stormwater flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the Sammis Plant may seek permit coverage under the general permit for industrial stormwater (permit # OHR000007) or submit a "No Exposure Certification." Parts IV, V, and VI will be removed from the final permit if: 1) the Sammis Plant submits a Notice of Intent (NOI) for coverage under the general permit for industrial stormwater or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

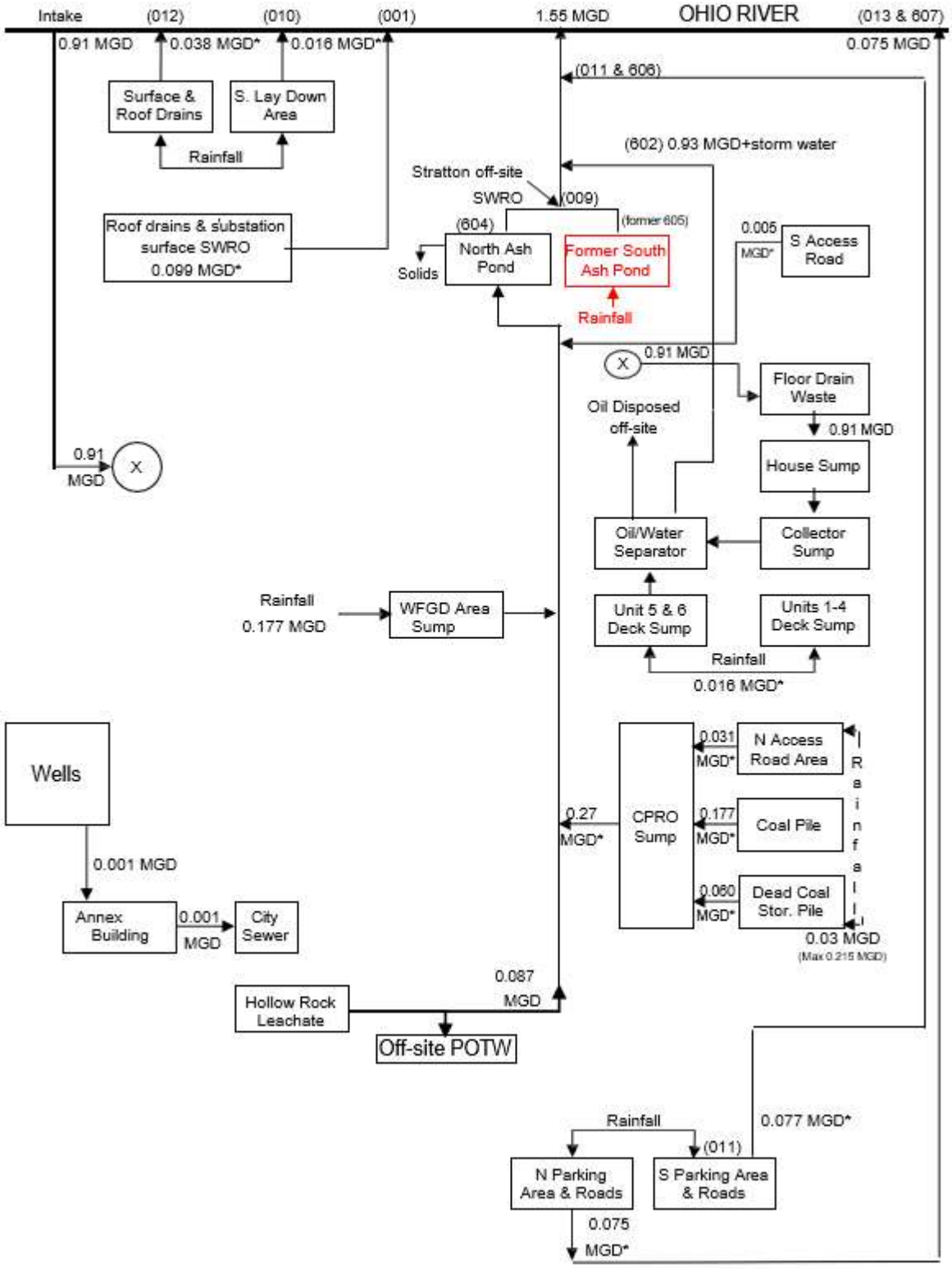
Benchmark monitoring for pH at outfalls 010, 011, 012, and 013 is proposed to characterize the discharge and trigger an evaluation of the drainage area and associated conveyances if necessary.

Figure 1. Location of the W.H. Sammis Plant

Figure 2. Water Balance Diagram



Note: This diagram is representative of conditions at the facility prior to decommissioning.



Note: This diagram is representative of conditions at the facility after decommissioning and prior to remediation.

Table 1. Monitoring Stations, Wastewater Sources, Treatment, Discharge Points, and Flows

Station #	Wastewater Source	Treatment Utilized	Discharge/ Receiving Stream	Average Flow Rate (MGD)[a]
001	Once-through cooling water	Dechlorination	Ohio River	1065
009	Ash pond	*Treatment at Outfall 604	Ohio River	6.94
600	Flue gas desulfurization wastewater inlet	Coagulation/flocculation, sedimentation, neutralization/rapid sand filtration	Ohio River via Outfall 009	0.36
602	Floor drains	Sedimentation	Ohio River	1.98
603	Boiler blowdown	N/A	Ohio River via Outfall 001	0.037
604	North ash pond	Sedimentation, neutralization	Ohio River via Outfall 009	7.30
606	South sanitary wastewater	Sedimentation, activated sludge/disinfection, dichlorination	Ohio River via Outfall 011	0.006
607	North sanitary wastewater	Sedimentation, activated sludge/disinfection, dichlorination	Ohio River via Outfall 013	N/A
608	Flue gas desulfurization wastewater	Coagulation/flocculation, sedimentation, neutralization/rapid sand filtration	Ohio River via Outfall 009	N/A

[a] = Average flow rates based on NPDES application Form 2C values.

