

National Pollutant Discharge Elimination System (NPDES) Permit Program**PUBLIC NOTICE****NPDES Permit to Discharge to State Waters**

Ohio Environmental Protection Agency
Permits Section
50 West Town St., Suite 700
P. O. Box 1049
Columbus, Ohio 43216-1049
(614) 644-2001

Public Notice No.: 212710
Date of Issue of Public Notice: 6/6/2025
Name and Address of Applicant: Cardinal Operating Company - Cardinal Plant, 306 County Road 7E, Brilliant, OH, 43913

Name and Address of Facility
Where Discharge Occurs: Cardinal Operating Company - Cardinal Plant, 306 County Road 7E, Brilliant, OH, 43913, Jefferson County

Outfall Flow and Location List:

008	20000 GPD	Lat: 40.244479	Long: -80.654063
006	20000 GPD	Lat: 40.251638	Long: -80.646104
001	1045000000 GPD	Lat: 40.251666	Long: -80.647222
019	6330000 GPD	Lat: 40.260556	Long: -80.648611
027	GPD	Lat: 40.253827	Long: -80.642046
026	GPD	Lat: 40.247781	Long: -80.650782
011	GPD	Lat: 40.243221	Long: -80.655184
024	9091000 GPD	Lat: 40.235886	Long: -80.660042

Receiving Stream: Ohio River, Riddles Run, Blockhouse Hollow Run

Nature of Business: Cardinal Plant is an electric generating station consisting of three units. Units 1 and 2 have a nameplate capacity of 600 megawatts each and Unit 3 has a nameplate capacity of 630 megawatts. All three units use coal as the fuel source. The units are equipped with electrostatic precipitators, selective catalytic reduction for control of NOx emissions, and flue gas desulfurization (scrubber) systems. Units 1 and 2 have a once-through cooling water system and Unit 3 utilizes closed-cycle cooling. The source of cooling water for all three units is the Ohio River. All three units are owned by Buckeye Power, Inc.

Key parameters to be limited
in the permit are as follows:

Total Suspended Solids, Fecal Coliform, CBOD 5 day, pH, E. coli, Chlorine, Total Residual, Thermal Discharge, Chlorination/Bromination Duration, Mercury, Total (Low Level), Oil and Grease, Hexane Extr Method, Arsenic, Total Recoverable, Copper, Total Recoverable

The Director has, after evaluation of pertinent technical, social, and economic information, determined that the discharge specified in this permit will result in a change from ambient in water quality of the receiving stream. This change will not interfere with or become injurious to the existing designated use.

On the basis of preliminary staff review and application of standards and regulations, the director of the Ohio Environmental Protection Agency will issue a permit for the discharge subject to certain effluent conditions and special conditions. The draft permit will 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. Any person may submit written comments on the draft permit and administrative record and may request a public hearing. A request for public hearing shall be in writing and shall state the nature of the issues to be raised. In appropriate cases, including cases where there is significant public interest, the director may hold a public hearing on a draft permit or permits prior to final issuance of the permit or permits. Following final action by the director, any aggrieved party has the right to appeal to the Environmental Review Appeals Commission.

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person, by E-mail or by mail no later than 30 days after the date of this public notice. Comments should be e-mailed to epa.dswcomments@epa.ohio.gov or delivered or mailed to both of the following locations: 1) Ohio Environmental Protection Agency, Lazarus Government Center, Division of Surface Water, Permits Processing Unit, 50 West Town St., Suite 700, P.O. Box 1049, Columbus, Ohio 43216-1049 and 2) Ohio Environmental Protection Agency, Southeast District Office 2195 Front St., Logan OH 43138.

The Ohio EPA permit number and public notice numbers should appear next to the above address on the envelope and on each page of any submitted comments. All comments received no later than 30 days after the date of this public notice will be considered.

Proposed Water Quality Based Effluent Limitations: This draft permit contains water quality based effluent limitation(s) (WQBELs). In accordance with Ohio Revised Code Section 6111.03(J)(3), the Director establishes 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 of the timely submitted National Pollutant Discharge Elimination System (NDPES) permit renewal application, along with any and all pertinent information available to the Director.

This public notice hereby 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 WQBEL(s). This information shall be submitted to the addresses listed above.

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 WQBEL(s), written notification for any additional time shall be sent no later than 30 days after the date of this public notice to the Director at the addresses listed above.

Should the applicant determine that compliance with a WQBEL is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQBEL in accordance with the terms and conditions set forth in Ohio Administrative Code (OAC) Rule 3745-1-38 no later than 30 days after the date of this public notice to the addresses listed above.

Alternately, the applicant may propose the development of site-specific water quality standard(s) pursuant to OAC Rule 3745-1-39. The permittee shall submit written notification to the Director regarding their intent to develop site-specific water quality standards for the pollutant at issue to the addresses listed above no later than 30 days after the date of this public notice.

The application, fact sheets, permit including effluent limitations, special conditions, comments received, and other documents are available for inspection and may be copied at a cost of 5 cents per page at the Ohio Environmental Protection Agency at the address shown on page one of this public notice any time between the hours of 8 a.m. and 4:30 p.m., Monday through Friday. Copies of the public notice are available at no charge at the same address. Individual NPDES draft permits that are in public notice are available on DSW's web site: <https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/list-of-draft-permit-public-notices>

Mailing lists are maintained for persons or groups who desire to receive public notice for all applications in the state or for certain geographical areas. Persons or groups may also request copies of fact sheets, applications, or other documents pertaining to specific applications. Persons or groups may have their names put on such a list by making a written request to the agency at the address shown above.

Ohio EPA Permit No.: 0IB00009*BE
Application No: OH0012581

DRAFT COPY
SUBJECT TO REVISION
OHIO EPA

Action Date: TBD
Effective Date: TBD
Expiration Date: 5 Years

Ohio Environmental Protection Agency
Authorization to Discharge Under the
National Pollutant Discharge Elimination System

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq., hereinafter referred to as the "Act"), and the Ohio Water Pollution Control Act (Ohio Revised Code Section 6111),

Cardinal Operating Company - Cardinal Plant

is authorized by the Ohio Environmental Protection Agency, hereinafter referred to as "Ohio EPA," to discharge from the Cardinal Operating Company - Cardinal Plant facility, located at 306 County Road 7E, Brilliant, Ohio, Jefferson County, and discharging to the Ohio River at Mile Point 76.6, 77.0 and 78.4, to Blockhouse Hollow Run at River Mile 0.82, and to Riddles Run at River Mile 0.01 in accordance with the conditions specified in Parts I, II, III, IV, V and VI of this permit.

This permit is conditioned upon payment of applicable fees as required by Section 3745.11 of the Ohio Revised Code.

This permit and the authorization to discharge shall expire at midnight on the expiration date shown above. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information and forms as are required by the Ohio EPA no later than 180 days prior to the above date of expiration.

John Logue
Director

Total Pages: 71

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009001. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 001 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading* kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00011 - Water Temperature - F	-	-	-	-	-	-	-	1/Day	Calculated	All
00015 - Thermal Discharge - Million BTU/Hr	6340	-	-	6340	-	-	-	1/Day	Calculated	All
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Week	Grab	All
01094 - Zinc, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Calculated	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	Calculated	All
50060 - Chlorine, Total Residual - mg/l	0.20	-	-	-	-	-	-	1/Day	Grab	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Calculated	All
78739 - Chlorination Duration - Minutes	120	-	-	-	-	-	-	1/Month	24hr Total	All

Notes for Station Number 0IB00009001:

- a. This outfall consists of once through cooling water, treated FGD wastewater from the diffuser (internal stations 601 and 604) and screen backwash.
- b. The monitoring requirements and limits in this table for total residual chlorine and chlorination are effective when chlorination minutes are effective when chlorination occurs for less than two (2) hours per day. Chlorination is not permitted to occur for longer than two hours per day. For chlorination duration, monitoring is to be performed only on days when using chlorine treatment. On days when treatment is not used, report "AH" on the DMR and explain in the remarks section.
- c. The Total Residual Chlorine (TRC) limit is the maximum allowed at any time at the outfall. Report the maximum concentration of TRC detected during chlorination for each day.
- d. Analyses for TRC is to be performed by Standard Method 4500-CL E (low level amperometric titration) or another equivalently sensitive TRC method approved in 40 CFR 136.
- e. Limits Below Quantification - See Part II, Item I.

f. Flow Calculated is the total flow from all sources to outfall 001. This shall be the sum of the flows recorded of the intake pump run times (station 801 and 802) for the non-contact cooling water plus the recorded daily flow at internal monitoring stations 601 and 604.

g. Water Temperature Calculated is the average effluent temperature coincident with the hour of the Unit's maximum generation [Resistant Thermal Devices (RTD) measure the temperature at each condenser discharge leg (6 legs per Unit x 4 RTD's per leg = 24 RTD's per Unit)]. See effluent temperature in Part II, Item V.

h. Thermal Discharge Calculation - See Part II, Item V.

i. Mercury and Zinc Calculated is a flow weighted calculation utilizing the monthly average mercury/zinc concentration at internal stations 601 and 604, and upstream station 800 based on the median of the previous calendar year, along with respective flow rates of 601, 604 and 001

$$\text{Conc001} = \frac{((Q001 - Q601 - Q604) \times \text{Conc800}) + (Q601 \times \text{Conc 601}) + (Q604 \times \text{Conc 604})}{Q001}$$

Where:

Concentrations are to be expressed in ng/L for mercury and ug/L for zinc.

Q = Flow values are to be identical units.

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009006. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 006 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading* kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00056 - Flow Rate - GPD	-	-	-	-	-	-	-	1/Day	24hr Total Estimate	All
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Month	Grab	All
00530 - Total Suspended Solids - mg/l	18	-	-	12	0.73	-	0.48	1/Month	Grab	All
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
31616 - Fecal Coliform - #/100 ml	2000	-	-	1000	-	-	-	1/Month	Grab	Winter
31648 - E. coli - #/100 ml	-	-	240	126	-	-	-	1/Month	Grab	Summer
80082 - CBOD 5 day - mg/l	15	-	-	10	0.60	-	0.40	1/Month	Grab	All

Notes for Station Number 0IB00009006:

* Effluent loadings based on flow of 0.02 MGD.

a. Sanitary wastewater treatment plant discharge from service buildings (Unit #3) to Riddles Run.

b. Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009008. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 008 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading* kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00056 - Flow Rate - GPD	-	-	-	-	-	-	-	1/Day	24hr Total Estimate	All
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Month	Grab	All
00530 - Total Suspended Solids - mg/l	18	-	-	12	1.08	-	0.72	1/Month	Grab	All
31616 - Fecal Coliform - #/100 ml	2000	-	-	1000	-	-	-	1/Month	Grab	Winter
31648 - E. coli - #/100 ml	-	-	240	126	-	-	-	1/Month	Grab	Summer
80082 - CBOD 5 day - mg/l	15	-	-	10	0.90	-	0.60	1/Month	Grab	All

Notes for Station Number 0IB00009008:

* Effluent loadings based on flow of 0.02 MGD.

a. Sanitary wastewater treatment plant discharge from FGD and service buildings (Units #1 & 2) to the Ohio River.

b. Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfalls 0IB00009011 and 0IB00009012. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 011 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly
00530 - Total Suspended Solids - mg/l	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly

Notes for Station Number 0IB00009011 and 0IB00009012:

a. This outfall consists of stormwater associated with industrial activities. Monitoring requirements apply only at outfall 0IB000090011; the quality of this discharge is considered representative of outfall 0IB00009012 as well.

b. Monitoring and sampling shall be performed as required in the above table and as stated in Part V.B.7. Sampling shall be performed when discharging. Quarterly sampling may be collected any time during the quarter (Q1 = January 1 - March 31; Q2 = April 1 - June 30; Q3 = July 1 - September 30; and Q4 = October 1 - December 31). Discharge Monitoring Reports (DMRs) must be submitted monthly. If there are no discharges during the month, select the "No Discharge" check box on the eDMR.

c. During the first eight quarterly monitoring periods of this permit, you shall select a total of four quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall occur during each of the represented quarterly monitoring periods (Q1-Q4) unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of quarterly samples, you shall average your four monitoring values and compare to the benchmark concentration.

d. The benchmark concentrations listed below and the requirements of Parts IV, V and VI of this permit apply to this outfall. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

Parameter	Benchmark
pH	6.5 min – 9.0 max
Total Suspended Solids	100 mg/l

e. Corrective Action Reports must be submitted to the Southeast District Office within 30 days of discovery. See Part IV.D.4.

PART I, A. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

5. During the period beginning on the effective date of this permit and lasting until January 1, 2030, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009019. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 019 - Interim

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	-	-	-	-	-	-	-	1/Week	Grab	All
00530 - Total Suspended Solids - mg/l	-	-	-	-	-	-	-	1/Month	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	-	-	-	-	-	-	-	1/Month	Grab	All
00900 - Hardness, Total (CaCO ₃) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00978 - Arsenic, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50092 - Mercury, Total (Low Level) - ng/l	1700	-	-	12	-	-	-	1/Month	Grab	All
70300 - Residue, Total Filterable - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly

Notes for Station Number 0IB000090019:

a. This outfall consists of a discharge from the Fly Ash Reservoir II (FAR II) closure activities that include unmanaged combustion residual leachate, seepage, and legacy wastewaters associated with FAR II, as well as a discharge from internal stations 602 (landfill leachate) and 605 (landfill contact stormwater).

b. Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.

c. Mercury Monitoring - See Part II, Item K.

d. Arsenic and Mercury (daily maximum) final effluent limits – See Schedule of Compliance, Part I.C.1.

e. The benchmark concentrations listed below apply to this outfall. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

Parameter	Benchmark
Total Suspended Solids	100 mg/l

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

6. Beginning on January 1, 2030, and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009019. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 019 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Week	Grab	All
00530 - Total Suspended Solids - mg/l	100	-	-	30	-	-	-	1/Month	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Month	Grab	All
00900 - Hardness, Total (CaCO3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00978 - Arsenic, Total Recoverable - ug/l	11	-	-	8	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50092 - Mercury, Total (Low Level) - ng/l	788	-	-	12	-	-	-	1/Month	Grab	All
70300 - Residue, Total Filterable - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly

Notes for Station Number 0IB000090019:

a. This outfall consists of a discharge from the Fly Ash Reservoir II (FAR II) closure activities that include unmanaged combustion residual leachate, seepage, and legacy wastewaters associated with FAR II, as well as a discharge from internal stations 602 (landfill leachate) and 605 (landfill contact stormwater).

b. Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.

c. Mercury Monitoring - See Part II, Item K.

d. Federal rules at 40 CFR 125.3(f) prohibit attaining compliance with technology-based standards by dilution. The technology-based limits (TBELs) include total suspended solids, oil and grease, arsenic and mercury (daily maximum only). The mercury 30-day average TBEL is 356 ng/L. Cardinal Power Plant shall ensure the dilution sources from the contact stormwater pond and capped impoundment area are not used to attain compliance with the technology standards for arsenic, mercury (daily maximum), oil and grease, total suspended solids and pH.

PART I, A. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

7. During the period beginning on the effective date of this permit and lasting until January 1, 2030, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009024. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 024 - Interim

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Month	Grab	All
00530 - Total Suspended Solids - mg/l	98.8	-	-	30	-	-	-	1/Month	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Month	Grab	All
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00900 - Hardness, Total (CaCO3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00981 - Selenium, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
01119 - Copper, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Month	24hr Total	All
50060 - Chlorine, Total Residual - mg/l	0.038	-	-	-	-	-	-	1/Month	Grab	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Grab	All

Notes for Station Number 0IB00009024:

- This outfall consists of the discharge from the low volume wastewater pond that contains flow from coal pile runoff, cooling towers and stormwater.
- Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.
- Total Residual Chlorine - See Part II, Item I.
- Mercury Monitoring - See Part II, Item K.
- Copper, Final Effluent Limits - See Part I, C.

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

8. Beginning on January 1, 2030, and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009024. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 024 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	1/Month	Grab	All
00530 - Total Suspended Solids - mg/l	98.8	-	-	30	-	-	-	1/Month	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Month	Grab	All
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00900 - Hardness, Total (CaCO3) - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
00981 - Selenium, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
01119 - Copper, Total Recoverable - ug/l	61	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Month	24hr Total	All
50060 - Chlorine, Total Residual - mg/l	0.038	-	-	-	-	-	-	1/Month	Grab	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Grab	All

Notes for Station Number 0IB00009024:

- This outfall consists of the discharge from the low volume wastewater pond that contains flow from coal pile runoff, cooling towers and stormwater.
- Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.
- Total Residual Chlorine - See Part II, Item I.
- Mercury Monitoring - See Part II, Item K.

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

9. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfalls 0IB00009025 and 0IB00009026. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 026 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly
00530 - Total Suspended Solids - mg/l	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly

Notes for Station Number 0IB00009025 and 0IB00009026:

- a. This outfall consists of stormwater associated with industrial activities. Monitoring requirements apply only at outfall 0IB000090026; the quality of this discharge is considered representative of outfall 0IB00009025 as well.
- b. Monitoring and sampling shall be performed as required in the above table and as stated in Part V.B.7. Sampling shall be performed when discharging. Quarterly sampling may be collected any time during the quarter (Q1 = January 1 - March 31; Q2 = April 1 - June 30; Q3 = July 1 - September 30; and Q4 = October 1 - December 31). Discharge Monitoring Reports (DMRs) must be submitted monthly. If there are no discharges during the month, select the "No Discharge" check box on the eDMR.
- c. During the first eight quarterly monitoring periods of this permit, you shall select a total of four quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall occur during each of the represented quarterly monitoring periods (Q1-Q4) unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of quarterly samples, you shall average your four monitoring values and compare to the benchmark concentration.
- d. The benchmark concentrations listed below and the requirements of Parts IV, V and VI of this permit apply to this outfall. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

Parameter	Benchmark
pH	6.5 min – 9.0 max
Total Suspended Solids	100 mg/l

- e. Corrective Action Reports must be submitted to the Southeast District Office within 30 days of discovery. See Part IV.D.4

PART I, A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

10. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 0IB00009027. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Final Outfall - 027 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly
00530 - Total Suspended Solids - mg/l	-	-	-	-	-	-	-	When Disch.	Grab	Quarterly

Notes for Station Number 0IB00009027:

a. This outfall consists of stormwater associated with industrial activities.

b. Monitoring and sampling shall be performed as required in the above table and as stated in Part V.B.7. Sampling shall be performed when discharging. Quarterly sampling may be collected any time during the quarter (Q1 = January 1 - March 31; Q2 = April 1 - June 30; Q3 = July 1 - September 30; and Q4 = October 1 - December 31). Discharge Monitoring Reports (DMRs) must be submitted monthly. If there are no discharges during the month, select the "No Discharge" check box on the eDMR.

c. During the first eight quarterly monitoring periods of this permit, you shall select a total of four quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall occur during each of the represented quarterly monitoring periods (Q1-Q4) unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of quarterly samples, you shall average your four monitoring values and compare to the benchmark concentration.

d. The benchmark concentrations listed below and the requirements of Parts IV, V and VI of this permit apply to this outfall. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

<u>Parameter</u>	<u>Benchmark</u>
pH	6.5 min – 9.0 max
Total Suspended Solids	100 mg/l

e. Corrective Action Reports must be submitted to the Southeast District Office within 30 days of discovery. See Part IV.D.4.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

11. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in

accordance with the following limitations and monitoring requirements from Station Number 0IB00009601. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 601 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.0	-	-	-	-	-	1/Week	Grab	All
00530 - Total Suspended Solids - mg/l	100	-	-	30	-	-	-	1/Week	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Week	Grab	All
00630 - Nitrite Plus Nitrate, Total - mg/l	-	-	-	-	-	-	-	1/Month	Grab	All
00978 - Arsenic, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
00981 - Selenium, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
01094 - Zinc, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Grab	All

Notes for Station Number 0IB00009601:

a. This station consists of a discharge from the existing FGD non-biological treatment system for Units 1, 2, & 3 to a diffuser within the Outfall 0IB00009001 cooling channel. This station will change once the new FGD biological treatment system is operational. Operating Units 1 & 2 flow must convert to the biological system as soon as possible, but no later than December 31, 2025. After that date, only the portion of flow generated by Unit 3 FGD will discharge from station 0IB00009601 until Unit 3 retires by December 31, 2028.

b. Mercury Monitoring - See Part II, Item K.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

12. Beginning on the effective date of this permit, and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from Station Number 0IB00009602. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 602 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.0	-	-	-	-	-	1/Month	Grab	All
00530 - Total Suspended Solids - mg/l	100	-	-	30	-	-	-	1/Month	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Month	Grab	All
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	-	-	-	-	-	1/Month	Grab	All
00978 - Arsenic, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
00981 - Selenium, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
00999 - Boron, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Grab	All
70300 - Residue, Total Filterable - mg/l	-	-	-	-	-	-	-	1/Month	Grab	All

Notes for station 0IB00009602:

- a. This station consists of a discharge from Fly Ash Reservoir I (FAR I) landfill leachate. Final discharge is to Outfall 0IB00009019.
- b. Mercury Monitoring - See Part II, Item K.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

13. During the period beginning on the effective date of this permit and lasting until January 1, 2030, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from Station Number 0IB00009603. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 603 - Interim

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
Parameter	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total Estimate	All

Notes for station 0IB00009603:

- a. Pursuant with 40 CFR 423.13(k)(2), a discharge from this station is authorized for only bottom ash transport water $\leq 10\%$ primary wetted volume.
- b. Sampling shall be performed when discharging. If this station is monitored during a particular month and there are no discharges during the entire month, select the "No Discharge" check box on the data entry form and PIN the eDMR.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

14. During the period beginning on January 1, 2030, and lasting until the expiration date of this permit, the permittee shall monitor this station in accordance with the following limitations and monitoring requirements from Station Number 0IB00009603. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 603 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
51484 - Number of Events - No./Month	0	-	-	-	-	-	-	1/Month	Total	All

Notes for station 0IB00009603:

- a. Pursuant with the “no discharge of pollutants” in 40 CFR 423.13(k)(4)(i), a discharge of in bottom ash transport water is prohibited.
- b. This internal station shall be utilized to report the number of events, or number of days in which bottom ash transport water is discharged.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

15. During the period beginning on the effective date of this permit and lasting until January 1, 2030, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from Station Number 0IB00009604. See Part II, OTHER REQUIREMENTS, for locations of effluent

sampling.

Table - Internal Monitoring Station - 604 - Interim

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
Parameter	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00400 - pH - S.U.	9.0	6.0	-	-	-	-	-	1/Week	Grab	All
00530 - Total Suspended Solids - mg/l	100	-	-	30	-	-	-	1/Week	Grab	All
00552 - Oil and Grease, Hexane Extr Method - mg/l	20	-	-	15	-	-	-	1/Week	Grab	All
00630 - Nitrite Plus Nitrate, Total - mg/l	4	-	-	3	-	-	-	1/Month	Grab	All
00978 - Arsenic, Total Recoverable - ug/l	18	-	-	8	-	-	-	1/Month	Grab	All
00981 - Selenium, Total Recoverable - ug/l	70	-	-	29	-	-	-	1/Month	Grab	All
01094 - Zinc, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50092 - Mercury, Total (Low Level) - ng/l	103	-	-	34	-	-	-	1/Month	Grab	All

Notes for station 0IB00009604:

- This station will consist of FGD wastewater from the new biological treatment system for the portion of scrubber blowdown associated with Units 1 & 2. Flow is combined with 601 to a diffuser within the Outfall 0IB00009001cooling channel.
- Until a discharge occurs from the FGD biological treatment system, the permittee shall select the "No Discharge" check box on the data entry form and PIN the eDMR. This system shall be operational and discharging as soon as possible, but no later than December 31, 2025, as required by 40 CFR 423.
- Mercury Monitoring - See Part II, Item K.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

16. During the period beginning on January 1, 2030, and lasting until the expiration date of this permit, the permittee shall monitor this station in accordance with the following limitations and monitoring requirements from Station Number 0IB00009604. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 604 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
51484 - Number of Events - No./Month	0	-	-	-	-	-	-	1/Month	Total	All

Notes for station 0IB00009604:

- a. Pursuant with the “no discharge of pollutants” in 40 CFR 423.13(g)(4)(i), a discharge of in FGD wastewater is prohibited
- b. This internal station shall be utilized to report the number of events, or number of days in which FGD wastewater is discharged.

PART I, A. INTERNAL LIMITATIONS AND MONITORING REQUIREMENTS

17. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from Station Number 0IB00009605. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 605 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00530 - Total Suspended Solids - mg/l	-	-	-	-	-	-	-	1/Quarter	Grab	Quarterly
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Quarter	24hr Total	Quarterly

Notes for station 0IB00009605:

- This station consists of a discharge from Fly Ash Reservoir I (FAR I) landfill contact stormwater. Final discharge is to Outfall 0IB00009019.
- Monitoring and sampling shall be performed as required in the above table and as stated in Part V.B.7. Sampling shall be performed when discharging. Quarterly sampling may be collected any time during the quarter (Q1 = January 1 - March 31; Q2 = April 1 - June 30; Q3 = July 1 - September 30; and Q4 = October 1 - December 31). Discharge Monitoring Reports (DMRs) must be submitted monthly. If there are no discharges during the month, select the "No Discharge" check box on the eDMR.
- During the first eight quarterly monitoring periods of this permit, you shall select a total of four quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall occur during each of the represented quarterly monitoring periods (Q1-Q4) unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of quarterly samples, you shall average your four monitoring values and compare to the benchmark concentration.
- The benchmark concentrations listed below and the requirements of Parts IV, V and VI of this permit apply to this outfall. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

<u>Parameter</u>	<u>Benchmark</u>
Total Suspended Solids	100 mg/l

PART I, B. SEWAGE SLUDGE OR BIOSOLIDS MONITORING REQUIREMENTS

1. Sewage Sludge or Biosolids Monitoring - Transfer to Another NPDES Permit. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee shall monitor the final sludge or biosolids at Station Number 0IB00009588, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS.

Table - Sludge Monitoring - 588 - Final

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
Parameter	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
80991 - Sludge Volume, Gallons - Gals	-	-	-	-	-	-	-	1/Year	Total	December

Notes for Station Number 0IB00009588:

- a. Monitoring is required when sewage sludge is removed from the permittee's sewage treatment plants for transfer to another NPDES permit holder. The total sludge volume transferred to another NPDES permit holder for the entire year shall be reported on the December Discharge Monitoring Report (DMR).
- b. If no sewage sludge is removed from the permittee's sewage treatment plants for transfer to another NPDES permit holder during the year, select the "No Discharge" check box on the data entry form and PIN the eDMR
- c. See Part II, Item J.

PART I, B. UPSTREAM MONITORING REQUIREMENTS

2. Upstream Monitoring. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee shall monitor the receiving stream, upstream of the point of discharge at Station Number 0IB00009800, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS, for location of sampling.

Table - Upstream Monitoring - 800 - Final

Effluent Characteristic Parameter	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
01094 - Zinc, Total Recoverable - ug/l	-	-	-	-	-	-	-	1/Month	Grab	All
50092 - Mercury, Total (Low Level) - ng/l	-	-	-	-	-	-	-	1/Month	Grab	All

Notes for Station Number 0IB00009800:

- a. Sampling shall occur on the same day as Outfall 0IB00009001.
- b. Mercury Monitoring – See Part II, Item K.

PART I, B. INTAKE MONITORING STATION REQUIREMENTS

3. Intake Monitoring. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee shall

monitor the Intake at Station Number 0IB00009801, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS, for location of sampling.

Table - Intake Monitoring - 801 - Final

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
Parameter	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total Estimate	All

Notes for Station Number 0IB00009801:

- a. This intake station is for Unit #3.
- b. Cooling Water Intake Requirements - See Part II, Items Q, R, S, and T.
- c. Flow monitoring can be a measurement of the intake pump run times that are in service.

PART I, B. INTAKE MONITORING STATION REQUIREMENTS

4. Intake Monitoring. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee shall monitor the Intake at Station Number 0IB00009802, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS, for location of sampling.

Table - Intake Monitoring - 802 - Final

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
Parameter	Concentration Specified Units				Loading kg/day			Measuring Frequency	Sampling Type	Monitoring Months
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly			
00011 - Water Temperature - F	-	-	-	-	-	-	-	1/Day	Calculated	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total Estimate	All

Notes for Station Number 0IB00009802:

- a. This intake station is for Units #1 & #2.
- b. Cooling Water Intake Requirements - See Part II, Items Q, R, S, and T.
- c. Flow monitoring can be a measurement of the intake pump run times that are in service.
- d. Temperature is the average intake temperature coincident with the hour of the Unit's maximum generation [Resistant Thermal Devices (RTD) measure the temperature at each condenser inlet leg (6 RTD's per Unit)]. See effluent temperature in Part II, Item V.

PART I, C. - SCHEDULE OF COMPLIANCE

Milestone Summary Report			
Section	Report	Event Code	Due Date
FGD Wastewater Treatment System Construction	Final Compliance with Effluent Limits	05699	December 31, 2025
<u>CWIS</u>	Impingement Mortality Selection	<u>88899</u>	3 months after the permit effective date
New Effluent Limits: 0IB00009019 and 0IB00009024	Submit First Annual Report	90199	12 months after the permit effective date
New Effluent Limits: 0IB00009019 and 0IB00009024	Submit Second Annual Report	90299	24 months after the permit effective date
New Effluent Limits: 0IB00009019 and 0IB00009024	Final Progress Report	61099	36 months after the permit effective date
New Effluent Limits: 0IB00009019 and 0IB00009024	Final Compliance with Effluent Limits	05699	December 31, 2029

1. New Final Effluent Limits for Arsenic and Mercury at Outfall 0IB00009019, and Copper at Outfall 0IB00009024

The permittee shall attain compliance with the new final effluent limits for arsenic and mercury at outfall 0IB00009019, and copper at outfall 0IB00009024, as soon as possible but not later than the dates in the following schedule:

a. No later than 12 months after the permit effective date, the permittee shall submit to Ohio EPA Southeast District Office a report on the progress toward attaining compliance with the final effluent limits for arsenic, mercury and copper. At a minimum, the report shall include progress towards identifying sources of the pollutants, a summary of all actions taken in the previous 12 months and planned to be implemented in the next 12 months to meet new limitations. (Event Code 90199)

b. If the permittee determines that its existing treatment facilities are not capable of meeting the final effluent limits, not later than 18 months from the effective date of this permit, the permittee shall submit an approvable Permit To Install application for necessary treatment plant improvements.

[Compliance with technology based effluent limits at outfall 0IB00009019 for arsenic and mercury (daily maximum) shall be met prior to dilution from stormwater influences from the contact stormwater pond or capped impoundment area.]

c. No later than 24 months after the permit effective date, the permittee shall submit to Ohio EPA Southeast District Office a report on the progress toward attaining compliance with the final effluent limits for arsenic, mercury and copper. At a minimum, the report shall include progress towards identifying sources of the pollutants, a summary of all actions taken in the previous 12 months and planned to be implemented in the next 12 months to meet new limitations. (Event Code 90299)

d. No later than 36 months after the permit effective date, the permittee shall submit to Ohio EPA Southeast District Office a report on the progress toward attaining compliance with the final effluent limits. (Event Code 61099)

e. As soon as possible but no later than December 31, 2029, the permittee shall attain compliance with the final effluent limits at outfall 0IB00009019 and at outfall 0IB00009024. The permittee shall notify Ohio EPA Southeast District Office within 14 days of attaining compliance. (Event Code 05699)

2. Flue Gas Desulfurization (FGD) biological wastewater treatment system construction

The permittee shall attain compliance with FGD wastewater at internal station 0IB00009604 as soon as possible but not later than the dates in the following schedule:

- a. The permittee shall attain full compliance with the final effluent limitations for internal station 0IB00009604 as soon as possible, but not later than December 31, 2025. (Event Code 05699)
- b. The permittee shall notify Ohio EPA Southeast District Office within 14 days of attaining compliance.

3. Cooling Water Intake Structure (CWIS) Impingement Mortality Selection

As soon as possible but not later than 3 months after the permit effective date, the permittee shall submit to the Ohio EPA Central Office the selected impingement mortality compliance option for Units 1 and 2. Should construction be required for complying with the selected impingement option, the submittal shall contain a proposed schedule for completing any retrofits to the CWIS, including consideration of Permit To Install (PTI) and NPDES modification submittal requirements. (Event Code 88899)

PART II - OTHER REQUIREMENTS

A. Operator Certification Requirements

1. Classification

a. In accordance with Ohio Administrative Code 3745-7-04, the sewage treatment facilities at for Units 1 & 2 and Unit 3 shall be classified as a Class A treatment works. The permittee shall designate one or more professional operator of record to oversee the technical operation of the treatment works with a valid certification of a class equal to or greater than the classification of the treatment works.

2. Professional Operator of Record

a. Within three days of a change in a professional operator of record, the permittee shall notify the Director of the Ohio EPA of any such change on a form acceptable to Ohio EPA. The notification can be submitted either electronically via the Ohio eBusiness Center website (<https://ebiz.epa.ohio.gov/login.html>) or hard copy. The appropriate form can be found at the following website:

<https://epa.ohio.gov/static/Portals/28/documents/opcert/Operator%20of%20Record%20Notification%20Form.pdf?ver=2018-09-11-102530-423>

b. All applications for renewal of this NPDES permit shall include an updated Operator of Record Notification form along with other necessary forms and fees to be considered a complete application.

c. If the designated professional operator of record is unable to meet the minimum staffing requirements at a class A or class I treatment works, then a professional operator with a certificate equal to or higher than that of the treatment works may serve as the professional operator of record until such time as the designated professional operator of record is available. The use of this provision does not require notification to the agency unless the use of the backup professional operator exceeds thirty consecutive days. In the event the use of a backup professional operator under this provision exceeds thirty consecutive days, the owner or professional operator shall provide notice in accordance with paragraph (A)(2) of rule 3745-7-02 of the Administrative Code.

3. Minimum Staffing Requirements

a. The permittee shall ensure that the treatment works professional operator of record is physically present at the facility in accordance with the minimum staffing requirements per paragraph (C)(1) of rule 3745-7-04 of the Ohio Administrative Code or the requirements from an approved 3745-7-04(C) minimum staffing hour reduction plan.

4. Additional Staffing Requirement

Visits to all treatment works shall be performed by the permittee, the permittee's representative, or agent five days a week and noted in the operational and maintenance records required by rule 3745-7-09 of the Administrative Code. Visits shall not be necessary when the treatment works is not in operation.

B. Description of the location of the required sampling stations are as follows:

Sampling Station	Description of Location
0IB00009001	Once-through cooling water. Samples to be collected of total units #1 and #2 cooling water discharge prior to mixing in the cooling channel and ultimately to the Ohio River (Lat: 40.2511 N; Long: 80.6481 W)
0IB00009006	Units #1 and #2 sewage treatment plant discharge. Samples to be collected at final discharge pipe from sewage treatment plant prior to entering Riddles Run (Lat: 40.2525 N; Long: 80.6461 W)
0IB00009008	Unit #3 sewage treatment plant discharge. Samples to be collected at final discharge pipe from sewage treatment plant prior to entering the Ohio River (Lat: 40.2444 N; Long: 80.6544 W)
0IB00009019	Fly Ash Reservoir II (FAR II) closure activity discharge. Once closure activities are completed, final discharge to consist of stormwater and landfill leachate. Samples to be collected below the FAR II Dam at the parshall flume prior to entering Blockhouse Hollow Run (Lat: 40.2606 N; Long: 80.6486 W)
0IB00009024	North Pond Low Volume Wastewater discharge to Ohio River (Lat: 40.2358 N; Long: 80.6600 W)
0IB00009588	Transfer of sewage sludge or biosolids from the sewage treatment plants to another NPDES permittee
0IB00009601	Internal Station: FGD non-biological treatment system discharge to diffuser to outfall 0IB00009001 cooling channel to Ohio River.
0IB00009602	Internal Station: Fly Ash Reservoir (FAR I) subsurface drainage and FGD landfill leachate that discharges to outfall 0IB00009019 to Blockhouse Hollow
0IB00009603	Internal Station: Bottom Ash Transport Waters
0IB00009604	Internal Station: Units 1 & 2 FGD biological treatment system discharge to diffuser to outfall 0IB00009001 cooling channel to Ohio River
0IB00009605	Internal Station: Landfill contact stormwater to outfall 0IB00009019
0IB00009800	Upstream Monitoring at marina on the Ohio River
0IB00009801	Intake Monitoring associated with Unit 3 CWIS
0IB00009802	Intake Monitoring associated with Units 1 and 2 CWIS

C. Subject to the terms and conditions of this permit, the permittee is authorized to discharge from the following outfalls and/or monitoring stations that are limited to stormwater associated with industrial activity. See Parts IV, V, and VI for monitoring and reporting requirements.