Table 2. Stormwater Outfalls at the W.H. Sammis Plant

Station #	Representative Sampling Basis
001	Substation surface runoff
009	Stratton off-site runoff
010	South lay down area
011	South parking area drains
012	Surface drains under deck and roof drains
013	North parking area drains

Table 3. Effluent Violations

Station	Parameter	2018	2019	2020	2021	2022
001	Copper, Total Recoverable	0	0	1	2	0
607	Fecal Coliform	1	0	0	0	0
009	Mercury (Low-Level)	0	1	0	0	0
	pH	1	0	0	0	0
Total		2	1	1	2	0

Table 4. Average Annual Effluent Flow Rates

	#	Flow Rate (Million Gallons per Day)			
Year	obs	Average	Median	95th Percentile	Maximum
2018	358	680.3	700	1064	1237
2019	357	505.6	534	868.6	991.4
2020	366	475	534	779.6	868.6
2021	352	563	531.4	832.2	991.4
2022	365	650.9	709.3	945.2	991.4
2018	365	5.115	5.3	7.282	9.3
2019	361	2.848	2.81	4.83	7.19
2020	366	2.616	2.745	4.04	6.35
2021	365	2.769	2.61	4.59	7.19
2022	365	3.003	2.93	4.322	6.98

MGD = million gallons per day

Table 5. Effluent Characterization Based on Form 2C Data

Parameter	Units	Concentration	
Outfall 001		*Effluent*	*Intake*
Aluminum[c]	µg/L	78.0	144
Antimony[c]	µg/L	0.374	0.374
Arsenic	µg/L	0.698	0.5
Barium[c]	µg/L	46.6	45.8
Boron[c]	µg/L	141	138
Cadmium	µg/L	AA (0.2)	AA (0.2)
Chlorine, Total Residual[c]	mg/L	0.058	0.12
Copper	µg/L	12.3	8.2
Fluoride[c]	mg/L	0.139	0.139
Iron[c]	µg/L	89.7	236
Manganese[c]	µg/L	33.9	62.2
Mercury	ng/L	1.2	AA (0.5)
Molybdenum[c]	µg/L	1.83	1.7
Nickel[c]	µg/L	2.05	2.1
Nitrate+Nitrite[c]	mg/L	0.765	0.79
Sulfate[c]	mg/L	84	82
Titanium	µg/L	4.8	1.7
Zinc[c]	µg/L	7.74	9.3
Outfall 009			
Aluminum	µg/L	192	
Antimony	µg/L	0.510	
Arsenic	µg/L	4.53	
Barium	µg/L	67.2	
Boron	µg/L	27600	
Cadmium	µg/L	0.370	
Chlorine, Total Residual	mg/L	0.145	
Chromium	µg/L	1.2	
Cobalt	µg/L	0.872	
Copper	µg/L	4.7	
Fluoride	mg/L	4.62	
Iron	µg/L	207	
Lead	µg/L	AA (0.5)	
Manganese	µg/L	1420	
Mercury	ng/L	3.2	
Molybdenum	µg/L	9.34	
Nickel	µg/L	18	

Parameter	Units	Conc.
Nitrate+Nitrite	mg/L	3.582
Selenium	µg/L	17
Sulfate	mg/L	617
Thallium	µg/L	0.46
Titanium	µg/L	3.9
Zinc	µg/L	8.6
Outfall 010		
Copper[d]	µg/L	3.714
Zinc[d]	µg/L	32.36
Outfall 011		
Copper[d]	µg/L	10.08
Zinc[d]	µg/L	23.93
Outfall 012		
Cadmium[d]	µg/L	38.76
Copper[d]	µg/L	30.73
Zinc[d]	µg/L	10950
Outfall 013		
Copper[d]	µg/L	14.07
Zinc[d]	µg/L	115.2

[c] = Result excluded due to presence of pollutant in the intake. Form 2C intake data exceeds or is within 10% of the effluent result.
[d] = Application Form 2F flow-weighted composite value

Table 6. Effluent Characterization Using Self-Monitoring Data

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
001	Water Temperature	°F	Monitoring Only		1223	68.5	91.2	37.4 - 116
	Thermal Discharge	Million BTU/Hr	10299	10299	1767	3300	5640	1.64 - 7330
	pH	S.U.	--	6.5 - 9.0	59	7.73	8.1	6.78 - 8.81
	Sulfate, (SO4)	mg/L	Monitoring Only		59	50.4	75.1	31 - 58800
	Barium, TR	µg/L	Monitoring Only		59	40.7	49	0 - 58.7
	Zinc, TR	µg/L	Monitoring Only		59	13.9	33.1	0 - 661
	Cadmium, TR	µg/L	Monitoring Only		59	< .14	.12	0 - .4
	Copper, TR	µg/L	18	20	61	11.1	18.2	0 - 20.4
	Flow Rate	MGD	Monitoring Only		1767	587	945	0 - 1240
	Chlorine, Total Residual	mg/L	--	0.20	329	0	.05	0 - .13
	Plant Core Person ID	Number	Monitoring Only		220	1010000	1010000	1010000 - 1010000
	Collection System Visit Core Person ID	Number	Monitoring Only		12	1010000	1010000	1010000 - 1010000
	Plant Time In	Time (HHMM)	Monitoring Only		221	930	1200	500 - 1400
	Plant Time Out	Time (HHMM)	Monitoring Only		221	1000	1230	715 - 1450
009	pH	S.U.	--	6.5 - 9.0	1246	7.98	8.7	5.34 - 8.9
	Hardness, Total (CaCO3)	mg/L	Monitoring Only		59	867	1560	163 - 628000
	Zinc, TR	µg/L	Monitoring Only		59	30	189	0 - 291
	Cadmium, TR	µg/L	Monitoring Only		59	.257	1.28	0 - 3.9
	Lead, TR	µg/L	Monitoring Only		59	.469	3.72	0 - 35.6
	Copper, TR	µg/L	Monitoring Only		59	4.99	23	0 - 99.4
	Flow Rate	MGD	Monitoring Only		1791	3.01	6.11	.15 - 9.3
	Mercury, Total	kg/day	0.000441	0.0625	79	.0000438	.00017	.0000077 - .00258
	Mercury, Total	ng/L	12	1700	79	4.1	12.1	1.2 - 163
010	pH	S.U.	Monitoring Only		14	7.96	8.29	6.73 - 8.32
	Total Suspended Solids	mg/L	Monitoring Only		14	60.5	415	4 - 510
	Zinc, TR	µg/L	Monitoring Only		13	40.6	254	0 - 289
	Copper, TR	µg/L	Monitoring Only		13	3.93	21.6	0 - 34.6
	Flow Rate	MGD	Monitoring Only		14	.0205	.0777	.001 - .142
011	pH	S.U.	Monitoring Only		14	7.4	8.2	7.15 - 8.27

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
	Total Suspended Solids	mg/L	Monitoring Only		14	205	2050	26 - 3920
	Zinc, TR	µg/L	Monitoring Only		13	1580	5290	2.03 - 5390
	Copper, TR	µg/L	Monitoring Only		13	43.7	111	0 - 140
	Flow Rate	MGD	Monitoring Only		14	.075	.339	.004 - .503
012	pH	S.U.	Monitoring Only		14	7.57	8.48	6.2 - 8.82
	Total Suspended Solids	mg/L	Monitoring Only		14	149	1420	18 - 1700
	Zinc, TR	µg/L	Monitoring Only		13	2630	4950	0 - 5720
	Copper, TR	µg/L	Monitoring Only		13	16.1	74	0 - 90
	Flow Rate	MGD	Monitoring Only		14	.00424	.0153	.0002 - .0278
013	pH	S.U.	Monitoring Only		14	7.96	8.42	6.12 - 8.74
	Total Suspended Solids	mg/L	Monitoring Only		14	157	403	13 - 430
	Zinc, TR	µg/L	Monitoring Only		13	264	586	25 - 669
	Copper, TR	µg/L	Monitoring Only		13	27	70.9	0 - 85.7
	Flow Rate	MGD	Monitoring Only		14	.0585	.221	.003 - .402
600	Flow Rate	MGD	Monitoring Only		234	.0905	250	0 - 250
	Mercury, Total	ng/L	Monitoring Only		19	91000	410000	380 - 1400000
602	pH	S.U.	--	6.0 - 9.0	230	7.67	8.23	6.34 - 8.97
	Total Suspended Solids	kg/day	237	791	237	86.8	169	7.27 - 589
	Total Suspended Solids	mg/L	30	100	237	14.6	27.9	2 - 81.5
	Oil and Grease, Total	kg/day	119	158	230	< 5.84	30.3	0 - 123
	Oil and Grease, Total	mg/L	15	20	230	< .97	4.8	0 - 17
	Flow Rate	MGD	Monitoring Only		1652	1.59	1.91	.08 - 2.23
603	Total Suspended Solids	kg/day	3.4	11.4	11	.212	.591	.00757 - .692
	Total Suspended Solids	mg/L	30	100	11	1	1.78	.2 - 1.85
	Oil and Grease, Total	kg/day	1.7	2.3	10	--	--	< .189
	Oil and Grease, Total	mg/L	15	20	10	--	--	< 5
	Copper, TR	µg/L	Monitoring Only		2	18.8	30.6	5.7 - 31.9
	Flow Rate	MGD	Monitoring Only		92	.0375	.171	.00036 - .238
604	Total Suspended Solids	kg/day	1101	3627	122	171	426	9.08 - 673
	Total Suspended Solids	mg/L	30	98.9	123	12.5	26.9	2 - 41
	Oil and Grease, Total	kg/day	551	734	37	< 94.6	104	0 - 239
	Oil and Grease, Total	mg/L	15	20	37	< 5	8.56	0 - 14
	Flow Rate	MGD	Monitoring Only		900	3.36	6.5	.15 - 9.25

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
605	Total Suspended Solids	kg/day	1101	3630	138	118	383	0 - 716
	Total Suspended Solids	mg/L	30	99	149	11.1	25	.006 - 70
	Oil and Grease, Total	kg/day	551	734	33	< 10.2	42.8	0 - 84.9
	Oil and Grease, Total	mg/L	15	20	33	< .97	2.8	0 - 12
	Flow Rate	MGD	Monitoring Only		915	2.7	5.5	0 - 8.2
606	pH	S.U.	--	6.0 - 9.0	59	7.24	8.2	6.25 - 8.36
	Total Suspended Solids	kg/day	1.70	2.55	66	.409	.818	.0908 - .886
	Total Suspended Solids	mg/L	30	45	66	18	35.5	4 - 39
	Zinc, TR	µg/L	Monitoring Only		17	92	512	43.6 - 588
	Copper, TR	µg/L	Monitoring Only		17	49.5	82.9	0 - 87.6
	Turbidity, Severity	Units	Monitoring Only		1248	0	1	0 - 1
	Fecal Coliform - Summer	#/100 mL	200	400	30	< 1	8.2	0 - 20
	Fecal Coliform - Winter	#/100 mL	1000	2000	31	1	156	0 - 410
	Flow Rate	MGD	Monitoring Only		1795	.006	.006	.006 - .01
	Chlorine, Total Residual	mg/L	--	0.038	118	.01	.02	0 - .03
	CBOD 5 day	kg/day	1.42	2.27	59	.0795	.412	0 - .506
	CBOD 5 day	mg/L	25	40	59	3.5	18.2	0 - 22.3
607	pH	S.U.	--	6.0 - 9.0	59	8.06	8.49	6.73 - 8.82
	Total Suspended Solids	kg/day	3.41	5.11	62	.397	.739	.0265 - 1.03
	Total Suspended Solids	mg/L	30	45	62	15	27.9	1 - 39
	Zinc, TR	µg/L	Monitoring Only		17	83.7	207	17.7 - 240
	Copper, TR	µg/L	Monitoring Only		17	34.4	80.6	12.4 - 115
	Turbidity, Severity	Units	Monitoring Only		1248	0	1	0 - 1
	Fecal Coliform - Summer	#/100 mL	200	400	30	< 1	43.3	0 - 140
	Fecal Coliform - Winter	#/100 mL	1000	2000	32	< 1	134	0 - 6100
	Flow Rate	MGD	Monitoring Only		1795	.007	.007	.007 - .007
	Chlorine, Total Residual	mg/L	--	0.038	118	.01	.02	0 - .023
	CBOD 5 day	kg/day	2.84	4.54	59	< .106	.286	0 - .485
	CBOD 5 day	mg/L	25	40	59	< 4	10.8	0 - 18.3
608	Water Temperature	°C	Monitoring Only		254	27.9	52	12.6 - 56
	Specific Conductance at 25 Degrees C	Umho/cm	Monitoring Only		236	17000	33000	22 - 39000

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
	pH	S.U.	--	6.0 - 9.0	236	8.57	8.82	6.49 - 8.98
	Alkalinity, Total (CaCO3)	mg/L	Monitoring Only		236	518	891	15 - 37000
	Total Suspended Solids	mg/L	30	100	120	16	29.1	0 - 38
	Oil and Grease, Total	mg/L	15	20	118	< .97	3.66	0 - 8.4
	Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		19	23	32.1	11 - 33.3
	Chloride, Total	mg/L	Monitoring Only		117	4500	8320	900 - 46000
	Sulfate, (SO4)	mg/L	Monitoring Only		117	5200	8580	6.36 - 64000
	Fluoride, Total (F)	mg/L	Monitoring Only		117	44.8	84.6	0 - 110
	Arsenic, TR	µg/L	Monitoring Only		118	2.69	7.65	0 - 13.2
	Iron, TR	µg/L	Monitoring Only		118	69.6	552	0 - 5400
	Selenium, TR	µg/L	Monitoring Only		118	349	1240	0 - 1570
	Barium, TR	µg/L	Monitoring Only		118	95.4	171	0 - 199
	Boron, Total	µg/L	Monitoring Only		118	273000	463000	41900 - 3620000
	Manganese, Total (Mn)	µg/L	Monitoring Only		118	17100	41000	0 - 150000
	Zinc, TR	µg/L	Monitoring Only		118	< 2.2	46.3	0 - 76.1
	Cadmium, TR	µg/L	Monitoring Only		118	< .14	.0905	0 - 1.6
	Lead, TR	µg/L	Monitoring Only		118	< .22	3.31	0 - 350
	Chromium, TR	µg/L	Monitoring Only		118	4.18	11.6	0 - 52.4
	Copper, TR	µg/L	Monitoring Only		118	1.39	22	0 - 35.3
	Flow Rate	MGD	Monitoring Only		197	.1	205	0 - 300
	Mercury, Total	ng/L	Monitoring Only		59	18	90.9	2.3 - 190
	Residue, Total Filterable	mg/L	Monitoring Only		236	18000	60300	580 - 280000
800	Water Temperature	°F	Monitoring Only		1237	58	81	32 - 89
	Copper, TR	µg/L	Monitoring Only		30	3.63	9.39	0 - 13.6

Note: For minimum pH, 5th percentile shown in place of 50th percentile.