Sampling Station	Description of Location
0IB00009011	Storm runoff from northeast of Unit 3 building discharging to the Ohio River. (Lat: 40.2433 N; Long: 80.6525 W)
0IB00009012	Storm runoff from northeast of Unit 3 building discharging to the Ohio River. (Lat: 4.2425 N; Long: 80.6558 W)
0IB00009014	Storm runoff from small drainage area adjacent to Units 1 and 2 sewage treatment plant area discharging to Riddles Run. (Lat: 40.2519 N; Long: 80.6467 W)
0IB00009025	Storm runoff from the coal unloaders and conveyor belt from river barge to the Ohio River. (Lat: 40.2459 N; Long: 80.6527 W)
0IB00009026	Storm runoff from the coal unloaders and conveyor belt from river barge to the Ohio River. (Lat: 40.2478 N; Long: 80.6508 W)
0IB00009027	Storm runoff from the gypsum conveyor load out system and limestone unloader system to the Ohio River. (Lat: 40.2538 N; Long: 80.6420 W)

D. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved.

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

E. Water quality based permit limitations in this permit may be revised based on updated wasteload allocations or use designation rules. This permit may be modified, or revoked and reissued, to include new water quality based effluent limits or other conditions that are necessary to comply with a revised wasteload allocation, or an approved total maximum daily loads (TMDL) report as required under Section 303 (d) of the Clean Water Act.

F. Grab samples shall be collected at such times and locations, and in such fashion, as to be representative of the facility's performance.

G. Treatment Additives

Written permission must be obtained from the director of the Ohio EPA prior to the use of any treatment additives discharged to waters of the state, except for those exempt in rule. If additives are being used that have not previously been approved, an approval must be obtained for continued use. This permit no longer contains limits for bromine-based additives, and any previous approved additives are no longer valid.

Discharges of these additives must meet Ohio Water Quality Standards and shall not be harmful or inimical to aquatic life. Request for approvals shall be filed in accordance with OAC 3745-33-03(G) and should be filed at least forty-five days prior to use or immediately if the additive is currently being used. Application forms are available for download on the DSW website:

<https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/individual-wastewater-discharge-permit-applications-industrial-and-municipal-discharges->

H. There shall be no detectable amount of any priority pollutant attributable to cooling tower maintenance chemicals in the cooling tower blowdown wastewater.

I. Limits Below Quantification

The parameters below have had effluent limitations established that are below the Ohio EPA Quantification Level (OEPA QL) for the approved analytical procedure promulgated at 40 CFR 136. OEPA QLs may be expressed as Practical Quantification Levels (PQL) or Minimum Levels (ML). Compliance with an effluent limit that is below the OEPA QL is determined in accordance with ORC Section 6111.13 and OAC Rule 3745-33-07(C). For maximum effluent limits, any value reported below the OEPA QL shall be considered in compliance with the effluent limit. For average effluent limits, compliance shall be determined by taking the arithmetic mean of values reported for a specified averaging period, using zero (0) for any value reported at a concentration less than the OEPA QL, and comparing that mean to the appropriate average effluent limit. An arithmetic mean that is less than or equal to the average effluent limit shall be considered in compliance with that limit.

The permittee must utilize the lowest available detection method currently approved under 40 CFR Part 136 for monitoring these parameters.

REPORTING:

All analytical results, even those below the OEPA QL (listed below), shall be reported. Analytical results are to be reported as follows:

1. Results above the QL: Report the analytical result for the parameter of concern.
2. Results above the MDL, but below the QL: Report the analytical result, even though it is below the QL.
3. Results below the MDL: Analytical results below the method detection limit shall be reported as "below detection" using the reporting code "AA".

The following table of quantification levels will be used to determine compliance with NPDES permit limits:

<u>Parameter</u>	<u>PQL</u>	<u>ML</u>
Chlorine, Total Residual	0.050 mg/l	--

This permit may be modified, or, alternatively, revoked and reissued, to include more stringent effluent limits or conditions if information generated as a result of the conditions of this permit indicate the presence of these pollutants in the discharge at levels above the water quality based effluent limit (WQBEL).

J. Sanitary Sewage Treatment Plants Sewage Sludge Disposal Requirements

1. All treatment, storage, transfer, or disposal of sewage sludge or biosolids or beneficial use of biosolids by the Permittee shall comply with Chapter 6111. of the Ohio Revised Code, Chapter 3745-40 of the Ohio Administrative Code (OAC), any further requirements specified in this NPDES permit, and any other actions of the Director that pertain to the treatment, storage, transfer, or disposal of sewage sludge and biosolids and the beneficial use of biosolids by the Permittee.

2. No later than March 1 of each calendar year, the Permittee shall submit an annual sludge report summarizing the sewage sludge disposal, use, storage, or treatment activities of the Permittee during the previous calendar year. The report shall be submitted through the Ohio EPA eBusiness Center, Division of Surface Water NPDES Permit Applications service.

K. The permittee shall use either EPA Method 1631 or EPA Method 245.7 promulgated under 40 CFR 136 to comply with the influent and effluent mercury monitoring requirements of this permit.

L. Outfall Signage

The permittee shall maintain a permanent marker on the Blockhouse Hollow Run, Riddles Run, and the Ohio River at each outfall that is regulated under this NPDES permit. This includes final outfalls and bypasses. The sign shall include, at a minimum, the name of the establishment to which the permit was issued, the Ohio EPA permit number, and the outfall number and a contact telephone number. The information shall be printed in letters not less than two inches in height. The sign shall be a minimum of 2 feet by 2 feet and shall be a minimum of 3 feet above ground level. The sign shall not be obstructed such that persons in boats or persons swimming on the river or someone fishing or walking along the shore cannot read the sign. Vegetation shall be periodically removed to keep the sign visible. If the outfall is normally submerged the sign shall indicate that. When an existing sign is replaced or reset, the new sign

shall comply with the requirements of this section.

M. There shall be no discharge of polychlorinated biphenyl compounds (PCBs) from any outfall under this permit.

N. Notification to Public Water Supply Operators

1. As required by OAC 3745-33-08(F), permits for major facilities in the following locations shall require the permittee to notify the public water supply operator as soon as practicable after a discharge begins that results from a spill, sanitary sewer overflow, combined sewer overflow, bypass, or upset that reaches waters of the state.

a. Discharges within three thousand (3,000) feet of a public water supply intake located in a lake; or

b. Discharges within ten (10) river miles upstream of a public water supply intake located in a reservoir or any other surface water of the state.

2. Public water supply operators meeting the criteria above for the permittee are:

Wheeling Water-Treatment Plant, North 13th and Richland Avenue, Wheeling, WV, 26003

Phone Number: 304-234-3835.

3. Within 6 months of the effective date of the permit, the permittee shall update notification procedures between the permittee and public water supply operator(s) listed above, that defines the specific notification requirements and what constitutes notification "as soon as practicable".

O. Diffuser Performance Verification and Maintenance

The permittee utilizes a diffuser within the cooling channel prior to discharge to the Ohio River at outfall 0IB00009001. The diffuser is considered part of the treatment process and requires performance verification, inspections, and maintenance.

The permittee shall conduct the following:

1. Inspection

The diffuser shall be visually inspected three times during the permit cycle by a diver or acoustic sonar camera (DIDSON), or other equivalent method acceptable by Ohio EPA, to verify that the field conditions are as close to the expected design as possible. Inspections need to assess:

a. Signs of damage, such as cracks, leaks, sediment intrusion, particle deposition or blockages;

b. Mixing zone is free of objectionable deposits, floating debris, oil, scum, or other substances that will create a nuisance; and

c. Flow distribution provides uniform velocity in all ports.

2. Maintenance

Upon discovery, necessary cleaning and/or repair must be conducted to remove debris and sediment that

interfere with flow from the ports. Small issues (such as sediment buildup in the ports) shall be corrected upon inspection and properly documented. If there is anything that cannot be fixed immediately during the inspection, Ohio EPA Southeast District Division of Surface Water shall be notified.

3. Report

Upon each inspection, the permittee shall submit a report no later than 30 days after each diffuser inspection and if necessary, the subsequent maintenance. The report shall be submitted through the Ohio EPA eBusiness Center, Division of Surface Water NPDES Permit Applications service.

P. Endangered Species Act

Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act.

Q. Cooling Water Intake Structure Minimization of Entrainment and Impingement - Units 1, 2 and 3
The permittee operates cooling water intake structures on the Ohio River that are designed with a combined maximum withdraw rate of 1,170.6 MGD. The permittee shall reduce impingement mortality and entrainment commensurate with the implementation of the technologies or operational measures selected. Ohio EPA has determined that the cooling water intake structures represent the best technology available to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326).

Impingement mortality option - defer selection until after entrainment BTA determination has been made (40 CFR 125.94(b))

R. Cooling Water Intake Structure Monitoring Requirements

The permittee is required to perform the following monitoring to demonstrate compliance with the performance standards of Part II. Q.

1. Visual or Remote Inspections

The permittee shall either conduct weekly visual inspections or employ remote monitoring devices during the period the cooling water intake structure is in operation.

Weekly inspections are not required for the off-shore intake crib. Should the facility be performing work or an inspection on the offshore intake crib scheduled as a result of maintenance or conditions required by other regulatory agencies, the permittee shall also perform an inspection (remotely or visually) of the offshore intake crib for 316(b) purposes. The inspection, for 316(b) purposes, will ensure that the offshore intake crib is being operated with good engineering and maintenance practices. The results of the inspection shall be documented and retained by the facility for Agency review until the subsequent permit is issued.

2. Intake Flow Monitoring

The permittee shall monitor flow rate at the effluent and intake station in accordance with Part I, A and Part I, B to characterize discharge and makeup volumes. The monitoring must be representative of normal operating conditions, and must include measuring cooling water withdrawals, make-up water, and blow down volume.

S. Cooling Water Intake Structure Record Keeping and Reporting Requirements

1. Record Keeping Requirements

- a. The permittee shall keep records of all the data used to complete the permit application and show compliance with the requirements of the 316(b) regulations until the subsequent permit is re-issued.
- b. In accordance with 40 CFR 125.97(f), the permittee shall retain all records supporting the Director's determination of BTA for entrainment until such time as the Director revises the determination of BTA for entrainment in the permit.

2. Reporting Requirements

The permittee shall submit an annual certification statement signed by the responsible corporate officer indicating whether there have been any substantial modifications of any units that impact the cooling water withdrawals and a summary of those changes. In addition, revisions must be submitted to the information required at 40 CFR 122.21(r) during the next permit application when new information is available.

T. Cooling Water Intake Structure Application Requirements

The permittee shall submit the information required in the applicable provisions of 40 CFR 122.21(r) with the subsequent permit renewal application. In accordance with 40 CFR 125.95(c), the permittee may request to reduce the information required. Such a request shall be submitted to the Director no later than 30 months prior to the permit expiration date.

U. 40 CFR 423 Federal Effluent Limit Guidelines (ELG) Compliance

1. The permittee shall evaluate their facility and utilize new technologies in order to meet the following ELG requirement:

a. 40 CFR 423.13(g)(1)(i) - Flue Gas Desulfurization (FGD) Wastewater by December 31, 2025

2. The permittee shall evaluate their facility and utilize new technologies in order to meet the following "no discharge of pollutants" requirement as soon as possible, but no later than December 31, 2029:

a. 40 CFR 423.13(g)(4)(i) – FGD Wastewater

b. 40 CFR 423.13(k)(4)(i) – Bottom ash transport water

c. 40 CFR 423.13(l)(1) & (2)(ii) – Combustion residual leachate (CRL) and unmanaged CRL

3. The permittee shall attain compliance with the applicable ELGs as soon as possible, but no later than the dates shown above in Part II, Item U.1 & 2.

4. The permittee shall submit an approvable Permit-To-Install application for treatment upgrades as necessary to comply with the 2024 ELG rule change.

5. The permittee shall notify the Ohio EPA Division of Surface Waters Central Office and Southeast District Office in writing 30 days prior to any treatment changes related to each 40 CFR 423 deadline.

6. The permittee shall notify the Ohio EPA Division of Surface Waters Central Office and Southeast District Office in writing within 14-days of achieving compliance with the 40 CFR 423 deadlines.

7. The permittee shall submit annual status reports summarizing the progress towards compliance with the new supplemental rule change in 40 CFR 423, outlined under Item 4 a & b above, in accordance with the following schedule:

- a. No later than 12 months after the effective date of the permit;
- b. No later than 24 months after the effective date of the permit.
- c. No later than 36 months after the effective date of the permit.
- d. No later than 48 months after the effective date of the permit.
- e. The permit renewal application shall include an annual status report.

V. Thermal Load Calculation

Hourly thermal loading to represent sum of Units 1 and 2 thermal loads coincident with the maximum hourly generation of Units 1 and 2 combined.

$$(\text{MBTU/hr}) = (\text{TE} - \text{T1}) \times (\text{QE} \times \text{CP} \times 0.3477)$$

Where:

TE (°F) = Average effluent temperature coincident with the hour of the Unit's maximum generation
[Resistant Thermal Device (RTD) measures the temperature at each condenser discharge leg (6 legs per Unit x 4 RTD's per leg = 24 RTD's per Unit)]

T1 (°F) = Average of the intake temperature coincident with the hour of the Unit's maximum generation
[RTD measures the temperature at each condenser inlet leg (6 RTD's per Unit)]

QE (MGD) = Effluent flow rate coincident with the hour of the Unit's maximum generation [Calculated flow value. Summation of in-service non-contact circulating water pump run times.]

$$\text{CP} = 1.0 \text{ BTU/lb } ^\circ\text{F}$$

$$\text{Conversion Factor: } 0.3477 = (8.345 \text{ lbs/gal}) / (24 \text{ hours/day})$$

PART III - GENERAL CONDITIONS

1. DEFINITIONS

"Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

"Average weekly" discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. Each of the following 7-day periods is defined as a calendar week: Week 1 is Days 1 - 7 of the month; Week 2 is Days 8 - 14; Week 3 is Days 15 - 21; and Week 4 is Days 22 - 28. If the "daily discharge" on days 29, 30 or 31 exceeds the "average weekly" discharge limitation, Ohio EPA may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28. Compliance with fecal coliform bacteria or *E. coli* bacteria limitations shall be determined using the geometric mean.

"Average monthly" discharge limitation means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. Compliance with fecal coliform bacteria or *E. coli* bacteria limitations shall be determined using the geometric mean.

"85 percent removal" means the arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.

"Absolute Limitations" Compliance with limitations having descriptions of "shall not be less than," "nor greater than," "shall not exceed," "minimum," or "maximum" shall be determined from any single value for effluent samples and/or measurements collected.

"Net concentration" shall mean the difference between the concentration of a given substance in a sample taken of the discharge and the concentration of the same substances in a sample taken at the intake which supplies water to the given process. For the purpose of this definition, samples that are taken to determine the net concentration shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"Net Load" shall mean the difference between the load of a given substance as calculated from a sample taken of the discharge and the load of the same substance in a sample taken at the intake which supplies water to given process. For purposes of this definition, samples that are taken to determine the net loading shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"MGD" means million gallons per day.

"mg/l" means milligrams per liter.

"ug/l" means micrograms per liter.

"ng/l" means nanograms per liter.

"S.U." means standard pH unit.

"kg/day" means kilograms per day.

"Reporting Code" is a five digit number used by the Ohio EPA in processing reported data. The reporting code does not imply the type of analysis used nor the sampling techniques employed.

"Quarterly (1/Quarter) sampling frequency" means the sampling shall be done in the months of March, June, August, and December, unless specifically identified otherwise in the Effluent Limitations and Monitoring Requirements table.

"Yearly (1/Year) sampling frequency" means the sampling shall be done in the month of September, unless specifically identified otherwise in the effluent limitations and monitoring requirements table.

"Semi-annual (2/Year) sampling frequency" means the sampling shall be done during the months of June and December, unless specifically identified otherwise.

"Winter" shall be considered to be the period from November 1 through April 30.

"Bypass" means the intentional diversion of waste streams from any portion of the treatment facility.

"Summer" shall be considered to be the period from May 1 through October 31.

"Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

"Sewage sludge" means a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works as defined in section 6111.01 of the Revised Code. "Sewage sludge" includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes. "Sewage sludge" does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator, grit and screenings generated during preliminary treatment of domestic sewage in a treatment works, animal manure, residue generated during treatment of animal manure, or domestic septage.

"Sewage sludge weight" means the weight of sewage sludge, in dry U.S. tons, including admixtures such as liming materials or bulking agents. Monitoring frequencies for sewage sludge parameters are based on the reported sludge weight generated in a calendar year (use the most recent calendar year data when the NPDES permit is up for renewal).

"Sewage sludge fee weight" means the weight of sewage sludge, in dry U.S. tons, excluding admixtures such as liming materials or bulking agents. Annual sewage sludge fees, as per section 3745.11(Y) of the Ohio Revised Code, are based on the reported sludge fee weight for the most recent calendar year.

2. GENERAL EFFLUENT LIMITATION

The effluent shall, at all times, be free of substances:

- A. In amounts that will settle to form putrescent, or otherwise objectionable, sludge deposits; or that will adversely affect aquatic life or waterfowl;
- B. Of an oily, greasy, or surface-active nature, and of other floating debris, in amounts that will form noticeable accumulations of scum, foam, or sheen;
- C. In amounts that will alter the natural color or odor of the receiving water to such degree as to create a nuisance;
- D. In amounts that either singly or in combination with other substances are toxic to human, animal, or aquatic life;
- E. In amounts that are conducive to the growth of aquatic weeds or algae to the extent that such growth become inimical to more desirable forms of aquatic life, or create conditions that are unsightly, or constitute a nuisance in any other fashion;
- F. In amounts that will impair designated instream or downstream water uses.

3. FACILITY OPERATION AND QUALITY CONTROL

All wastewater treatment works shall be operated in a manner consistent with the following:

- A. At all times, the permittee shall maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee necessary to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with conditions of the permit.
- B. The permittee shall effectively monitor the operation and efficiency of treatment and control facilities and the quantity and quality of the treated discharge.
- C. Maintenance of wastewater treatment works that results in degradation of effluent quality shall be scheduled during non-critical water quality periods and shall be carried out in a manner approved by Ohio EPA as specified in the Paragraph in the PART III entitled, "UNAUTHORIZED DISCHARGES".

4. REPORTING

- A. Monitoring data required by this permit shall be submitted monthly on Ohio EPA 4500 Discharge Monitoring Report (DMR) forms using the electronic DMR (e-DMR) internet application. e-DMR allows permitted facilities to enter, sign, and submit DMRs on the internet. e-DMR information is found on the following web page:

<https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/electronic-business-services>

- B. DMRs shall be signed by a facility's Responsible Official or a Delegated Responsible Official (i.e. a person delegated by the Responsible Official). The Responsible Official of a facility is defined as:

1. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) The manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated facility including having explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

3. In the case of a municipal, state, or other public facility, by either the principal executive officer, the ranking elected official or other duly authorized employee.

For e-DMR, the person signing and submitting the DMR will need to obtain an eBusiness Center account and Personal Identification Number (PIN). Additionally, Delegated Responsible Officials must be delegated by the Responsible Official, either on-line using the eBusiness Center's delegation function, or on a paper delegation form provided by Ohio EPA. For more information on the PIN and delegation processes, please view the following web page: <https://epa.ohio.gov/help-center/ebusiness-center>

C. DMRs submitted using e-DMR shall be submitted to Ohio EPA by the 20th day of the month following the month-of-interest.

D. If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in Section 5. SAMPLING AND ANALYTICAL METHODS, the results of such monitoring shall be included in the calculation and reporting of the values required in the reports specified above.

E. Analyses of pollutants not required by this permit, except as noted in the preceding paragraph, shall not be reported to the Ohio EPA, but records shall be retained as specified in Section 7. RECORDS RETENTION.

5. SAMPLING AND ANALYTICAL METHOD

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored flow. Test procedures for the analysis of pollutants shall conform to regulation 40 CFR 136, "Test Procedures for the Analysis of Pollutants" unless other test procedures have been specified in this permit. The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.

6. RECORDING OF RESULTS

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

A. The exact place and date of sampling; (time of sampling not required on EPA 4500)

B. The person(s) who performed the sampling or measurements;

- C. The date the analyses were performed on those samples;
- D. The person(s) who performed the analyses;
- E. The analytical techniques or methods used; and
- F. The results of all analyses and measurements.

7. RECORDS RETENTION

The permittee shall retain all of the following records for the wastewater treatment works for a minimum of three years except those records that pertain to sewage sludge disposal, use, storage, or treatment, which shall be kept for a minimum of five years, including:

- A. All sampling and analytical records (including internal sampling data not reported);
- B. All original recordings for any continuous monitoring instrumentation;
- C. All instrumentation, calibration and maintenance records;
- D. All plant operation and maintenance records;
- E. All reports required by this permit; and
- F. Records of all data used to complete the application for this permit for a period of at least three years, or five years for sewage sludge, from the date of the sample, measurement, report, or application.

These periods will be extended during the course of any unresolved litigation, or when requested by the Regional Administrator or the Ohio EPA. The three-year period, or five-year period for sewage sludge, for retention of records shall start from the date of sample, measurement, report, or application.

8. AVAILABILITY OF REPORTS

Except for data determined by the Ohio EPA to be entitled to confidential status, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the appropriate district offices of the Ohio EPA. Both the Clean Water Act and Section 6111.05 Ohio Revised Code state that effluent data and receiving water quality data shall not be considered confidential.

9. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating the permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. RIGHT OF ENTRY

The permittee shall allow the Director or an authorized representative upon presentation of credentials and other documents as may be required by law to:

- A. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or

where records must be kept under the conditions of this permit.

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit.

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

11. UNAUTHORIZED DISCHARGES

A. Bypass Not Exceeding Limitations - The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 11.B and 11.C.

B. Notice

1. Anticipated Bypass - If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least ten days before the date of the bypass.

2. Unanticipated Bypass - The permittee shall submit notice of an unanticipated bypass as required in paragraph 12.B (24-hour notice).

C. Prohibition of Bypass

1. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. The permittee submitted notices as required under paragraph 11.B.

2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 11.C.1.

12. NONCOMPLIANCE NOTIFICATION

A. Exceedance of a Daily Maximum Discharge Limit

1. The permittee shall report noncompliance that is the result of any violation of a daily maximum discharge limit for any of the pollutants listed by the Director in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office: sedo24hournpdes@epa.ohio.gov
Southwest District Office: swdo24hournpdes@epa.ohio.gov
Northwest District Office: nwdo24hournpdes@epa.ohio.gov
Northeast District Office: nedo24hournpdes@epa.ohio.gov
Central District Office: cdo24hournpdes@epa.ohio.gov
Central Office: co24hournpdes@epa.ohio.gov

The permittee shall attach a noncompliance report to the email. A noncompliance report form is available on the following website under the Monitoring and Reporting - Non-Compliance Notification section: <https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/individual-wastewater-discharge-permits>

Or, the permittee may report to the appropriate Ohio EPA district office by telephone toll-free between 8:00 AM and 5:00 PM as follows:

Southeast District Office: (800) 686-7330
Southwest District Office: (800) 686-8930
Northwest District Office: (800) 686-6930
Northeast District Office: (800) 686-6330
Central District Office: (800) 686-2330
Central Office: (614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

- a. The name of the permittee, and a contact name and telephone number;
- b. The limit(s) that has been exceeded;
- c. The extent of the exceedance(s);
- d. The cause of the exceedance(s);
- e. The period of the exceedance(s) including exact dates and times;
- f. If uncorrected, the anticipated time the exceedance(s) is expected to continue; and,
- g. Steps taken to reduce, eliminate or prevent occurrence of the exceedance(s).

B. Other Permit Violations

1. The permittee shall report noncompliance that is the result of any unanticipated bypass resulting in an exceedance of any effluent limit in the permit or any upset resulting in an exceedance of any effluent limit in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office: sedo24hournpdes@epa.ohio.gov
Southwest District Office: swdo24hournpdes@epa.ohio.gov
Northwest District Office: nwdo24hournpdes@epa.ohio.gov
Northeast District Office: nedo24hournpdes@epa.ohio.gov
Central District Office: cdo24hournpdes@epa.ohio.gov
Central Office: co24hournpdes@epa.ohio.gov

The permittee shall attach a noncompliance report to the e-mail. A noncompliance report form is available on the following web site under the Monitoring and Reporting - Non-Compliance Notification section: <https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/individual-wastewater-discharge-permits>

Or, the permittee may report to the appropriate Ohio EPA district office by telephone toll-free between 8:00 AM and 5:00 PM as follows:

Southeast District Office: (800) 686-7330
Southwest District Office: (800) 686-8930
Northwest District Office: (800) 686-6930
Northeast District Office: (800) 686-6330
Central District Office: (800) 686-2330
Central Office: (614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

- a. The name of the permittee, and a contact name and telephone number;
 - b. The time(s) at which the discharge occurred, and was discovered;
 - c. The approximate amount and the characteristics of the discharge;
 - d. The stream(s) affected by the discharge;
 - e. The circumstances which created the discharge;
 - f. The name and telephone number of the person(s) who have knowledge of these circumstances;
 - g. What remedial steps are being taken; and,
 - h. The name and telephone number of the person(s) responsible for such remedial steps.
2. The permittee shall report noncompliance that is the result of any spill or discharge which may endanger human health or the environment within thirty (30) minutes of discovery by calling the 24-Hour Emergency Hotline toll-free at (800) 282-9378. The permittee shall also report the spill or discharge by e-mail or telephone within twenty-four (24) hours of discovery in accordance with B.1 above.
- C. When the telephone option is used for the noncompliance reports required by A and B, the permittee shall submit to the appropriate Ohio EPA district office a confirmation letter and a completed noncompliance report within five (5) days of the discovery of the noncompliance. This follow up report is not necessary for the e-mail option which already includes a completed noncompliance report.
- D. If the permittee is unable to meet any date for achieving an event, as specified in a schedule of compliance in their permit, the permittee shall submit a written report to the appropriate Ohio EPA district office within fourteen (14) days of becoming aware of such a situation. The report shall include the following:
1. The compliance event which has been or will be violated;
 2. The cause of the violation;
 3. The remedial action being taken;
 4. The probable date by which compliance will occur; and
 5. The probability of complying with subsequent and final events as scheduled.

E. The permittee shall report all other instances of permit noncompliance not reported under paragraphs A or B of this section on their monthly DMR submission. The DMR shall contain comments that include the information listed in paragraphs A or B as appropriate.

F. If the permittee becomes aware that it failed to submit an application, or submitted incorrect information in an application or in any report to the director, it shall promptly submit such facts or information.

13. RESERVED

14. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

15. AUTHORIZED DISCHARGES

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such violations may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act and Ohio Revised Code Sections 6111.09 and 6111.99.

16. DISCHARGE CHANGES

The following changes must be reported to the appropriate Ohio EPA district office as soon as practicable:

A. For all treatment works, any significant change in character of the discharge which the permittee knows or has reason to believe has occurred or will occur which would constitute cause for modification or revocation and reissuance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. Notification of permit changes or anticipated noncompliance does not stay any permit condition.

B. For publicly owned treatment works:

1. Any proposed plant modification, addition, and/or expansion that will change the capacity or efficiency of the plant;
2. The addition of any new significant industrial discharge; and
3. Changes in the quantity or quality of the wastes from existing tributary industrial discharges which will result in significant new or increased discharges of pollutants.

C. For non-publicly owned treatment works, any proposed facility expansions, production increases, or process modifications, which will result in new, different, or increased discharges of pollutants.

Following this notice, modifications to the permit may be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants not identified and limited herein. A determination will also be made as to whether a National Environmental Policy Act (NEPA) review will be required. Sections 6111.44 and 6111.45, Ohio Revised Code, require that plans for

treatment works or improvements to such works be approved by the Director of the Ohio EPA prior to initiation of construction.

D. In addition to the reporting requirements under 40 CFR 122.41(l) and per 40 CFR 122.42(a), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant which is not limited in the permit. If that discharge will exceed the highest of the "notification levels" specified in 40 CFR Sections 122.42(a)(1)(i) through 122.42(a)(1)(iv).
2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the "notification levels" specified in 122.42(a)(2)(i) through 122.42(a)(2)(iv).

17. TOXIC POLLUTANTS

The permittee shall comply with effluent standards or prohibitions established under Section 307 (a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement. Following establishment of such standards or prohibitions, the Director shall modify this permit and so notify the permittee.

18. PERMIT MODIFICATION OR REVOCATION

A. After notice and opportunity for a hearing, this permit may be modified or revoked, by the Ohio EPA, in whole or in part during its term for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this permit;
2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
3. Change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

B. Pursuant to rule 3745-33-04, Ohio Administrative Code, the permittee may at any time apply to the Ohio EPA for modification of any part of this permit. The filing of a request by the permittee for a permit modification or revocation does not stay any permit condition. The application for modification should be received by the appropriate Ohio EPA district office at least ninety days before the date on which it is desired that the modification become effective. The application shall be made only on forms approved by the Ohio EPA.

19. TRANSFER OF OWNERSHIP OR CONTROL

This permit may be transferred or assigned, and a new owner or successor can be authorized to discharge from this facility, provided the following requirements are met:

- A. The permittee shall notify the succeeding owner or successor of the existence of this permit by a letter, a copy of which shall be forwarded to the appropriate Ohio EPA district office. The copy of that letter will serve as the permittee's notice to the Director of the proposed transfer. The copy of that letter shall be received by the appropriate Ohio EPA district office sixty (60) days prior to the proposed date of transfer;

B. A written agreement containing a specific date for transfer of permit responsibility and coverage between the current and new permittee (including acknowledgement that the existing permittee is liable for violations up to that date, and that the new permittee is liable for violations from that date on) shall be submitted to the appropriate Ohio EPA district office within sixty days after receipt by the district office of the copy of the letter from the permittee to the succeeding owner;

At any time during the sixty (60) day period between notification of the proposed transfer and the effective date of the transfer, the Director may prevent the transfer if he concludes that such transfer will jeopardize compliance with the terms and conditions of the permit. If the Director does not prevent transfer, he will modify the permit to reflect the new owner.

20. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

21. SOLIDS DISPOSAL

Collected grit and screenings, and other solids other than sewage sludge, shall be disposed of in such a manner as to prevent entry of those wastes into waters of the state, and in accordance with all applicable laws and rules.

22. CONSTRUCTION AFFECTING NAVIGABLE WATERS

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

23. CIVIL AND CRIMINAL LIABILITY

Except as exempted in the permit conditions on UNAUTHORIZED DISCHARGES or UPSETS, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

24. STATE LAWS AND REGULATIONS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

25. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

26. UPSET

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "upset," see Part III, Paragraph 1, DEFINITIONS.

27. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

28. SIGNATORY REQUIREMENTS

All applications submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR 122.22.

All reports submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR Section 122.22.

29. OTHER INFORMATION

A. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

B. ORC 6111.99 provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$25,000 per violation.

C. ORC 6111.99 states that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$25,000 per violation.

D. ORC 6111.99 provides that any person who violates Sections 6111.04, 6111.042, 6111.05, or division (A) of Section 6111.07 of the Revised Code shall be fined not more than \$25,000 or imprisoned not more than one year, or both.

30. NEED TO HALT OR REDUCE ACTIVITY

40 CFR 122.41(c) states that it shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with conditions of this permit.

31. APPLICABLE FEDERAL RULES

All references to 40 CFR in this permit mean the version of 40 CFR which is effective as of the effective date of this permit.

32. AVAILABILITY OF PUBLIC SEWERS

Notwithstanding the issuance or non-issuance of an NPDES permit to a semi-public disposal system, whenever the sewage system of a publicly owned treatment works becomes available and accessible, the permittee operating any semi-public disposal system shall abandon the semi-public disposal system and connect it into the publicly owned treatment works.

PART IV. STORMWATER CONTROL MEASURES AND POLLUTION PREVENTION PROGRAMS

In Part IV and in Part VI, the term "minimize" means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practice.

A. Control Measures

You shall select, design, install, and implement control measures (including best management practices) to address the selection and design considerations in Part IV.B, and meet the control measures/best management practices in Part IV.C and any applicable numeric effluent limits in Part I. The selection, design, installation, and implementation of these control measures shall be in accordance with good engineering practices and manufacturer's specifications. Note that you may deviate from such manufacturer's specifications where you provide justification for such deviation and include documentation of your rationale in the part of your SWPPP that describes your control measures, consistent with Part IV.J.3. If you find that your control measures are not achieving their intended effect of minimizing pollutant discharges, you shall modify these control measures as expeditiously as practicable. Regulated stormwater discharges from your facility include stormwater run-on that commingles with stormwater discharges associated with industrial activity at your facility.

B. Control Measure Selection and Design Considerations

You shall consider the following when selecting and designing control measures:

1. Preventing stormwater from coming into contact with polluting materials is generally more effective, and less costly, than trying to remove pollutants from stormwater
2. Using control measures in combination is more effective than using control measures in isolation for minimizing pollutants in your stormwater discharge;
3. Assessing the type and quantity of pollutants, including their potential to impact receiving water quality, is critical to designing effective control measures that will achieve the limits in this permit;
4. Minimizing impervious areas at your facility and infiltrating runoff onsite (including bioretention cells, green roofs, and pervious pavement, among other approaches) can reduce runoff and improve groundwater recharge and stream base flows in local streams, although care shall be taken to avoid ground water contamination;
5. Attenuating flow using open vegetated swales and natural depressions can reduce in-stream impacts of erosive flows;
6. Conserving and/or restoring of riparian buffers will help protect streams from stormwater runoff and improve water quality; and
7. Using treatment interceptors (e.g., swirl separators and sand filters) may be appropriate in some instances to minimize the discharge of pollutants.

C. Control Measures/Best Management Practices (BMPs)

1. Minimize Exposure - You shall minimize the exposure of manufacturing, processing, and material storage areas (including loading and unloading, storage, disposal, cleaning, maintenance, and fueling

operations) to rain, snow, snowmelt, and runoff by either locating these industrial materials and activities inside or protecting them with storm resistant coverings (although significant enlargement of impervious surface area is not recommended). In minimizing exposure, you should pay particular attention to the following:

- a. Use grading, berming, or curbing to prevent runoff of contaminated flows and divert run-on away from these areas;
- b. Locate materials, equipment, and activities so that leaks are contained in existing containment and diversion systems (confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to protected areas);
- c. Clean up spills and leaks promptly using dry methods (e.g., absorbents) to prevent the discharge of pollutants;
- d. Use drip pans and absorbents under or around leaky vehicles and equipment or store indoors where feasible;
- e. Use spill/overflow protection equipment;
- f. Drain fluids from equipment and vehicles prior to on-site storage or disposal;
- g. Perform all cleaning operations indoors, under cover, or in bermed areas that prevent runoff and run-on and also that capture any overspray; and
- h. Ensure that all washwater drains to a proper collection system (i.e., not the stormwater drainage system).

If the discharge of vehicle and equipment washwater is not authorized under Part I of this permit, these wastewaters must be discharged to sanitary sewer in accordance with applicable industrial pretreatment requirements or disposed of otherwise in accordance with applicable law.

[Note: Industrial materials do not need to be enclosed or covered if stormwater runoff from affected areas will not be discharged to receiving waters or if discharges are authorized under Part I of this permit.]

2. Good Housekeeping - You shall keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals, keeping materials orderly and labeled, and storing materials in appropriate containers.

3. Maintenance - You shall regularly inspect, test, maintain, and repair all industrial equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater discharged to receiving waters. You shall maintain all control measures that are used to achieve the control measures/best management practices (BMPs) required by this permit in effective operating condition. Nonstructural control measures shall also be diligently maintained (e.g., spill response supplies available, personnel appropriately trained). If you find that your control measures need to be replaced or repaired, you shall make the necessary repairs or modifications as expeditiously as practicable.

4. Spill Prevention and Response Procedures - You shall minimize the potential for leaks, spills and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur. At a minimum, you shall implement:

- a. Procedures for plainly labeling containers (e.g., "Used Oil", "Spent Solvents", "Fertilizers and Pesticides", etc.) that could be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur;
 - b. Preventative measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling;
 - c. Procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other releases. Employees who may cause, detect, or respond to a spill or leak shall be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of your stormwater pollution prevention team (Part IV.J.1); and
 - d. Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies. Where a leak, spill or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, occurs during a 24-hour period, you shall notify the Ohio EPA in accordance with the requirements of Part III Item 12 of this permit as soon as you have knowledge of the discharge. Contact information shall be in locations that are readily accessible and available.
5. Erosion and Sediment Controls - You shall stabilize exposed areas and contain runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation, and the resulting discharge of pollutants. Among other actions you shall take to meet this limit, you shall place flow velocity dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion and/or settle out pollutants. In selecting, designing, installing, and implementing appropriate control measures, you are encouraged to consult with the current edition of Ohio's Rainwater and Land Development manual (<https://epa.ohio.gov/divisions-and-offices/surface-water/guides-manuals/rainwater-and-land-development>), U.S. EPA's internet-based resources relating to BMPs for erosion and sedimentation, including the sector-specific Industrial Storm Water Fact Sheet Series, (<https://www.epa.gov/npdes/stormwater-discharges-industrial-activities-fact-sheets-and-guidance>), National Menu of Storm Water BMPs (<https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater>), and National Management Measures to Control Nonpoint Source Pollution from Urban Areas (<https://www.epa.gov/nps/urban-runoff-national-management-measures>).
6. Management of Runoff - You shall divert, infiltrate, reuse, contain, or otherwise reduce stormwater runoff, to minimize pollutants in your discharges. In selecting, designing, installing, and implementing appropriate control measures, you are encouraged to consult with the current edition of Ohio's Rainwater and Land Development manual (<https://epa.ohio.gov/divisions-and-offices/surface-water/guides-manuals/rainwater-and-land-development>), U.S. EPA's internet-based resources relating to runoff management, including the sector-specific Industrial Storm Water Fact Sheet Series, (<https://www.epa.gov/npdes/stormwater-discharges-industrial-activities-fact-sheets-and-guidance>), National Menu of Storm Water BMPs (<https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater>), and National Management Measures to Control Nonpoint Source Pollution from Urban Areas (<https://www.epa.gov/nps/urban-runoff-national-management-measures>).
7. Salt Storage Piles or Piles Containing Salt - You shall enclose or cover storage piles of salt, or piles containing salt, used for deicing or other commercial or industrial purposes, including maintenance of paved surfaces. You shall implement appropriate measures (e.g., good housekeeping, diversions, containment) to minimize exposure resulting from adding to or removing materials from the pile.
8. Sector Specific Control Measures/Best Management Practices (BMPs) - You shall achieve any additional control measures/best management practices (BMPs) stipulated in the relevant sector-specific

section(s) of Part IV.K. of this permit.

9. Employee Training - You shall train all employees who work in areas where industrial materials or activities are exposed to stormwater, or who are responsible for implementing activities necessary to meet the conditions of this permit (e.g., inspectors, maintenance personnel), including all members of your Pollution Prevention Team. Training shall cover both the specific control measures used to achieve the conditions in this Part, and monitoring, inspection, planning, reporting, and documentation requirements in other parts of this permit. Ohio EPA requires that training be conducted at least annually (or more often if employee turnover is high).

10. Non-Stormwater Discharges - You shall eliminate non-stormwater discharges not authorized in Part I and Part II of this NPDES permit. The following are additional non-stormwater discharges authorized under this permit:

- a. Discharges from fire-fighting activities (not planned exercises);
- b. Fire hydrant flushings;
- c. Potable water, including water line flushings;
- d. Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids;
- e. Irrigation drainage;
- f. Landscape watering provided all pesticides, herbicides, and fertilizer have been applied in accordance with the approved labeling;
- g. Pavement wash waters where no detergents or hazardous cleaning products are used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols, etc.), and the wash waters do not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities (see Part IV.J.2), or any other toxic or hazardous materials, unless residues are first cleaned up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags) and you have implemented appropriate control measures to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention, settlement);
- h. Routine external building washdown/power wash water that does not use detergents or hazardous cleaning products (e.g., those containing bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols, etc.);
- i. Uncontaminated groundwater or spring water
- j. Foundation or footing drains where flows are not contaminated with process materials;
- k. Incidental windblown mist from cooling towers that collect on rooftops or adjacent portions of your facility, but not intentional discharges from the cooling tower (e.g., "piped" cooling tower blowdowns or drains)

11. Waste, Garbage and Floatable Debris - You shall ensure that waste, garbage, and floatable debris are not discharged to receiving waters by keeping exposed areas free of such materials or by intercepting them before they are discharged.

12. Dust Generation and Vehicle Tracking of Industrial Materials - You shall minimize generation of dust and off-site tracking of raw, final, or waste materials.

D. Corrective Actions

1. Conditions Requiring Review and Revision to Eliminate Problem - If any of the following conditions occur, you shall review and revise the selection, design, installation, and implementation of your control measures to ensure that the condition is eliminated and will not be repeated in the future:

- a. An unauthorized release or discharge (e.g., spill, leak, or discharge of non-stormwater not authorized by this or another NPDES permit) occurs at your facility;
- b. A discharge violates a numeric effluent limit;
- c. You become aware, or Ohio EPA determines, that your control measures are not stringent enough for the discharge to meet applicable water quality standards;
- d. An inspection or evaluation of your facility by an Ohio EPA official or local MS4 operator determines that modifications to the control measures are necessary to meet the control measures/best management practices (BMPs) in this permit; or
- e. You find in your routine facility inspection or quarterly visual assessment that your control measures are not being properly operated and maintained.

2. Conditions Requiring Review to Determine if Modifications Are Necessary - If any of the following conditions occur, you shall review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the Part IV.A conditions in this permit:

- a. Construction or a change in design, operation, or maintenance at your facility significantly changes the nature of pollutants discharged in stormwater from your facility, or significantly increases the quantity of pollutants discharged; or
- b. The average of your four quarterly sampling results exceeds an applicable benchmark (see Part V.B.7). If less than four benchmark samples have been taken, but the results are such that an exceedance of the four-quarter average is mathematically certain (i.e., if the sum of quarterly samples results to date is more than four times the benchmark level) this is considered a benchmark exceedance, triggering this review.

3. Corrective Action Deadlines - You shall document your discovery of any of the conditions listed in Part IV.D.1 and Part IV.D.2 within 24 hours of making such discovery. Subsequently, within 30 days of such discovery, you shall document any corrective action(s) to be taken to eliminate or further investigate the deficiency, or if no corrective action is needed, the basis for that determination. Specific documentation required within 24 hours and 30 days is detailed in Part IV.D.4. If you determine that changes are necessary following your review, any modifications to your control measures shall be made before the next storm event if possible, or as soon as practicable following that storm event. These time intervals are not grace periods, but are schedules considered reasonable for documenting your findings and for making repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements are not allowed to persist indefinitely.

4. Corrective Action Report - Within 24 hours of discovery of any condition listed in Part IV.D.1 and Part IV.D.2, you shall document the following information:

- a. Identification of the condition triggering the need for corrective action review;
- b. Description of the problem identified; and
- c. Date the problem was identified.

Within 30 days of discovery of any condition listed in Part IV.D.1 and Part IV.D.2, you shall document the following information and submit the report to the appropriate Ohio EPA District Office):

- a. Summary of corrective action taken or to be taken (or, for triggering events identified in Part IV.D.2 where you determine that corrective action is not necessary, the basis for this determination);
- b. Notice of whether SWPPP modifications are required as a result of this discovery or corrective action;
- c. Date corrective action initiated; and
- d. Date corrective action completed or expected to be completed.

In addition to your corrective action report, you shall also include this documentation in an annual report as required in Part V. A.2 and retain onsite with your SWPPP.

5. Effect of Corrective Action - If the event triggering the review is a permit violation (e.g., non-compliance with an effluent limit), correcting it does not remove the original violation. Additionally, failing to take corrective action in accordance with this section is an additional permit violation. Ohio EPA will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations.

6. Substantially Identical Outfalls - If the event triggering corrective action is linked to an outfall that represents other substantially identical outfalls, your review shall assess the need for corrective action for each outfall represented by the outfall that triggered the review. Any necessary changes to control measures that affect these other outfalls shall also be made before the next storm event if possible, or as soon as practicable following that storm event.

E. Inspections

Beginning on the effective date of this permit, you shall conduct the inspections in Part IV.E.1 and Part IV.E.2 at your facility.

1. Routine Facility Inspections

a. Routine Facility Inspection Procedure - Conduct routine facility inspections of all areas of the facility where industrial materials or activities are exposed to stormwater, and of all stormwater control measures used to comply with Part IV. Items A-C conditions contained in this permit. Routine facility inspections shall be conducted at least quarterly (i.e., once each calendar quarter) although in many instances, more frequent inspection (e.g., monthly) may be appropriate for some types of equipment, processes, and control measures or areas of the facility with significant activities and materials exposed to stormwater. Perform these inspections during periods when the facility is in operation. You shall specify the relevant inspection schedules in your SWPPP document as required in Part IV. Items A-C. These routine inspections shall be performed by qualified personnel (for definition see VI - Definitions) with at least one member of your stormwater pollution prevention team participating. At least once each calendar year, the routine facility inspection shall be conducted during a period when a stormwater discharge is occurring.

b. Routine Facility Inspection Documentation - You shall document the findings of each routine facility inspection performed and maintain this documentation onsite with your SWPPP. You are not required to submit your routine facility inspection findings to Ohio EPA, unless specifically requested to do so. At a

minimum, your documentation of each routine facility inspection shall include:

- i. The inspection date and time;
- ii. The name(s) and signature(s) of the inspector(s);
- iii. Weather information and a description of any discharges occurring at the time of the inspection;
- iv. Any previously unidentified discharges of pollutants from the site;
- v. Any control measures needing maintenance or repairs;
- vi. Any failed control measures that need replacement;
- vii. Any incidents of noncompliance observed; and
- viii. Any additional control measures needed to comply with the permit requirements.

Any corrective action required as a result of a routine facility inspection shall be performed consistent with Part IV.D of this permit.

c. *Exceptions to Routine Facility Inspections:*

i. *Inactive and Unstaffed Sites* - The requirement to conduct routine facility inspections on a quarterly basis does not apply at a facility that is inactive and unstaffed, as long as there are no industrial materials or activities exposed to stormwater. Such a facility is only required to conduct an annual site inspection in accordance with the requirements of Part IV.E.1. To invoke this exception, you shall maintain a statement in your SWPPP pursuant to Part IV.F indicating that the site is inactive and unstaffed, and that there are no industrial materials or activities exposed to precipitation, in accordance with the substantive requirements in 40 CFR 122.26(g)(4)(iii). The statement shall be signed and certified in accordance with Part III.28. If circumstances change and industrial materials or activities become exposed to stormwater or your facility becomes active and/or staffed, this exception no longer applies and you shall immediately resume quarterly facility inspections. If you are not qualified for this exception at the time you are authorized under this permit, but during the permit term you become qualified because your facility is inactive and unstaffed, and there are no industrial materials or activities that are exposed to stormwater, then you shall include the same signed and certified statement as above and retain it with your records.

ii. *Ohio EPA's Encouraging Environmental Excellence (E3) Program* - If your facility has been recognized under the Gold and Platinum levels by Ohio EPA's Encouraging Environmental Excellence (E3) Program, you only need to conduct routine facility inspections for two quarters each year. If Part IV.K of this permit requires your facility to conduct routine facility inspections on a monthly basis, you only need to conduct routine facility inspections on a quarterly basis.

2. Quarterly Visual Assessment of Stormwater Discharges

a. *Quarterly Visual Assessment Procedures* - Once each calendar quarter for the entire permit term you shall collect a stormwater sample from **Outfalls 01B00009011, 01B00009012, 01B00009014, 01B00009025-027** and conduct a visual assessment of each of these samples. These samples are not required to be collected consistent with 40 CFR Part 136 procedures but should be collected in such a manner that the samples are representative of the stormwater discharge. The visual assessment shall be made:

- i. Of a sample in a clean, clear glass, or plastic container, and examined in a well-lit area;
- ii. On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample shall be collected as soon as practicable after the first 30 minutes and you shall document why it was not possible to take samples within the first 30 minutes. In the case of snowmelt, samples shall be taken during a period with

a measurable discharge from your site; and

iii. For storm events, on discharges that occur at least 72 hours (3 days) from the previous discharge. The 72-hour (3-day) storm interval does not apply if you document that less than a 72-hour (3-day) interval is representative for local storm events during the sampling period. If it is not possible to collect the sample on discharges that occur at least 72 hours (3 days) from the previous discharge, the sample shall be collected as close to this storm interval as practicable and you shall document why it was not possible to take samples from a 72 hour (3 day) storm interval.

iv. Areas Subject to Snow: In areas subject to snow, at least one quarterly visual assessment shall capture snowmelt discharge.

v. For the following water quality characteristics: color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution.

b. Quarterly Visual Assessment Documentation - You shall document the results of your visual assessments and maintain this documentation onsite with your SWPPP. You are not required to submit your visual assessment findings to Ohio EPA, unless specifically requested to do so. At a minimum, your documentation of the visual assessment shall include:

- i. Sample location(s)
- ii. Sample collection date and time, and visual assessment date and time for each sample;
- iii. Personnel collecting the sample and performing visual assessment, and their signatures;
- iv. Nature of the discharge (i.e., runoff or snowmelt);
- v. Results of observations of the stormwater discharge;
- vi. Probable sources of any observed stormwater contamination; and
- vii. If applicable, why it was not possible to take samples within the first 30 minutes and/or from a 72 hour (3 day) storm interval.

Any corrective action required as a result of a quarterly visual assessment shall be performed consistent with Part IV.D of this permit.

c. Exceptions to Quarterly Visual Assessments

The following are exceptions to quarterly visual assessments:

i. *Adverse Weather Conditions* - When adverse weather conditions prevent the collection of samples during the quarter, you shall take a substitute sample during the next qualifying storm event. Documentation of the rationale for no visual assessment for the quarter shall be included with your SWPPP records. Adverse conditions are those that are dangerous or create inaccessibility for personnel, such as local flooding, high winds, or electrical storms, or situations that otherwise make sampling impractical, such as drought or extended frozen conditions.

ii. *Areas Subject to Snow* - In areas subject to snow, at least one quarterly visual assessment shall capture snowmelt discharge, as described in Part IV.E.2.

iii. *Substantially Identical Outfalls* - If your facility has two or more outfalls that you believe discharge substantially identical effluents, as documented in your SWPPP, you may conduct quarterly visual assessments of the discharge at just one of the outfalls and report that the results also apply to the substantially identical outfall(s) provided that you perform visual assessments on a rotating basis of each substantially identical outfall throughout the period of your coverage under this permit. If stormwater

contamination is identified through visual assessment performed at a substantially identical outfall, you shall assess and modify your control measures as appropriate for each outfall represented by the monitored outfall.

iv. *Inactive and Unstaffed Sites* - The requirement for a quarterly visual assessment does not apply at a facility that is inactive and unstaffed, as long as there are no industrial materials or activities exposed to stormwater. To invoke this exception, you shall maintain a statement in your SWPPP indicating that the site is inactive and unstaffed, and that there are no industrial materials or activities exposed to precipitation, in accordance with the substantive requirements in 40 CFR 122.26(g)(4)(iii). The statement shall be signed and certified in accordance with Part III.28 of this permit. If circumstances change and industrial materials or activities become exposed to stormwater or your facility becomes active and/or staffed, this exception no longer applies and you shall immediately resume quarterly visual assessments. If you are not qualified for this exception at the time you are authorized under this permit, but during the permit term you become qualified because your facility is inactive and unstaffed, and there are no industrial materials or activities that are exposed to stormwater, then you shall include the same signed and certified statement as above and retain it with your records.

v. *Ohio EPA's Encouraging Environmental Excellence (E3) Program* - If your facility has been recognized under the Gold and Platinum levels by Ohio EPA's Encouraging Environmental Excellence (E3) Program, you only need to conduct quarterly visual assessment of stormwater discharges for two quarters each year.

F. Stormwater Pollution Prevention Plan (SWPPP)

A stormwater pollution prevention plan (SWPPP) shall be developed to address each outfall that discharges to waters of the state that contains stormwater associated with industrial activity. Stormwater pollution prevention plans shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges associated with industrial activity from the facility. The SWPPP shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in stormwater discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the stormwater pollution prevention plan required under this part as a condition of this permit.

The SWPPP does not contain effluent limitations; the limitations or benchmarks are contained in Part I. The SWPPP is intended to document the selection, design, and installation of control measures. As distinct from the SWPPP, the documentation requirements are intended to document the implementation (including inspection, maintenance, monitoring, and corrective action) of the permit requirements.

G. Deadline to Update the SWPPP

The permittee shall continue to implement and be in compliance with the SWPPP required by the previous permit. Within six months of the effective date of this permit, the permittee shall update the SWPPP as necessary to address any new or reviewed requirements of this permit.

H. Signature Requirements and SWPPP Availability

1. Your plan shall be signed and dated in accordance with Part III, Item 28, and be retained on-site at the facility which generates the stormwater discharge.
2. You shall retain a copy of the current SWPPP required by this permit at the facility, and it shall be

immediately available to Ohio EPA; a local agency approving stormwater management plans; and the operator of an MS4 receiving discharges from the site. Ohio EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) may be withheld from the public, but may not be withheld from those staff cleared for CBI review within Ohio EPA. Your current SWPPP or certain information from your current SWPPP shall be made available to the public, except any confidential business information (CBI) or restricted information, but you shall clearly identify those portions of the SWPPP that are being withheld from public access. See 40 CFR Part 2 for relevant definitions of CBI: <https://www.govinfo.gov/content/pkg/CFR-2013-title40-vol1/pdf/CFR-2013-title40-vol1-part2-subpartB.pdf>

3. All stormwater pollution prevention plans required under this permit are considered reports that shall be available to the public under Section 308(b) of the Act. Confidential Business Information (CBI) may be withheld from the public, but may not be withheld from those staff cleared for CBI review within Ohio EPA. An interested party wishing a copy of a discharger's SWPPP will have to contact the Ohio EPA to obtain a copy.

I. Required SWPPP Modifications

The permittee shall modify your SWPPP whenever necessary to address any of the triggering conditions for corrective action in Part IV.D and to ensure that they do not reoccur, or to reflect changes implemented when a review following the triggering conditions in Part IV.D.2 indicates that changes to your control measures are necessary to meet the control measures/best management practices (BMPs) in this permit. Changes to your SWPPP document shall be made in accordance with the corrective action deadlines in Part IV.D.3 and Part IV.D.4.

The Director may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Within 30 days of such notification from the Director, the permittee shall make the required changes to the plan and shall submit to the Director a written certification that the requested changes have been made.

J. Contents of SWPPP

The plan shall include, at a minimum, the following items:

1. Stormwater Pollution Prevention Team

You shall identify the staff members (by name or title) that comprise the facility's stormwater pollution prevention team as well as their individual responsibilities. Your stormwater pollution prevention team is responsible for assisting the facility manager in developing and revising the facility's SWPPP as well as maintaining control measures and taking corrective actions where required. Each member of the stormwater pollution prevention team shall have ready access to either an electronic or paper copy of applicable portions of this permit and your SWPPP.

2. Site Description

Your SWPPP shall include the following:

- a. Activities at the Facility - Provide a description of the nature of the industrial activities at your facility;
- b. General location map. - Provide a general location map (e.g. U.S. Geologic Survey (USGS) quadrangle map) with enough detail to identify the location of your facility and all receiving waters for your

stormwater discharges.

c. Site map - Provide a site map showing:

- The size of the property in acres;
- The location and extent of significant structures and impervious surfaces;
- Directions of stormwater flow (use arrows);
- Locations of all existing structural control measures;
- Locations of all receiving waters in the immediate vicinity of your facility;
- Locations of all stormwater conveyances including ditches, pipes and swales;
- Locations of potential pollutant sources identified under Part IV J. 2.b;
- Locations where significant spills or leaks identified under Part IV J. 2.b. have occurred;
- Locations of all stormwater monitoring points;
- Locations of stormwater inlets and outfalls, with a unique identification code for each outfall (e.g. Outfall 001, Outfall 002, etc), indicating any outfalls that are considered substantially identical to another outfall, and an approximate outline of the areas draining to each outfall;
- Municipal separate storm sewer systems, where your stormwater discharges to them;
- Locations and descriptions of all non-stormwater discharges identified under Part IV. C. 10;
- Locations of the following activities where such activities are exposed to precipitation:
 - Fueling stations;
 - Vehicle and equipment maintenance and/or cleaning areas;
 - Loading/unloading areas;
 - Locations used for the treatment, storage, or disposal of wastes;
 - Liquid storage tanks;
 - Processing and storage areas;
 - Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
 - Transfer areas for substances in bulk;
 - Machinery; and
 - Locations and sources of run-on to your site from adjacent property that contains significant quantities of pollutants.

3. Summary of Potential Pollutant Sources

You shall document at your facility where industrial materials or activities are exposed to stormwater and from which allowable non-stormwater discharges are released. Industrial materials or activities, include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials; industrial production and processes; and intermediate products, by-products, final product or waste product. Material handling activities include, but are not limited to: the storage, loading and unloading, transportation, disposal, or conveyance of any raw material, intermediate product, final product or waste product. For each area identified, the description shall include, at a minimum:

a. Activities in the Area - This includes a list of industrial activities exposed to stormwater (e.g., material storage; equipment fueling, maintenance, and cleaning; cutting steel beams).

b. Pollutants - A list of the pollutant(s) or pollutant constituents (e.g, crankcase oil, zinc, sulfuric acid, and cleaning solvents) associated with each identified activity. The pollutant list shall include all significant materials that have been handled, treated, stored, or disposed, and that have been exposed to stormwater in the three years prior to the date you prepare or amend your SWPPP.

c. Spills and Leaks - You shall document where potential spills and leaks could occur that could

contribute pollutants to stormwater discharges, and the corresponding outfall(s) that would be affected by such spills and leaks. You shall document all significant spills and leaks of oil or toxic or hazardous pollutants that actually occurred at exposed areas, or that drained to a stormwater conveyance, in the three years prior to the date you prepare or amend your SWPPP.

[Note: Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC Section 9602. This permit does not relieve you of the reporting requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 relating to spills or other releases of oil or hazardous substances.]

d. Non-Stormwater Discharges - You shall document that you have evaluated for the presence of non-stormwater discharges, except for those listed in Part I and Part IV.C.10, and that all unauthorized discharges have been eliminated. Documentation of your evaluation shall include:

- i. The date of any evaluation;
- ii. A description of the evaluation criteria used;
- iii. A list of the outfalls or onsite drainage points that were directly observed during the evaluation;
- iv. The different types of non-stormwater discharge(s) and source locations; and
- v. The action(s) taken, such as a list of control measures used to eliminate unauthorized discharge(s), if any were identified. For example, a floor drain was sealed, a sink drain was re-routed to sanitary, or an NPDES permit application was submitted for an unauthorized cooling water discharge.

e. Salt Storage - You shall document the location of any storage piles containing salt used for deicing or other commercial or industrial purposes.

f. Sampling Data - A summary of existing discharge sampling data describing pollutants in stormwater discharges from the facility.

4. Description of Control Measures

You shall document the location and type of control measures you have installed and implemented at your site to achieve the control measures/best management practices (BMPs) in Part IV.C, and where applicable, in Part IV.K. You shall describe how you addressed the control measure selection and design considerations in Part IV.B. This documentation shall describe how the control measures at your site address both the pollutant sources identified in Part IV.J.2 and any stormwater run-on that commingles with any discharges covered under this permit.

5. Schedules and Procedures

a. Pertaining to Control Measures used to Comply with the Control Measures/Best Management Practices (BMPs) - The following shall be documented in your SWPPP:

- i. Good Housekeeping (See Part IV.C.2) - A schedule for regular pickup and disposal of waste materials, along with routine inspections for leaks and conditions of drums, tanks and containers.
- ii. Maintenance (See Part IV.C.3) - Preventative maintenance procedures, including regular inspections, testing, maintenance, and repair of all industrial equipment and systems, and control measures, to avoid situations that may result in leaks, spills, and other releases, and any back-up practices in place should a runoff event occur while a control measure is off-line;
- iii. Spill Prevention and Response Procedures (See Part IV.C.4) - Procedures for preventing and

responding to spills and leaks. You may reference the existence of other plans for Spill Prevention Control and Countermeasure (SPCC) developed for the facility under Section 311 of the CWA or BMP programs otherwise required by an NPDES permit for the facility, provided that you keep a copy of that other plan onsite (hard copy or electronic) and make it available for review consistent with Part IV.J.5; and

iv. *Employee Training* (See Part IV.C.9) - A schedule for all types of necessary training.

b. *Pertaining to Monitoring and Inspection* - Where applicable, you shall document in your SWPPP your procedures for conducting analytical stormwater monitoring. You shall document in your SWPPP your procedures for performing, as appropriate, the two types of inspections specified by this permit, including: 1) Routine facility inspections (See Part IV.E.1) and 2) Quarterly visual assessment of stormwater discharges (See Part IV.E.2).

For each type of monitoring, your SWPPP shall document:

- i. Locations where samples are collected, including any determination that two or more outfalls are substantially identical;
- ii. Parameters for sampling and the frequency of sampling for each parameter;
- iii. Schedules for monitoring at your facility (see Part 6.1.6);
- iv. Any numeric control values (benchmarks, effluent limitations guidelines, or other requirements) applicable to discharges from each outfall; and
- v. Procedures (e.g., responsible staff, logistics, laboratory to be used, etc.) for gathering storm event data.

For each type of inspection performed, your SWPPP shall identify:

- i. Person(s) or positions of person(s) responsible for inspection;
- ii. Schedules for conducting inspections; and
- iii. Specific items to be covered by the inspection, including schedules for specific outfalls.

If you are invoking the exception for inactive and unstaffed sites relating to routine facility inspections and quarterly visual assessments, you shall include in your SWPPP the information to support this claim as required by Parts V.E. If you are invoking the exception for inactive and unstaffed sites for benchmark monitoring, you shall include in your SWPPP the information to support this claim.

You shall document the following in your SWPPP if you plan to use the substantially identical outfall exception for your quarterly visual assessment requirements in Part IV.E.2 or your benchmark monitoring requirements in Part V:

- i. Location of each of the substantially identical outfalls;
- ii. Description of the general industrial activities conducted in the drainage area of each outfall;
- iii. Description of the control measures implemented in the drainage area of each outfall;
- iv. Description of the exposed materials located in the drainage area of each outfall that are likely to be significant contributors of pollutants to stormwater discharges;
- v. An estimate of the runoff coefficient of the drainage areas (low = under 40%; medium = 40 to 65%; high = above 65%); and
- vi. Why the outfalls are expected to discharge substantially identical effluents.

6. *Documentation Requirements* - You are required to keep inspection, monitoring, and certification records with your SWPPP that together keep your records complete and up-to-date, and demonstrate your full compliance with the conditions of this permit:

- i. A copy of this permit (an electronic copy easily available to SWPPP personnel is also acceptable);
- ii. Descriptions and dates of any incidences of significant spills, leaks, or other releases that resulted in discharges of pollutants to surface waters of the State, through stormwater or otherwise; the circumstances leading to the release and actions taken in response to the release; and measures taken to prevent the recurrence of such releases (see Part IV.C.4);
- iii. Records of employee training, including date training received (see Part IV.C.9);
- iv. Documentation of maintenance and repairs of control measures, including the date(s) of regular maintenance, date(s) of discovery of areas in need of repair/replacement, and for repairs, date(s) that the control measure(s) returned to full function, and the justification for any extended maintenance/repair schedules (see Part IV.C.3);
- v. All inspection reports, including the Routine Facility Inspection Reports (see Part IV.E.1) and the Quarterly Visual Assessment Reports (see Part IV.E.2);
- vi. Description of any deviations from the schedule for visual assessments and/or monitoring, and the reason for the deviations (e.g., adverse weather or it was impracticable to collect samples within the first 30 minutes and/or from a 72-hour (3 day) storm interval) (see Parts IV.E.2.a, Part V.B.4 & 7);
- vii. Description of any corrective action taken at your site, including triggering event and dates when problems were discovered and modifications occurred;
- viii. Documentation of any benchmark exceedances and how they were responded to, including either (1) corrective action taken, (2) a finding that the exceedance was due to natural background pollutant levels, or (3) a finding that no further pollutant reductions were technologically available and economically practicable and achievable in light of best industry practice consistent with Part V.B.7;
- ix. Documentation to support any determination that pollutants of concern are not expected to be present above natural background levels if you discharge directly to impaired waters, and that such pollutants were not detected in your discharge or were solely attributable to natural background sources (see Part V.B.7); and
- x. Documentation to support your claim that your facility has changed its status from active to inactive and unstaffed with respect to the requirements to conduct routine facility inspections (see Part IV.E.1), quarterly visual assessments (see Part IV.E.2), and/or benchmark monitoring (see Part V.B.7.)

Where your SWPPP refers to procedures in other facility documents, such as a Spill Prevention, Control and Countermeasure (SPCC) Plan or an Environmental Management System (EMS) developed for a National Environmental Performance Track facility, copies of the relevant portions of those documents shall be kept with your SWPPP.

K. Sector-Specific Requirements

Sector O - Steam Electric Generating Facilities

You shall comply with the following sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part VI. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

1. Limitations on Coverage - Except for process discharges covered under Part I and other allowable discharges listed in Part IV.C.10

a. Prohibition of Non-Stormwater Discharges - Non-stormwater discharges subject to effluent limitations guidelines are not covered by this permit.

b. Prohibition of Stormwater Discharges - Stormwater discharges from the following are not covered by this permit:

- i. ancillary facilities (e.g., fleet centers and substations) that are not contiguous to a stream electric power generating facility;
- ii. gas turbine facilities (providing the facility is not a dual-fuel facility that includes a steam boiler), and combined-cycle facilities where no supplemental fuel oil is burned (and the facility is not a dual-fuel facility that includes a steam boiler); and
- iii. cogeneration (combined heat and power) facilities utilizing a gas turbine.

2. Additional Control Measures/Best Management Practices (BMPs)

The following good housekeeping measures are required in addition to Part IV.C.2:

a. Fugitive Dust Emissions - Minimize fugitive dust emissions from coal handling areas. To minimize the tracking of coal dust offsite, consider procedures such as installing specially designed tires or washing vehicles in a designated area before they leave the site and controlling the wash water.

b. Delivery Vehicles - Minimize contamination of stormwater runoff from delivery vehicles arriving at the plant site. Consider procedures to inspect delivery vehicles arriving at the plant site and ensure overall integrity of the body or container and procedures to deal with leakage or spillage from vehicles or containers.

c. Fuel Oil Unloading Areas - Minimize contamination of precipitation or surface runoff from fuel oil unloading areas. Consider using containment curbs in unloading areas, having personnel familiar with spill prevention and response procedures present during deliveries to ensure that any leaks or spills are immediately contained and cleaned up, and using spill and overflow protection devices (e.g., drip pans, drip diapers, or other containment devices placed beneath fuel oil connectors to contain potential spillage during deliveries or from leaks at the connectors).

d. Chemical Loading and Unloading - Minimize contamination of precipitation or surface runoff from chemical loading and unloading areas. Consider using containment curbs at chemical loading and unloading areas to contain spills, having personnel familiar with spill prevention and response procedures present during deliveries to ensure that any leaks or spills are immediately contained and cleaned up, and loading and unloading in covered areas and storing chemicals indoors.

e. Miscellaneous Loading and Unloading Areas - Minimize contamination of precipitation or surface runoff from loading and unloading areas. Consider covering the loading area; grading, berming, or curbing around the loading area to divert run-on; locating the loading and unloading equipment and vehicles so that leaks are contained in existing containment and flow diversion systems; or equivalent procedures.

f. Liquid Storage Tanks - Minimize contamination of surface runoff from above-ground liquid storage tanks. Consider protective guards around tanks, containment curbs, spill and overflow protection, dry cleanup methods, or equivalent measures.

g. Large Bulk Fuel Storage Tanks - Minimize contamination of surface runoff from large bulk fuel storage tanks. Consider containment berms (or their equivalent). You shall also comply with applicable State and Federal laws, including Spill Prevention, Control and Countermeasure (SPCC) Plan requirements.

h. Spill Reduction Measures - Minimize the potential for an oil or chemical spill or reference the appropriate part of your SPCC plan. Visually inspect as part of your routine facility inspection the structural integrity of all above-ground tanks, pipelines, pumps, and related equipment that may be exposed to stormwater, and make any necessary repairs immediately.

i. Bearing Equipment in Switchyards - Minimize contamination of surface runoff from oil-bearing equipment in switchyard areas. Consider using level grades and gravel surfaces to retard flows and limit the spread of spills or collecting runoff in perimeter ditches.

j. Residue-Hauling Vehicles - Inspect all residue-hauling vehicles for proper covering over the load, adequate gate sealing, and overall integrity of the container body. Repair vehicles without load covering or adequate gate sealing, or with leaking containers or beds.

k. Ash Loading Areas - Reduce or control the tracking of ash and residue from ash loading areas. Clear the ash building floor and immediately adjacent roadways of spillage, debris, and excess water before departure of each loaded vehicle.

l. Areas Adjacent to Disposal Ponds or Landfills - Minimize contamination of surface runoff from areas adjacent to disposal ponds or landfills. Reduce ash residue that may be tracked on to access roads traveled by residue handling vehicles and reduce ash residue on exit roads leading into and out of residue handling areas.

m. Landfills, Scrap yards, Surface Impoundments, Open Dumps, General Refuse Sites - Minimize the potential for contamination of runoff from these areas.

3. Additional SWPPP Requirements

a. Drainage Area Site Map - (See also Part IV.J.2.) Document in your SWPPP the locations of any of the following activities or sources that may be exposed to precipitation or surface runoff: storage tanks, scrap yards, and general refuse areas; short- and long-term storage of general materials (including but not limited to supplies, construction materials, paint equipment, oils, fuels, used and unused solvents, cleaning materials, paint, water treatment chemicals, fertilizer, and pesticides); landfills and construction sites; and stock pile areas (e.g., coal or limestone piles).

b. Documentation of Good Housekeeping Measures - You shall document in your SWPPP the good housekeeping measures implemented to meet the effluent limits in Part IV.K.2.

4. Additional Inspection Requirements

a. As part of your inspection, inspect the following areas monthly: coal handling areas, loading or unloading areas, switchyards, fueling areas, bulk storage areas, ash handling areas, areas adjacent to disposal ponds and landfills, maintenance areas, liquid storage tanks, and long term and short-term material storage areas.

PART V. MONITORING AND REPORTING REQUIREMENTS

A. Reporting and Recordkeeping

1. Reporting Benchmark Monitoring Data to Ohio EPA - Benchmark monitoring data shall be submitted to Ohio EPA in accordance with Part III Item 4. of this permit.

2. Annual Report - You shall complete an annual report using the Annual Reporting Form provided by Ohio EPA at the following location:
<https://view.officeapps.live.com/op/view.aspx?src=https://epa.ohio.gov/static/Portals/35/permits/OHR000007/OHR000007-AR.docx&wdOrigin=BROWSELINK>

You are not required to submit your annual report to Ohio EPA unless specifically requested. The timeframe to complete the report is at the discretion of the permittee but the same schedule to complete shall be maintained throughout this permit term. You shall keep the completed annual reports with your SWPPP.

B. Stormwater Monitoring Requirements

1. Monitored Outfalls

Applicable benchmark monitoring requirements apply to stormwater outfalls 01B00009011 & 012, 01B00009025-027, except as otherwise exempt from monitoring as a "substantially identical outfall". For monitoring purposes, an outfall can include a discrete conveyance (i.e., pipe, ditch, channel tunnel or conduit) or a location where sheet flow leaves your facility's property. If your facility has two or more outfalls that you believe discharge substantially identical effluents, based on the similarities of the general industrial activities and control measures, exposed materials that may significantly contribute pollutants to stormwater, and runoff coefficients of their drainage areas, you may monitor the effluent of just one of the outfalls and report that the results also apply to the substantially identical outfall(s). As required in Part IV.F, your SWPPP shall identify each outfall authorized by this permit and describe the rationale for any substantially identical outfall determinations. The allowance for monitoring only one of the substantially identical outfalls is not applicable to any outfalls with numeric effluent limitations. You are required to monitor each outfall covered by a numeric effluent limit as identified in Part I.