Table 7. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Outfall 001					
Aluminum	µg/L	1	1	353	483.6
Arsenic - TR	µg/L	1	1	3.159	4.328
Barium	µg/L	61	56	47.27	54.76
Cadmium - TR	µg/L	61	7	0.233	0.2495
Chlorine, Total Residual	mg/L	329	123	0.02871	0.05835
Copper - TR	µg/L	63	58	16.64	22.84
Manganese - TR	µg/L	1	1	153.4	210.2
Mercury	ng/L	1	1	5.431	7.44
Sulfates	mg/L	60	60	66.33	83.37
Titanium	µg/L	1	1	21.72	29.76
Zinc - TR	µg/L	60	47	27.91	42.32
Outfall 009					
Aluminum	µg/L	1	1	869	1190
Antimony	µg/L	1	1	2.308	3.162
Arsenic - TR	µg/L	1	1	20.5	28.09
Barium	µg/L	1	1	304.1	416.6
Boron	µg/L	1	1	124918	171120
Cadmium - TR	µg/L	61	35	1.668	2.442
Chlorine, Total Residual	mg/L	1	1	0.6563	0.899
Chromium - TR	µg/L	1	1	5.431	7.44
Cobalt	µg/L	1	1	3.947	5.406
Copper - TR	µg/L	61	50	26.17	41.1
Fluoride	mg/L	1	1	20.91	28.64
Iron - TR	µg/L	1	1	936.9	1283
Lead - TR	µg/L	61	40	4.153	5.966
Manganese - TR	µg/L	1	1	6427	8804
Mercury	ng/L	80	80	7.689	11.27
Molybdenum	µg/L	1	1	42.27	57.91
Nickel - TR	µg/L	1	1	81.47	111.6
Nitrate-N + Nitrite-N	mg/L	1	1	16.21	22.21
Selenium - TR	µg/L	1	1	76.94	105.4
Sulfates	mg/L	1	1	2793	3825
Thallium	µg/L	1	1	2.08196	2.852
Titanium	µg/L	1	1	17.6514	24.18
Zinc - TR	µg/L	61	51	163.1	245.2
Outfall 010					
Copper - TR	µg/L	13	10	25.22	47.83
Zinc - TR	µg/L	13	12	682	1112

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Outfall 011					
Copper - TR	µg/L	13	11	151.3	284.5
Zinc - TR	µg/L	12	12	8274	15603
Outfall 012					
Copper - TR	µg/L	13	11	99.15	188.9
Zinc - TR	µg/L	12	11	5157	8527
Outfall 013					
Copper - TR	µg/L	13	10	75.8	134.7
Zinc - TR	µg/L	13	13	954.2	1814

MDL = analytical method detection limit
PEQ = projected effluent quality
TR = Total Recoverable

Table 8. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Outfalls 001, 010, 011, 012, 013						
Aluminum	µg/L	--	--	--	--	--
Arsenic - TR	µg/L	50	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Bromine, Total Residual	mg/L	--	--	0.00026	0.0024	0.0048
Cadmium - TR	µg/L	--	50	2.6	4.8	9.6
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Copper - TR	µg/L	1300	500	9.8	15	30
Manganese - TR	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	1700
Sulfates	mg/L	--	--	--	--	--
Titanium	µg/L	--	--	--	--	--
Zinc - TR	µg/L	9100	25000	130	130	250
Outfall 009						
Aluminum	µg/L	--	--	--	--	--
Antimony	µg/L	14	--	190	900	1800
Arsenic - TR	µg/L	50	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Boron	µg/L	--	--	3900	33000	65000
Cadmium - TR	µg/L	--	50	2.6	4.8	43
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chromium - TR	µg/L	--	100	90	1900	11000
Cobalt	µg/L	--	--	24	220	440
Copper - TR	µg/L	1300	500	9.8	15	100
Fluoride	mg/L	1	2	--	--	--
Iron - TR	µg/L	--	5000	--	--	--
Lead - TR	µg/L	--	100	6.9	130	1400
Manganese - TR	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nickel - TR	µg/L	610	200	55	490	3000
Nitrate-N + Nitrite-N	mg/L	10	100	--	--	--
Selenium - TR	µg/L	170	50	5	--	--
Sulfates	mg/L	250	--	--	--	--
Thallium	µg/L	1.7	--	17	79	160
Titanium	µg/L	--	--	--	--	--
Zinc - TR	µg/L	9100	25000	130	130	780

Table 9. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	5000	ORSANCO; Pollution Control Standards; 2019
7Q10	cfs	annual	5880	ORSANCO; Pollution Control Standards; 2019
Harmonic Mean	cfs	annual	20500	ORSANCO; Pollution Control Standards; 2019
Mixing Assumption	%	average	10	(***WLAs for non-carcinogens are developed using 100 percent of the 7Q10.)
		maximum	1	
Outfall 001				
Mixing Assumption	%	average	100	WLAs developed using 100 percent of the 7Q10 due to mixing at New Cumberland Dam.
		maximum	7	Alternate value based on 1992 Chlorine Study.
Hardness	mg/L	annual	106	ORSANCO Bimonthly; 2014-2019; median
Discharge flow	cfs	annual	1307	95th percentile of monthly avgs; 2018-2022
Outfall 009				
Mixing Assumption	%	average	10	(***WLAs for non-carcinogens are developed using 100 percent of the 7Q10.)
		maximum	1	
Hardness, OMZM	mg/L	annual	106	ORSANCO Bimonthly; 2014-2019; median
Hardness, IMZM	mg/L	annual	400	50th percentile of effluent values; 2018-2022
Discharge flow	cfs	annual	8.564	95th percentile of monthly avgs; 2018-2022
Background Water Quality				
Aluminum	µg/L		196	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Antimony	µg/L		0.05	ORSANCO; 2014-2019; n=33; 17<MDL; ORSANCO; 2014-2019; median
Arsenic - TR	µg/L		0.05	ORSANCO; 2014-2019; n=33; 26<MDL; ORSANCO; 2014-2019; median
Barium	µg/L		38	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Boron	µg/L		0	No representative data available.
Bromine, Total Residual	mg/L		0	No representative data available.
Cadmium - TR	µg/L		0.5	ORSANCO; 2014-2019; n=33; 32<MDL; ORSANCO; 2014-2019; median
Chlorine, Total Residual	mg/L		0	No representative data available.
Chromium - TR	µg/L		0.5	ORSANCO; 2014-2019; n=33; 24<MDL; ORSANCO; 2014-2019; median
Cobalt	µg/L		0	No representative data available.
Copper - TR	µg/L		2.9	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Fluoride	mg/L		0	No representative data available.