Representative Outfall	Identical Outfall	Description
011	012	Northeast of Unit #3 plant building
026	025	Coal unloaders and conveyor belt from river barge
027	None	Gypsum conveyor load out system and limestone unloader system

2. Commingled Discharges

If discharges authorized by this permit commingle with discharges not authorized under this permit, any required sampling of the authorized discharges shall be performed at a point before they mix with other waste streams, to the extent practicable.

3. Measurable Storm Event

All required monitoring shall be performed on a storm event that results in an actual discharge from your site ("measurable storm event") that follows the preceding measurable storm event by at least 72 hours (3 days). The 72-hour (3-day) storm interval does not apply if you are able to document that less than a 72-hour (3-day) interval is representative for local storm events during the sampling period. In the case of snowmelt, the monitoring shall be performed at a time when a measurable discharge occurs at your site.

For each monitoring event, except snowmelt monitoring, you shall identify the date and duration (in hours) of the rainfall event, rainfall total (in inches) for that rainfall event, and time (in days) since the previous measurable storm event. For snowmelt monitoring, you shall identify the date of the sampling event.

4. Sample Type

You shall take a minimum of one grab sample from a discharge resulting from a measurable storm event as described in Part V.B.2. Samples shall be collected within the first 30 minutes of a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample shall be collected as soon as practicable after the first 30 minutes and documentation shall be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes. In the case of snowmelt, samples shall be taken during a period with a measurable discharge.

5. Adverse Weather Conditions

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, you shall take a substitute sample during the next qualifying storm event. You shall report any failure to monitor as specified in Part IV.E.2 indicating the basis for not sampling during the usual reporting period.

6. Monitoring for Allowable Non-Stormwater Discharges

You are only required to monitor allowable non-stormwater discharges (as delineated in Part IV.C.10) when they are commingled with stormwater discharges associated with industrial activity.

7. Benchmark Monitoring

This permit stipulates pollutant benchmark concentrations that are applicable to certain sectors and subsectors and must be monitored within the first 2-years. **The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation.** Benchmark monitoring data are for your use to determine the overall effectiveness of your control measures and to assist you in knowing when additional corrective action(s) may be necessary to comply with the control measures/best management practices (BMPs) in Part IV. Items A-C.

At your discretion, more than four samples may be taken during separate runoff events and used to determine the average benchmark parameter concentration for facility discharges.

a. Benchmark Monitoring Schedule: During the first 8 quarterly monitoring periods of your permit coverage, you shall select a total of 4 quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall be taken during each of the quarterly monitoring periods unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of quarterly samples, you shall average your 4 monitoring values and compare to the benchmark concentration.

b. Data Not Exceeding Benchmarks: After collection of 4 quarterly samples if the average of the 4 monitoring values for any parameter does not exceed the benchmark, you have fulfilled your monitoring requirements for that parameter for the permit term. For averaging purposes, use a value of zero for any individual sample parameter analyzed using procedures consistent with 40 CFR 136, which is determined to be less than the method detection limit. For sample values that fall between the method detection level and the quantification limit (i.e., a confirmed detection but below the level that can be reliably quantified), use a value halfway between zero and the quantification limit.

c. Data Exceeding Benchmark: Based on the average of your monitoring results, if the monitoring values for any parameter exceeds the benchmark, you shall in accordance with Part IV.D.2, review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the Part IV Items A-C control measures/best management practices (BMPs) of this permit, and either:

i. Make the necessary modifications and during the next 8 quarterly monitoring periods, you shall select a total of 4 quarterly monitoring periods and perform benchmark monitoring. Over this 2-year period, one benchmark sampling event shall be taken during each of the quarterly monitoring periods unless your facility is always inactive and unstaffed for a particular quarterly monitoring period. After collection of the quarterly samples, you shall average your 4 monitoring values and compare to the benchmark concentration to determine the effectiveness of your modification: or

ii. Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the control measures/best management practices (BMPs) in Part IV., Items A-C of this permit. You shall also document your rationale for concluding that no further pollutant reductions are achievable, and retain all records related to this documentation with your SWPPP. You shall also notify Ohio EPA of this determination within 30 days.

iii. If less than four benchmark samples have been taken, but the results are such that an exceedance of the four-quarter average is mathematically certain (i.e., if the sum of quarterly samples results to date is more than four times the benchmark level), this is considered a benchmark exceedance, triggering this review.

Ideally your stormwater samples will contain only runoff from your site. However, stormwater from a neighboring facility can run-on and comeingle with your regulated stormwater discharge, possibly adding contaminants not found at your facility. The SWPPP site description shall document the locations and sources of any run-on. If you feel your discharge is exceeding a benchmark value due to, run-on from neighboring properties, you may collect and analyze samples of the run-on. Determined contaminant concentrations of run-on from neighboring properties may be deducted from your stormwater discharge when determining whether a benchmark has been exceeded. This information shall be documented within your eDMR's comment section. All sample data and findings shall be maintained with your SWPPP.

If it is determined that a water quality standard is less restrictive than this permit's benchmark value, you may use the less restrictive value for benchmark monitoring purposes.

Pollutant concentrations from your facility's structures (roofs, walls, fencing, etc.) can be considered to determine if it is technologically available and economically practical and achievable in light of best industry practice to implement additional control measures or not when a benchmark has been exceeded.

In accordance with Part IV.D.2, you shall review your control measures and perform any required corrective action immediately or document why no corrective action is required.

d. Natural Background Pollutant Levels: If you determine that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, you are not required to perform corrective action provided that:

- i. The concentration of your benchmark monitoring result is less than or equal to the concentration of that pollutant in the natural background;
- ii. You document and maintain with your SWPPP your supporting rationale for concluding that benchmark exceedances are in fact attributable solely to natural background levels. You shall include in your supporting rationale any data previously collected by you or others (including literature studies) that describe the levels of natural background pollutants in your stormwater discharge; and

Natural background pollutants include those substances that are naturally occurring in soils or groundwater. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources which are not naturally occurring.

e. Exception for Inactive and Unstaffed Sites: The requirement for benchmark monitoring does not apply at a facility that is inactive and unstaffed, as long as there are no industrial materials or activities exposed to stormwater. To invoke this exception, you shall do the following:

- i. Maintain a statement onsite with your SWPPP stating that the site is inactive and unstaffed, and that there are no industrial materials or activities exposed to stormwater in accordance with the substantive requirements in 40 CFR 122.26(g) and sign and certify the statement in accordance with Part IV.E.1.b.
- ii. If circumstances change and your facility becomes active and/or staffed, this exception no longer applies, and you shall immediately begin complying with the applicable benchmark monitoring requirements under Part V.B; and
- iii. If you are not qualified for this exception at the time you are authorized under this permit, but during the permit term you become qualified because your facility is inactive and unstaffed, and there are no industrial materials or activities that are exposed to stormwater, then you shall notify the appropriate district office of Ohio EPA of this change in your next benchmark monitoring report. You may discontinue benchmark monitoring once you have notified Ohio EPA, and prepared and signed the certification statement described above concerning your facility's qualification for this special exception.

PART VI. DEFINITIONS AND ACRONYMS

Action Area - all areas to be affected directly or indirectly by the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities, and not merely the immediate area involved in these discharges and activities.

Best Management Practices (BMPs) - schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to surface waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. See 40 CFR 122.2.

Co-located Industrial Activities - Any industrial activities, excluding your primary industrial activity(ies), located on-site that are defined by the stormwater regulations at 122.26(b)(14)(i)-(ix) and (xi). An activity at a facility is not considered co-located if the activity, when considered separately, does not meet the description of a category of industrial activity covered by the stormwater regulations or identified by the SIC code list in the Industrial Multi-Sector General Permit OHR000007, Appendix D.

Control Measure - refers to any BMP or other method (including effluent limitations) used to prevent or reduce the discharge of pollutants to surface waters of the State.

Director - the Director of the Ohio Environmental Protection Agency (Ohio EPA).

Discharge - when used without qualification, means the "discharge of a pollutant." See 40 CFR 122.2.

Discharge of a pollutant - any addition of any "pollutant" or combination of pollutants to "surface waters of the State" from any "point source", or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into surface waters of the State from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. See 40 CFR 122.2.

Discharge-related activities - activities that cause, contribute to, or result in stormwater and allowable non-stormwater point source discharges, and measures such as the siting, construction and operation of BMPs to control, reduce, or prevent pollution in the discharges.

Drought-stricken area - a period of below average water content in streams, reservoirs, ground-water aquifers, lakes and soils.

U.S. EPA Approved or Established Total Maximum Daily Loads (TMDLs) - "U.S. EPA Approved TMDLs" are those that are developed by a State and approved by U.S. EPA. "U.S. EPA Established TMDLs" are those that are developed by U.S. EPA.

Existing Discharger - an operator applying for coverage under this permit for discharges authorized previously under an NPDES general or individual permit.

Facility or Activity - any NPDES "point source" (including land or appurtenances thereto) that is subject to regulation under the NPDES program. See 40 CFR 122.2.

Federal Facility - any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to,

the federal government.

Illicit Discharge - is defined at 40 CFR 122.26(b)(2) and refers to any discharge to a municipal separate storm sewer that is not entirely composed of stormwater, except discharges authorized under an NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire fighting activities.

Impaired Water (or "Water Quality Impaired Water" or "Water Quality Limited Segment") - A water is impaired for purposes of this permit if it has been identified by a State or U.S. EPA pursuant to Section 303(d) of the Clean Water Act as not meeting applicable State water quality standards (these waters are called "water quality limited segments" under 40 CFR 30.2(j)). Impaired waters include both waters with approved or established TMDLs, and those for which a TMDL has not yet been approved or established.

Industrial Activity - the 10 categories of industrial activities included in the definition of "stormwater discharges associated with industrial activity" as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi).

Industrial Stormwater - stormwater runoff from industrial activity.

Municipal Separate Storm Sewer - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;

(ii) Designed or used for collecting or conveying stormwater;

(iii) Which is not a combined sewer; and

(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2; See 40 CFR 122.26(b)(4) and (b)(7).

New Discharger - a facility from which there is a discharge, that did not commence the discharge at a particular site prior to August 13, 1979, which is not a new source, and which has never received a finally effective NPDES permit for discharges at that site. See 40 CFR 122.2.

New Source - any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(i) after promulgation of standards of performance under section 306 of the CWA which are applicable to such source, or

(ii) after proposal of standards of performance in accordance with section 306 of the CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal. See 40 CFR 122.2.

New Source Performance Standards (NSPS) - technology-based standards for facilities that qualify as new sources under 40 CFR 122.2 and 40 CFR 122.29.

No exposure - all industrial materials or activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. See 40 CFR 122.26(g).

Ohio EPA - the Ohio Environmental Protection Agency.

Operator - any entity with a stormwater discharge associated with industrial activity that meets either of the following two criteria:

- (i) The entity has operational control over industrial activities, including the ability to modify those activities; or
- (ii) The entity has day-to-day operational control of activities at a facility necessary to ensure compliance with the permit (e.g., the entity is authorized to direct workers at a facility to carry out activities required by the permit).

Person - an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof. See 40 CFR 122.2.

Point source - any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff. See 40 CFR 122.2.

Pollutant - dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste discharged into water. See 40 CFR 122.2.

Pollutant of concern - A pollutant which causes or contributes to a violation of a water quality standard, including a pollutant which is identified as causing an impairment in a state's 303(d) list.

Primary industrial activity - includes any activities performed on-site which are (1) identified by the facility's primary SIC code; or (2) included in the narrative descriptions of 122.26(b)(14)(i), (iv), (v), or (vii), and (ix). [For co-located activities covered by multiple SIC codes, it is recommended that the primary industrial determination be based on the value of receipts or revenues or, if such information is not available for a particular facility, the number of employees or production rate for each process may be compared. The operation that generates the most revenue or employs the most personnel is the operation in which the facility is primarily engaged. In situations where the vast majority of on-site activity falls within one SIC code, that activity may be the primary industrial activity.] Narrative descriptions in 40 CFR 122.26(b)(14) identified above include: (i) activities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards; (iv) hazardous waste treatment storage, or disposal facilities including those that are operating under interim status or a permit under subtitle C of the Resource Conservation and Recovery Act (RCRA); (v) landfills, land application sites and open dumps that receive or have received industrial wastes; (vii) steam electric power generating facilities; and (ix) sewage treatment works with a design flow of 1.0 MGD or more.

Qualified Personnel - Qualified personnel are those who possess the knowledge and skills to assess conditions and activities that could impact stormwater quality at your facility, and who can also evaluate the effectiveness of control measures.

Reportable Quantity Release - a release of a hazardous substance at or above the established legal threshold that requires emergency notification. Refer to 40 CFR Parts 110, 117, and 302 for complete definitions and reportable quantities for which notification is required.

Runoff coefficient - the fraction of total rainfall that will appear at the conveyance as runoff. See 40 CFR 122.26(b)(11).

Run-On - sources of stormwater that drain from land located upslope or upstream from the regulated facility in question.

Semi-Arid Climate - areas where annual rainfall averages from 10 to 20 inches.

Significant materials - includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of CERCLA; any chemical the facility is required to report pursuant to section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with stormwater discharges. See 40 CFR 122.26(b)(12).

Special Aquatic Sites - sites identified in 40 CFR 230 Subpart E. These are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

Stormwater - stormwater runoff, snow melt runoff, and surface runoff and drainage. See 40 CFR 122.26(b)(13).

Stormwater Discharges Associated with Construction Activity - a discharge of pollutants in stormwater runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavating), construction materials, or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located. See 40 CFR 122.26(b)(14)(x) and 40 CFR 122.26(b)(15).

Stormwater Discharges Associated with Industrial Activity - the discharge from any conveyance that is used for collecting and conveying stormwater and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under Part 122. For the categories of industries identified in this section, the term includes, but is not limited to, stormwater discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at part 401 of this chapter); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and final products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater. For the purposes of this paragraph, material handling activities include storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with stormwater drained from the above described areas. Industrial

facilities include those that are federally, State, or municipally owned or operated that meet the description of the facilities listed in 40 CFR 122.26(b)(14).

Surface Waters of the State - Means all streams, lakes, ponds, marshes, watercourses, waterways, springs, irrigation systems, drainage systems, and all other bodies or accumulations of surface water, natural or artificial, which are situated wholly or partly within, or border upon, this state, or are within its jurisdiction, except those private waters which do not combine or effect a junction with natural surface waters.

Total Maximum Daily Loads (TMDLs) - A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL includes wasteload allocations (WLAs) for point source discharges; load allocations (LAs) for nonpoint sources and/or natural background, and shall include a margin of safety (MOS) and account for seasonal variations. (See section 303(d) of the Clean Water Act and 40 CFR 130.2 and 130.7).

Water Quality Impaired - See "Impaired Water".

Water Quality Standards - A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and U.S. EPA adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (See CWA sections 101(a)2 and 303(c)). Water quality standards also include an antidegradation policy. See P.U.D. o. 1 of Jefferson County et al v. Wash Dept of Ecology et al, 511 US 701, 705 (1994).

"You" and "Your" - as used in this permit are intended to refer to the permittee, the operator, or the discharger as the context indicates and that party's facility or responsibilities. The use of "you" and "your" refers to a particular facility and not to all facilities operated by a particular entity. For example, "you shall submit" means the permittee shall submit something for that particular facility. Likewise, "all your discharges" would refer only to discharges at that one facility.

ABBREVIATIONS AND ACRONYMS

BAT - Best Available Technology Economically Achievable
BOD5 - Biochemical Oxygen Demand (5-day test)
BMP - Best Management Practice
BPJ - Best Professional Judgment
BPT - Best Practicable Control Technology Currently Available
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CGP - Construction General Permit
COD - Chemical Oxygen Demand
CWA - Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
CWT - Centralized Waste Treatment
DMR - Discharge Monitoring Report
U.S. EPA - U. S. Environmental Protection Agency
FWS - U. S. Fish and Wildlife Service
LA - Load Allocations
MDMR - MSGP Discharge Monitoring Report
MGD - Million Gallons per Day
MOS - Margin of Safety
MS4 - Municipal Separate Storm Sewer System
MSDS - Material Safety Data Sheet
MSGP - Multi-Sector General Permit
NAICS - North American Industry Classification System
NMFS - U. S. National Marine Fisheries Service
NOI - Notice of Intent
NOT - Notice of Termination
NPDES - National Pollutant Discharge Elimination System
NRC - National Response Center
NTU - Nephelometric Turbidity Unit
OMB - U. S. Office of Management and Budget
ORW - Outstanding Resource Water
OSM - U. S. Office of Surface Mining
POTW - Publicly Owned Treatment Works
RCRA - Resource Conservation and Recovery Act
RQ - Reportable Quantity
SARA - Superfund Amendments and Reauthorization Act
SIC - Standard Industrial Classification
SMCRA - Surface Mining Control and Reclamation Act
SPCC - Spill Prevention, Control, and Countermeasures
SWPPP - Stormwater Pollution Prevention Plan
TMDL - Total Maximum Daily Load
TSDF - Treatment, Storage, or Disposal Facility
TSS - Total Suspended Solids
USGS - United States Geological Survey
WLA - Wasteload Allocation
WQS - Water Quality Standard

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for **Cardinal Operating Company**

Public Notice No.: 212710
Public Notice Date: June 6, 2025
Comment Period Ends: July 6, 2025

Ohio EPA Permit No.: **0IB00009*BE**
Application No.: **OH0012581**

Name and Address of Applicant:

Cardinal Operating Company – Cardinal Plant
6677 Busch Blvd
Columbus, OH 43229

Name and Address of Facility Where
Discharge Occurs:

Cardinal Operating Company
306 County Road 7E
Brilliant, OH 43913
Jefferson County

Receiving Water: **Ohio River, Blockhouse Hollow Run, Riddles Run**

Subsequent Stream Network: **Ohio 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.

Antidegradation provisions in Ohio Administrative Code (OAC) Chapter 3745-1 describe the conditions under which water quality may be lowered in surface waters. 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

The effluent limits and/or monitoring requirements proposed for all parameters are the same as in the current permit, except those listed below.

Outfall 001/091:

- Monitoring is proposed to be removed for ammonia, barium, and copper. See discussion under the Reasonable Potential Section.
- Zinc monitoring is proposed to be a flow-weighted calculation similar to mercury.
- Fictitious Outfall 091 is proposed to be removed. The facility does not continuously chlorinate and plans to continue intermittent use of no more than 2 hours/day.
- Monitoring is proposed to be removed for total residual oxidant. The facility does not use bromine-based additives.

Outfall 006:

- New quarterly monitoring is proposed for ammonia.
- Limits and monitoring for copper are proposed to be removed.

Outfall 008:

- Monitoring is proposed to be removed for copper.

Outfall 019:

- The existing technology-based limits for combustion residual leachate for total suspended solids, oil and grease and pH are proposed to be relocated at internal station 602, where leachate has been redirected around the FAR II reservoir.
- Technology-based limits are proposed for arsenic and mercury (daily maximum only) by January 1, 2030. The technology-based limits for total suspended solids, oil and grease and pH are proposed to reapply by January 1, 2030, for the application of the unmanaged combustion residual leachate waste stream.
- Monthly monitoring is proposed for all limited parameters. This includes total suspended solids, oil and grease, and mercury. Weekly pH monitoring is proposed to continue.
- Monitoring is proposed to be reduced for arsenic (monthly) and total filterable residue (quarterly).

- New monitoring for hardness is proposed.
- Monitoring requirements are proposed to be removed for ammonia based on the Group 2 placement and temperature because sluice water transport has ceased.
- Monitoring of alkalinity, boron, chlorides, chromium (hexavalent), copper, nitrate plus nitrite, specific conductance, selenium, sulfates, total kjeldahl nitrogen and zinc are proposed to be removed.

Outfall 024:

- Replacing Outfall 023 due to bottom ash pond retrofit, wastestream and location changes.
- New daily maximum limit is proposed for copper based on the wasteload allocation. A compliance schedule is proposed for meeting the new final effluent limit.
- Daily maximum limit for total suspended solids is proposed to decrease slightly due to flow data.
- New monitoring for hardness is proposed.
- Monitoring is proposed to decrease to quarterly for ammonia and selenium.
- Monitoring is proposed to be removed for arsenic, boron, cadmium, chromium (dissolved hexavalent), fluoride and zinc.

Internal monitoring station 601 (existing FGD treatment system):

- Technology based effluent limits are proposed for oil and grease. Weekly monitoring is proposed.
- Monitoring is reduced to once per month for arsenic, mercury, nitrate plus nitrite, selenium and zinc.
- Monitoring of water temperature, specific conductance, alkalinity, total kjeldahl nitrogen, chloride, sulfate, fluoride, iron, boron, barium, nickel, cadmium, chromium, copper, lead, and total filterable residue, are proposed to be removed.

Internal monitoring station 602 (landfill leachate):

- Technology based limits are proposed for combustion residual leachate for total suspended solids and oil and grease.
- New monitoring is proposed for ammonia, arsenic, total suspended solids, and oil and grease based on final effluent limits at outfall 019.
- Monitoring for fluoride is proposed to be removed.
- Monthly monitoring is proposed for all parameters, except flow monitoring which is proposed daily.

Internal Station 603

This station is used to make record of bottom ash transport waters discharge as required under the federal effluent limit guidelines. An interim outfall table is proposed to track the primary wetted volume until December 31, 2029. The final table includes a limit of “0” for number of days to discharge that correspond to the 2024 ELG date of “no discharge of pollutants” in bottom ash transport waters. On October 13, 2023, Cardinal Power Plant submitted certification of zero-discharge fly ash transport water pursuant to 40 CFR 423.13(h) and of the 2020 BAT bottom ash transport water ($\leq 10\%$ primary wetted volume) pursuant to 40 CFR 423.13(k)(2).

Internal monitoring station 604 (new FGD biological treatment):

The use of internal monitoring station 604 is proposed to change. Previously, this station was used to make record of days when fly ash transport water was discharged. The conversion to a dry fly ash system was completed with a last day of fly ash transport water discharge on 5/4/21. Station 604 is proposed for monitoring the FGD wastewater effluent from the new biological treatment system. Details of the monitoring and limit requirements at this station are proposed below:

- Technology based effluent limits are proposed for total suspended solids, oil and grease, pH, along with the following parameters which apply as soon as possible but not later than December 31, 2025: arsenic, nitrate/nitrite, mercury and selenium.
- Monitoring is proposed for zinc for Outfall 001 flow-weighted calculation.

- Monthly monitoring is proposed for all parameters, except flow rate is to be monitored daily, and pH weekly.
- An interim and final table are proposed that correspond to the 2024 ELG date of “no discharge of pollutants” in FGD wastewaters. The 2020 BAT limitations are proposed at the interim table until December 31, 2029. The 2024 BAT limitations are proposed at the final table to make record of days when FGD wastewaters are discharged and includes a limit of “0” for number of days to discharge.

Internal monitoring station 605 (landfill stormwater)

A benchmark for total suspended solids is proposed with quarterly monitoring.

Stormwater outfalls 011, 012, 025, 026 and 027

Three new stormwater outfalls are being added to the permit, Outfalls 025-027. Monitoring is only proposed at outfalls 011, 025 and 027. New quarterly benchmark monitoring is proposed for pH and total suspended solids.

New Intake stations 800 and 802; and existing 801

New upstream station number 800 is proposed to report monitoring of mercury and zinc at the marina on the Ohio River. New intake station number 802 is proposed for Units 1 & 2 to monitor flow and temperature. Intake station 801 for Unit 3 is proposed to continue, except monitoring of cycles of concentration is proposed to be removed.

Compliance Schedules

Part I, C includes two schedules to meet the applicable final effluent limits mentioned in the above summary for Outfall 019 and Outfall 024. A third schedule is also proposed to comply with the 2020 BAT federal effluent guideline limitations in 40 CFR 423 for FGD wastewaters.

In Part II of the permit, special conditions are included that address the following: operator certification for the sanitary package plants, minimum staffing and operator of record; limits below quantification; downstream public water supply notification; Section 316(b); federal effluent limitation requirements; thermal load calculation; and outfall signage.

The chemical metal cleaning wastewater requirement is proposed to be removed since the permittee no longer intends to discharge from this operation.

Stormwater Requirements

Updates to Parts IV, V and VI to maintain consistency with the renewed Industrial Stormwater Multi-Sector General Permit are proposed. The main changes include the following: benchmark sampling to be taken within the first 8 quarters (2 years); quarterly sample collection during any month of the quarter; and submission of a corrective action report for benchmark exceedances.

Table of Contents

	Page
INTRODUCTION.....	1
SUMMARY OF PERMIT CONDITIONS	2
PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS ..	7
INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS	7
LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION	9
FACILITY DESCRIPTION.....	9
DESCRIPTION OF EXISTING DISCHARGE	10
ASSESSMENT OF IMPACT ON RECEIVING WATERS	11
DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS	12
REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS	16
OTHER REQUIREMENTS.....	25

List of Figures

Figure 1. Location of Cardinal Operating Company.....	28
Figure 2. Site Drainage Map	29
Figure 3. Current Flow Diagram.....	30
Figure 4. Future Flow Diagram.....	31

List of Tables

Table 1. Monitoring Stations, Wastewater Sources, Treatment Processes, Discharge Points, and Flow Rates ..	32
Table 2. Stormwater Outfalls at Cardinal Operating Company	34
Table 3. Average Annual Flow Rates	34
Table 4. Effluent Characterization Based on Form 2C Data.....	35
Table 5. Effluent Characterization Based on Form 2E Data	36
Table 6. Effluent Characterization Based on Form 2F Data	37
Table 7. Effluent Characterization Using Self-Monitoring Data	41
Table 8. Projected Effluent Quality.....	45
Table 9. Water Quality Criteria in the Study Area.....	47
Table 10. Instream Conditions and Discharger Flow.....	49
Table 11. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria.....	54
Table 12. Parameter Assessment.....	57
Table 13. Final Effluent Limits.....	62

List of Attachments

Attachment 1. Applicable Federal Effluent Limitation Guidelines.....	66
Attachment 2. Internal Station 604, TBEL verse WQBEL Comparison	68

Attachment 3. Dilution Factors for Flow-Weighted Calculation 69

Attachment 4. List of Approved Boiler/Cooling Water System Additives 70

Attachment 5. Cooling Water Intake Structure 71

List of Addendums

Addendum 1. Acronyms 92

DRAFT

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 Allison Cycyk 330-963-1132, allison.cycyk@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

Cardinal Operating Company (Cardinal Plant) discharges to the Ohio River at Mile Point 76.6 (Outfall 001), Mile Point 77.0 (Outfall 008), and Mile Point 78.4 (Outfall 023). Cardinal Plant also discharges to Blockhouse Hollow Run at River Mile (RM) 0.82 (Outfall 019), and Riddles Run at RM 0.01 (Outfall 006). Figure 1 shows the approximate location of the facility.

This segment of the Ohio River is described by Ohio EPA River Code: 25-001, County: Jefferson, Ecoregion: Western Allegheny Plateau. The Ohio River is designated for the following uses under Ohio's WQS (OAC 3745-1-32): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Bathing Waters, Public Water Supply.

The segments of the Riddles Run and Blockhouse Hollow Run are described by Ohio EPA River Code 06-087; Hydrologic Unit Code: 05030106-12-02. Blockhouse Hollow Run is designated for the following uses: Limited Resource Water (LRW), IWS, and Secondary Contact Recreation (SCR). Riddles Run has no designated uses. By default, the stream is categorized as general high quality waters and warmwater habitat Ohio River Basin criteria applies.

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 Cardinal Operating Company operates three coal-fired steam electric generating units and has the capacity to produce 1830 megawatts (MW). The units are equipped with electrostatic precipitators for removal of fly ash particulate matter, selective catalytic reductions for control of NOx emissions and flue gas desulfurization (FGD) scrubber systems for removal of SO2. Units 1 & 2 have a capacity of 600 MW each and are once-through cooling water systems. Unit 3 has a capacity of 630 MW and utilizes a cooling tower. Buckeye Power Generating, LLC owns the three units.

The FGD bleed stream is managed through the FGD Wastewater Treatment Plant. Units 1 & 2 are cooled with a once-through cooling water system. Unit 3 utilizes a cooling tower. The residual waste of burning coal produces fly ash and bottom ash. Fly ash is stored in dry fly ash silos, where it is loaded onto trucks for disposal at the on-

site residual solid waste landfill, Fly Ash Reservoir I (FAR I). Fly Ash Reservoir II (FAR II) does not receive any active waste streams and closure activities are ongoing. Bottom Ash is sluiced to the Retrofitted Bottom Ash Pond, where it is excavated and decanted, prior to disposal in the landfill. The bottom ash transport water is re-circulated back to the generating units in a closed loop system. Blowdown from the closed loop system is sent to and reused in the FGD system.

The facility receives coal and limestone from barges on the Ohio River. The byproduct of the FGD air emission control system produces synthetic gypsum. Most of the gypsum is loaded onto barges from conveyor belts for beneficial sales (*i.e.*: wallboard). Coal, gypsum, and limestone are loaded/unloaded to and from the facility by conveyor belt systems.

The process operations at the Cardinal Plant are classified in the Standard Industrial Classification (SIC) category 4911, Electric Services. The process wastewaters generated from these operations are regulated under federal effluent guidelines (ELG) in 40 CFR 423, “Steam Electric Power Generating” Industrial Category. Since the facility was originally commissioned, the federal regulations applicable to the appropriate facility discharges are 40 CFR 423.12, Best Practicable Control Technology Currently Available (BPT), and 40 CFR Part 423.13, Best Available Technology Economically Achievable (BAT). Pursuant to the 2015 ELG rule update, the Cardinal Plant has achieved a zero liquid discharge of fly ash transport water by converting the generating units to dry fly ash handling systems. This project was completed in 2021.

Additionally, the bottom ash pond closure and retrofit project was completed on October 7, 2024. The south pond is now a coal combustion residual bottom ash pond that operates in a closed loop system with blowdown to the FGD system. Notification of zero ash transport water discharge was submitted to Ohio EPA on April 6, 2023. The north pond operates as a low volume waste pond receiving non-coal combustion residual waste streams.

The Cardinal Plant is currently working towards installing new treatment technology for FGD wastewater as required by the October 13, 2020, ELG Reconsideration Rule. Cardinal Plant submitted a Notice of Planned Participation to Ohio EPA stating the intent to close Unit 3 by the end of 2028 and install a supplemental FGD biological wastewater treatment system for Units 1 & 2. The Cardinal Plant is currently working to install the treatment system as soon as possible, but no later than December 31, 2025, as required by the effective rule.

The Cardinal Plant obtains cooling water for all three systems from the Ohio River from three intake structures (one for each unit). The facility obtains well water for potable use.

DESCRIPTION OF EXISTING DISCHARGE

The Cardinal Plant has five (5) main process outfalls and six (6) stormwater outfalls. Table 1 highlights the primary outfalls, internal monitoring stations, wastewater sources, treatment processes, discharge/receiving streams and associated flows at the Cardinal Plant. Stormwater outfalls are presented on Table 2. Figure 3 provides the current flow schematic of the wastewater sources associated with the Cardinal Plant. Figure 4 provides the future flow schematic of the wastewater sources associated with the Cardinal Plant.

Outfall 001 is associated with Units 1 & 2 cooling water, the flue gas desulfurization (FGD) treatment plant and the intakes screen backwash, which all outlet to a “cooling water channel” prior to the Ohio River. The effluent from the FGD wastewater treatment system (internal station 601) is discharged via a diffuser into this channel. The diffuser and FGD treatment system were approved under PTI#557305 on February 20, 2007. The internal diffuser was designed to receive water pumped from the storage tank at a rate of 630 GPM (0.90 MGD) to ensure an even flow pattern and promote mixing within the cooling water channel prior to final outfall 001 discharge to Ohio River.

Outfalls 006 & 008 are the sanitary wastewater treatment plants.

Outfall 019 is the fly ash reservoir (FAR) closure dewatering and FGD landfill leachate (monitored at Internal Station 602).

Outfall 024 is the low volume waste pond. The previous Outfall 023 has been retrofitted to a closed loop system with zero ash transport water discharge as of April 6, 2023. The discharge location from the low volume waste pond has moved slightly and is proposed under this permit to be renumbered as Outfall 024.

Changes at the facility are addressed with new monitoring requirements:

- internal station 603 is used to make record of bottom ash transport waters ELG regulations.
- internal station 604 is proposed to monitor biologically treated FGD wastewater from Units #1 & #2 prior to discharge to the diffuser and cooling channel.
- internal station 605 is proposed to monitor landfill contact stormwater from FAR I runoff pond, upstream of outfall 019.

During the previous permit cycle there were two effluent violations at outfall 019 for mercury, both a load and a concentration violation were reported in 2022. No other violations were reported.

Table 3 presents the flow rates for the permit cycle for each outfall.

Table 4 presents data compiled from the NPDES permit renewal application Form 2C.

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

Table 6 presents data compiled from the NPDES permit renewal application Form 2F.

Table 7 presents a summary of unaltered Discharge Monitoring Reports (DMRs). Data are presented for the period February 2019 through February 2024. Except for Outfalls 019 and 023, where the date range is June 2021 through February 2024 and March 2023 through February 2024, respectively. This is to reflect the time periods of the recent changes to FAR handling and low volume wastewater handling. Current permit limits are presented for comparison.

Table 8 summarizes the chemical specific data for outfalls 001, 006, 008, 019 and 024 by presenting the average and maximum PEQ values.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Cardinal Plant discharges directly to the Ohio River in the Pike Island dam pool. 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/or biological survey results/pool reports.

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

The most recent pool report 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. The entire Ohio River is in partial support for fish consumption due to legacy polychlorinated biphenyl (PCBs) and dioxins contamination but meets the other use designations (i.e. aquatic

life). The determination that the Ohio River is not supportive of fish consumption use means that either 1) fish caught in the Ohio River had tissue samples containing pollutants at levels which present a health risk if consumed in certain amounts or 2) chemistry results from the water exceeded the human health criteria for fish consumption. Cardinal Plant has no known discharges of PCBs or dioxins and therefore is not contributing to the conditions of the Ohio River. In the 2018 Pike Island dam pool survey, overall, the results show on average fish population in ‘Fair’ condition.

Within the discharge segment of the Cardinal Plant, ORSANCO data shows mile points 40.2 to 82.2 not supporting recreational use caused by *E. coli* or fecal coliform bacteria. The Cardinal Plant is not contributing to the recreational impairment because discharges potentially containing *E. coli* are treated by UV disinfection. *E. coli* and fecal coliform permit limits are proposed to continue for the sanitary waste treatment facilities.

The Salt-Run watershed assessment unit, which includes Blockhouse Hollow Run and Riddles Run in the vicinity of the Cardinal Plant, is listed as impaired for aquatic life (warmwater habitat) and recreation (primary contact) on Ohio’s 303(d) list. The identified issues for aquatic life are sedimentation/siltation and total dissolved solids. The identified issues for recreation are *E. coli*.

The most recent data available for Salt Run-Ohio River watershed assessment unit is from 2010. Salt Run-Ohio River is impaired for total dissolved solids and siltation due to the following: surface mining. Salt Run-Ohio River is also impaired for *E. coli* due to the following: failing home sewage treatment system or poor agricultural activities. This indicates that the Cardinal Plant is not contributing to the impairments in Salt Run-Ohio River watershed. As mentioned above, the Cardinal Plant discharges associated with *E. coli* are in compliance with permit limits. No additional limits are recommended for Cardinal Plant.

The full Integrated Report is available through the Ohio EPA, Division of Surface Water website at: <https://epa.ohio.gov/static/Portals/35/tmdl/2022intreport/Full-2022-IR.pdf>

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 Cardinal Plant were 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)	February 2019 through February 2024 <u>except for the following outfalls:</u>
– Outfall 019	June 2021 through February 2024 (Fly ash transport water ceased operations in May 2021)
– Outfall 023/024	March 2023 through February 2024 (Bottom ash transport water ceased discharge in February 2023)
NPDES application Form 2C data	May 2022 to April 2023

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 019 – Total Filterable Residue: 11,400 mg/L (5/2/22); seven times higher than the next highest value
- Outfall 024 – Selenium: 230 ug/L (3/15/23); ten times higher than the next highest 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 8).

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 11)

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. By rule, mixing zones are not authorized for pollutants, such as mercury, which have been designated as bioaccumulative chemicals of concern (BCCs). For BCCs, the WLA is set equal to the respective WQS value.

The methodology employed generally depends on whether the facility is considered a direct discharger to a free-flowing receiving water/stream or non-flowing receiving water/Lake.

For free flowing streams, WLAs for both average and maximum criteria are performed using the following general equation:

$$\text{Discharger WLA} = (\text{Downstream Flow} \times \text{WQS}) - (\text{Upstream Flow} \times \text{Background Concentration}).$$

Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

WLAs for direct discharges to lakes are done using the following equation for average criteria: $WLA = (11 \times \text{Water Quality Criteria}) - (10 \times \text{Background Concentration})$. Allocations for maximum criteria are set equal to the Inside Mixing Zone Maximum (IMZM) values.

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

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Wildlife		Annual 90Q10
Agricultural Water Supply		Harmonic mean flow

Human Health (nondrinking)

Harmonic mean flow

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

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 10 and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

Thermal Wasteload

The NPDES permit for Cardinal Plant contains alternate thermal effluent limits established in accordance with Section 316(a) of the CWA for Units 1 & 2. The alternate limits of a net daily maximum of 6340 million British Thermal Units (mBTU)/Hour were developed as a part of the 316(a) approval given in 1977 by the U.S. EPA. The alternate limits were continued in the permit renewals that occurred prior to this renewal with the last renewal occurring on January 1, 2018. Those renewals were based on the initial 316(a) study and the fact that no harm to aquatic life has been documented due to the thermal discharge from outfall 001 since the discharge began operations. In January 2017, AEP 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. The 2017 demonstration is still applicable to the present day conditions and Cardinal requests the existing 316(a) variance be continued.

Per AEP's 2017 316(a) study, the thermal mixing zone encompasses no more than 40 percent of the Ohio River's 7Q10 flow. The thermal discharge has been evaluated year-round by calculating a wasteload allocation (WLA) for the thermal load using the Ohio River temperature criteria per OAC 3745-1-32, Table 32-3. The following equation was used to calculate the thermal load WLA at outfall 001:

$$\text{MBTU/hr} = \frac{[Q_{\text{up}} \times (\text{WQS } ^\circ\text{F} - \text{background temperature } ^\circ\text{F}) \times \text{conversion factor}]}{24}$$

Where: Q_{up} = Ohio River 7Q10 flow at 40% per 316(a) study (cfs) - Q_{d}

Q_{d} = Unit 1 & 2 intake flow rate (cfs) (i.e., Outfall 001 flow – Internal Station 601)

WQS = Monthly Temperature Standard from OAC 3745-1-32

Background temperature = 75th percentile of daily temperature data represents the maximum. 75th percentile of the monthly average daily temperature data represents the average. Data collected at the ETEM Remediation One LLC, Sammis Plant intake, 01B00010800 from July 2018- July 2023. (This facility is located approximately 23 miles upstream of the Cardinal Plant)

Conversion factor = $8.34 \times (1/1.547)$

Month	Upstream Temp. (°F)		WQS Temp. (°F)		Thermal Load WLA (MBTU/hr)	
	Max	Ave	Max	Ave	Max	Ave
January	40.0	38.8	47.0	47.0	1156.7	1361.2
February	40.0	39.7	46.2	43.9	1024.5	694.0
March	46.0	44.9	56.4	51.2	1718.5	1046.0
April	55.0	52.7	66.3	61.2	1867.2	1407.5
May	64.0	62.8	76.5	71.2	2065.5	1385.0
June*	77.0	74.7	87.0	87.0	1652.4	2035.4
July*	80.3	80.7	89.0	89.0	1445.8	1379.1
August	81.0	79.4	89.0	89.0	1321.9	1587.7
September*	76.0	74.7	87.0	87.0	1817.6	2040.7
October	69.0	66.4	78.3	74.1	1536.7	1267.6
November	53.0	51.8	69.0	65.0	2642.0	2181.4
December	42.0	42.1	60.0	55.8	2972.2	2262.2

* Most conservative value.

Cardinal Power Plant has reasonable potential to exceed temperature standards on the Ohio River, and an alternate under the Section 316(a) limit of 6340 MBTU/Hr is proposed to be continued. The permittee has demonstrated that the alternate thermal load limit will allow a balanced, indigenous community of aquatic life in the Ohio River.

Whole Effluent Toxicity Wasteload Allocation

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent. Numeric WQS for WET are listed in the Ohio WQS [OAC 3745-1-44]. This rule lists numeric values of 0.3 TUa and 1.0 TUc. WLAs are calculated using these criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TUc) and 7Q10 flow for the average and the acute toxicity unit (TUa) and 1Q10 flow for the maximum. WET WLAs are based on meeting the values of 0.3 TUa and 1.0 TUc downstream of the discharge and include any available dilution. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. WLAs for acute toxicity are capped at 1.0 TUa unless the discharger demonstrates that an Area-of-Initial-Mixing (AIM) exists under OAC 3745-1-06, or that one of the factors in OAC 3745-33-07(B)(5)-(9) allows a higher TUa limit to be granted. For the purposes of establishing WET limitations, the values of 1.0 TUa and 1.0 TUc are the most restrictive limitations that can be applied in NPDES permits [OAC 3745-33-07(B)(10)].

For the Cardinal Plant, the WLA values are:

Outfall	TUa	TUc
001	0.3	1.36
019	0.3	Not Applicable - Only acute criteria apply to Limited Resource Waters

The chronic toxicity unit (TUc) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC25):

$$TUc = 100/IC25$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (Ceriodaphnia dubia only):

$TU_c = 100 / \text{geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration}$

The acute toxicity unit (TUa) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC50) for the most sensitive test species:

$$TU_a = 100 / LC_{50}$$

This equation applies outside the mixing zone for all designated waters. Based on the above, a value of 1.0 TUa is the lowest value that can be calculated using the equation. TUa values between 0.2 and 1.0 are based on an interpolation of toxic effects where an LC50 cannot be identified.

When the acute WLA is less than 1.0 TUa, it may be defined as a ratio of the stream dilution to the effluent flow:

Acute Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

$$\text{Acute Dilution Ratio} = \frac{7Q_{10} + [\text{OUTFALL "00Y" flow rate}]}{[\text{OUTFALL "00Y" flow rate}]}$$

$$\text{Outfall 001} = \frac{58.8 \text{ cfs} + 1617 \text{ cfs}}{1617 \text{ cfs}} = 1.04$$

$$\text{Outfall 019} = \frac{0.0965 \text{ cfs} + 9.79 \text{ cfs}}{9.79 \text{ cfs}} = 1.1$$

The acute WLA for the Cardinal Plant at outfalls 001 and 019 can be expressed as 30% in 100% effluent based on 1 to 1 dilution ratio. If the acute dilution ratio is less than 3.3 to 1.0, and there is evidence that effluent values between 0.3 TUa and 1.0 TUa cause or contribute to violations of WQS, the permittee may be required to investigate and remediate toxicity in this range.

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 11. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 8, and the PEL_{max} is compared to the PEQ_{max} . Based on the calculated percentage of the allocated value [$(PEQ_{avg} \div PEL_{avg}) \times 100$, or $(PEQ_{max} \div PEL_{max}) \times 100$], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 12.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 13 presents the final effluent limits and monitoring requirements proposed for the Cardinal Plant outfalls 001, 006, 008, 019 and 024 and internal monitoring stations 601, 602, 603, 604 and 605 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 001

Outfall 001 represents total flow and thermal loads of the non-contact cooling water (NCCW), treated FGD wastewater from the diffuser (internal stations 601 and 604) and screen backwash, that mix within the cooling channel prior to discharging to the Ohio River. Note the screen backwash water is drawn from the condenser NCCW.

pH

The pH data is representative of NCCW only. Limits proposed for pH are based on the WQS in OAC 3745-1-35.

Total Residual Chlorine, Total Residual Oxidants, and Chlorination/Bromination Duration

The total residual chlorine data is representative of NCCW only. Permit limits for total residual chlorine and the duration of chlorine discharges are being continued due to the use in the cooling water processes. The daily maximum chlorine limit is based on Best Technical Judgement (BTJ), which stems from 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 excursions of the IMZM criterion are not acutely toxic to aquatic life within the mixing zone when limited to two hours per day. The 120-minute limit on chlorine duration regulates the exposure time so that acutely toxic conditions are avoided. Details regarding quantification levels for these parameters are in Part II of the permit.

Total residual oxidant monitoring and limits are proposed to be removed as the facility does not use bromine-based additives. Past authorizations that authorized bromine-based additives were issued under Director Final Findings and Orders (DFFOs), journalized in 2002 and 2011, these chemicals are no longer used. If Cardinal Power Plant proposes to use bromine-based additives in the future, then a new approval must be obtained from the director of the Ohio EPA prior to the use of any treatment additives.

Zinc

The Ohio EPA risk assessment (Table 15) places zinc 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 zinc (Table 8) are not representative of its actual levels in a discharge to the Ohio River. The cooling channel is expected to reasonably mix the NCCW with the diffused/treated FGD water prior to entering the Ohio River. Monitoring is proposed to represent all discharges within the cooling channel and be reported as a flow weighted calculation of internal stations 601 and 604 with the intake station. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of the pollutant in the discharge.

Copper

The Ohio EPA risk assessment (Table 15) places copper in group 4. This placement, as well as the data in Table 7 and Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(6), monitoring is proposed to be removed since copper has not been detected since April 2020.

Ammonia (Summer and Winter), Barium, Boron, Fluoride, Iron, Magnesium, Manganese, Nitrate+Nitrite, and Sulfates

The data provided for these parameters is representative of NCCW only. A wasteload allocation using the data presented in Table 4, 7 and 8 would not reflect a direct discharge to the Ohio River. The cooling channel is expected to reasonably mix the NCCW with the diffused/treated FGD water prior to entering the Ohio River. The technology-based standards applied to the FGD discharge (stations 601 & 604) are protective of the water-quality standards for the Ohio River. These parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to be removed for ammonia and barium. No new monitoring is proposed for the other parameters.

Mercury

The mercury data is calculated based on intake samples and internal station 601. The Ohio EPA risk assessment (Table 12) places mercury in group 3. This placement, as well as the data in Tables 4, 7, and 8, 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 mercury is proposed to continue and reported as a flow weighted calculation of internal stations 601 and 604 with the intake station.

Flow and Temperature

Monitoring for flow is proposed as a calculation of the total flow of all outputs to the cooling channel that represent the final outfall. Monitoring of temperature is necessary to verify the thermal loads are protective at the final outfall. Temperature monitoring is proposed as a calculation of the average of each condenser leg maximum hourly output for each day.

Thermal discharge

Based on the updated 316(a) demonstration submitted with the renewal application, the current limit and monitoring requirements 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 006

This outfall represents the sanitary wastewater treatment plant discharge from service buildings (Unit #3) to Riddles Run.

Total suspended solids and 5-day biological oxygen demand

The limits proposed for total suspended solids and 5-day biological oxygen demand are all based on plant design criteria.

E. coli and Fecal Coliform

Limits proposed for *E. coli* are based on WQS (OAC 3745-1-32), and fecal coliform are based on ORSANCO criteria protective of public water supply use.

pH

Limits proposed for pH are based on provisions of OAC 3745-1-35.

Ammonia (summer) and (winter)

The Ohio EPA risk assessment (Table 12) places ammonia (summer) and (winter) in groups 3 and 4. This placement, as well as the data in Table 7 and Table 8, support that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. New quarterly monitoring is proposed.

Copper

The Ohio EPA risk assessment (Table 12) places copper in group 3. This placement, as well as the data in Tables 4, 5, 6, and 7, support that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Limits and monitoring for copper are proposed to be removed.

Flow rate

Monitoring for this parameter is proposed to continue in order to evaluate the performance of the treatment plant.

Outfall 008

This outfall represents the sanitary wastewater treatment plant discharge from FGD and service buildings (Units #1 & 2) to the Ohio River.

Total suspended solids and 5-day biological oxygen demand

The limits proposed for total suspended solids and 5-day biological oxygen demand are all based on plant design criteria.

E. coli and Fecal Coliform

Limits proposed for *E. coli* and fecal coliform are based on WQS (OAC 3745-1-32).

pH

Limits proposed for pH are based on provisions of OAC 3745-1-35.

Ammonia and Copper

The Ohio EPA risk assessment (Table 12) places ammonia and copper in groups 2 and 3. This placement, as well as the data in Tables 4, 5, 6, and 7, 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.

Flow rate

Monitoring for this parameter is proposed to continue in order to evaluate the performance of the treatment plant.

Outfall 019

Fly Ash Reservoir II (FAR II) closure activity discharge (including unmanaged combustion residual leachate, seepage, and legacy wastewaters associated with FAR II), internal stations 602 (landfill leachate) and 605 (landfill contact stormwater).

Oil and Grease, pH and Total Suspended Solids

Federal effluent guideline limitations (ELGs) apply for these parameters are based on available treatment technology. Federal and State laws and regulations require that dischargers meet both the ELGs and any standards need to comply with state WQS. Permit limits are based on the more stringent of the two. All ELGs are listed in Attachment 1.

Best Practicable Control Technology Available (BPT) ELGs (40 CFR 423.12) apply to combustion residual leachate which has been redirected around FAR II to internal station 602. These limits are proposed to be assessed at internal station 602 rather than the final outfall. Federal rules at 40 CFR 125.3(f) prohibit attaining compliance with technology-based standards by dilution. For an interim period, monitoring is proposed for oil and grease, pH and total suspended solids based on BPJ. A total suspended solids benchmark of 100 mg/L is proposed based on BPJ.

When the new 2024 BAT ELGs are applicable on December 31, 2029, the unmanaged combustion residual leachate at outfall 019 will also need to meet technology-based limits. Therefore, on January 1, 2030, the BPT ELGs for total suspended solids, oil and grease and pH are proposed based on BPJ. Limits for pH are based on the more stringent WQS in OAC 3745-1-35.

Arsenic and Mercury

The 2024 Best Available Technology Economically Achievable (BAT) ELGs (40 CFR 423.13) for arsenic and mercury are proposed. The mercury (30-day average) limit is proposed to continue based on the more stringent WQBEL. BAT limits are concentration-based limits and are not required to be expressed with a corresponding mass loading limit per OAC 3745-33-05(C)(3), therefore loading limits are proposed to be removed. Additionally, the discharge fluctuates with discharge volume based on the size of precipitation event. Cardinal Power Plant shall ensure the dilution sources from the contact stormwater pond and capped impoundment area are not used to attain compliance with the technology standards for arsenic and mercury (daily maximum). A compliance schedule is proposed for final limits to be effective as soon as possible but no later than December 31, 2029.

Total Filterable Residue

The Ohio EPA risk assessment (Table 15) places this parameter in group 3. This placement, as well as the data in Table 7 and Table 8, 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 at a quarterly frequency is proposed to document that this parameter continues to remain at low levels.

Ammonia (summer and winter), Barium, Boron, Chlorides, Chromium (Total), Copper, Dissolved Hexavalent Chromium, Fluoride, Molybdenum, Selenium, Sulfates and Zinc

The Ohio EPA risk assessment (Table 15) places these parameters in groups 2 and 3. This placement, as well as the data in Table 7 and Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring and limits are proposed to be removed for ammonia. Monitoring for boron, chlorides, chromium (hexavalent), selenium, sulfates and zinc are proposed to be removed. No new monitoring is proposed for the other parameters.

Alkalinity, Flow Rate, Hardness, Nitrate+Nitrite, Specific Conductance, Total Kjeldahl Nitrogen and Temperature

Monitoring for flow rate is proposed to continue in order to evaluate the performance of the treatment plant. Based on best technical judgment, monitoring is proposed for hardness in order to determine future IMZM criteria for metals. Monitoring is proposed to be removed for all other parameters.

Outfall 024 (formerly Outfall 023)

This outfall consists of the discharge from the low volume wastewater pond that contains flow from coal pile runoff, cooling towers, water supply treatment wastewaters, boiler blowdown and stormwater. The renumbering to outfall 024 is because the discharge type has changed, and the discharge pipe has been relocated just further south along the pond. Bottom ash transport water ceased discharge in February 2023 and the south pond was converted to a closed loop system with restricted blowdown to the scrubber system. Metal cleaning wastes are no longer discharged.

pH

Limits are proposed to continue for pH based on provisions of OAC 3745-1-35.

Oil and Grease, Total Residual Chlorine and Total Suspended Solids

Permit limits for oil and grease, total residual chlorine and total suspended solids are recommended based on the federal effluent limitation guidelines (ELGs) found in 40 CFR Part 423.12 – Best Practicable Control Technology Currently Available (BPT) and 40 CFR Part 423.13 – Best Available Technology Economically Achievable (BAT). ELG limits are shown in Attachment 1. The chlorine limit is proposed to continue based on the more stringent WQS IMZM.

Maximum limits for TSS are based on a flow-weighted concentration that accounts for the coal pile runoff ELG listed in Attachment 1. The flow-weighted data and example calculation can be found in Attachment 3.

Copper

The Ohio EPA risk assessment (Table 12) places copper in group 5, which recommends limits to protect water quality. This placement, as well as the data in Table 7 and Table 8, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, 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). For copper, the proposed limitations are based on the WLA. Monitoring is proposed to continue at the same frequency. A 36-month compliance schedule is proposed for meeting the new final effluent limit.

Mercury

The Ohio EPA risk assessment (Table 12) places mercury in group 4. This placement, as well as the data in Table 7 and Table 8, 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). Monitoring is proposed to continue at the same frequency.

Ammonia and Selenium

The Ohio EPA risk assessment (Table 15) places these parameters in group 3. This placement, as well as the data in Table 7 and Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a reduced frequency is proposed to document that these pollutants continue to remain at low levels.

Arsenic, Barium, Boron, Cadmium, Dissolved Hexavalent Chromium, Fluoride, Iron, Lead, Nitrate+Nitrite and Zinc

The Ohio EPA risk assessment (Table 15) places these parameters in groups 2 and 3. This placement, as well as the data in Table 7 and Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to be removed for arsenic. No new monitoring is proposed.

Flow Rate and Hardness

Monitoring for this parameter is proposed to continue in order to evaluate the performance of the treatment plant. Monitoring for hardness are proposed to evaluate the effluent quality.

Internal Station 601

This station consists of a discharge from the existing FGD non-biological treatment system (Units # 1, 2, & 3). Unit #3 is scheduled for decommission prior to December 29, 2028, and only the portion of flow generated by Unit #3 will remain monitored at internal station 601 once the new biological system comes online. The flow portion associated with Units # 1 & 2 will be processed by the new biological system and monitored by internal station 604 by a date no later than December 31, 2025. The existing 601 discharge and the future 604 are combined and directed to an internal diffuser within the cooling channel to mix with NCCW prior to final discharge at Outfall 001.

Consistent with 40 CFR 122.45(h), technology-based limits from the federal effluent limitation guidelines (ELGs) found in 40 CFR 423, are applied at internal stations 601. ELGs are applied at this station to ensure that these treatment standards are met prior to combining with other waste streams. Federal rules at 40 CFR 125.3(f) prohibit attaining compliance with technology standards by dilution. If monitoring was not done at these locations, it would not be possible to verify compliance with these standards due to dilution.

Oil and Grease and Total Suspended Solids and pH

The ELGs apply to FGD wastewaters (40 CFR 423.12) and are listed in Attachment 1. Limits for oil and grease, pH and total suspended solids are proposed based on the ELG.

Arsenic, Barium, Boron, Cadmium, Chloride, Chromium, Copper, Fluoride, Iron, Lead, Mercury, Nickel, Nitrate Plus Nitrite, Total Kjeldahl Nitrogen, Selenium, Sulfate, Total Filterable Residue and Zinc

Based on best technical judgement, monitoring is proposed to continue for arsenic, mercury, nitrate plus nitrite, selenium and zinc, but be reduced to once per month. The purpose of the monitoring is to ensure these metals remain at low levels and are well mixed within the cooling channel prior to discharging to the Ohio River. All other parameters are proposed to be removed.

Flow Rate and Temperature

Monitoring for flow rate is proposed to continue in order to evaluate the performance of the treatment plant. Temperature is proposed to be removed as the thermal load calculation does not use this value.

Internal Station 602

This station consists of a discharge from Fly Ash Reservoir I (FAR I) landfill leachate. Final discharge is to Outfall 019.

Oil and Grease, Total Suspended Solids and pH

The 2020 BPT ELGs for combustion residual leachate that apply for these parameters are proposed.

Arsenic and Mercury

Monitoring is proposed based on best technical judgement. The new 2024 BAT ELGs for combustion residual leachate are proposed at final outfall 019, which contains all ELG sources, both managed and unmanaged combustion residual leachate. Cardinal Power Plant shall ensure the dilution sources from outfall 019 are not used to attain compliance with the technology standards for arsenic and mercury.

Ammonia, Boron, Selenium and Total Filterable Residue

Monitoring is proposed to continue based on best technical judgement. The purpose of the ammonia monitoring is to ensure it remains at low levels at the final outfall since ammonia indicated reasonable potential at outfall 019. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the effluent.

Fluoride

Monitoring is proposed to be removed based on best technical judgement as this was not a parameter detected at final outfall 019.

Flow Rate

Monitoring for this parameter is proposed to continue to characterize the volume of wastewater attributable to this station.

Internal Station 603

This station is used to make record of bottom ash transport waters ELG regulations. The primary wetted volume shall be tracked in the interim table to December 31, 2029. If Cardinal Power Plant operates past December 31, 2034, then the “no discharge of pollutants” requirement applies as soon as possible, but no later than December 31, 2029, for bottom ash transport waters. A final table is intended for compliance with this 2024 ELG date [40 CFR 423.13(k)(4)(i)] and includes a limit of “0” for number of days to discharge, consistent with “no discharge of pollutants”. A permit modification may be necessary, if certification pursuant to 40 CFR 423.19(h) for permanent cessation of coal is sought. Additional details on ELG date applicability are outlined below under the section Steam-Electric ELG Compliance.

Internal Station 604

This station will consist of the FGD wastewater volume generated from Units #1 & #2 to be treated at a new biological treatment system. The treated water will blend with internal station 601 and discharge to the diffuser which will blend with NCCW in the cooling water channel prior to final outfall 001.

Federal effluent guidelines apply to the discharge at internal station 604. Consistent with 40 CFR 122.45(h), technology-based limits from the federal effluent limitation guidelines (ELGs) found in 40 CFR 423, are applied at internal stations 604. ELGs are applied at this station to ensure that these treatment standards are met prior to combining with other waste streams. Federal rules at 40 CFR 125.3(f) prohibit attaining compliance with technology standards by dilution. If monitoring was not done at these locations, it would not be possible to verify compliance with these standards due to dilution.

Interim

This table is consistent with the BPT and 2020 BAT limitations for FGD wastewaters.

Oil and Grease and Total Suspended Solids and pH

The ELGs apply to FGD wastewater (40 CFR 423.12, BPT) and are listed in Attachment 1. Limits for the above parameters are proposed based on the ELGs.

Arsenic, Mercury, Nitrate/Nitrite, and Selenium

Federal and State laws and regulations require that dischargers meet both the technology based effluent limits (TBELs) and state WQS. Permit limits are based on the more stringent of the two. In order to ensure the TBELs are protective of the Ohio WQS, the WQBEL must also be evaluated. By back calculating the flows from outfall 001, both sets of limits were compared (See Attachment 2.) The TBELs are protective of the WQBELs. Limits for the above parameters are proposed based on the ELGs, which are to be effective as soon as possible but not later than December 31, 2025. The ELGs apply to FGD wastewater (40 CFR 423.13, 2020 BAT) are listed in Attachment 1.

Zinc

Based on best technical judgement, monitoring is proposed for zinc. The purpose of the monitoring is to ensure the metal remain at low levels and are well mixed within the cooling channel prior to discharging to the Ohio River.

Flow Rate

Monitoring for this parameter is proposed to continue in order to evaluate the performance of the treatment plant.

Final

This table is consistent with the 2024 BAT limitations for “no discharge of pollutants” in FGD wastewaters, as soon as possible, but not later than December 31, 2029. If Cardinal Power Plant operates past December 31, 2034, then the “no discharge of pollutants” requirement applies as soon as possible, but no later than December 31, 2029, for FGD wastewater. A final table is intended for compliance with this 2024 ELG date [40 CFR 423.13(g)(4)(i)] and includes a limit of “0” for number of days to discharge, consistent with “no discharge of pollutants”. A permit modification may be necessary, if certification pursuant to 40 CFR 423.19(h) for permanent cessation of coal is sought. Additional details on ELG date applicability are outlined below under the section Steam-Electric ELG Compliance.

Internal Station 605

This station consists of a discharge from Fly Ash Reservoir I (FAR I) landfill contact stormwater. Final discharge is to Outfall 019.

Total Suspended Solids

Monitoring with a benchmark is proposed at the internal station based on best technical judgement.

Flow Rate

Monitoring for this parameter is proposed to continue to characterize the volume of wastewater attributable to this station.

Whole Effluent Toxicity Reasonable Potential

There are no current toxicity tests that have been performed on Cardinal Power Plant discharges. Historical data from the previous permit cycle did not indicate the presence of toxicity associated with the discharge. The existing impairment identified in the Ohio River is due to dioxins, PCBs and *E. coli*. Presently, there is no information to suggest that Cardinal Power Plant is contributing to this impairment. Based on this assessment, Cardinal Power Plant is placed in Category 4 with respect to WET and toxicity monitoring is not necessary at this time. The chemical specific effluent limitations proposed in the permit should provide protection against any adverse effluent toxicity.

Additional Monitoring Requirements

Intake monitoring at station 801 is proposed to continue for flow rate. New upstream station 800 is proposed to report monitoring of mercury and zinc at the marina on the Ohio River. New intake station number 802 is proposed for Units 1 & 2 to monitor flow and temperature.

Monitoring of mercury at the scrubber purge stream WWTP (internal station 600) is proposed to be removed. Cardinal can continue to monitor internal sources for mercury for process control as necessary.

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(s) – A schedule to meet final effluent limits at Outfall 019 is proposed as soon as possible but no later than December 31, 2029 (consistent with 40 CFR 423). A schedule to meet final effluent limits at Outfall 024 is proposed as soon as possible but no later than December 31, 2029. Details are in Part I, C of the permit.

Flue Gas Desulfurization (FGD) wastewater treatment system construction – This is a construction schedule to achieve the final effluent limitations pursuant to 40 CFR 423.13(g)(1)(i) as soon as possible but not later than December 31, 2025.

Operator Certification and Operator of Record

Operator certification requirements have been included in Part II of the permit in accordance with rules adopted on August 15, 2018 (OAC 3745-7). These rules require the Cardinal Plant to have a Class A wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfalls 006 and 008. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Sufficiently Sensitive Method

Part II of the permit includes a condition requiring the Cardinal Plant to use laboratory analytical methods with a sufficiently sensitive MDL.

Method Detection Limit Reporting

When submitting monitoring results in eDMR, the permittee must report all detected concentration values above the method detection limit (MDL), even if that value is below the quantification level, as indicated in Permit Guidance 9: Limits below Quantification. A detection above the MDL indicates the presence of a pollutant with strong confidence, which must be considered in reasonable potential analyses. Per OAC 3745-33-07(C)(2)(c), for the purpose of assessing compliance, any value reported below the quantification level shall be considered in compliance with an effluent limit.

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 can be found in Attachment 5.

Ohio EPA has evaluated this information and at this time has determined that the CWIS represents BTA in accordance with Section 316(b) of the CWA.

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 became effective on July 8, 2024, published in the Federal Register on May 9, 2024. The rule revision requires implementation of a “no discharge of pollutants” requirement, as soon as possible beginning July 8, 2024, but no later than December 31, 2029 for the following: FGD wastewater, bottom ash (BA) transport water, and combustion residual leachate (CRL) which includes new defined subcategories for unmanaged CRL and legacy wastewaters.

U.S. EPA retained the 2020 FGD wastewater and BA transport water guidelines and affirms that the technologies on which they are based are available and achievable, as an interim step toward meeting the “no discharge of pollutants” requirement in this rule. The less stringent FGD wastewater and BA transport water guidelines are based on a certification that qualifies a subcategory based on permanent cessation of coal combustion. The 2020 reconsideration rule is to be implemented as soon as possible beginning October 13, 2021, but no later than December 31, 2025.

The 2020 BAT guidelines that apply to Cardinal Power Plant include:

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

If Cardinal Power Plant operates past December 31, 2034, then the “no discharge of pollutants” requirement applies as soon as possible, but no later than December 31, 2029, for FGD wastewater, BA transport water, and CRL.

If Cardinal Power Plant seeks to qualify electrical generating units #1 & #2 that will achieve permanent cessation of coal combustion, then the rule includes a certification under 40 CFR 423.19(h), no later than December 31, 2028, or December 31, 2034. Under the 40 CFR 423.19(h) certification, the following 2024 BAT limitations apply to each waste stream and extended compliance dates:

- A "no discharge of pollutants" requirement for FGD wastewater and BA transport after April 30, 2035.
- Arsenic and mercury limitations based on chemical precipitation treatment for CRL as soon as possible beginning 120 days after permanently ceasing coal combustion, but no later than April 30, 2035.
- Arsenic and mercury limitations based on chemical precipitation treatment for unmanaged CRL, no later than December 31, 2029.
- BPJ limits apply for CRL and unmanaged CRL until permanent cessation of coal combustion.
- Legacy wastewater related to FAR II closure is subject to BPJ limitations.

These limitations would apply if cessation occurred by the date provided. If Cardinal Power Plant fails to cease combustion of coal by December 31, 2034, for any reason other than those specified in 40 CFR 423.18, then the "no discharge of pollutants" requirement would automatically apply.

On October 13, 2021, Cardinal Power Plant submitted a Notice of Planned Participation (NOPP) (revised October 4, 2022), indicating Unit #3 will retire by December 31, 2028.

On October 13, 2023, Cardinal Power Plant submitted certification of zero-discharge fly ash transport water pursuant to 40 CFR 423.13(h) and of the 2020 BAT bottom ash transport water ($\leq 10\%$ primary wetted volume) pursuant to 40 CFR 423.13(k)(2).

Part II of the permit renewal requires annual status reports related to the requirements under the 40 CFR 423 supplemental rule effective on July 8, 2024. This includes the regulation applicability deadlines for each waste stream type if the permittee decides to cease coal combustion prior to December 31, 2034 and submit the Notice of Planned Participation, or if the permittee decides to continue operating past December 31, 2034. ELG compliance dates extend beyond the expiration date of the permit. A permit modification may be necessary, if regulations are met sooner.

Outfall Signage

Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the Blockhouse Hollow Run, Riddles Run, and 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 Wheeling Water Treatment Plant operates a public water supply intake ten miles downstream from the Cardinal 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 Cardinal 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 Cardinal 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.

Stormwater monitoring is proposed at Outfalls 011, 025 and 027 based on best technical judgement of assessment of Form 2F data and WQS IMZMs. Benchmark values for pH and total suspended solids. There are no applicable benchmarks for Outfall 014 as the drainage areas consists of the sewage treatment plants.

See Part V for more details.

LEGEND

- APPROXIMATE PLANT BOUNDARY
- DRINKING WATER WELL
- INTAKE UNIT
- OUTFALL

SCALE

0 1,500 3,000
FEET
1:36,000 1" = 3,000'

PROJECT: CARDINAL OPERATING COMPANY
306 COUNTY ROAD 7E
BRILLIANT, OHIO, 43913

TITLE: SITE LOCATION MAP

DRAWN BY: A. ADAIR **PROJ. NO.:** 524031

CHECKED BY: S. PAWLUKIEWICZ

APPROVED BY: S. PAWLUKIEWICZ **FIGURE: FORM 1, PART XI**

DATE: JUNE 2023

TRC 1382 WEST NINTH STREET SUITE 400
CLEVELAND OH, 44113
PHONE: 216 344 3072

FILE: CARDINAL

BASE MAP: USGS 24K TOPOGRAPHIC MAP SERVICE (THE NATIONAL MAP)
DATA SOURCES: USGS, ESRI

Figure 2. Site Drainage Map

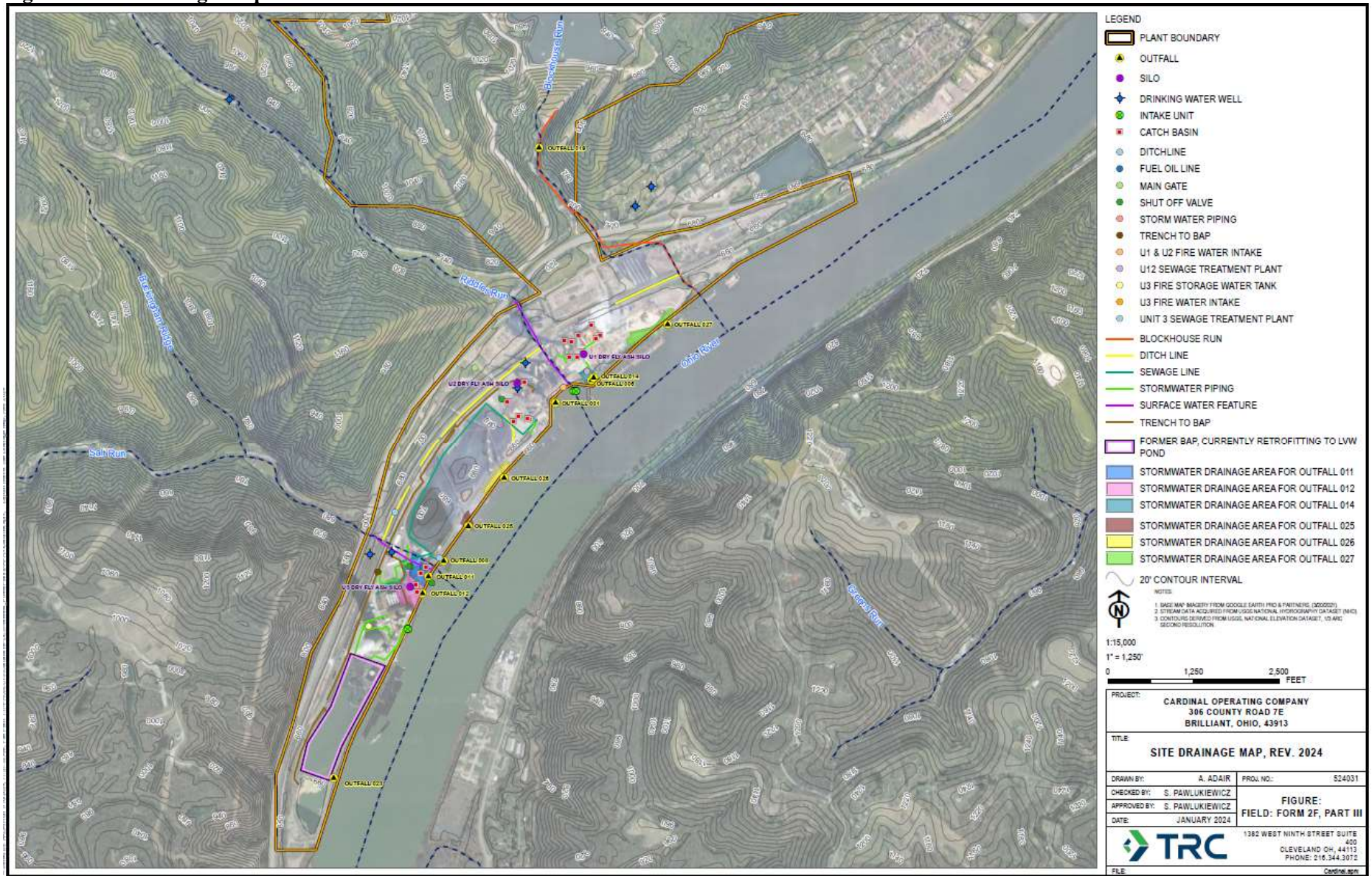


Figure 2: Water Balance Diagram

The diagram illustrates the water balance for the Cardinal Operating Company's Units 1, 2, and 3. It shows the flow of water in millions of gallons per day (MGD) through various processes, including intake, desulfurization, ash handling, cooling, and wastewater treatment. The diagram includes numerous flow lines with numerical values and labels for different units and equipment.