Parameter	Units	Season	Value	Basis
Iron - TR	µg/L		380	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Lead - TR	µg/L		0.5	ORSANCO; 2014-2019; n=33; 27<MDL; ORSANCO; 2014-2019; median
Manganese - TR	µg/L		74.9	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Mercury	ng/L		1.8	ORSANCO; 2014-2019; n=33; 14<MDL; ORSANCO; 2014-2019; median
Molybdenum	µg/L		0	No representative data available.
Nickel - TR	µg/L		2.54	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median
Nitrate-N + Nitrite-N	mg/L		0.87	ORSANCO; 2003-2015; n=113; 0<MDL; ORSANCO; 2000-2018; median
Selenium - TR	µg/L		0.5	ORSANCO; 2014-2019; n=33; 28<MDL; ORSANCO; 2014-2019; median
Sulfates	mg/L		64	ORSANCO; 2003-2015; n=114; 0<MDL; ORSANCO; 2000-2018; median
Thallium	µg/L		0.05	ORSANCO; 2014-2019; n=33; 32<MDL; ORSANCO; 2014-2019; median
Titanium	µg/L		0	No representative data available.
Zinc - TR	µg/L		5.66	ORSANCO; 2014-2019; n=33; 0<MDL; ORSANCO; 2014-2019; median

MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
Ohio EPA = Ohio Environmental Protection Agency
ORSANCO = Ohio River Valley Water Sanitation Commission

Table 10. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Outfall 001						
Arsenic - TR	µg/L	270[B]	--	--	353	680
Barium	µg/L	--	--	3479[AB]	3009	5800
Bromine, Total Residual	mg/L	--	--	0.0014	0.0032	0.0048
Cadmium - TR	µg/L	--	--	12[AB]	5	9.6
Chlorine, Total Residual	mg/L	--	--	0.06[A]	0.024	0.038
Copper - TR	µg/L	--	--	41[AB]	15	30
Mercury[C]	ng/L	12	10000	910	1700	1700
Zinc - TR	µg/L	--	--	689[AB]	135	250
Outfall 009						
Antimony	µg/L	9592	--	13232	6154	1800
Arsenic - TR	µg/L	--	--	--	--	680[D]
Barium	µg/L	--	--	--	--	4000[D]
Boron	µg/L	--	--	271675	225669	65000
Cadmium - TR	µg/L	--	--	--	--	43[D]
Chlorine, Total Residual	mg/L	--	--	0.77[A]	0.13	0.038
Chromium - TR	µg/L	--	23918	6235	12990	11000
Cobalt	µg/L	--	--	1672[A]	1504	440
Copper - TR	µg/L	--	--	--	--	100[D]
Fluoride	mg/L	688	481	--	--	--
Iron - TR	µg/L	--	1110921	--	--	--
Lead - TR	µg/L	--	23918	446	886	1400
Mercury[C]	ng/L	12	10000	910	1700	1700
Molybdenum	µg/L	--	--	1393206	1299308	370000
Nickel - TR	µg/L	417694	47467	3657	3336	3000
Nitrate-N + Nitrite-N	mg/L	6279	23829	--	--	--
Selenium - TR	µg/L	116549	11899	314	--	--
Thallium	µg/L	1135	--	1181[A]	540	160
Zinc - TR	µg/L	--	--	--	--	780[D]
Outfall 010						
Copper - TR	µg/L	--	--	--	--	30
Zinc - TR	µg/L	--	--	--	--	250
Outfall 011						
Copper - TR	µg/L	--	--	--	--	30
Zinc - TR	µg/L	--	--	--	--	250
Outfall 012						
Cadmium - TR	µg/L	--	--	--	--	9.6
Copper - TR	µg/L	--	--	--	--	30

Zinc - TR	µg/L	--	--	--	--	250
Outfall 013						
Copper - TR	µg/L	--	--	--	--	30
Zinc - TR	µg/L	--	--	--	--	250

[A] = Allocation must not exceed the OMZM/IMZM.

[B] = Values calculated as the remaining load difference of the minimum OMZA criteria applicable to the combined flows from outfall 001 and 009, and the maximum allowable loads for outfall 009.

[C] = Bioaccumulative Chemical of Concern (BCC), WQS must be met at end-of-pipe, unless the requirements for an exclusion are met as listed in 3745-2-08 (L).

[D] = Only the IMZM applies based on OMZA calculations for outfall 001.

Table 11. Parameter Assessment

Outfall 001

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Aluminum Manganese Sulfates
Titanium

Group 2: PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.

Arsenic Barium Cadmium

Group 3: PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL. No limit recommended; monitoring optional.

Mercury Zinc

Group 4: $PEQ_{max} \geq 50$ percent, but < 100 percent of the maximum PEL or $PEQ_{avg} \geq 50$ percent, but < 100 percent of the average PEL. Monitoring is appropriate.

No parameters fit this group

Group 5: Maximum PEQ ≥ 100 percent of the maximum PEL or average PEQ ≥ 100 percent of the average PEL, or either the average or maximum PEQ is between 75 and 100 percent of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

			Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Chlorine, Total Residual	mg/L	Annual	--	0.024
Copper	µg/L	Annual	--	15

Outfall 009

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Aluminum	Manganese	Sulfates
Titanium		

Group 2: PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.

Antimony	Arsenic	Barium
Cadmium	Chromium	Cobalt
Fluoride	Iron	Lead
Molybdenum	Nickel	Nitrate+Nitrite
Selenium	Thallium	

Group 3: PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL. No limit recommended; monitoring optional.