Legend:

- Changes from Previous VB
- New Equipment
- Repurposed Equipment

Table 1: Average Flow (MGD)

Outlet	Location	Average Flow (MGD)
001	Ohio River	9.02
002	Ohio River	1,144.95
006	Riddies Run	8.02
016	Stockhouse Hollow	5.99
023	Ohio River	10.18
001	Internal (Units 1 & 2 Condensers)	1,144.95
001	Internal (Units FGD Water Treatment)	8.78
002	Internal (FGW Leachate)	9.12

Table 2: Drawing Release Record

Rev	Date	By	Chk	App	Purpose
0	1/29/2024	BB	MNH	DW	Initial Issue
1	2/28/2024	BB	MNH	DW	For Use

Cardinal Operating Company

Project No: 13778-015 (FAR 0 & 13778-015 (ELG))
 Project Title: FAR I Closure & WWTP Upgrade
 Drawing Title: Current Permitted Water Balance
 Document No: MSK-CAP-WB-001P

Notes:

- All flows measured in Million Gallons per Day
- Average Flow - MGPD
(Maximum Flow - MGD)
- Max. Flows and Runoff based on 15-year/24-hr Storm
- FGD Leachate Max. Flow based on 25-year/24-hr Storm
- Includes water redirected from Outfalls 016, 017 and parts of 011, 012 and 013.
- Includes water redirected from Outfall 010
- Excess water to cooling tower.
- Water balance diagram is developed based on Cardinal Operating Company's Fact Sheet for NPDES Permit Renewed 2016, Fig. 2 Water Balance Diagram.
- Ash conditioning water usage at maximum and average cases assume 20% and 15% final fly ash moisture, respectively. Unit 1, 2 & 3 fly ash make rate based on Cardinal Design Basis.
- Material removed from generating units (ash & FGD) as part of outages/maintenance may be dewatered on the South Pond Decant Island - closed loop system, prior to disposal in landfill.
- 10% rating 30-day average of the Primary Wetted Volume calculation
(40 CFR 423.10(c)) equals 65,735 Gallons Per Day
- The design basis for the Blowdown is 0.83 MGPD

Outfall	Location	Average Flow (MGD)
008	Ohio River	0.02
001	Ohio River	1,144.95
002	Ohio River	1,144.95
006	Riddies Run	0.02
019	Blockhouse Hollow	5.90
023	Ohio River	10.18
001	Internal (Units 1 & 2 Condensates)	1,144.95
001	Internal (Units FGD Water Treatment)	0.78
002	Internal (RSW Leachate)	0.12

Legend

- Changes from Previous WS
- New Equipment
- Repurposed Equipment

Drawing Release Record

Rev	Date	By	Chk	App	Purpose
0	1/25/2024	BG	MKH	DW	Initial Issue
1	2/26/2024	BG	MKH	DW	For Use

Owner: **CARDINAL OPERATING COMPANY**

Project No: 13770-015 (FAR I & 13770-016 (ELG))

Project Title: FAR I Closure & WWTP Upgrade

Drawing Title: Future Permitted Water Balance

Document No: MSK-CAR-WB-015

Table 1. Monitoring Stations, Wastewater Sources, Treatment Processes, Discharge Points, and Flow Rates

Station #	Wastewater Source	Treatment Utilized	Discharge/ Receiving Stream	Average Flow Rate (MGD)
001	Units 1 & 2 condensers, Intake 1 & 2 Screen backwash	Reuse/Recycle. Screening, Chlorination	Ohio River	1145
006	Sanitary Waste (Service buildings include Unit 3)	Activated sludge, Settling, Surface Sand Filters and Ultraviolet Disinfection	Riddles Run	0.01*
008	Sanitary Waste (Service buildings include Units 1, 2 and FGD)	Activated sludge, Settling, Surface Sand Filters and Ultraviolet Disinfection	Ohio River	0.015*
019	Station 602 & 605, Fly Ash Reservoir (FAR) II dewatering and seepage, stormwater runoff from capped impoundments	Settling and Neutralization	Blockhouse Hollow Run	5.99
024	Low volume wastewater pond (boiler blowdown, cooling tower blowdown, cooling tower basin overflow, stormwater, water supply treatment wastewaters and coal pile runoff)	Reuse/Recycle. Sedimentation, Chemical Oxidation, Chemical Precipitation, Neutralization	Ohio River	9.09**
601	<u>Current:</u> FGD non-biological wastewater treatment, includes blowdown from bottom ash recycle. <i>(Prior to Unit #3 closure)</i> <u>Future:</u> FGD non-biological wastewater treatment (portion of flow generated by Unit #3)	Equalization, Neutralization, Clarification (Primary and Secondary) and Diffuser	Cooling Channel to Outfall 001	<u>Current:</u> 0.78 <u>Future:</u> 0.15

Station #	Wastewater Source	Treatment Utilized	Discharge/ Receiving Stream	Average Flow Rate (MGD)
602	<u>Current:</u> Fly Ash Reservoir (FAR) I runoff and subsurface drainage and FGD landfill leachate <u>Future:</u> FAR I subsurface drainage and FGD landfill leachate	Current: None Future: Landfill leachate treatment system (TBD)	Outfall 019	0.1
603	Bottom Ash Transport Water		Directed to scrubber system where later purged to treatment associated with Outfall 601/604	≤ 10% primary wetted volume
604	Portion of FGD purge wastewaters associated with Units #1 & 2 (<i>PROPOSED</i>)	Biological treatment system and Diffuser	Cooling Channel to Outfall 001	0.63
605	Landfill contact stormwater	Contact Stormwater Runoff Pond and Lift Station	Outfall 019	0.03
801	Intake associated with Unit 3 CWIS	Screening		
802	Intake associated with Units 1 and 2 CWIS	Screening		

* Plant Design

**95th percentile of the monthly averages from March 2023 through February 2024

Table 2. Stormwater Outfalls at Cardinal Operating Company

Outfall #	Represented by	Representative Sampling Basis	Receiving Stream
011 ^a		Northeast of Unit #3 plant building	Ohio River
012	011	Northeast of Unit #3 plant building	Ohio River
014		Adjacent to Units #1 & 2 sewage treatment plant areas	Riddles Run
025 ^a		Coal unloaders and conveyor belt from river barge	Ohio River
026	025	Coal unloaders and conveyor belt from river barge	Ohio River
027		Gypsum conveyor load out system and limestone unloader system	Ohio River

^a = representative sampling outfall per Part V of the permit.

Table 3. Average Annual Flow Rates

Outfall	Flow Rate (Million Gallons per Day)					
	Year	# obs	Average	Median	95th Percentile	Maximum
001	2019	334	965.93	1045	1045	1045
001	2020	366	883.07	1045	1045	1045
001	2021	365	840.44	1045	1045	1045
001	2022	365	937.74	1045	1045	1045
001	2023	365	922.81	1045	1046	1046
001	2024	31	1045	1045	1045	1045
019	2019	334	9.50	9.55	12.98	17.57
019	2020	366	11.15	11.2	14.11	24.46
019	2021	365	7.34	8.04	15.34	27.31
019	2022	365	3.15	2.74	7.1	14.74
019	2023	357	2.09	1.7	4.84	9.11
019	2024	31	1.70	1.13	3.71	4.83
023	2020	1	0.16	0.158	0.158	0.158
023	2021	245	5.46	6.47	11.02	15.53
023	2022	365	8.50	8.32	15.20	20.90
023	2023	365	6.65	6.01	11.46	19.87

Time period of review is from February 2019 to February 2024.

Table 4. Effluent Characterization Based on Form 2C Data

Parameter	Units	Concentration	
Outfall 001 ^a		<i>Effluent</i>	<i>Intake</i>
Boron	µg/L	130	34
Fluoride	mg/L	0.199	0.105
Iron	µg/L	510	260
Magnesium	mg/L	9.78	8.37
Manganese ^b	µg/L	94	100
Nitrate + Nitrite	mg/L	0.76	0.56
Sulfates	mg/L	63	56
Outfall 019			
Barium	µg/L	25	
Chromium	µg/L	AA (20)	
Fluoride	mg/L	0.625	
Magnesium	mg/L	75.6	
Manganese	µg/L	110	
Molybdenum	µg/L	230	
Outfall 023			
Barium	µg/L	51	
Iron	µg/L	1900	
Lead	µg/L	4	
Magnesium	mg/L	12.8	
Manganese	µg/L	120	
Nitrate + Nitrite	mg/L	1.08	
Sulfate	mg/L	110	

^a Outfall 001 data represents NCCW only.

^b Result excluded due to presence of pollutant in the intake. Form 2C intake data exceeds or is within 10% of the effluent result.

One test result was provided for the above parameters.

AA = non-detection; analytical method detection limit in parentheses

Table 5. Effluent Characterization Based on Form 2E Data

Parameter	Units	Maximum Concentration	Number of Observations
Outfall 006			
Ammonia (summer)	mg/L	0.98	3
Ammonia (winter)	mg/L	1.6	1
Chemical Oxygen Demand	mg/L	27	1
Hardness	mg/L	730*	3
Total Organic Carbon (TOC)	mg/L	5.6	1
Outfall 008			
Ammonia	mg/L	0.1	1
Chemical Oxygen Demand	mg/L	17	1
Hardness	mg/L	657*	3
Total Organic Carbon (TOC)	mg/L	3.6	1

*Represents the average of the three observations.

- Additional data for ammonia (summer) and hardness were provided on 10/17/2023 to support the application. Sample dates include 9/20/23, 9/27/23, and 10/4/23.
- All other Form 2E data was sampled between May 2022 and April 2023.

Table 6. Effluent Characterization Based on Form 2F Data

Parameter	Units	Concentration
		Grab Sample
Outfall 011		
Ammonia	mg/L	1.44
Arsenic	µg/L	13
Barium	µg/L	69
Boron	µg/L	54
Cadmium	µg/L	AA (1.0)
Chloride, Total	mg/L	93
Chromium	µg/L	AA (20)
Cobalt	µg/L	AA (20)
Copper	µg/L	AA (20)
Iron	µg/L	8300
Lead	µg/L	20
Mercury	ng/L	137
Nickel	µg/L	AA (20)
Nitrogen, Total	mg/L	13.4
Nitrate Plus Nitrite	mg/L	1.23
Oil and Grease	mg/L	AA (5.2)
pH	S.U.	9.87
Total Filterable Residue	mg/L	240
Total Suspended Solids	mg/L	380
Selenium	µg/L	AA (10)
Sulfate	mg/L	76
Zinc	µg/L	200
Outfall 012		
Ammonia	mg/L	7.95
Arsenic	µg/L	29
Barium	µg/L	98
Boron	µg/L	270
Cadmium	µg/L	AA (1.0)
Chloride, Total	mg/L	41
Chromium	µg/L	AA (20)
Cobalt	µg/L	AA (20)
Copper	µg/L	20
Iron	µg/L	13000
Lead	µg/L	24

Parameter	Units	Concentration
		Grab Sample
Mercury	ng/L	47.9
Nickel	µg/L	AA (20)
Nitrogen, Total	mg/L	37.4
Nitrate Plus Nitrite	mg/L	1.09
Oil and Grease	mg/L	AA (5.1)
pH	S.U.	9.21
Total Filterable Residue	mg/L	228
Total Suspended Solids	mg/L	530
Selenium	µg/L	AA (10)
Sulfate	mg/L	62
Zinc	µg/L	320
Outfall 025		
Ammonia	mg/L	0.10
Arsenic	µg/L	7.8
Barium	µg/L	47
Boron	µg/L	59
Cadmium	µg/L	1.1
Chloride	mg/L	43
Chromium	µg/L	AA (20)
Cobalt	µg/L	AA (20)
Copper	µg/L	AA (20)
Iron	µg/L	6900
Lead	µg/L	16
Mercury	ng/L	52.5
Nickel	µg/L	AA (20)
Nitrate Plus Nitrite	mg/L	AA (0.50)
Nitrogen, Total	mg/L	6.44
Oil and Grease	mg/L	AA (5.0)
Total Filterable Residue	mg/L	408
Total Kjeldahl Nitrogen	mg/L	6.36
Total Suspended Solids	mg/L	590
Selenium	µg/L	AA (10)
Sulfate	mg/L	180
Zinc	µg/L	160

Parameter	Units	Concentration
		Grab Sample
Outfall 026		
Ammonia	mg/L	0.07
Arsenic	µg/L	AA (6.0)
Barium	µg/L	28
Boron	µg/L	32
Cadmium	µg/L	AA (1.0)
Chloride	mg/L	27
Chromium	µg/L	AA (20)
Cobalt	µg/L	AA (20)
Copper	µg/L	AA (20)
Iron	µg/L	2800
Lead	µg/L	8.0
Mercury	ng/L	44.8
Nickel	µg/L	AA (20)
Nitrate Plus Nitrite	mg/L	AA (0.50)
Nitrogen, Total	mg/L	7.45
Oil and Grease	mg/L	<5.0
Total Filterable Residue	mg/L	114
Total Kjeldahl Nitrogen	mg/L	7.24
Total Suspended Solids	mg/L	300
Selenium	µg/L	AA (10)
Sulfate	mg/L	33
Zinc	µg/L	100
Outfall 027		
Ammonia	mg/L	0.16
Arsenic	µg/L	6.8
Barium	µg/L	42
Boron	µg/L	67
Cadmium	µg/L	AA (1.0)
Chloride	mg/L	83
Chromium	µg/L	AA (20)
Cobalt	µg/L	AA (20)
Copper	µg/L	AA (20)
Fluoride	mg/L	0.409
Hardness	mg/L	890
Iron	µg/L	4500

Parameter	Units	Concentration
		Grab Sample
Lead	µg/L	10
Mercury	ng/L	256
Nickel	µg/L	AA (20)
Nitrate Plus Nitrite	mg/L	0.53
Nitrogen, Total	mg/L	1.38
Oil and Grease	mg/L	AA (5.6)
Total Filterable Residue	mg/L	1210
Total Kjeldahl Nitrogen	mg/L	0.85
Total Suspended Solids	mg/L	240
Selenium	µg/L	AA (10)
Sulfate	mg/L	680
Zinc	µg/L	140

AA = non-detection; analytical method detection limit in parentheses

Table 7. 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		1826	71.9	101	41.3 - 105
	Thermal Discharge	Million BTU/Hr	6340	6340	1826	4820	5870	0 - 6310
	pH	S.U.	6.5 - 9.0		241	7.7	8.47	6.5 - 8.9
	Nitrogen, Ammonia	mg/L	Monitoring Only		20	.135	148	0 - 183
	Barium	µg/L	Monitoring Only		20	41.4	87.3	36 - 130
	Zinc	µg/L	Monitoring Only		20	18.5	193	0 - 254
	Copper	µg/L	Monitoring Only		61	< 10	7.42	0 - 17.1
	Flow Rate	MGD	Monitoring Only		1826	1050	1050	261 - 1050
	Chlorine, Total Residual	mg/L	--	0.20	1421	0	0	0 - .18
	Mercury, Total	ng/L	Monitoring Only		61	1.37	6.54	0 - 8.19
	Chlorination/Bromination Duration	Minutes	--	120	1739	120	120	0 - 120
006	Flow Rate	GPD	Monitoring Only		1826	4930	9650	0 - 17300
	pH	S.U.	6.5 - 9.0		60	7.67	8.2	6.8 - 8.35
	Total Suspended Solids	kg/day	0.48	0.73	60	< .00919	.0357	0 - .0527
	Total Suspended Solids	mg/L	12	18	60	< 4	1.61	0 - 2.4
	Copper	kg/day	--	0.0019	60	.00021	.000415	0 - .000849
	Copper	µg/L	--	47	60	12	20.1	0 - 28
	Fecal Coliform	#/100 mL	1000	2000	30	< 2	80.8	0 - 182
	E. coli	#/100 mL	126	240 ^w	31	< 1	< 1	0 - 42
	CBOD 5 day	kg/day	0.40	0.60	61	< .0172	.0334	0 - .139
	CBOD 5 day	mg/L	10	15	61	< 2	1.53	0 - 2.3
008	Flow Rate	GPD	Monitoring Only		1826	3510	8190	24 - 26100
	pH	S.U.	6.5 - 9.0		61	7.51	8.1	6.86 - 8.33
	Total Suspended Solids	kg/day	0.72	1.08	61	< .00181	.0254	0 - .107
	Total Suspended Solids	mg/L	12	18	61	< 4	3	0 - 11
	Copper	µg/L	Monitoring Only		60	19.7	36.8	0 - 62
	Fecal Coliform	#/100 mL	1000	2000	30	--	--	< 1
	E. coli	#/100 mL	126	240 ^w	30	--	--	< 1
	CBOD 5 day	kg/day	0.60	0.90	60	< .0312	.0228	0 - .0779
	CBOD 5 day	mg/L	10	15	60	< 2	1.48	0 - 2.9
019	Water Temperature	°F	Monitoring Only		264	57.2	75.2	33.8 - 81.5

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
	Specific Conductance at 25 Degrees C	Umho/cm	Monitoring Only		33	1610	2100	973 - 2190
	pH	S.U.	6.5 - 9.0		135	8.10	8.40	7.20 - 8.90
	Alkalinity, Total (CaCO3)	mg/L	Monitoring Only		33	140	160	62.0 - 160
	Total Suspended Solids	kg/day	1490	4838	263	32.0	147	0 - 418
	Total Suspended Solids	mg/L	30	97.4	264	3.50	11.0	0 - 34.5
	Oil and Grease	kg/day	745	993	33	--	--	< 16.9
	Oil and Grease	mg/L	15	20	33	--	--	< 5.00
	Nitrogen, Ammonia - June - Oct.	kg/day	--	184	119	0.591	6.06	0 - 13.0
	Nitrogen, Ammonia - June - Oct.	mg/L	--	3.7	120	0.100	0.300	0 - 0.490
	Nitrogen, Ammonia - Nov - May	kg/day	--	179	72	0.867	2.90	0 - 4.86
	Nitrogen, Ammonia - Nov - May	mg/L	--	3.6	72	0.100	0.200	0 - 0.400
	Nitrogen Kjeldahl, Total	mg/L	Monitoring Only		6	< 0.500	5.99	0 - 7.72
	Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		6	0.565	0.988	0 - 1.08
	Chloride, Total	mg/L	Monitoring Only		33	43.0	61.6	19.0 - 90.0
	Sulfate, (SO4)	mg/L	Monitoring Only		33	770	888	340 - 920
	Arsenic	µg/L	Monitoring Only		66	37.5	60.8	0 - 69.0
	Selenium	µg/L	Monitoring Only		66	11.0	23.5	0 - 35.0
	Boron	µg/L	Monitoring Only		66	3900	6750	880 - 11000
	Chromium, Hexavalent - 2021-2023	kg/day	--	0.79	51	< 0.0369	< 0.0369	0 - 0.0420
	Chromium, Hexavalent - 2023-2024	µg/L	--	16	51	< 4.00	< 4.00	0 - 4.70
	Chromium, Hexavalent	µg/L	Monitoring Only		16	--	--	< 4.00
	Zinc	µg/L	Monitoring Only		38	< 20.0	4.05	0 - 60.0
	Copper	µg/L	Monitoring Only		6	--	--	< 20.0
	Flow Rate	MGD	Monitoring Only		996	2.03	10.1	0.530 - 19.3
	Mercury, Total	kg/day	0.00060	0.084	11	0.0000131	0.000520	0.00000298 - 0.000920
	Mercury, Total	ng/L	12	1700	11	1.65	17.9	0.560 - 24.0
	Residue, Total Filterable	mg/L	Monitoring Only		33	1320	1590	568 - 11400

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
023	pH	S.U.	6.5 - 9.0		12	7.65	8.25	6.70 - 8.30
	Total Suspended Solids	mg/L	30	98.9	12	6.50	18.7	1.50 - 19.0
	Oil and Grease	mg/L	15	20	12	--	--	< 5.00
	Nitrogen, Ammonia	mg/L	Monitoring Only		12	0.575	6.44	0.150 - 9.18
	Fluoride, Total (F)	mg/L	Monitoring Only		12	0.270	0.414	0.150 - 0.480
	Arsenic	µg/L	Monitoring Only		12	--	--	< 6.00
	Selenium	µg/L	Monitoring Only		12	< 10.0	112	0 - 230
	Boron	µg/L	Monitoring Only		12	170	506	78.0 - 550
	Chromium, Hexavalent	µg/L	Monitoring Only		12	--	--	< 4.00
	Zinc	µg/L	Monitoring Only		12	5.50	58.0	0 - 58.0
	Cadmium	µg/L	Monitoring Only		12	< 1.00	1.31	0 - 2.90
	Copper	µg/L	Monitoring Only		12	34.0	61.9	0 - 69.0
	Flow Rate	MGD	Monitoring Only		366	6.01	11.1	0 - 19.9
	Chlorine, Total Residual	mg/L	--	0.038	12	--	--	0 - 0
	Mercury, Total	ng/L	Monitoring Only		12	3.59	5.70	1.17 - 5.87
588	Sludge Volume, Gallons	Gals	Monitoring Only		5	30600	42300	20.4 - 43400
600	Mercury, Total	ng/L	Monitoring Only		60	185000	364000	1570 - 722000
601	Water Temperature	°F	Monitoring Only		240	78.7	95.8	15.7 - 100
	Specific Conductance at 25 Degrees C	Umho/cm	Monitoring Only		65	13900	19800	0 - 22200
	pH - 2020-2024	S.U.	6.0 - 9.0		160	8.1	8.57	7.4 - 8.7
	pH - 2019-2020	S.U.	6.5 - 9.0		80	8.58	8.85	7.71 - 8.97
	Alkalinity, Total (CaCO3)	mg/L	Monitoring Only		68	389	650	160 - 856
	Total Suspended Solids	kg/day	80	265	245	14.6	67.2	0 - 161
	Total Suspended Solids	mg/L	30	100	245	8	26.4	.05 - 51
	Nitrogen Kjeldahl, Total	mg/L	Monitoring Only		10	6.6	20.9	3.07 - 30.4
	Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		11	5.13	14.6	1.11 - 18.5
	Chloride, Total	mg/L	Monitoring Only		120	3200	5300	110 - 5900
	Sulfate, (SO4)	mg/L	Monitoring Only		120	3700	6110	91 - 13500
	Fluoride, Total (F)	mg/L	Monitoring Only		121	37.3	61.5	3.2 - 98.2
	Arsenic- 2019-2020	µg/L	8	11	40	6.56	19.6	0 - 73
	Arsenic- 2020-2024	µg/L	Monitoring Only		80	< 6	22.5	0 - 54

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
	Iron	µg/L	Monitoring Only		120	420	1810	0 - 14000
	Selenium	µg/L	Monitoring Only		121	210	510	0 - 644
	Boron	µg/L	Monitoring Only		121	180000	320000	0 - 650000
	Barium	µg/L	Monitoring Only		120	57.5	88.3	26 - 594
	Nickel	µg/L	Monitoring Only		120	24	222	0 - 390
	Zinc	µg/L	Monitoring Only		120	< 20	34	0 - 160
	Cadmium	µg/L	Monitoring Only		81	< 1	7	0 - 15
	Lead	µg/L	Monitoring Only		81	< 4	21	0 - 44
	Chromium	µg/L	Monitoring Only		120	< 20	14.1	0 - 26
	Copper	µg/L	Monitoring Only		87	< 20	11.5	0 - 24
	Flow Rate	MGD	Monitoring Only		1826	.608	.925	0 - 1.01
	Mercury, Total	ng/L	Monitoring Only		61	128	745	1.2 - 1110
	Residue, Total Filterable	mg/L	Monitoring Only		84	10900	16500	2580 - 19400
602	pH	S.U.	Monitoring Only		65	7.97	8.4	7.1 - 8.5
	Fluoride, Total (F)	mg/L	Monitoring Only		20	3.37	4.46	1.87 - 4.58
	Selenium	µg/L	Monitoring Only		20	74.6	121	0 - 130
	Boron	µg/L	Monitoring Only		20	10300	22100	110 - 23000
	Flow Rate	MGD	Monitoring Only		269	.094	.315	.005 - 60
	Mercury, Total	ng/L	Monitoring Only		20	3.9	151	0 - 468
	Residue, Total Filterable	mg/L	Monitoring Only		20	2910	3420	1170 - 3760
603	Number of Events	No./Month	Monitoring Only		1218	1	1	0 - 1
	Overflow Occurrence	No./Month	Monitoring Only		608	1	1	1 - 1
604	Number of Events	No./Month	Monitoring Only		1218	0	1	0 - 1
	Overflow Occurrence	No./Month	Monitoring Only		608	1	1	1 - 1
801	Flow Rate	MGD	Monitoring Only		1826	9	9	0 - 9
	Mercury, Total	ng/L	Monitoring Only		60	1.38	6.55	0 - 8.2
	Cycles of Concentration	Cycles	Monitoring Only		1624	1.69	2.15	0 - 3.15

Data Range from February 2019 through February 2024. Except for Outfalls 019 and 023, where the date range is June 2021 through February 2024 and March 2023 through February 2024, respectively.

^w = weekly average

Table 8. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Outfall 001*					
Ammonia (Summer)	mg/L	10	8	0.36	0.64
Ammonia (Winter)	mg/L	5	5	0.44	0.60
Barium	µg/L	20	20	69.68	94.62
Boron	µg/L	1	1	588.38	806
Chlorine, Total Residual	mg/L	1450	41	0.079	0.12
Copper	µg/L	62	9	7.15	10.318
Fluoride	mg/L	1	1	0.90	1.23
Iron	µg/L	1	1	2.31	3.16
Magnesium	mg/L	1	1	44.26	60.64
Mercury	ng/L	62	57	4.16	6.54
Nitrate-N + Nitrite-N	mg/L	1	1	3.44	4.71
Sulfates	mg/L	1	1	285.14	390.6
Zinc	µg/L	20	13	259.59	355.6
Outfall 006					
Ammonia (Summer)	mg/L	3	3	2.15	2.94
Ammonia (Winter)	mg/L	1	1	7.24	9.92
Copper	µg/L	61	46	17.89	24.59
Outfall 008					
Ammonia (Summer)	mg/L	1	1	0.4526	0.62
Ammonia (Winter)	mg/L	1	1	0.4526	0.62
Copper	µg/L	61	58	30.49	40.53
Outfall 019					
Ammonia (Summer)	mg/L	96	87	0.179	0.309
Ammonia (Winter)	mg/L	36	34	0.178	0.251
Arsenic	µg/L	66	64	56.02	75.98
Barium	µg/L	1	1	113.2	155
Boron	µg/L	66	66	6202	8801
Chlorides	mg/L	33	33	60.65	78.76
Chromium	µg/L	1	1	--	--
Hexavalent Chromium (Dissolved)	µg/L	66	2	3.43	4.7
Copper	µg/L	6	0	--	--
Dissolved Solids	mg/L	32	32	1612	2037
Fluoride	mg/L	1	1	2.83	3.88
Magnesium	mg/L	1	1	342.17	468.72
Manganese	µg/L	1	1	497.86	682
Mercury	ng/L	11	11	22.23	43.22
Molybdenum	µg/L	1	1	1041	1426
Nitrate-N + Nitrite-N	mg/L	6	4	1.66	2.27

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Selenium	µg/L	66	40	18.56	26.79
Sulfates	mg/L	33	33	905	1115.6
Zinc	µg/L	38	2	4.70	6.44
Outfall 024					
Ammonia (Summer)	mg/L	4	4	3.00	4.12
Ammonia (Winter)	mg/L	3	3	9.20	12.6
Arsenic	µg/L	12	0	--	--
Barium	µg/L	1	1	230.83	316.2
Boron	µg/L	12	12	444	769
Cadmium	µg/L	12	1	3.39	4.64
Chlorine – Total Residual	mg/L	12	0	--	--
Hexavalent Chromium (Dissolved)	µg/L	12	0	--	--
Copper	µg/L	12	9	67.74	92.8
Fluoride	mg/L	12	12	0.49	0.59
Iron	µg/L	1	1	8599	11780
Lead	µg/L	1	1	18.10	24.8
Magnesium	mg/L	1	1	57.93	79.36
Manganese	µg/L	1	1	543.12	744
Mercury	ng/L	12	12	6.89	11.42
Nitrate-N + Nitrite-N	mg/L	1	1	4.89	6.70
Selenium	µg/L	11	1	19.86	27.2
Sulfates	mg/L	1	1	497.86	682
Zinc	µg/L	12	6	67.74	92.8

*Outfall 001 represents NCCW only, except for mercury which is a calculated value based on intake and internal station 601 samples.

MDL = analytical method detection limit

PEQ = projected effluent quality

Table 9. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Outfall 001						
Ammonia (Summer)	mg/L	--	--	0.9	--	--
Ammonia (Winter)	mg/L	--	--	3.6	--	--
Arsenic ^a	µg/L	50	100	150	340	680
Barium	µg/L	1000	--	620	2700	5300
Boron	µg/L	--	--	3900	33000	65000
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Copper	µg/L	--	--	500	--	--
Fluoride	mg/L	--	1	2	--	--
Iron	µg/L	--	--	5000	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Nitrate-N + Nitrite-N ^a	mg/L	10	100	--	--	--
Selenium ^a	µg/L	170	50	5	62	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	7400	25000	120	120	230
Outfall 006						
Ammonia (Summer)	mg/L	--	--	0.9	--	--
Ammonia (Winter)	mg/L	--	--	1.9	--	--
Copper	µg/L	--	500	15	24	100
Outfall 008						
Ammonia (Summer)	mg/L	--	--	0.9	--	--
Ammonia (Winter)	mg/L	--	--	3.6	--	--
Copper	µg/L	--	500	9.1	14	100
Outfall 019						
Ammonia (Summer)	mg/L	--	--	--	7.4	--
Ammonia (Winter)	mg/L	--	--	--	5.1	--
Arsenic	µg/L	--	--	--	340	680
Barium	µg/L	--	--	--	4500	8900
Boron	µg/L	--	--	--	33000	65000
Chlorides	mg/L	--	--	--	--	--
Chromium	µg/L	--	--	--	2900	5700
Hexavalent Chromium (Dissolved)	µg/L	--	--	--	16	31
Copper	µg/L	--	--	--	24	47
Dissolved Solids	mg/L	--	--	--	--	--
Fluoride	mg/L	--	--	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Mercury	ng/L	12	--	--	1700	3400
Molybdenum	µg/L	--	--	--	190000	370000
Nitrate-N + Nitrite-N	mg/L	--	--	--	--	--
Selenium	µg/L	4200	--	--	62	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	26000	--	--	190	380
Outfall 024						
Ammonia (Summer)	mg/L	--	--	0.9	--	--
Ammonia (Winter)	mg/L	--	--	3.6	--	--
Arsenic	µg/L	50	100	150	340	680
Barium	µg/L	1000	--	620	2700	11000
Boron	µg/L	--	--	3900	33000	65000
Cadmium	µg/L	--	50	2.4	4.4	23
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper	µg/L	--	500	9.1	14	61
Fluoride	mg/L	1	2	--	--	--
Iron	µg/L	--	5000	--	--	--
Lead	µg/L	--	100	6.2	120	710
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Nitrate-N + Nitrite-N	mg/L	10	100	--	--	--
Selenium	µg/L	170	50	5	62	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	7400	25000	120	120	490

^a The criteria for these parameters is provided for the TBEL verse WQBEL comparison shown in Attachment 2.