Copper	Zinc

Group 4: $PEQ_{max} \geq 50$ percent, but < 100 percent of the maximum PEL or $PEQ_{avg} \geq 50$ percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Mercury

Group 5: Maximum PEQ ≥ 100 percent of the maximum PEL or average PEQ ≥ 100 percent of the average PEL, or either the average or maximum PEQ is between 75 and 100 percent of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

			Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Boron	µg/L	Annual	--	65000
Chlorine, Total Residual	mg/L	Annual	--	0.038

PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standard

Table 12. Final Effluent Limits

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 001						
Water Temperature	°F	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Thermal Discharge	mBTU/ hr	10299	10299	--	--	316a
pH	S.U.	6.5 - 9.0		--	--	WQS
Copper	µg/L	--	15	--	--	WLA/ OMZM
Total Residual Oxidants	mg/L	--	0.0032	--	--	WLA
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Total Residual Chlorine	mg/L	--	0.20	--	--	BTJ/ IMZM
Chlorination Duration	Mins	--	120	--	--	BTJ/ IMZM
Outfall 009						
pH	S.U.	6.5 - 9.0				WQS
Hardness	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Boron	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Outfall 010						
pH	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Total Suspended Solids	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Zinc	µg/L	--	240	--	--	IMZM
Copper	µg/L	--	28	--	--	IMZM
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Outfall 011						
pH	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Total Suspended Solids	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Zinc	µg/L	--	240	--	--	IMZM
Copper	µg/L	--	28	--	--	IMZM
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Outfall 012						
pH	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Total Suspended Solids	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Zinc	µg/L	--	240	--	--	IMZM
Cadmium	µg/L	--	9.6	--	--	IMZM
Copper	µg/L	--	28	--	--	IMZM
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Outfall 013						
pH	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Total Suspended Solids	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Zinc	µg/L	--	240	--	--	IMZM
Copper	µg/L	--	28	--	--	IMZM
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Fictitious Station 091						
Total Residual Oxidants	mg/L	--	0.0032	--	--	WLA
Total Residual Chlorine	mg/L	--	0.019	--	--	ABS
Chlorination Duration	Mins	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Internal Monitoring Station 600						
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Internal Monitoring Station 602						
pH	S.U.	6.0 – 9.0		--	--	BPT
Total Suspended Solids	mg/L	30	100	209	697	BPT
Oil and Grease	mg/L	15	20	105	139	BPT
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Internal Monitoring Station 603						
Total Suspended Solids	mg/L	30	100	3.4	11.4	BPT/ ABS
Oil and Grease	mg/L	15	20	1.7	2.3	BPT/ ABS
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Internal Monitoring Station 604						
Total Suspended Solids	mg/L	30	98.9	640	2109	BPT
Oil and Grease	mg/L	15	20	320	427	BPT

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Internal Monitoring Station 606						
pH	S.U.	6.0 – 9.0		--	--	BPJ/ST
Total Suspended Solids	mg/L	30	45	0.681	1.02	BPJ/ST
Zinc	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Turbidity	Severity	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Fecal Coliform (Winter)	#/100 ml	1000	2000	--	--	WQS
E. coli (Summer)	#/100 ml	126	240[d]	--	--	WQS
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Total Residual Chlorine	mg/L	--	0.038	--	--	IMZM
CBOD (5-day)	mg/L	25	40	0.568	0.908	BPJ/ST
Internal Monitoring Station 607						
pH	S.U.	6.0 – 9.0		--	--	BPJ/ST
Total Suspended Solids	mg/L	30	45	0.795	1.19	BPJ/ST
Zinc	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Turbidity	Severity	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Fecal Coliform (Winter)	#/100 ml	1000	2000	--	--	WQS
E. coli (Summer)	#/100 ml	126	240[d]	--	--	WQS
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Total Residual Chlorine	mg/L	--	0.038	--	--	IMZM
CBOD (5-day)	mg/L	25	40	0.662	1.06	ST
Internal Monitoring Station 608						
Water Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Specific Conductance	Umho/cm	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
pH	S.U.	6.0 – 9.0		--	--	BPT
Alkalinity	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Total Suspended Solids	mg/L	30	100	--	--	BPT
Oil and Grease	mg/L	15	20	--	--	BPT
Nitrate plus Nitrite	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Chloride	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Sulfate	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Fluoride	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Arsenic	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Iron	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Selenium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Barium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Boron	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Manganese	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Zinc	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Chromium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Total Filterable Residue	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Intake Monitoring Station 800						
Water Temperature	°F	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]

[a] Effluent loadings based on:
Outfall 009 – 5.535 MGD.
Internal Monitoring Station 602 – 1.841 MGD.
Internal Monitoring Station 603 – 0.1141 MGD.
Internal Monitoring Station 604 – 5.635 MGD.
Internal Monitoring Station 606 – 0.006 MGD.
Internal Monitoring Station 607 – 0.007 MGD.

[b] Definitions:
ABS = Antibacksliding Rule (OAC 3745-33-05(F) and 40 CFR Part 122.44(l))
BAT = Best Available Technology Economically Achievable, 40 CFR Part 423.13, Steam Electric Power Generating Point Source Category
BPJ = Best Professional Judgment
BPT = Best Practicable Control Technology Currently Available, 40 CFR Part 423.12, Steam Electric Power Generating Point Source Category
BTJ = Best Technical Judgment
M = BEJ of Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges
NPDES = National Pollutant Discharge Elimination System
OAC = Ohio Administrative Code
PD = Plant Design (OAC 3745-33-05(E))
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
ST = Secondary Treatment, 40 CFR Part 133, Secondary Treatment Regulation
WLA = Wasteload Allocation procedures (OAC 3745-2)
WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum
WLA/OMZM = Wasteload Allocation limited by Outside Mixing Zone Maximum
WQS = Ohio Water Quality Standards (OAC 3745-1)

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

[d] 7-day average limit.

Attachment 1. Applicable Federal Effluent Limitation Guidelines

40 CFR 423.12 – Best Practicable Control Technology (BPT)

Parameter	Daily Maximum (mg/L)	30-Day Average (mg/L)
Low Volume Waste Sources		
Total Suspended Solids	100	30
Oil and Grease	20	15
Fly and Bottom Ash Transport		
Total Suspended Solids	100	30
Oil and Grease	20	15
Coal Pile Runoff		
Total Suspended Solids	50	--
FGD Wastewater and Combustion Residual Leachate		
Total Suspended Solids	100	30
Oil and Grease	20	15

40 CFR 423.13 – Best Available Technology Economically Achievable (BAT)

Parameter	Daily Maximum (mg/L)	30-Day Average (mg/L)
Once Through Cooling Water		
Chlorine, Total Residual	0.2	--
FGD Wastewater [a]		
Arsenic, Total	18	8
Selenium, Total	103	34
Mercury, Total	70	29
Nitrate + Nitrite	4	3
Bottom Ash Transport Water [a]		
No Discharge	--	--

[a] BAT limitations defer to BPT due to anticipated cessation of coal combustion by December 31, 2028.

Attachment 2. List of Utilized Treatment Additives

Chemical	Outfall	Use
Sodium Hypochlorite	001	Biocontrol
Sodium Hydroxide	009	pH Control
Hydrated Lime	608	pH Control
Ferric Chloride	608	Coagulant
Metclear MR2405	608	Mercury Removal
Scaletrol PDC9313	608	Scale Inhibitor
Polyfloc AE1115	608	Flocculant
Klaraid CDP2727	608	Flocculant

Attachment 3. Cooling Water Intake Structure Compliance

Cooling water intake structure information

The CWIS is considered an existing unit at an existing facility and therefore must comply with 40 CFR 125, Subpart J. Information supplied from the permittee regarding the CWIS and other pertinent data include the following:

- The plant previously had a design intake flow (DIF) of 1,409 MGD when all circulation and service pumps were in operation. Since the decommissioning of Units 1-4, the DIF has been reduced to 917.5 MGD.
- The Sammis Plant uses a once-through condenser cooling system that is supplied by six recirculating pumps (two per unit).
- Approximately 99 percent of the water withdrawn from the Ohio River is used for once-through cooling. The remaining one percent is used for service uses such as traveling screen wash, bearing cooling, boiler seals, and ash sluicing.
- Biological data for impingement and entrainment evaluation were compiled from ORSANCO, EPRI, USEPA, and FirstEnergy reports.
- Description of screens, technologies, and operations measures used to reduce impingement and entrainment – travelling screens with 0.375-inch square openings, fish return system, and fish buckets for Units 5-7. The shutdown of Units 1-4 resulted in an intake flow reduction of 35 percent, which is expected to result in a similar reduction of entrainment.
- The table below presents the through-screen design intake velocities for each unit.

Factor	Units 1 - 4	Unit 5	Unit 6	Unit 7
Number of Screens	8	2	2	2
Screen Width (feet)	10	10	10	10
Bottom of Screen Elevation (feet)	636.0	636.0	636.0	636.0
Low Water Elevation (feet)	649.3	649.3	649.3	649.3
Low Water Submergence Depth (feet)	13.3	13.3	13.3	13.3
Screen Open Area Percentage	60.9%	60.9%	60.9%	60.9%
Design Intake Flow (DIF) (GPM)	369,200	117,100	210,10	282,000
Design Intake Flow (DIF) (cfs)	822.1	260.8	468.1	628.3
Maximum Actual Intake Flow (AIF)	356,306	113,025	202,85	272,316
Maximum Actual Intake Flow (AIF)	793.7	251.8	451.9	606.6
Through-Screen Velocity at DIF	1.44	1.83	3.29	4.41
Through-Screen Velocity at AIF	1.39	1.77	3.17	4.26

*Units 1-4 are no longer operational

Description of intake structure

The CWIS shoreline structure is 56 feet long by 53 feet high and consists of three separate submerged intake bays. Each bay is 17 feet wide and is protected by trash racks. Downstream of the trash racks, the individual bays transition into three underground intake channels, each 14 feet wide by 155 feet long, which convey cooling water underneath of State Route 7. Upon reaching the west side of State Route 7, the intake channels combine into a 263-foot long, 28 feet wide forebay that feeds water to the six individual screen bays of the screen house. There are six total traveling water screen bays, two per unit; each traveling water screen bay has a traveling water screen with 10-foot basket widths and 3/8-inch square mesh openings. Fish and debris are collected on the screens and spray washed to a return trough that discharges water to the Ohio River immediately downstream of the intake ducts.

Monthly Percentage of Water Body Withdrawn

Month	Average Streamflow[1]	Average Intake Flow 2015-2017[2]		Proportion of Stream Flow Withdrawn
	cfs	M	cfs	%
January	51,667	8	1,285	2.49
February	56,869	7	1,148	2.02
March	74,401	7	1,094	1.47
April	64,531	7	1,161	1.80
May	45,530	7	1,092	2.40
June	28,326	9	1,433	5.06
July	20,260	1	1,794	8.85
August	16,306	1	1,708	10.5
September	17,159	9	1,428	8.32
October	20,073	6	1,003	5.00
November	33,310	7	1,098	3.30
December	51,604	6	1,048	2.03

[1] Source: Average monthly streamflow for flows passing through the USACE New Cumberland Locks and Dam for 1956-2011.
[2] Source: Monthly average intake flow for Sammis intake for 2015-2017 (prior to Unit 1-4 decommission).

Fish and wildlife in the vicinity of the intake structure

FirstEnergy submitted biological characterization data based on fish surveys performed near Sammis during the period from 1973 to 1997 and 2004 to 2014 and published by EPRI. Site specific impingement sampling was performed at Sammis from April 1977 through March 1978 and again from July 2005 to August 2006. Entrainment studies were conducted in 1977 and more recently in 2015 and 2016.

Federal Listed Endangered Species
No federally-protected aquatic species were identified from impingement, entrainment, and fisheries studies conducted near the Sammis Plant.

Federal Critical Habitat
None were identified.

State-Listed Endangered or Threatened Fish Species
The ODNR lists the species in the table below as endangered or threatened in the State of Ohio. These species have been identified near the Sammis Plant. Four other state-listed species have been recorded in the New Cumberland Pool of the Ohio River: goldeye (Endangered), shoal chub (Endangered), shortnose gar (Endangered), and Tippecanoe darter (Threatened). However, these records are either older than 25 years or occurred more than 10 river miles away from the Sammis Plant.

Common	Scientific	Status	Notes
American eel	*Anguilla rostrata*	T	- Collected during lock chamber rotenone surveys in 1969 and 1988 at the New Cumberland L/D - Collected near Sammis in 1985 - Collected below the New Cumberland L/D in 2012 and 2016
Channel darter	*Percina copelandi*	T	- 212 individuals collected in the vicinity of Sammis between 2004 and 2014
River darter	*Percina shumardi*	T	- 32 individuals collected in the vicinity of Sammis between 2007 and 2014

T = Threatened

Fragile Species
Fragile species are defined in 40 CFR 125.92 (m) as *"... a species of fish or shellfish that has an impingement survival rate of less than 30 percent even when the BTA technology of modified travelling screens are in operation.*" The fragile species at the Sammis Plant include gizzard shad and skipjack herring.

Other Agency Reviews

No public participation or consultation with Federal or State agencies related to CWA Section 316(b) was undertaken during the development of the 122.21(r) reports.

Impingement and Entrainment

Impingement
The most recent impingement sampling was conducted from July 2005 to August 2006. Gizzard shad accounted for 98 percent of impingement, followed by freshwater drum (0.7 percent), and white perch (0.4 percent). The estimated annual impingement based on this sampling is presented in the table below.