Table 10. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Riddles Run				
Stream Flows				
1Q10	cfs	annual	0.1	USGS StreamStats - 2.28 sq mi
7Q10	cfs	annual	0.12	USGS StreamStats - 2.28 sq mi
30Q10	cfs	summer	0.162	USGS StreamStats - 2.28 sq mi
		winter	0.162	USGS StreamStats - 2.28 sq mi
Harmonic Mean	cfs	annual	0.559	USGS StreamStats - 2.28 sq mi
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	175	BWR central Ohio River 2018, n=960
Hardness, IMZ	mg/L	annual	400	default. 006 9/1/23 (n=3) hardness = 730 mg/l
pH	S.U.	summer	8.09	BWR Central Ohio River 2018, n=631
		winter	8.29	BWR central Ohio River 2018, n=47
Temperature	°C	summer	22.7	BWR central Ohio River 2018, n=634
		winter	6.06	BWR central Ohio River 2018, n=47
Cardinal Power flow, Outfall 006	cfs	annual	0.030945	Average Daily Design Flow – Outfall 006
Background Water Quality – Riddles Run, Outfall 006				
Ammonia (Summer)	mg/L		0.025	BWR; 2018; n=651; 401<MDL; Central Ohio River tributaries (median)
Ammonia (Winter)	mg/L		0.025	BWR; 2018; n=57; 48<MDL; Central Ohio River tributaries (median)
Copper	µg/L		1	BWR; 2018; n=960; 752<MDL; Central Ohio River tributaries (median)

BWR = Ohio EPA 2018 Background Water Quality Report

MDL = analytical method detection limit

n = number of samples

Ohio EPA = Ohio Environmental Protection Agency

USGS = United States Geological Survey

Parameter	Units	Season	Value	Basis
Ohio River				
Stream Flows				
1Q10	cfs	annual	5000	Direct Ohio River dischargers use 7Q10 instead of 1Q10; ORSANCO MP 31.7-161.7
7Q10	cfs	annual	5880	ORSANCO MP 31.7-161.7
Harmonic Mean	cfs	annual	20500	ORSANCO MP 31.7-161.7
Mixing Assumption	%	average	10	(***)WLAs for non-carcinogens are developed using 100 percent of the 7Q10.)
		maximum	1	
Hardness, OMZ	mg/L	annual	97	ORSANCO, Pike Island, median, n=27
Hardness, IMZ (Outfalls 001 and 019)	mg/L	annual	97	ORSANCO, Pike Island, median, n=27
Hardness, IMZ (Outfall 008)	mg/L	annual	400	Outfall 008 from October 2023 (n=3) = 657 mg/L (average). Default maximum = 400 mg/l
Hardness, IMZ (Outfall 024)	mg/L	annual	230	Outfall 023 effluent data October 2023 (n=3)
pH	S.U.	summer	8	ORSANCO 75th% (Pike Island, 2019-2023, n=5)
		winter	7.8	ORSANCO 75th% (Pike Island, 2019-2023, n=5)
Temperature	°C	summer	26.3	OIB00010800, 75th%, (7/2019-7/2023)
		winter	13.6	OIB00010800, 75th%, (7/2019-7/2023)
Cardinal Power flow, Outfall 001	cfs	annual	1616.9	95th percentile monthly avg (Feb19-Feb24)
Cardinal Power flow, Outfall 008	cfs	annual	0.030945	Average Daily Flow - Outfall 008
Cardinal Power flow, Outfall 019	cfs	annual	9.794	(June2021-Feb2024) 95th% of monthly average flows
Cardinal Power flow, Outfall 024	cfs	annual	14.064	95th% (March 2023-Feb2024)
Background Water Quality – Ohio River				
Ammonia (Summer)	mg/L		0.067	ORSANCO; 2019-2023; n=7; 0<MDL; bimonthly, New Cumberland, average
Ammonia (Winter)	mg/L		0.058	ORSANCO; 2019-2023; n=4; 1<MDL; bimonthly, New Cumberland, average
Arsenic	µg/L		0.5	ORSANCO; 2019-2023; n=27; 25<MDL; clean metals, New Cumberland, median
Barium	µg/L		36.8	ORSANCO; 2019-2023; n=27; 0<MDL; clean metals, New Cumberland, median
Boron	µg/L		0	No representative data available.
Cadmium	µg/L		0	ORSANCO; 2019-2023; n=27; 27<MDL; clean metals, New Cumberland, median

Parameter	Units	Season	Value	Basis
Chlorine—, Total Residual	mg/L		0	No representative data available.
Hexavalent Chromium (Dissolved)	µg/L		0	No representative data available.
Copper	µg/L		2.06	ORSANCO; 2019-2023; n=27; 1<MDL; clean metals, New Cumberland, median
Fluoride	mg/L		0	No representative data available.
Iron	µg/L		373	ORSANCO; 2019-2023; n=27; 0<MDL; clean metals, New Cumberland, median
Lead	µg/L		0.5	ORSANCO; 2019-2023; n=27; 23<MDL; clean metals, New Cumberland, median
Magnesium	mg/L		7.1	ORSANCO; 2019-2023; n=27; 0<MDL; clean metals, New Cumberland, median
Manganese	µg/L		70.3	ORSANCO; 2019-2023; n=27; 0<MDL; clean metals, New Cumberland, median
Mercury	ng/L		0.75	ORSANCO; 2019-2023; n=27; 16<MDL; clean metals, New Cumberland, median
Nitrate-N + Nitrite-N	mg/L		0.8	ORSANCO; 2019-2023; n=24; 0<MDL; bimonthly, New Cumberland, median
Selenium	µg/L		0	ORSANCO; 2019-2023; n=27; 27<MDL; clean metals, New Cumberland, median
Sulfates	mg/L		48.2	ORSANCO; 2019-2023; n=25; 0<MDL; bimonthly, New Cumberland, median
Zinc	µg/L		3.75	ORSANCO; 2019-2023; n=27; 0<MDL; clean metals, New Cumberland, median

MDL = analytical method detection limit

n = number of samples

ORSANCO = Ohio River Valley Water Sanitation Commission

Parameter	Units	Season	Value	Basis
Blockhouse Hollow Run				
Stream Flows				
1Q10	cfs	annual	0.0965	USGS Streamstats - 2.12 sq mi
7Q10	cfs	annual	0.112	USGS Streamstats - 2.12 sq mi
		summer	0.112	USGS Streamstats - 2.12 sq mi
		winter	0.112	USGS Streamstats - 2.12 sq mi
Harmonic Mean	cfs	annual	1.01	USGS Streamstats - 2.12 sq mi
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	175	BWR Central Ohio River 2018, n=960
Hardness, IMZ	mg/L	annual	175	BWR Central Ohio River 2018, n=960
pH	S.U.	summer	8.09	BWR Central Ohio River 2018, n=631
		winter	8.29	BWR Central Ohio River 2018, n=47
Temperature	°C	summer	22.7	BWR Central Ohio River 2018, n=634
		winter	6.06	BWR Central Ohio River 2018, n=47
Cardinal Power flow - Outfall 019	cfs	annual	9.794	(June 2021-Feb 2024) 95th% of monthly average flows
Background Water Quality – Blockhouse Hollow Run				
Ammonia (Summer)	mg/L		0.025	BWR; 2018; n=651; 401<MDL; Central Ohio River tributaries (median)
Ammonia (Winter)	mg/L		0.025	BWR; 2018; n=57; 48<MDL; Central Ohio River tributaries (median)
Arsenic	µg/L		0	STORET C03S07; n=19; 19<MDL; Short Creek (Ohio River tributary); 2010-2011
Barium	µg/L		31	STORET C03S07; n=19; 0<MDL; median; Short Creek (Ohio River tributary); 2010-2011
Boron	µg/L			No representative data available.
Chlorides	mg/L		16.4	BWR; 2018; n=960; 81<MDL; Central Ohio River tributaries (median)
Chromium	µg/L		1	BWR; 2018; n=960; 875<MDL; Central Ohio River tributaries (median)
Hexavalent Chromium (Dissolved)	µg/L		5	BWR; 2018; n=18; 17<MDL; statewide (median)
Copper	µg/L		1	BWR; 2018; n=960; 752<MDL; central ohio river tributaries (median)
Dissolved Solids	mg/L		241	BWR; 2018; n=960; 0<MDL; central ohio river tributaries (median)
Fluoride	mg/L			No representative data available.
Magnesium	mg/L		11	BWR; 2018; n=960; 0<MDL; central ohio river tributaries (median)
Manganese	µg/L		29	STORET C03S07; n=19; 0<MDL; median; Short Creek (Ohio River tributary); 2010-2011

Mercury	ng/L			No representative data available.
Molybdenum	µg/L			No representative data available.
Nitrate-N + Nitrite-N	mg/L		0.11	BWR; 2018; n=946; 360<MDL; central ohio river tributaries (median)
Selenium	µg/L			No representative data available.
Sulfates	mg/L		1220	STORET C03S07; n=19; 0<MDL; median; Short Creek (Ohio River tributary); 2010-2011
Zinc	µg/L		5	BWR; 2018; n=960; 775<MDL; central ohio river tributaries (median)

BWR = Ohio EPA 2018 Background Water Quality Report

MDL = analytical method detection limit

n = number of samples

Ohio EPA = Ohio Environmental Protection Agency

STORET = STORage and RETrieval

USGS = United States Geological Survey

Table 11. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Outfall 001						
Ammonia (Summer)	mg/L	--	--	1.2	--	--
Ammonia (Winter)	mg/L	--	--	4.89	--	--
Arsenic ^a	µg/L	232	227	205	352	680
Barium	µg/L	4503	--	832	2797	5300
Boron	µg/L	--	--	5318	34200	65000
Chlorine, Total Residual	mg/L	--	--	0.015	0.02	0.038
Copper	µg/L	--	1131	12	14	27
Fluoride	mg/L	4.6	4.5	--	--	--
Iron	µg/L	--	10866	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Nitrate-N + Nitrite-N ^a	mg/L	43	226	--	--	--
Selenium ^a	µg/L	788	113	6.8	64	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	34297	56692	162	124	230
Outfall 006						
Ammonia (Summer)	mg/L	--	--	5.48	--	--
Ammonia (Winter)	mg/L	--	--	11.72	--	--
Copper	µg/L	--	9514	69	98	100
Outfall 008						
Ammonia (Summer)	mg/L	--	--	15829.11	--	--
Ammonia (Winter)	mg/L	--	--	67306.75	--	--
Copper	µg/L	--	32987315	133779	22702	100
Outfall 019 – Blockhouse Hollow						
Ammonia (Summer)	mg/L	--	--	--	7.48	--
Ammonia (Winter)	mg/L	--	--	--	5.16	--
Arsenic	µg/L	--	--	--	343	680
Barium	µg/L	--	--	--	4544	8900
Boron	µg/L	--	--	--	33325	65000
Chlorides	mg/L	--	--	--	--	--
Chromium	µg/L	--	--	--	2929	5700
Hexavalent Chromium (Dissolved)	µg/L	--	--	--	16	31
Copper	µg/L	--	--	--	24	47
Dissolved Solids	mg/L	--	--	--	--	--
Fluoride	mg/L	--	--	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Mercury	ng/L	12	--	--	1700	3400
Molybdenum	µg/L	--	--	--	191872	370000
Nitrate-N + Nitrite-N	mg/L	--	--	--	--	--
Selenium	µg/L	4633	--	--	63	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	28681	--	--	192	380
Outfall 019 – Ohio River						
Ammonia (Summer)	mg/L	--	--	53.43	--	--
Ammonia (Winter)	mg/L	--	--	218.23	--	--
Arsenic	µg/L	30068	21031	9156	2381	680
Barium	µg/L	582756	--	35982	18724	5300
Boron	µg/L	--	--	238043	231121	65000
Chlorides	mg/L	--	--	--	--	--
Chromium	µg/L	--	20822	5067	12601	3500
Hexavalent Chromium (Dissolved)	µg/L	--	--	371	82	31
Copper R	µg/L	--	104947	495	92	27
Dissolved solids (ave)	mg/L	--	--	77086	--	--
Fluoride	mg/L	601	421	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	1220735	1330698	370000
Nitrate-N + Nitrite-N	mg/L	5948	21008	--	--	--
Selenium	µg/L	102232	10516	305	434	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	4447118	5256749	7024	810	230
Outfall 024						
Ammonia (Summer)	mg/L	--	--	35.73	--	--
Ammonia (Winter)	mg/L	--	--	151.69	--	--
Arsenic	µg/L	20745	14603	6400	1759	680
Barium	µg/L	403703	--	25003	13835	11000
Boron	µg/L	--	--	166955	170969	65000
Cadmium	µg/L	--	7338	103	23	23
Chlorine, Total Residual	mg/L	--	--	0.47	0.098	0.038
Hexavalent Chromium (Dissolved)	µg/L	--	--	471	83	31
Copper	µg/L	--	73081	303	64	61
Fluoride	mg/L	419	294	--	--	--
Iron	µg/L	--	679442	--	--	--
Lead	µg/L	--	14603	245	620	710
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Mercury	ng/L	12	10000	910	1700	3400
Nitrate-N + Nitrite-N	mg/L	3856	14560	--	--	--
Selenium	µg/L	71245	7338	214	321	120
Sulfates	mg/L	--	--	--	--	--
Zinc	µg/L	3099689	3668509	4980	606	490

^a The criteria for these parameters is provided for the TBEL verse WQBEL comparison shown in Attachment 2.

Table 12. Parameter Assessment

Outfall 001

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

Magnesium Manganese Sulfates

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

Ammonia (Winter) Barium Boron
Iron

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL.
No limit recommended; monitoring optional.

Ammonia (Summer) Fluoride Mercury
Nitrate-N + Nitrite-N

Group 4: PEQmax ≥ 50 percent, but < 100 percent of the maximum PEL or
PEQavg ≥ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Copper

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

<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>	
		<i>Average</i>	<i>Maximum</i>
Chlorine – Total			
Residual	mg/L	0.015	0.02
Zinc	µg/L	--	124

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

Outfall 006

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

No parameters

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

No parameters

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL.
No limit recommended; monitoring optional.

Ammonia (Summer)

Copper

Group 4: PEQmax $\geq$ 50 percent, but < 100 percent of the maximum PEL or
PEQavg $\geq$ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Ammonia (Winter)

Group 5: Maximum PEQ $\geq$ 100 percent of the maximum PEL or average PEQ $\geq$ 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.

No parameters

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

Outfall 008

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

No parameters

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

Ammonia (Winter)

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

Ammonia (Summer)

Copper

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

No parameters

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.

No parameters

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

Outfall 019

(Most restrictive grouping is shown between the Blockhouse Hollow and Ohio River allocations)

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

Chlorides	Fluoride	Magnesium
Manganese	Nitrate-N + Nitrite-N	Sulfates

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

Ammonia-S	Ammonia-W	Barium
Chromium	Copper	Molybdenum

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL.
No limit recommended; monitoring optional.

Arsenic	Boron	Fluoride
Hexavalent Chromium (Dissolved)		Selenium
Total Filterable Residue	Zinc	

Group 4: PEQmax $\geq$ 50 percent, but < 100 percent of the maximum PEL or
PEQavg $\geq$ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

No parameters

Group 5: Maximum PEQ $\geq$ 100 percent of the maximum PEL or average PEQ $\geq$ 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

<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>	
		<i>Average</i>	<i>Maximum</i>
Mercury	ng/L	12	1700

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

Outfall 024

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

Magnesium

Manganese

Sulfates

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

Arsenic

Boron

Chlorine, Total Residual

Hexavalent Chromium
(Dissolved)

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

Ammonia (Summer)

Ammonia (Winter)

Barium

Cadmium

Fluoride

Iron

Lead

Nitrate-N + Nitrite-N

Selenium

Zinc

Group 4: PEQ_{max} ≥ 50 percent, but < 100 percent of the maximum PEL or
PEQ_{avg} ≥ 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

<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>	
		<i>Average</i>	<i>Maximum</i>
Copper	µg/L	--	61

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

Table 13. 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	6340	6340	--	--	316(a)
pH	S.U.	6.5 - 9.0		--	--	WQS
Zinc	µg/L	----- Monitor -----				M
Flow Rate	MGD	----- Monitor -----				M ^c
Chlorine, Total Residual	mg/L	--	0.20	--	--	BTJ/OMZM
Mercury	ng/L	----- Monitor -----				M
Chlorination Duration	Minutes	--	120	--	--	BTJ/OMZM
Outfall 006						
Flow Rate	GPD	----- Monitor -----				M ^c
pH	S.U.	6.5 - 9.0		--	--	WQS
Total Suspended Solids	mg/L	12	18	0.45	0.73	PD
Ammonia	mg/L	----- Monitor -----				M
Fecal Coliform (Winter)	#/100 mL	1000	2000	--	--	WQS/BTJ
E.coli (Summer)	#/100 mL	126	240 ^c	--	--	WQS
CBOD	mg/L	10	15	0.40	0.60	PD
Outfall 008						
Flow Rate	GPD	----- Monitor -----				M ^c
pH	S.U.	6.5 - 9.0		--	--	WQS
Total Suspended Solids	mg/L	12	18	0.72	1.08	PD
Fecal Coliform	#/100 mL	1000	2000	--	--	WQS/ORS
E.coli	#/100 mL	126	240 ^c	--	--	WQS
CBOD	mg/L	10	15	0.60	0.90	PD
Outfall 011						

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
pH	S.U.	----- Monitor -----				BTJ
Total Suspended Solids	mg/L	----- Monitor -----				BTJ
Outfall 019						
pH	S.U.	6.5 - 9.0		--	--	WQS
Total Suspended Solids	mg/L	30	100	--	--	BPJ/BPT
Oil and Grease	mg/L	15	20	--	--	BPJ/BPT
Hardness	mg/L	----- Monitor -----				M ^c
Arsenic	µg/L	8	11	--	--	BAT
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	12	788	--	--	BAT/WLA
Total Filterable Residue	mg/L	----- Monitor -----				M
Outfall 024						
pH	S.U.	6.5 - 9.0		--	--	WQS
Hardness	mg/L	----- Monitor -----				M ^c
Total Suspended Solids	mg/L	30	98.8	--	--	BPT
Oil and Grease	mg/L	15	20	--	--	BPT
Nitrogen, Ammonia	mg/L	----- Monitor -----				M
Hardness	mg/L	----- Monitor -----				M
Selenium	µg/L	----- Monitor -----				M
Copper	µg/L	--	61	--	--	WLA
Flow	MGD	----- Monitor -----				M ^c
Chlorine, Total Residual	mg/L	--	0.038	--	--	WLA/IMZM
Mercury	ng/L	----- Monitor -----				RP
Outfalls 025 and 027						
pH	S.U.	----- Monitor -----				M
Total Suspended Solids	mg/L	----- Monitor -----				M
Internal Monitoring Station 601						

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
pH	S.U.	6.0 - 9.0		--	--	BPT
Total Suspended Solids	mg/L	30	100	--	--	BPT
Oil and Grease	mg/L	15	20	--	--	BPT
Nitrate Plus Nitrite	mg/L	----- Monitor -----				M
Arsenic	µg/L	----- Monitor -----				M
Selenium	µg/L	----- Monitor -----				M
Zinc	µg/L	----- Monitor -----				M
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	----- Monitor -----				M
Internal Monitoring Station 602						
pH	S.U.	6.0 - 9.0		--	--	M
Total Suspended Solids	mg/L	30	100	--	--	BPT
Oil and Grease	mg/L	15	20	--	--	BPT
Ammonia	mg/L	----- Monitor -----				M
Arsenic	µg/L	----- Monitor -----				M
Selenium	µg/L	----- Monitor -----				M
Boron	µg/L	----- Monitor -----				M
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	----- Monitor -----				M
Total Filterable Residue	mg/L	----- Monitor -----				M
Internal Monitoring Station 603 (Interim)						
Flow Rate	MGD	----- Monitor -----				M
Internal Monitoring Station 603 (Final)						
Number of Events	No./Month	--	0	--	--	BAT
Internal Monitoring Station 604 (Interim)						
pH	S.U.	6.0 - 9.0		--	--	BPT
Total Suspended Solids	mg/L	30	100	--	--	BPT
Oil and Grease	mg/L	15	20	--	--	BPT
Nitrate Plus Nitrite	mg/L	3	4	--	--	BAT
Arsenic	µg/L	8	18	--	--	BAT
Selenium	µg/L	29	70	--	--	BAT

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Zinc	µg/L	----- Monitor -----				M
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	34	103	--	--	BAT
Internal Monitoring Station 604 (Final)						
Number of Events	No./Month	--	0	--	--	BAT
Internal Monitoring Station 605						
Total Suspended Solids	mg/L	----- Monitor -----				M
Flow Rate	MGD	----- Monitor -----				M ^c

^a Effluent loadings based on: Outfall 006 – 0.01 MGD, Outfall 008 – 0.015 MGD and Outfall 019 – 6.33 MGD.

^b Definitions:

316(a) = CWA 316(a) thermal variance

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

BPJ = Best Professional Judgment

BPT = Best Practicable Control Technology Currently Available, 40 CFR Part 423.12

BTJ = Best Technical Judgment

CFR = Code of Federal Regulations

M = Division of Surface Water NPDES Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges

NPDES = National Pollutant Discharge Elimination System

OAC = Ohio Administrative Code

ORS = ORSANCO WQS

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))

WLA = Wasteload Allocation procedures (OAC 3745-2)

WLA/IMZM = Wasteload Allocation limited by Inside 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.

Attachment 1. Applicable Federal Effluent Limitation Guidelines

40 CFR 423.12 – Best Practicable Control Technology (BPT)

Parameter (mg/L)	Daily Maximum	30-Day Average
<u>Low Volume Waste Sources</u>		
Total Suspended Solids	100	30
Oil & Grease	20	15
<u>Once Through Cooling Water</u>		
Chlorine, Total Residual	0.5	0.2
<u>Cooling Tower Blowdown</u>		
Chlorine, Total Residual	0.5	0.2
<u>Coal Pile Runoff</u>		
Total Suspended Solids	50	--
<u>FGD wastewater, Combustion Residual Leachate</u>		
Total Suspended Solids	100	30
Oil & Grease	20	15

The pH for all sources, except once through cooling water shall be within the range of 6.0-9.0.

*BPT limits for Outfall 024 are subject to reductions due to dilution factors presented in the tables below.

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

Parameter	Daily Maximum	30-Day Average
<u>Once Through Cooling Water</u>		
Chlorine, Total Residual (mg/L)	0.2	--
<u>Cooling Tower Blowdown</u>		
Free Available Chlorine (mg/L)	0.5	0.2
Chromium, Total (mg/L)	0.2	0.2
Zinc, Total (mg/L)	1.0	1.0
<u>FGD Wastewater (2020 BAT)</u>		
Arsenic, Total (ug/L)	18	8
Mercury, Total (ng/L)	103	34
Selenium, Total (ug/L)	70	29
Nitrate/Nitrite, as N(mg/)	4	3
<u>FGD Wastewater (2024 BAT)</u>		
No Discharge of Pollutants	--	--
<u>Fly Ash Transport Water</u>		
No Discharge of Pollutants	--	--

Bottom Ash Transport Water (2020 BAT)

Exception to no discharge of pollutants (k)(2)(i)(B): In no event shall such discharge exceed a 30-day rolling average of ten percent of the primary active wetted bottom ash system volume. The volume of daily discharges used to calculate the 30-day rolling average shall be calculated using measurements from flow monitors.

Bottom Ash Transport Water (2024 BAT)

No Discharge of Pollutants

--

--

Combustion Residual Leachate

Arsenic, Total (ug/L)

11

8

Mercury, Total (ng/L)

788

356

Unmanaged Combustion Residual Leachate

Arsenic, Total (ug/L)

11

8

Mercury, Total (ng/L)

788

356

Attachment 2. Internal Station 604, TBEL verse QBEL Comparison

Parameter	Units	QBEL at Outfall 001		QBEL conversion to Station 604 limits				TBEL			
		Daily Max	Monthly Avg	Concentration		Loading (kg/d)		Concentration		Loading (kg/d)	
				Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg
Arsenic - TR	µg/L	352	205	5838.73	3400.40	13.92	8.11	18	8	0.04	0.02
Mercury - TR	ng/L	1700	12	28198.41	199.05	67.24	0.47	103	34	0.25	0.08
Nitrate-N + Nitrite-N	mg/L	--	43	--	713.25	--	1.70	4	3	0.01	0.01
Selenium - TR	µg/L	64	6.8	1061.59	112.79	2.53	0.27	70	29	0.17	0.07

The most restrictive concentrations and loads are in **bold** and are limited at internal outfall 604.

Outfall 001 flows are based on 1045 MGD and Station 604 flows are based on 0.63 MGD.

Station 604 QBEL Load Calculation:

$$Load \frac{kg}{day} = \frac{\left(WQ \text{ Criteria } \frac{ug}{Litre} \right) * \left(3.785 \frac{Litres}{Gallon} \right) * \left(10,450,000 \frac{Gallons}{Day} \right)}{1,000,000,000 \frac{ug}{Killogram}}$$

Station 604 QBEL Concentration Equation:

$$Concentration \frac{ug}{l} = \frac{\frac{Daily \text{ Max Load } \frac{kg}{day}}{630,000 \frac{Gallons}{day}} * 1,000,000,000 \frac{ug}{kg}}{3.785 \frac{Litres}{Gallon}}$$

Example Daily Max Concentration Calculation for Arsenic:

$$3,400 \frac{ug}{L} = \frac{\frac{8.11 \frac{kg}{day}}{630,000 \frac{gallons}{day}} * 1,000,000,000 \frac{ug}{kg}}{3.785 \frac{Litres}{Gallon}}$$

Attachment 3. Dilution Factors for Flow-Weighted Calculation

Outfall 024 – Total Suspended Solids (TSS) Calculation

Source of Flow	MGD	% of Total
Unit 3 Cooling Tower	5.24	53.32%
net rain minus evaporation	0.038	0.39%
Coal Pile Runoff	0.23	2.34%
Units 1 & 2 wastewater	4.32	43.96%
Total	9.828	100%

Outfall 024 TSS calculation:

$$C_{\text{wgt}} = [100 \text{ mg/L} * (100\% - \% \text{ of } Q_c) + (50 \text{ mg/L} * \% \text{ of } Q_c)]$$

$$C_{\text{wgt}} = [100 \text{ mg/L} * (100\% - 2.34\%) + (50 \text{ mg/L} * 2.34\%)] = 98.8 \text{ mg/L}$$

Where:

C_{wgt} = the flow-weighted concentration for TSS

% of Q_c = percent of flow without the coal pile runoff ($Q_{\text{total}} - Q_c$)

Q_{total} = total flow to Outfall 024 = 9.83 MGD

Q_c = flow rate of coal pile runoff = 0.23 MGD

Attachment 4. List of Approved Boiler/Cooling Water System Additives

Form 2C, Part II - Approved Additives			
Chemical Additive Name	Purpose	System	Date
3D TRASAR 3DT121	Cooling Water Treatment	Recirculating Cooling Water	9/8/2009
NALCO 1315	Detoxification agent	Zebra Mussel Control	10/8/2009
NALCO 7468	Defoamer	Recirculating Cooling Water	10/8/2009
NALCO H-130M	Biocide	Zebra Mussel Control	10/8/2009
NALCO 73297	Corrosion inhibitor	Wet Flue Gas Desulfurization System	1/22/2010
ChemTreat RL9007	Reverse osmosis cleaner	Reverse Osmosis Boiler WTS	3/18/2011
ControlBrom CB70	Biocide	Recirculating Cooling Water	11/28/2011
NALCO 7468	Defoamer	Zebra Mussel Control	11/28/2011
NALSPERSE 73550	Dispersant and detergent	Recirculating Cooling Water	11/28/2011
NALCO 5200M	Scale inhibitor	Wet Flue Gas Desulfurization System / JBR	10/2/2014
3DT138	Dispersant	Wastewater Treatment Systems	2/5/2019
ChemTreat CL1365	Scale inhibitor	Fly Ash Disposal System	2/5/2019
ChemTreat FGD1300	Scale inhibitor	Fly Ash Disposal System	2/5/2019
NALCO 3DT120	Dispersant	Wastewater Treatment Systems	2/5/2019
pHREEdom 5200M	Scale inhibitor	Wastewater Treatment Systems	2/5/2019
ChemTreatCL4075	Scale inhibitor	Cooling Tower Basin	3/30/2022
ChemTreatCL4428	Dispersant	Cooling Tower Basin	3/30/2022
ChemTreatP8007L	Metal Precipitant	Outlet of primary clarifier	3/30/2022
ChemTreatP817E	Flocculant	Inlet to primary and secondary clarifiers	3/30/2022
ChemtreatP8281L	Coagulant	Inlet to coagulant mix tank	3/30/2022
Nalco MerControl 8034 Plus	Mercury re-emission prevention	U1, U2 or U3 JBR	3/30/2022
PC191T	Scale inhibitor		9/8/2010
Ferric chloride	Coagulant	Wastewater Treatment Systems	8/29/2011
CAT-FLOC 71264	Coagulant aid	Wastewater Treatment Systems	pre-2018
NALCLEAR 7768	Flocculant	Wastewater Treatment Systems	pre-2018
NALCO 1393	Scale inhibitor	Recirculating Cooling Water	pre-2018
NALMET 1689	Water clarification aid	Wastewater Treatment Systems	pre-2018
PermaClean PC-11	Biocide	Reverse Osmosis Boiler WTS	pre-2018
PermaClean PC-33	Reverse osmosis cleaner	Reverse Osmosis Boiler WTS	pre-2018
PermaClean PC-67	Reverse osmosis cleaner	Reverse Osmosis Boiler WTS	pre-2018
PermaClean PC-77	Reverse osmosis cleaner	Reverse Osmosis Boiler WTS	pre-2018
Redox-HgRPC	Mercury re-emission prevention	Wet Flue Gas Desulfurization System	pre-2018
Sodium formate 40%	Cleaning material/ detergent	Wet Flue Gas Desulfurization System	pre-2018
Sodium hypochlorite	Biocide	Recirculating Cooling Water	pre-2018

Attachment 5. Cooling Water Intake Structure

Cooling Water Intake Structure Compliance – Units 1 & 2

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:

- Design intake flow (DIF) – 1,152 MGD
- Ninety nine percent of the intake water flow is used for non-contact cooling. The remaining water is used for plant service water, bottom ash disposal, fly ash handling water, and water for the Unit 1 and Unit 2 flue-gas desulfurization (FGD) system.
- Biological data for impingement and entrainment evaluation were compiled from the Ohio River Ecological Research Program (ORERP), ORSANCO, and Cardinal Plant reports.
- Through-screen design intake velocity – 1.5 feet per second (fps).
- The Cardinal Plant uses traveling water screens with no fish returns.

Description of intake structure

The facility withdrawals once-through cooling water for Units 1 and 2 into the screen house through a 405' x 200' forebay. A floating debris boom and parked coal barges prevent floating debris from entering the forebay. Each unit has a screen house that is divided into six intake bays (three bays per pump). Water is fed to one of twelve bays and passes through trash racks with 2" openings. Downstream of the trash racks are 8' wide traveling water screens equipped with 14-gauge stainless steel wire screen cloth with 0.375-inch square openings. These screens do not include any fish-friendly features.

Operation and Intake Flows

Four circulating water pumps supply the Cardinal Plant's two generating units with a DIF of 800,000 gpm (1,782.4 cfs, 1,152 MGD). Normally, both circulating water pumps per unit are operated when a unit is operating, however both units can operate with only one pump per unit, which typically occurs during the winter. The four intake pumps operate 24 hours per day, 365 days per year to maintain adequate cooling water to the generating units. The Unit 1 circulating water pumps withdrew an average of 75%, and Unit 2 withdrew an average of 74% of their respective DIF from 2013-2017. Combined, Unit 1 and Unit 2 withdrew an average of 74% of their total DIF during the same period. The table below presents historical DIF and AIF data compared to average Ohio River flows.

Average Monthly Ohio River Flow and Percent of Ohio River Flow Withdrawn by the Cardinal Plant

Month	Ohio River Flow (cfs)	Design Intake Flow (cfs)	Percent of River Withdrawn	Actual Intake Flow (cfs)	Percent of River Withdrawn
January	57,693	1,782	3.1	1,377	2.4
February	55,308	1,782	3.2	1,516	2.7

Month	Ohio River Flow (cfs)	Design Intake Flow (cfs)	Percent of River Withdrawn	Actual Intake Flow (cfs)	Percent of River Withdrawn
March	68,954	1,782	2.6	1,364	2.0
April	60,772	1,782	2.9	1,072	1.8
May	47,100	1,782	3.8	1,150	2.4
June	28,482	1,782	6.3	1,520	5.3
July	20,967	1,782	8.5	1,379	6.6
August	17,590	1,782	10.1	1,413	8.0
September	19,675	1,782	9.1	1,460	7.4
October	20,710	1,849	8.6	962	4.6
November	33,814	1,849	5.3	1,301	3.7
December	53,069	1,849	3.4	1,439	2.7

*Actual intake flow based on average monthly intake.

Fish and wildlife in the vicinity of the intake structure

The Cardinal Plant submitted biological characterization data based on an electrofishing survey conducted by ORSANCO in 2012, their recent entrainment study (2015-2016), and 2012-2016 fish survey results provided from EPRI's Ohio River Ecological Research Program (ORERP). Data for mussels were also provided from an EPRI study (2012), which contains data collected from four surveys conducted between 1990 and 2008.

Mussels

A total of eight different mussel species were collected within five miles of the Cardinal Plant during surveys in 1990, 1993, 2005, and 2008. The table below summarizes the mussel species observed.

Scientific Name	Common Name	1990		1993		2005		2008		Surveys Combined	
		No.	%	No.	%	No.	%	No.	%	No.	%
<i>Amblema plicata</i>	Threeridge	--	--	--	--	--	--	3	4.8	3	3
<i>Lasmigona complanata</i>	White Heelsplitter	--	--	--	--	3	9.1	8	12.9	11	10.9
<i>Lasmigona costata</i>	Flutedshell	--	--	--	--	--	--	1	1.6	1	1
<i>Obliquaria reflexa</i>	Threehorn Wartyback	--	--	1	50	3	9.1	8	12.9	12	11.9
<i>Potamilus alatus</i>	Pink Heelsplitter	--	--	--	--	5	15.2	28	45.2	33	32.7
<i>Quadrula quadrula</i>	Mapleleaf	--	--	1	50	22	66.7	14	22.6	37	36.6
<i>Unio merus tetralasmus</i>	Pondhorn	3	75	--	--	--	--	--	--	3	3
<i>Utterbackia imbecillis</i>	Paper Pondshell	1	25	--	--	--	--	--	--	1	1
Total Individuals		4		2		33		62		101	
Total Species		2		2		4		6		8	

Fish

A list of fish species in the vicinity of the Cardinal Plant was compiled from ORERP surveys conducted from 2012-2016 and an ORSANCO electrofishing survey of the Pike Island Pool from 2012. In total, 63 species and two hybrids were observed (123,878 total specimens), representing 14 families. Nine taxa accounted for 89.3% of the five-year total: Emerald Shiner (55.3%), Channel Shiner (13.5%), Gizzard Shad (5.3%), Bluegill (4.6%), young-of-the-year (YOY) *Ictiobinae* sp. (2.7%), Spotfin Shiner (2.1%), Freshwater Drum (2.1%), Bluntnose Minnow (2.0%), and Smallmouth Bass (1.7%).

A two-year entrainment study was conducted at the Cardinal Plant in 2015 and 2016. In 2015, 1,840 specimens were collected, representing 18 distinct identifications. The most abundant taxa collected in 2015 were, in decreasing order of abundance, *Ictiobinae* sp. (carpsucker/buffalo species), Freshwater Drum, Emerald Shiner (+type), *Pimephales* sp. (+type), *Cyprinidae* sp. (+type), and Gizzard Shad (+Clupeidae). These taxa composed 86% of the specimens collected. The following year's collections yielded 3,269 specimens, embodying 15 distinct identifications. Dominant taxa included Logperch type, Gizzard Shad (+Clupeidae), *Ictiobinae* sp., Freshwater Drum, *Pimephales* sp. (+type), and *Morone* sp. (+not Striped Bass). The table below summarizes the observations of the entrainment study.

Family	Taxa	2015		2016		Years Combined	
		#	%	#	%	#	%
Clupeidae	GIZZARD SHAD (+Clupeidae)	128	7.0%	913	27.9%	1,041	20.4%
	SKIPJACK HERRING	1	0.1%	1	<0.05%	2	<0.05%
Hiodontidae	MOONEYE	1	0.1%	--	--	1	<0.05%
Cyprinidae	COMMON CARP	70	3.8%	89	2.7%	159	3.1%
	STRIPED SHINER type	1	0.1%	--	--	1	<0.05%
	SHINER type	2	0.1%	51	1.6%	53	1.0%
	EMERALD SHINER (+type)	233	12.7%	99	3.0%	332	6.5%

Family	Taxa	2015		2016		Years Combined	
		#	%	#	%	#	%
	CHANNEL SHINER	3	0.2%	--	--	3	0.1%
	<i>Pimephales</i> sp. (+type)	183	9.9%	211	6.5%	394	7.7%
	CYPRINIDAE sp. (+type)	135	7.3%	103	3.2%	238	4.7%
Catostomidae	<i>Moxostoma</i> sp.	--	--	4	0.1%	4	0.1%
	CATOSTOMINAE sp.	--	--	1	<0.05%	1	<0.05%
	ICTIOBINAE sp.	537	29.2%	332	10.2%	869	17.0%
	CATOSTOMIDAE sp.	--	--	1	<0.05%	1	<0.05%
Ictaluridae	CHANNEL CATFISH	2	0.1%	2	0.1%	4	0.1%
Moronidae	<i>Morone</i> sp. (+not STRIPED BASS)	20	1.1%	112	3.4%	132	2.6%
Centrarchidae	<i>Lepomis</i> sp.	30	1.6%	4	0.1%	34	0.7%
	<i>Lepomis/Pomoxis</i> sp.	--	--	2	0.1%	2	<0.05%
	SMALLMOUTH BASS	1	0.1%	--	--	1	<0.05%
	<i>Micropterus</i> sp.	1	0.1%	--	--	1	<0.05%

Family	Taxa	2015		2016		Years Combined	
		#	%	#	%	#	%
	<i>Pomoxis</i> sp.	--	--	1	<0.05%	1	<0.05%
Percidae	GREENSIDE DARTER type	--	--	1	<0.05%	1	<0.05%
	TIPPECANOE DARTER	1	0.1%	--	--	1	<0.05%
	YELLOW PERCH	1	0.1%	--	--	1	<0.05%
	SAUGER	1	0.1%	2	0.1%	3	0.1%
	LOGPERCH type	41	2.2%	960	29.4%	1,001	19.6%
	DARTER sp.	--	--	82	2.5%	82	1.6%
	DARTER (not LOGPERCH) sp.	1	0.1%	--	--	1	<0.05%
	PERCIDAE (not <i>Sander</i>) sp.	10	0.5%	4	0.1%	14	0.3%
	PERCIDAE sp.	2	0.1%	7	0.2%	9	0.2%
Sciaenidae	FRESHWATER DRUM	374	20.3%	265	8.1%	639	12.5%
	CYPRINIDAE/ CATOSTOMIDAE	8	0.4%	--	--	8	0.2%

Family	Taxa	2015		2016		Years Combined	
		#	%	#	%	#	%
	CYPRINIDAE/ CATOSTOMIDAE type	--	--	5	0.2%	5	0.1%
	<i>Morone</i> /FRESHWATER DRUM	--	--	1	<0.05%	1	<0.05%
	UNIDENTIFIED	53	2.9%	16	0.5%	69	1.4%
	Grand Total	1,840	100.0%	3,269	100.0%	5,109	100.0%

Federal and State-Listed Species

The U.S. Fish and Wildlife Services (USFWS) and Ohio Department of Natural Resources (ODNR) lists the species in the table below as endangered or threatened in the State of Ohio and nationally. There are no federally-listed species known to occur in the action area according to USFWS.

Three state-threatened fish species were noted as present in Jefferson County: Channel Darter, River Darter, and Tippecanoe Darter. Only one specimen of Channel Darter (*Percina copelandi*) was collected during the 2012-2016 in-river surveys and none were impinged during the recent two-year study. River Darter (*Percina shumardi*) and Tippecanoe Darter (*Etheostoma tippecanoe*) were not collected during the recent in-river surveys nor during the impingement study. However, a single Tippecanoe Darter specimen was collected during the 2015-2016 entrainment study. No other state-listed fish species were identified in entrainment samples collected at the Cardinal Plant. However, Channel Darter and additional Tippecanoe Darter specimens may have been represented among the following percid taxa groups in 2015 and/or 2016: Logperch type, Darter sp., Darter (not Logperch) sp., Percidae (not Sander) sp., and Percidae sp. Therefore, entrainment of Channel Darter and/or additional Tippecanoe Darter specimens cannot be completely ruled out.

Of the three state-listed mussel species, the black sandshell was not observed in any of the mussel surveys, however, the two other species (Threehorn Wartyback and Pondhorn) were observed at least once. The Black Sandshell is typically found in medium-sized to large rivers in locations with strong current and substrates of coarse sand, gravel, and cobble, habitat not present near the Cardinal Plant. The Pondhorn typically inhabits the quiet or slow-moving, shallow waters of sloughs, borrow pits, ponds, ditches, and streams. It is tolerant of poor water conditions and can be found well-buried in a substrate of fine silt and/or mud. The Threehorn Wartyback is typically found in large rivers with moderate current, where the stable substrate is made up of gravel, sand, and mud. It can also occur in shallow embayments and reservoirs with very little current.

The habitat of the state-endangered Eastern Hellbender consists of large slab rocks in clear and well aerated streams and rivers, habitat that is lacking in the impounded Ohio River near the facility.

Group	Common Name	Scientific Name	Listing Status	
			Federal	State
Amphibian	Eastern Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	--	Endangered
Fish	Tippecanoe Darter	<i>Etheostoma tippecanoe</i>	--	Endangered
	Channel Darter	<i>Percina copelandi</i>	--	Threatened
	River Darter	<i>Percina shumardi</i>	--	Threatened
Mussels	Black Sandshell	<i>Ligumia recta</i>	--	Threatened
	Threehorn Wartyback	<i>Obliquaria reflexa</i>	--	Threatened
	Pondhorn	<i>Unio merus tetralasmus</i>	--	Threatened

Mussels are not among the organisms most susceptible to impingement and entrainment. However, impingement of glochidia host fish may present a risk for impact. Most common host species for listed mussels are bottom-dwelling fish, as they provide the greatest opportunity for interaction with mussels and provide the greatest success rates for glochidia attachment.

Federal Critical Habitat

None were identified.

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 only fragile species susceptible to impacts from the Cardinal Plant’s intake is gizzard shad.

Impingement and Entrainment

Impingement

A two-year impingement study conducted from June 2005 through June 2007 provided recent data that addressed the species and life stages susceptible to impingement at the Cardinal Plant. That study consisted of thirty-seven, 24-hour sampling events during which 29 fish species were impinged. Impingement collections were dominated by Gizzard Shad, and Freshwater Drum was the second most abundant species. Collectively, they accounted for over 99% of the fish impinged during the two-year study. Compared to the in-stream sampling, Freshwater Drum had approximately the same abundance, and Gizzard Shad were proportionally much more abundant. This indicates that Gizzard Shad are considerably more susceptible to impingement due to their abundance, pelagic schooling behavior of young-of-year, and vulnerability to winter die-offs. Emerald Shiner ranked first in the in-river catch but ranked tenth in the impingement collections as only 13 specimens were collected during the two-year study. The in-river collections showed that cyprinids were much more abundant than indicated by the impingement collections, suggesting that they are not susceptible to impingement. Similarly, Bluegill and Ictiobinae (carpsucker/buffalo) species also had higher relative abundances in the in-river surveys compared to the impingement collections. Recreational fish taxa contributed less than 1% to the impingement catch, suggesting low susceptibility to impingement at the Cardinal Plant. Species identified during the impingement studies conducted in 2005-2007 are presented in the table below.

Species	June 2005 – June 2006		June 2006 – June 2007		Years Combined	
	Number	%	Number	%	Number	%
Crayfish	8	0.01	12	0.81	20	0.02
Skipjack Herring	4	0.01	23	1.57	28	0.03
Gizzard Shad	76,105	96.09	1,165	78.19	77,270	95.76

Species	June 2005 – June 2006		June 2006 – June 2007		Years Combined	
	Number	%	Number	%	Number	%
Mooneye	25	0.03	2	0.14	27	0.03
Common Carp	3	0.00	1	0.07	4	0.01
Silver Chub	6	0.01	5	0.30	11	0.01
Golden Shiner	--	--	1	0.09	1	0.00
Emerald Shiner	13	0.02	--	--	13	0.02
Bluntnose Minnow	--	--	1	0.07	1	0.00
River Carpsucker	2	0.00	1	0.	3	0.00
Quillback	7	0.01	6	0.40	13	0.02
<i>Carpoides</i> sp.	1	0.00	--	--	1	0.00
Northern Hog Sucker	2	0.00	1	0.07	3	0.00
Smallmouth Redhorse	3	0.00	--	--	3	0.00
Silver Redhorse	--	--	1	0.07	1	0.00
Yellow Bullhead	1	0.00	--	--	1	0.00
Channel Catfish	133	0.17	18	1.20	150	0.19
Flathead Catfish	7	0.01	3	0.22	10	0.01
White Perch	7	0.01	--	--	7	0.01
White Bass	144	0.18	37	2.48	181	0.22
Hybrid striper	--	--	1	0.07	1	0.00
<i>Morone</i> sp.	225	0.28	1	0.07	226	0.28
Rock Bass	1	0.00	--	--	1	0.00
Warmouth	1	0.00	--	--	1	0.00
Bluegill	7	0.01	28	1.91	36	0.04
Spotted Bass	1	0.00	1	0.07	2	0.00
White Crappie	9	0.01	2	0.13	11	0.01
Black Crappie	1	0.00	1	0.07	2	0.00
Yellow Perch	--	--	2	0.13	2	0.00
Logperch	--	--	1	0.07	1	0.00
Sauger	14	0.02	23	1.51	36	0.05
Walleye	2	0.00	5	0.33	7	0.01
Saugeye	1	0.00	2	0.14	3	0.00
Freshwater Drum	2,471	3.12	145	9.75	2,616	3.24
Totals	79,205	100	1,490	100.00	80,696	100
Number of Fish Species	24		23		29	
24-hr sampling events	17		20		37	

*0.00 denotes values less than 0.005; % = relative abundance; "--" indicates none collected.

Entrainment

The two-year study conducted in 2015 and 2016 provided recent data that addressed the taxa and life stages susceptible to entrainment at the Cardinal Plant. Twenty-one unique taxa were collected during the study with *Ictiobinae* sp. and Freshwater Drum accounting for 50% of the catch in 2015 and Logperch type, Gizzard Shad (+Clupeidae), *Ictiobinae* sp. and Freshwater Drum composing 48% of the catch in 2016. Collectively, these four taxa composed 48% to 59% of the catch each year. These taxa are considered baitfish and/or commercial and rough or forage by the Ohio Administrative Code. *Morone* sp. (+not Striped Bass) was the most commonly

entrained recreational fish taxon and is most likely represented by White Bass, a recreational “protected” species. Morone sp. (+not Striped Bass) composed only 1.1% to 3.4% of the catch each year. The table below summarizes data collected during the entrainment study.

Year	2015			2016		
Volume Sampled (m3)	9,442.60			10,414.50		
Taxa	#	%	Density	#	%	Density
Gizzard Shad (+Clupeidae)	128	7	0.14	913	27.9	0.88
Emerald Shiner (+type)	233	12.7	0.25	99	3	0.1
Pimephales sp. (+type)	183	9.9	0.19	211	6.5	0.2
Cyprinidae sp. (+type)	135	7.3	0.14	103	3.2	0.1
Ictiobinae sp.	537	29.2	0.57	332	10.2	0.32
Morone sp. (+not Striped Bass)	20	1.1	0.02	112	3.4	0.11
Logperch type	41	2.2	0.04	960	29.4	0.92
Freshwater Drum	374	20.3	0.4	265	8.1	0.25
Other Identified Taxa	136	7.4	0.14	258	7.9	0.25
Unidentified	53	2.9	0.06	16	0.5	0.02
Total	1,840	100	1.95	3,269	100	3.14

*# = number collected; % = relative abundance; and Density = #/10m³

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(b):*** The permittee proposes to defer selection until after the entrainment BTA determination has been made.

2. Entrainment

- a. ***Site-Specific Entrainment Standards – 40 CFR 125.94(d):*** The permittee proposes that no additional technologies are necessary to minimize entrainment.

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. No additional monitoring is proposed at this time. New requirements may be established once an impingement mortality compliance option has been selected.

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

The Director may establish monitoring requirements for entrainment. A new intake flow monitoring requirement is proposed for Units 1 and 2 to characterize intake volumes and temperature.

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.

Reporting and Recordkeeping Requirements

40 CFR 125.97(a) – Monitoring Reports

The permittee is required to submit eDMRs which will characterize intake flows.

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

The permittee has provided information on multiple new technologies to minimize entrainment at OVEC. For *existing units*, the Director must weigh factors to determine whether these entrainment control technologies perform better than the current technologies. The proposed entrainment reduction options are evaluated below.

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 organisms 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).

A two-year entrainment characterization study was conducted at the Cardinal Plant in 2015 and 2016 and the results were summarized earlier in this attachment. Total entrainment of all species was estimated to be 128 million fish in 2015 and 176 million in 2016. In 2015, collections were dominated by Ictiobinae sp. (25.06%), Freshwater Drum (21.78%), Emerald Shiner type (14.22%), Pimephales sp. type (12.16%), Cyprinidae sp. Type (8.2%) that together made up over 81% of the entrainment. The 2016 entrainment was dominated by Logperch type (38.10%), Gizzard Shad (Clupeidae) (24.17%), Pimephales sp. Type (7.56%), Ictiobinae sp. 7.49%) and Freshwater Drum (7.13%) that together made up just under 85% of the entrainment. Entrainment at Cardinal was consistent with historical and expected temporal spawning patterns in the Ohio River. For example, the vast majority of entrainment in 2015 occurred from May through August with comparatively few ichthyoplankton or adults estimated to have been entrained outside of these times. Similarly, the majority of entrainment in 2016 occurred from May through early August. An evaluation of river drift was conducted using entrainment data and the Ohio River flow. River drift of ichthyoplankton was approximately 3.0 billion in 2015 and 3.1 billion in 2016, with estimated entrainment representing 4.2% and 5.7% of the river drift, respectively. Based on in-river

abundance and the highly fecund reproductive strategy for most of the common taxa entrained, it is unlikely that losses due to entrainment would have population level impacts.

Importantly, there was no entrainment of state or federally protected fish species at the Cardinal Plant, with the exception of a single Tippecanoe Darter collected in 2015. Further, there is no designated critical habitat at risk due to entrainment. However, fish utilized as host species for glochidia of listed mussel species may have been entrained during the study.

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

There are two sources of additional air emissions related to operation of a closed-cycle recirculation system (CCRS). One is the emissions of the cooling towers themselves in the form of 'drift' particulate matter (PM) which results from the aerosol droplets of cooling water that are released from the towers. The second source of emissions is related to additional generation that would be required from the regional power grid to replace the reduction in net power output of 2.0% from the Cardinal Plant due to the efficiency loss from a CCRS retrofit.

The calculated total PM drift estimate for the Cardinal Plant is 9.2 tons per year, based on the use of a mechanical draft cooling tower equipped with state-of-the-art drift eliminators. The annual loss of plant power generation when the hypothetical CCRS would become operational is estimated to be 53.4 MWe. At current operating capacity, a retrofit to a CCRS would entail an estimated average increase in heat input of 3,068,663 MMBTU per year. This increase in operation would result in the following emissions increases:

- 130 tons per year nitrogen oxides (NOX)
- 383 tons per year sulfur dioxide (SO₂)
- 3.7 tons per year volatile organic compounds (VOCs)
- 317,392 tons per year carbon dioxide equivalents
- 3.7 tons per year PM_{10/24}
- 0.94 pounds per year mercury

Noise modeling suggests that there would not be noise impacts requiring mitigation as there was no violation of any noise ordinance. However, noise level could increase offsite that could be considered an impact.

There are no particulate emissions or other pollutants associated with narrow-slot cylindrical wedgewire screens or fine-mesh travelling screens.

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

OVEC does have adequate space to accommodate installation of cooling towers and a CCRS, modified travelling screens, or cylindrical wedgewire screens (except 0.5 mm).

The installation of cooling towers would be considered difficult, as it requires substantial piping across a major roadway and around the existing infrastructure, in addition to construction of several large structures within the limited available space.

For cylindrical wedgewire screens, it was determined that installation of 0.5mm sized screens is not feasible due to the number of screen units needed to maintain the through-screen velocity and the confines of the coal barge lane. Additionally, there is significant concern regarding the conditions in the intake channel and the operational costs associated with installing wedgewire screens. One major issue with this option is the lack of flow in the intake channel. To maximize effectiveness, a current is needed to carry debris and organisms with limited motility past the screens. Other concerns stemming from the conditions in the intake channel include sedimentation and biofouling of the screens. Also, according to OVEC's application materials, there are no known examples of facilities using wedgewire screens of this size for once-through cooling applications.

Remaining useful plant life.

Units 1 and 2 have significant remaining life, and Cardinal plans to operate well into the future.

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.

A rigorous analysis of retrofitting the Cardinal Plant with a CCRS or fine-mesh screens (both wedgewire and modified traveling screens) was conducted and provided in the CWIS reports. The social cost of a CCRS retrofit would be primarily characterized by increased electricity costs for consumers and decreased shareholder dividends to offset exorbitant costs associated with construction and operation. Other less significant costs include reduced property values in the vicinity of the facility and the regulatory burden of project. Similar social costs apply to the installation of fine-mesh screens but on a lesser scale. The table below outlines estimated social costs of feasible entrainment technologies at the Cardinal Plant.

Discount Rate	Compliance Costs ^a			Social Costs ^b						
	Technology Type	Total Design, Construction, & Installation Costs	Annual O&M Costs	Shareholder Dividend Decreases	Electricity Price Increases	Power System Costs	Externality Costs	Permitting Costs	Total Present Value of Social Costs	Annual Social Costs
3%	Closed-cycle cooling	\$400.2M	\$7.1M	\$172.7M	\$172.7M	\$118.6M	\$4.0M	\$69.0k	\$468.0M	\$15.6M
	Fine mesh traveling screens	\$17.5M	\$0.8M	\$12.6M	\$12.6M	\$1.2M	\$0	\$2.0k	\$26.4M	\$0.9M
	Wedge wire screens 1mm	\$30.7M	\$0.6M	\$14.8M	\$13.7M	\$0.2M	\$0	\$2.9k	\$29.9M	\$1.0M
	Wedge wire screens 2mm	\$24.6M	\$0.5M	\$11.6M	\$10.6M	\$0.2M	\$0	\$2.3k	\$23.4M	\$0.8M
7%	Closed-cycle cooling	\$400.2M	\$7.1M	\$90.4M	\$90.4M	\$61.2M	\$3.1M	\$57.1k	\$245.1M	\$8.2M
	Fine mesh traveling screens	\$17.5M	\$0.8M	\$7.4M	\$7.4M	\$0.7M	\$0	\$1.8k	\$15.5M	\$0.5M
	Wedge wire screens 1mm	\$30.7M	\$0.6M	\$8.4M	\$7.8M	\$0.1M	\$0	\$2.6k	\$16.9M	\$0.6M
	Wedge wire screens 2mm	\$24.6M	\$0.5M	\$6.6M	\$6.0M	\$0.1M	\$0	\$2.0k	\$13.2M	\$0.4M

^a Compliance costs are undiscounted and in 2018 dollars. These costs were developed as part of the engineering studies for Cardinal.

^b Social costs associated with each technology are discounted at 3 and 7 percent.

The cost of a CCRS retrofit exceeds the annualized benefit by a ratio of 2,517 to 1 and 2,407 to 1 at discount rates of 7% and 3%, respectively. The entrainment technology with the lowest cost to benefit ratio is 1.0 mm narrow-slot wedgewire screens, however, this technology has an annualized cost benefit ratio of 195 to 1 and 190 to 1 at discount rates of 7% and 3%, respectively. There is legislative and judicial history to aid in deciding whether these cost-benefit ratios are appropriate for mandating application of an alternative technology at the Cardinal Plant. The term “wholly disproportionate” has been used as a descriptor in judicial decisions for when the additional degree of effluent reduction is wholly out of proportion to the costs of achieving a marginal level of reduction. In an analysis of the Phase III 316(b) rule, EPA found a ratio of costs to benefits that ranged from 17-to-1 to 22-to-1 and found this to be “wholly disproportionate.” In other cases, lower ratios have been found to be “wholly disproportionate.” Comparison of these precedents with the cost benefit ratios for the Cardinal Plant suggests that the costs of any of the alternative technologies would be disproportionate to benefits.

May consider factors

The following correlate to subparagraphs of 40 CFR 125.98(f)(3) and are factors the Director may consider when determining BTA.

Entrainment impacts on the waterbody.

Surveys of the fish assemblage near the Cardinal Plant have been conducted by the Ohio River Ecological Research Program (ORERP) since 1978, except in 2002, using a variety of collection methods. Since 1991, seasonal surveys (typically June, August, and October) have been conducted by daytime seining and nighttime electrofishing at six locations, three upstream of the facility's discharge and three downstream of it. The CWIS report summarizes the number and relative abundance of fish collected by these two sampling gears from 2012 through 2016. In recent years, nine electrofishing community measures have been calculated and analyzed to detect temporal and spatial differences at the facility. One of these measures, the modified Ohio River Fish Index (mORFI_n), is an Index of Biotic Integrity that was developed by the Ohio River Valley Water Sanitation Commission (ORSANCO) specifically for the Ohio River. ORSANCO uses average mORFI_n scores to assist with determining the overall biological condition of Ohio River pools, and mORFI_n scores greater than or equal to 20.0 are considered to be in attainment of the aquatic life-use designation. The ORERP has used the mORFI_n since 2011 and mean August/October scores for the OVEC study area from 2011 through 2016 were consistently greater than 22.0 and in attainment of the aquatic life-use designation. However, the study area was in non-attainment in 2013, which was attributed to low catch rates caused by dense beds of Hydrilla that reduced electrofishing effectiveness and the well above normal flow regime in July that likely reduced recruitment of the 2013 year class for some species. Therefore, the non-attainment in 2013 was not related to operation of the Cardinal Plant.

River drift of ichthyoplankton was approximately 3.0 billion in 2015 and 3.1 billion in 2016. Therefore, the estimated entrainment of 128 million in 2015 represented approximately 4.2% of the river drift, and the estimated entrainment of 176 million in 2016 represented approximately 5.7% of the river drift. Based on in-river abundance and the highly fecund reproductive strategy for most of the common taxa entrained, it is unlikely that losses due to entrainment would have population level impacts.

ORSANCO assessed the fish community in Pike Island Pool during 2012

(<http://www.orsanco.org/programs/biological-programs/pool-results/>). ORSANCO used a random, probability-based survey design to select 15 electrofishing locations throughout the Pool. The average Pool mORFI_n score for 2012 was 31.6 and in attainment of the aquatic life-use designation.

Thermal discharge impacts.

In terms of thermal impacts, the Cardinal Plant has been granted alternate thermal effluent limitations. The facility's 316(a) demonstration showed that the thermal discharges would ensure a balanced indigenous population of shellfish, fish, and wildlife as a result of the thermal mixing zone that was granted. It is therefore reasonable to assume that the only technology that would further reduce thermal discharge temperatures (i.e., a CCRS) would not provide a significant biological benefit. The addition of narrow-slot cylindrical wedgewire or fine-mesh screens would not further reduce thermal discharge temperatures, and therefore, would not provide a biological benefit in this sense.

Credit for reductions in flow associated with the retirement of units occurring within the ten years preceding October 14, 2014.

No units were retired at the Cardinal Plant in the ten years preceding October 14, 2014.

Impacts on the reliability of energy delivery within the immediate area.

The evaluation determined that if required to install an entrainment reduction technology it would do so rather than retire Cardinal's once-through cooled units. A retrofitted CCRS at the Cardinal Plant would result in higher power requirements for additional pumping, cooling tower fan operation, and a reduced electrical energy output due to lowered turbine efficiency from increased cooling water temperatures (heat rate penalty). The additional required pumping power to the Cardinal units in the retrofitted system is estimated to be 20.7 megawatts-electric (MWe). The cooling tower fan power is estimated to require an additional 7.9 MWe. Therefore, the combined power loss while operating at full-load is approximately 28.6 MWe; which is approximately 2.3% of the plant's gross power rating of 1,240 MWe.

Retrofitting the Cardinal Plant with an all-wet CCRS would likely cause short-term decreases in the facility's electrical output during tie-in of the cooling tower during the construction phase. During operations, it does not appear that there are any times at which the turbine backpressure would approach a backpressure limit, so no capacity limit is to be expected. The increased turbine exhaust pressure, due to an expected increase in the intake cooling water temperatures used in the condenser, could result in an output restriction on the hottest days. However, based on available facility operating information, a retrofit would appear to have a minor effect on output.

Impacts on water consumption.

The Cardinal Plant uses the Pike Island Pool of the Ohio River as a source waterbody. Given that water levels in the Pike Island Pool are regulated by the United States Army Corps of Engineers to maintain a minimum pool elevation for navigational purposes and the amount of water the facility would be withdrawing is approximately 0.07% of the total river flow, minimal water consumption impacts are expected. Water consumption would be similar to the current system with the installation of fine-mesh screens. If utilizing a wet mechanical draft cooling tower, withdrawals from the river would be drastically reduced but evaporative loss would increase (approximately 50%). The estimated evaporative loss would be 11,434 gpm, an increase of approximately 5,717 gpm from open cycle flow.

The utilization of narrow-slot cylindrical wedgewire or fine-mesh travelling screens would not significantly impact the volume of water withdrawn from the Ohio River. Cardinal would not expect impacts from water consumption to change from the current condition with the use of these technologies.

Availability of process water, gray water, wastewater, reclaimed water, or other waters of appropriate quantity and quality for reuse as cooling water.

The Cardinal Plant has no available alternative source capable of supplying the volume of cooling water necessary to operate the facility using this alternative. Water reuse through use of a CCRS is discussed in the CWIS report.

BTA Evaluation – Closed-Cycle Recirculating System (CCRS)

The installation of a CCRS at the Cardinal Plant undoubtedly would result in a significant reduction in entrainment, as the intake flow would decrease by an estimated 90.3-percent. However, Ohio EPA must give significant weight to the social costs of this technology. At a 7-percent discount rate, installation of a CCRS has a cost:benefit ratio which exceeds that of any other technology by over thirteen times (2,407:1 compared to 847:1 for fine-mesh modified screens). In addition, the cost is approximately thirteen times that of 1.0mm cylindrical wedgewire screens, which can potentially outperform the CCRS biologically.

In addition to the cost concerns associated with a CCRS retrofit, the fish entrained at the Cardinal Plant are primarily forage and bait species, which do not have significant recreational value. According to surveys performed by ORSANCO, the Ohio River in the vicinity of the Cardinal Plant is meeting the aquatic life use designation, meaning an adequate forage base is available to maintain the fish community. Additionally, entrainment of federally or state-listed species has been limited to a single specimen and river surveys do not indicate notable populations of listed species near the facility.

Based on the information available, Ohio EPA has considered the factors established in 40 CFR 125.98(f)(2-3) and determined that the installation of a CCRS is not an appropriate entrainment control technology. This conclusion was reached primarily due to the unproportionate social cost:benefit ratio, discussed above.

BTA Evaluation – Narrow-Slot Cylindrical Wedgewire Screens

With respect to social costs and entrainment reduction, the installation of 1.0mm cylindrical wedgewire screens is the best option at the Cardinal Plant. The installation of this technology has a social cost:benefit ratio of approximately 190:1 (at 3% discount rate) and is estimated to have a biological effectiveness near to or better than a CCRS. However, the Cardinal Plant still finds the benefits of this compliance option to be wholly disproportionate to the costs.

Studies at OVEC have shown impingement and entrainment numbers dominated by forage and bait fish (gizzard shad, freshwater drum, etc.). The use of cylindrical wedgewire screens would result in significant reductions in entrainment from exclusion, and impingement due to the screen surface and through-screen velocity. However, the impact to federally and state-listed species, as well as recreational species would be minimal, as they are not commonly impinged/entrained at the Cardinal Plant. As previously stated, one single federally or state-listed species specimen was collected during the 2015-2016 entrainment study. While not ideal, Ohio EPA does not believe that the loss of forage base associated with operation of the Cardinal Plant's CWIS causes any significant adverse impact to the biological community.

Ohio EPA's final determination on narrow-slot cylindrical wedgewire screens was also influenced by conditions in the space that is available for the installation of this technology. The Cardinal Plant is limited to the space within their forebay to construct the new screens. Screens cannot be installed outside the forebay, as they would block the coal barges. The facility would need to install up to 64 5.5-foot diameter screens, which will leave no open space in the forebay. While the technology is feasible, there are significant uncertainties regarding the conditions in the forebay, as it relates to the operation and maintenance of the screens. The screens are designed to function in a current so that debris and organisms can statically drift by the intake. Wedgewire screens do not include an automated means to collect and remove the debris, relying on natural sweeping currents to move debris past the screens. Over time, this would lead to an accumulation of debris around the screens that would need to be manually removed. It is likely that the plant will experience debris and sediment trapped in the forebay, inhibiting the function of the screens and causing additional maintenance (cleaning, dredging, screen replacement, etc.). As there are no known comparable examples of this technology under these conditions, Ohio EPA is not recommending that the Cardinal Plant take on the financial burden of installing narrow-slot cylindrical wedgewire screens to address entrainment.

BTA Evaluation – Fine Mesh Travelling Screens

While fine-mesh traveling screens tend to be the lowest cost entrainment reduction technology, biological performance (i.e., entrainment survival) for early life stages (e.g., larvae <12 mm) is generally poor (<0 to 15%) as the larvae have not yet developed scales and musculature needed to survive the collection and handling process associated with this technology. After development of scales and musculature, biological performance improves (depending on species and life stage). Impingeable sized gizzard shad are defined in the rule as a fragile species and it is the most dominant species entrained at Cardinal. Survival is expected to be particularly

poor. Additionally, modifying the existing traveling screens with fine-mesh would result in increased through-screen velocity and, therefore, increased impingement. In order to equip the facility with fine-mesh traveling screens and maintain the through-screen intake velocity, the Cardinal Plant would need to construct a new screen house, creating significant additional financial responsibility. The small screen openings would also make the screens susceptible to clogging/fouling, increasing operation and maintenance costs.

Summary

Based on an evaluation of the application materials provided by the Cardinal Plant and the factors established in 40 CFR 125.98(f), the Director has determined that the existing CWIS represents BTA for entrainment. A compliance schedule is included in Part I, C of the permit for the Cardinal Plant to declare their intended method of compliance with the impingement mortality standard.

Cooling Water Intake Structure Compliance – Unit 3

Cooling water intake information

The CWIS for Unit 3 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:

- Design intake flow rate – 12,900 gallons per minute (gpm), or 18.6 MGD.
- Maximum design intake flow rate of pumps – 17,200 gpm or 24.8 MGD. Normal water needs can be met with three pumps while the fourth pump is held in standby and reserve mode.
- Cardinal Plant Unit 3 uses a closed-cycle cooling system. The cooling tower is presently operating at two-to-five cycles of concentration and provides a flow reduction of at least 96.5% compared to a once-through system.
- Impingement/entrainment data
 - Impingement sampling was done at Units 1 & 2 from June 2005 to June 2007
 - Custom-built mesh baskets were used to conduct 37, 24-hour sampling events
 - The collected species were dominated by gizzard shad, freshwater drum, and *Morone* species
- Operation of the cooling water system – The CWIS is operated 24 hours per day, 365 days per year. It is only shut down during unit outages.

Description of intake structure

The Unit 3 intake structure is comprised of a 96-foot long, 36-inch diameter perforated intake screen, with the perforated section spanning 59 feet. This structure is located 105 feet from the onshore caisson and 66 inches above the river bottom. Two 36-inch intake pipes deliver water from the screen to the caisson, which lies beneath the pump house. Air lines at each perforated intake header function to clean the screens using air bursts to clear trash and debris. AEP calculates the area of influence (intake velocity > 0.5 fps) to be a radius of one foot surrounding the intake screen.

Intake flow

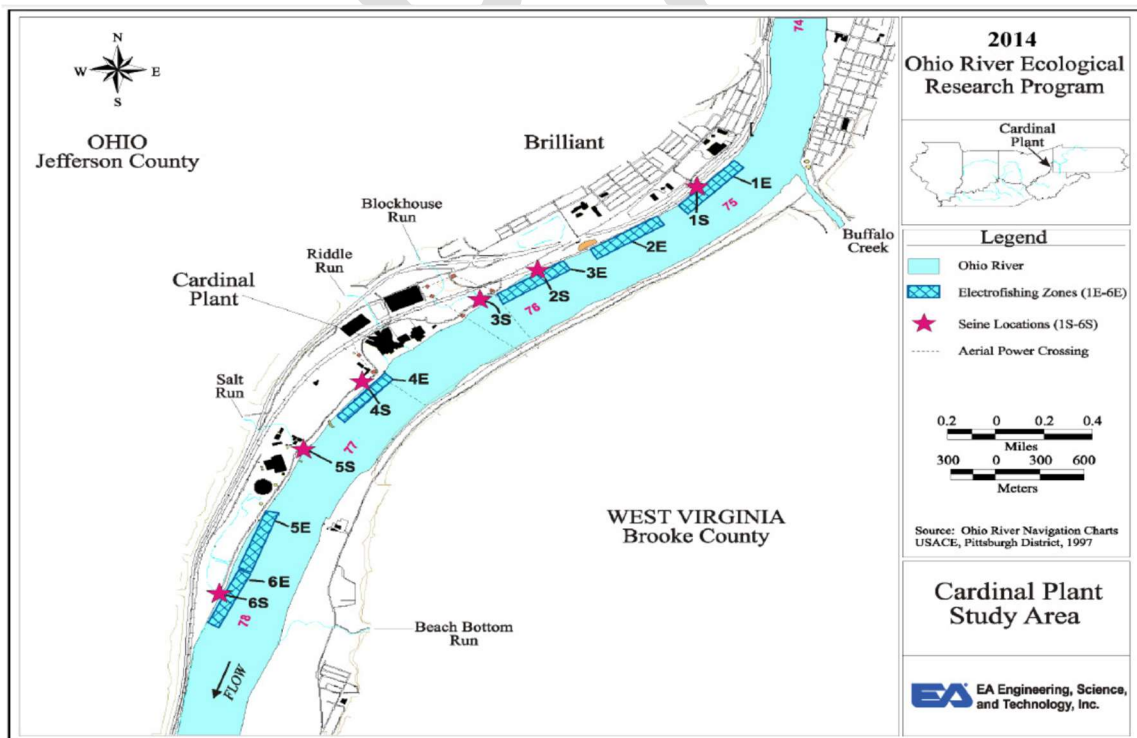
The design intake flow of the intake structure (18.6 MGD) represents only 0.09% of the mean annual Ohio River flow. The table below shows monthly withdrawal percentages for the design flow and actual flow of the intake.

Month	Ohio River Flow (MGD)	Design Flow (%)	Actual Flow (%)
January	37,000	0.05	0.02
February	35,200	0.05	0.02
March	45,300	0.04	0.01
April	39,500	0.05	0.01
May	29,600	0.06	0.02
June	18,900	0.10	0.03
July	14,200	0.13	0.03
August	11,100	0.17	0.05
September	12,500	0.15	0.03
October	13,500	0.14	0.04
November	22,000	0.08	0.03
December	33,900	0.05	0.02
*Averages calculated based on data from 2012-2015 (National Weather Service)			

Fish and wildlife in the vicinity of the intake structure

AEP submitted biological characterization data from the Ohio River Ecological Research Program (ORERP) surveys of power plants on the Ohio River. The Cardinal Plant has participated in this study since 1978.

Electrofishing and seining were performed in the study area between river miles 74.8 and 78.1. The Unit 3 intake structure is located between sampling stations 5S and 5E. A total of 407,236 fish were collected, representing 78 different species. Gizzard shad (58.59%) and emerald shiners (26.13%) made up a majority of the species collected. Significant quantities of freshwater drum (1.44%), carpsucker (1.35%), smallmouth bass (1.28%), and bluegill (1.17%) were also collected near the intake. Sampling performed at the Unit 1 & 2 intake indicated that gizzard shad, freshwater drum, emerald shiner, and temperate bass species are most likely to be affected by impingement and/or entrainment at the facility.



Federally Listed Endangered Species

The U.S. Fish and Wildlife Services (USFWS)- Information, Planning, and Conservation System (IPaC) lists no endangered or threatened species possibly present near the intake.

Federal Critical Habitat

None were identified.

State-Listed Endangered or Threatened Species

The ODNR lists the black sandshell and threehorn wartyback as state-threatened mussels that may potentially occur in this part of the Ohio River. Also included on this list as threatened species are the channel darter, river darter, and Tippecanoe darter. Due to the intake system design and life history characteristics, it is unlikely that any of these species would become impinged or entrained.

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 only fragile species found in the vicinity of the Cardinal Plant is gizzard shad.

U.S. Fish and Wildlife Services

The USFWS, Ohio Ecological Services office was provided the Cardinal Plant’s Unit 3 316(b) information submittal for a 60-day review period. No comments or objections regarding the facility’s biological data were received by Ohio EPA.

Impingement and Entrainment BTA Determination

The facility proposes the following to minimize adverse environmental impacts:

Impingement option - 40 CFR 125.94(c)(1)

The facility utilizes a recirculating cooling system with one cooling tower. This system is maintained at two-to-five cycles of concentration and reduces actual intake flow (AIF) by 96.5%.

Entrainment – 40 CFR 125.94(d)

The permittee proposes closed-cycle recirculation to minimize entrainment. Assuming that the reduction in entrainment is commensurate with reduction in flow, the Cardinal Plant’s CWIS reduces entrainment by approximately 96.5 percent. By rule, closed-cycle recirculating systems are considered BTA for both new units at existing facilities and new facilities.

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. No additional monitoring is proposed due to the withdrawal reduction from the closed-cycle recirculating system and low intake rates relative to the water body.

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

The Director may establish monitoring requirements for entrainment. No additional monitoring is proposed due to the reduction of water withdrawn due to the closed-cycle recirculating system.

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.

Reporting and Recordkeeping Requirements

40 CFR 125.97(a) – Monitoring Reports

The permittee is required to submit eDMRs which will characterize blowdown rates.

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

The permittee proposes closed-cycle recirculating system to minimize entrainment. For both *new units at existing facilities* and *new facilities*, closed-cycle recirculating systems are indicated as the best technology available according to the 40 CFR 125.94(e) and 40 CFR 125.85, respectively, although additional measures may be required depending on site conditions and *new facilities* also require additional flow requirements based on water source body. For *existing units*, the Director must weigh factors to determine whether there are entrainment control technologies that perform better than the selected technologies. However, since this facility employs closed cycle cooling and minimizes the amount of makeup water withdrawn, it was the only technology evaluated.

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).

There are no known Federally-listed, threatened and endangered species, or designated critical habitats. Gizzard shad made up nearly 60 percent of the local population and were the predominate species which would be prone to entrainment. This species utilizes broadcast spawning, making their early life stages vulnerable to entrainment. In addition, adults and juveniles are attracted to current and tend to congregate at the nearby outfall. Freshwater drum were also observed and may be susceptible to entrainment for similar reasons.

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

It is believed that this project will not increase particulate emissions. The cooling towers are already present.

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

This is not applicable as cooling towers are already on-site and allow for a closed-loop recirculating system.

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.

There is no data on the social benefits and costs of available entrainment technology of sufficient rigor to weigh this factor.

May consider factors

The following correlate to subparagraphs of 40 CFR 125.98(f)(3) and are factors the Director may consider when determining BTA.

Entrainment impacts on the waterbody.

The entrainment impacts are thought to be negligible based on the operation of a closed-cycle recirculating system and small size of the intake versus the size of the water body. Section 5.1.7 of the 316(b) application submittal indicate that the Unit 3 CWIS withdrew between 0.01 and 0.05% of the monthly average of the Ohio River flows from 2012 – 2015. In addition, Section 6.1 of the submittal provides calculations indicating a flow reduction of 96.5%. Assuming that intake flow reduction is proportional to reduction in entrainment, the facility demonstrates significant entrainment reduction.

Thermal discharge impacts.

The thermal discharge impacts of Unit 3 are thought to be negligible as the facility utilizes cooling towers.

Credit for reductions in flow associated with the retirement of units occurring within the ten years preceding October 14, 2014.

This is not applicable

Impacts on the reliability of energy delivery within the immediate area.

This is not applicable

Impacts on water consumption.

The impact on water consumption is thought to be negligible as the facility uses cooling towers and withdrawals a minimal amount versus the size of the water body. While operating at 2 cycles of concentration, loss from evaporation, drift, and blowdown require the facility to uptake approximately 10,106 gpm (14.6 MGD) in makeup water. As a result, the percent flow reduction compared to a once-through cooling flow of 288,400 gpm (415.3 MGD) is approximately 96.5%.

Availability of process water, gray water, waste water, reclaimed water, or other waters of appropriate quantity and quality for reuse as cooling water.

This is not applicable

Summary

The Director considers the Cardinal Plant's cooling water intake structure to be BTA to minimize adverse environmental impacts based on the use of a recirculating cooling system. In addition, the facility withdrawals between 0.01 and 0.05% of the monthly average of source water flows, which can be considered minimal.

DRAFT

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