Common Name	Scientific Name	Individuals	Biomass
		%	%
Gizzard shad	*Dorosoma cepedianum*	98.21	87.22
Freshwater drum	*Aplodinotus grunniens*	0.74	2.20
White perch	*Morone americana*	0.40	0.97
White bass	*Morone chrysops*	0.33	4.00
Sauger	*Sander canadensis*	0.19	4.86
Bluegill	*Lepomis macrochirus*	0.03	0.02
Largemouth bass	*Micropterus salmoides*	0.03	0.08

Common Name	Scientific Name	Individuals	Biomass
		%	%
Walleye	*Sander vitreus*	0.02	0.35
Channel catfish	*Ictalurus punctatus*	0.02	0.12
Black crappie	*Pomoxis nigromaculatus*	0.01	0.01
Quillback	*Carpiodes cyprinus*	0.01	0.05
Silver chub	*Macrhybopsis storeiana*	<0.01	0.02
Logperch	*Percina caprodes*	<0.01	<0.01
Shorthead redhorse	*Moxostoma macrolepidotum*	<0.01	0.01
Golden shiner	*Notemigonus crysoleucas*	<0.01	<0.01
Emerald shiner	*Notropis atherinoides*	<0.01	<0.01
Mooneye	*Hiodon tergisus*	<0.01	0.04
Yellow perch	*Perca flavescens*	<0.01	0.01
Smallmouth bass	*Micropterus dolomieu*	<0.01	0.01
Northern hogsucker	*Hypentelium nigricans*	<0.01	<0.01
Skipjack herring	*Alosa chrysochloris*	<0.01	0.01
Flathead catfish	*Pylodictis olivaris*	<0.01	<0.01
White crappie	*Pomoxis annularis*	<0.01	0.02

Initial condition of impinged fish was also recorded during the 2005-2006 study. The majority of fish impinged (63 percent) were recently dead; approximately 19 percent were dead prior to impingement.

Based on the impingement studies at the Sammis Plant, gizzard shad, freshwater drum, white perch, and white bass are the most likely species to be impinged at the CWIS.

Entrainment
Entrainment data as collected at the Sammis plant as part of an EPRI study in 2015 and 2016. In the first year of the study, 26 taxa were collected, 90% of which were from four groups (carpsucker/buffalo, freshwater drum, gizzard shad, and common carp). The 2016 survey yielded less than half the samples collected in 2015, with about the same number of taxa (25). Gizzard shad were the dominant species present (34%). The dominant lifestage identified during the 2-year project was larvae, of which the most susceptible species were carpsucker/buffalo, herring/shad, gizzard shad, and freshwater drum.

Cessation of Operations
The Sammis plant has a planned shutdown date of May 31, 2023. By the time this permit is effective, it is likely that energy generation activities at the site have been discontinued. The permittee does not expect to withdraw water from the Ohio River for cooling purposes beyond this date. The intake structure will be maintained to provide water for fire suppression activities and other utility services. These needs will be negligible.

Compliance with 40 CFR 125.94(c) and (d)

This facility utilizes the following to minimize adverse environmental impacts:

1. **Impingement**

   a. ***Impingement Mortality BTA - 40 CFR 125.94(c):*** The Sammis plant has elected to defer the selection of the impingement mortality BTA compliance method until after the entrainment

BTA determination has been made. Since the entrainment BTA determination has been made based on the decommissioning of the facility, it is not expected that the permittee would select an impingement mortality option.

2. Entrainment

a. ***Site-Specific Entrainment Standards – 40 CFR 125.94(d):*** Ohio EPA has evaluated the factors in 40 CFR 125.98(f)(2) to determine BTA for entrainment. Based on the anticipated cessation of operations at the facility, the Agency has assigned all weight of the determination to the "remaining useful plant life" factor. No site-specific requirements are recommended to address entrainment at the Sammis Plant.

Director Requirements

The Director is required to include monitoring requirements, record keeping requirements, and reporting requirements within the permit. Additionally, the Director is required to make site-specific entrainment requirements weighing various factors.

Monitoring

40 CFR 125.96(a) – Monitoring requirements for impingement mortality for existing facilities:

The Director may establish monitoring requirements such as intake velocity, biological monitoring, and flow measurements. New monitoring is proposed for flow rate at the intake station.

40 CFR 125.96(b) – Monitoring requirements for entrainment for existing facilities:

The Director may establish monitoring requirements for entrainment. New monitoring is proposed for flow rate at the intake station.

40 CFR 125.96(e) – Visual or remote inspections:

To comply with the regulation, the permit proposes weekly visual or remote monitoring devices to ensure that all technologies installed are maintained and operated as designed. The results of the inspections shall be documented and retained by the facility for Agency review until the subsequent permit is issued.

Reporting and Recordkeeping Requirements

40 CFR 125.97(a) – Monitoring Reports

The permittee is required to submit eDMRs which will characterize withdrawals.

40 CFR 125.97(c) – Annual certification

The permittee is required to submit an annual certification indicating any substantial changes at any unit which may impact cooling water intake. This is consistent with the rule.

40 CFR 125.97(d) – Permit reporting records retention

The permittee shall retain all records of all submissions related to 316(b) until the subsequent permit is issued.

Site Specific Entrainment BTA Determination

For *existing units*, the Director must weigh the factors in 40 CFR 125.98(f)(2) to determine whether there are entrainment control technologies that perform better than the technologies in place. Since the facility has committed to ceasing operation of its units in 2023, the only factor seriously considered was "remaining useful plant life."

Must Consider Factors

The following correlate to subparagraphs of 40 CFR 125.98(f)(2) and are factors the Director must consider in BTA determination.

Numbers and types of organism entrained, including, specifically, the numbers and species (or lowest taxonomic classification possible) of Federally-listed, threatened and endangered species, and designated critical habitat (e.g., prey base).

Factor not considered.

Impact of changes in particulate emissions or other pollutants associated with entrainment technologies.

Factor not considered.

Land availability inasmuch as it relates to the feasibility of entrainment technology.

Factor not considered.

Remaining useful plant life.

There is no proposed production end date for this facility.

Quantified and qualitative social benefits and costs of available entrainment technologies when such information on both benefits and costs is of sufficient rigor to make a decision.

Factor not considered,

Summary

The Director considers the Sammis Plant's cooling water intake structure to be BTA to minimize adverse environmental impacts based on the proposed cessation of coal-burning activities in 2023. Ohio EPA has determined that it is not appropriate to impose requirements to install new site-specific entrainment controls prior to closure. A Part II condition is included in the permit, requiring that the permittee reopen the permit should they decide to continue coal-burning activities.

Addendum 1. Acronyms

ABS	Anti-backsliding
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BPJ	Best professional judgment
BPT	Best Practicable Control Technology Currently Available
BTJ	Best technical judgment
CFR	Code of Federal Regulations
CONSWLA	Conservative substance wasteload allocation
CWA	Clean Water Act
CWIS	Cooling water intake structure
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
ELG	Federal effluent limitation guideline
gpm	Gallons per minute
IMZM	Inside mixing zone maximum
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
NSPS	New source performance standards
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SIC	Standard Industrial Classification
TBEL	Technology-based effluent limit
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards