

National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

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

Public Notice No.: 14-03-030
Public Notice Date: March 18, 2014
Comment Period Ends: April 18, 2014

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

Name and Address of Applicant:

Cardinal Operating Company
1 Riverside Plaza
Columbus, Ohio 43215

Name and Address of Facility Where

Discharge Occurs:

Cardinal Plant
306 County Road 7E
Brilliant, Ohio 43913
Jefferson County

Receiving Water: Ohio River, Salt Run
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 and Ohio Water Pollution Control Law (Ohio Revised Code [ORC] 6111). Decisions to award variances to Water Quality Standards or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

In accordance with the antidegradation rule, Ohio Administrative Code (OAC) 3745-1-05, it has been determined that a lowering of water quality in Blockhouse Hollow Run is necessary. Provision (D)(1)(a) was applied to this application. This provision excludes the need for the submittal and subsequent review of technical alternatives and social and economic issues related to the degradation. Other rule provisions, however, including public participation and appropriate intergovernmental coordination were required and considered prior to reaching this decision.

Procedures for Participation in the Formulation of Final Determinations

The proposed modification is tentative but shall become final on the effective date unless (1) an adjudication hearing is requested, (2) the Director withdraws and revises the proposed modification after consideration of the record of a public meeting or written comments, or (3) upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty (30) days of publication of this notice, any person may submit written comments, a statement as to why the proposed modification should be changed, a request for a public meeting on the proposed modification and/or a request for notice of further actions concerning the modification. All communications timely received will be considered in the final formulation of the modification. If significant public interest is shown a public meeting will be held prior to finalization of the modification.

Within thirty (30) days of the issuance of the proposed modification any officer of an agency of the state or of a political subdivision, acting in his representative capacity or any person aggrieved or adversely affected by issuance of it may request an adjudication hearing by submitting a written objection in accordance with ORC Section 3745.07. Since all other conditions of the permit remain in effect, a hearing may not be requested on any issues other than the proposed modification. If an adjudication hearing is requested, the existing NPDES permit will remain in effect until the hearing is resolved. Following the finalization of the modification by the Director, any person who was a party to an adjudication hearing may appeal to the Environmental Review Appeals Commission.

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 addressed to:

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

Interested persons are invited to submit written comments upon the proposed modification. Comments should be submitted in person 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 and Compliance Section
Lazarus Government Center
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 proposed modification, contact Sara Hise, (614) 644-4824, Sara.Hise@epa.ohio.gov.

Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed water quality based effluent limitations for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants:

http://epa.ohio.gov/portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf .)

In accordance with ORC Section 6111.03(J)(3), the Director established these water quality based effluent limits 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 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, written notification 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 water quality based effluent limitations 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 water quality standard(s) 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 water quality standard(s) pursuant to OAC 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific water quality standards for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

Location of Discharge/Receiving Water Use Classification

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

This segment of the Ohio River is described by Ohio EPA River Code: 25-650, U.S. EPA River Reach #: 05030106-002, 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 (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Public Water Supply (PWS), and Bathing Waters (BW).

Blockhouse Hollow Run is designated for the following uses: Limited Resource Water (LRW), IWS, and Secondary Contact Recreation (SCR).

Facility Description

The Cardinal Plant has three coal-fired steam electric generating units totaling 1830 megawatts. The process operations performed at this facility are classified by the Standard Industrial Classification code 4911 – Electric Services, Steam Electric Power Plants. Discharges resulting from process operations are therefore subject to Federal Effluent Guideline Limitations, continued in Chapter 40 of the CFR, Part 423, “Steam Electric Power Generating” Industrial Category. There are several discharges at the facility; however, the modification only concerns outfall 019.

Description of Existing Discharge

Table 1 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfall 019 only. Data are presented for the period January 2007 to December 2011.

Basis of the Modification

The Cardinal Plant is applying to 1) extend the schedule of compliance for meeting the average monthly effluent limitation for thallium at outfall 019 until August 1, 2015 and 2) increase the maximum summer-time ammonia concentration limit at outfall 019 from 2.8 mg/L to 3.7 mg/L and 3) increase the maximum summer-time ammonia loading limit from 134 kg/day to 177 kg/day. The loading increase is only a result of increasing the concentration limit; the increase is not a result of increased production.

Schedule of Compliance

Cardinal Plant requests the compliance schedule modification in Part I.C. be extended based primarily on 1) constraints on chemical treatment technologies to reduce the fly ash reservoir and outfall 019 total thallium levels to 6.3 µg/L and 2) the need for an alternate site-specific human health criterion due to factors that indicate zero or negligible human exposure to thallium in the immediate receiving stream.

Evaluation of Thallium Treatment Technologies

A study of potential thallium treatment technologies and a thallium source assessment were conducted at the Cardinal Plant. The fly ash sluice pipes were found to contain the most total thallium and the final discharge was found to be comprised mostly of dissolved thallium. Various treatment technologies were evaluated in laboratory scale tests using samples of fly ash sluice. Only organosulfide consistently reduced thallium levels to the limit or below. There are no existing proven treatment applications for an industrial waste stream designed to reduce thallium loads for a high discharge volume such as outfall 019, so in order to determine the practicality of chemical treatment for the entire outfall 019 volume flow, Cardinal Plant requires time to perform a sequence of trials. The purpose of the trials would be to determine where to apply

the chemical, how to assess the chemical treatment performance in the fly ash reservoir and final outfall, and the capital and annual operation and maintenance costs if the trials indicate feasible treatment success.

Site-Specific Criterion Evaluation

The outfall 019 receiving stream, Blockhouse Hollow Run, flows about 1.1 miles before joining the Ohio River. All of the property bordering the stream is owned by Cardinal Operating Company and human access to the stream is prevented by installed fences. The stream does not support fish species that are large enough for human consumption. The technical basis of a potential site-specific thallium human health criterion is expected to be completed within two months. However, this is only the first step to completing the site-specific study.

Ohio EPA is proposing to extend the schedule of compliance for the thallium limitation at outfall 019 as requested. The draft modification will change the final compliance deadline from August 1, 2014 to August 1, 2015. The U.S. EPA has indicated they will not object to this permit for this reason.

Ammonia Limits

Cardinal Plant requests that the summer-time ammonia maximum effluent concentration limitation of 2.8 mg/L at outfall 019 be modified to 3.7 mg/L. Following an increase the concentration limit, Cardinal Plant requests the summer-time ammonia maximum effluent loading limit of 134 kg/day at outfall 019 be modified to 177 kg/day. The request is based on a revised calculation of the maximum effluent concentration limitation, which considers available pH and temperature data at outfall 019. The effluent pH and temperature data have been updated since the last permit cycle. The concentration limits for LRW are based on OAC 3745-1-07. Utilizing the updated 75th percentile pH (8.42 S.U.) and temperature (23 °C) values and Table 7-2 of OAC 3745-1-07 yields an ammonia concentration limit of 3.7 mg/L.

Ohio EPA is proposing to make the effluent limits changes requested by Cardinal Plant. The justifications for all limits include antidegradation because LRW are exempt from the Antidegradation rule.

Figure 1. Location of Cardinal Plant

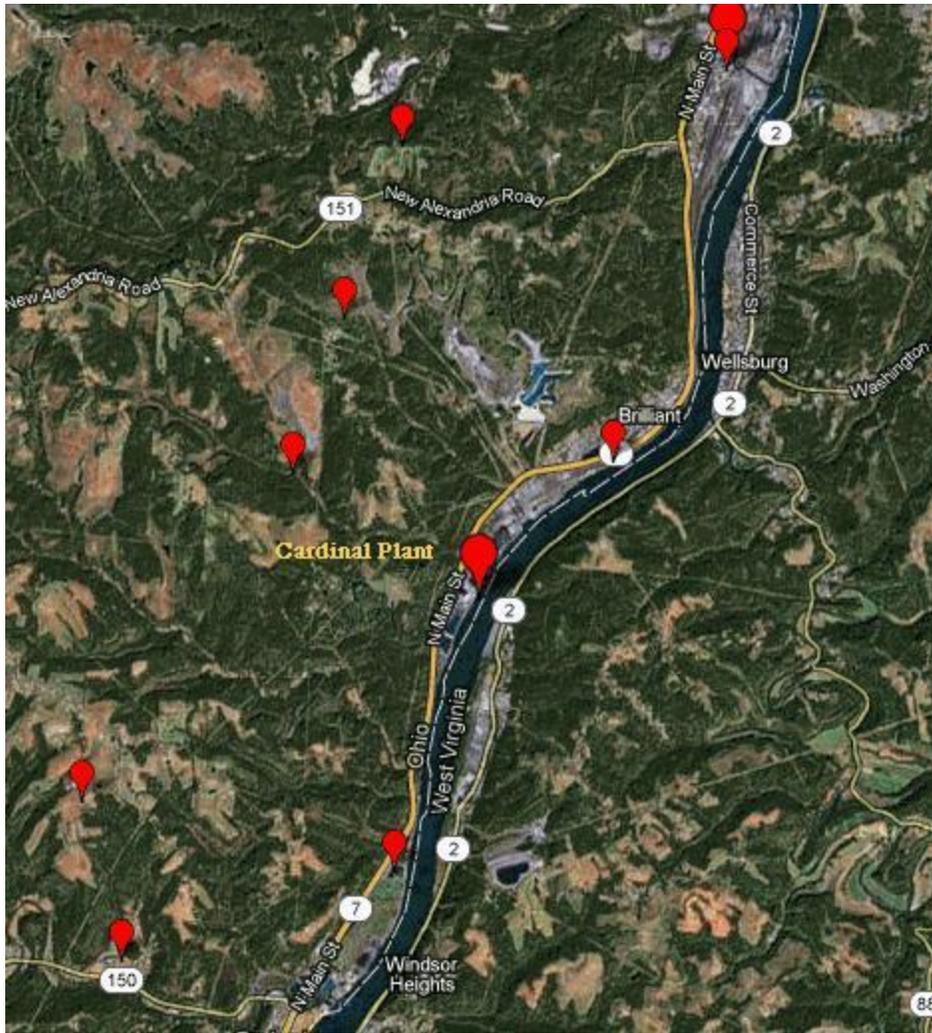


Table 1. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 th	95 th	
Outfall 019								
Specific Conductance at 25 Degrees C	Annual	µmho/cm	MONITOR		244	1920	2520	858-2780
pH	Annual	S.U.	6.5 - 9.0		500	8.25	8.63	6.87-8.91
Alkalinity, Total	Annual	mg/L	MONITOR		232	131	192	0-225
Residue, Total Dissolved	Annual	mg/L	MONITOR		231	1360	1800	443-2190
Total Suspended Solids	Annual	mg/L	30	100	480	7.5	18.5	0.5-55
Oil and Grease	Annual	mg/L	15	20	61	0	0	0-0
Ammonia	Summer	mg/L	MONITOR		238	0.65	3.63	0-9.05
Ammonia	Winter	mg/L	2.8 MAXIMUM		130	1.4	6.45	0-66
Total Nitrogen Kjeldahl	Annual	mg/L	MONITOR		7	0.9	1.75	0-1.9
Nitrite Plus Nitrate	Annual	mg/L	MONITOR		7	4.2	5.3	1.2-5.3
Chloride, Total	Annual	mg/L	MONITOR		123	74.7	108	26-121
Sulfate	Annual	mg/L	MONITOR		87	783	997	274-1120
Arsenic	Annual	µg/L	MONITOR		137	112	321	20-475
Selenium	Annual	µg/L	MONITOR		125	51	89.8	3.9-105
Boron	Annual	µg/L	MONITOR		88	2620	3620	1.44-58400
Chromium ⁺⁶ (dissolved)	Annual	µg/L	MONITOR		134	13	28.7	0-36
Copper	Annual	µg/L	MONITOR		57	0	7	0-9
Flow Rate	Annual	MGD	MONITOR		1815	10.8	14.6	0-77.1
Mercury	Annual	ng/L	MONITOR		31	1.6	5.8	0-7.6

Table 2. Modified Final Effluent Limits and Monitoring Requirements for Cardinal Plant Outfall 019

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
<i>Outfall 019</i>						
Flow	MGD	----- Monitor -----				M ^c
Specific Conductance at 25 °C	µmho/cm	----- Monitor -----				M ^c
pH	S.U.	6.5 - 9.0				WQS
Alkalinity, Total	mg/L	----- Monitor -----				M ^c
Total Filterable Solids	mg/L	----- Monitor -----				M ^c
Total Suspended Solids	mg/L	30	95	1303	4507	BEJ/BPT
Oil & Grease	mg/L	15	20	713	951	BPT
Ammonia						
Summer	mg/L	--	3.7	--	177	AD
Winter	mg/L	--	3.6	--	206	WLA
Total Kjeldahl nitrogen	mg/L	----- Monitor -----				M ^c
Nitrite + Nitrate	mg/L	----- Monitor -----				M ^c
Chloride, total	mg/L	----- Monitor -----				EP
Sulfate	mg/L	----- Monitor -----				EP
Arsenic	µg/L	----- Monitor -----				WLA
Boron	µg/L	--	33000	--	1580	WLA
Chromium ⁺⁶ (dissolved)	µg/L	----- Monitor -----				WLA
Copper	µg/L	----- Monitor -----				EP
Mercury	ng/L	----- Monitor -----				EP
Selenium	µg/L	----- Monitor -----				EP
Zinc	µg/L	----- Monitor -----				RP
Thallium	µg/L	6.3	79	0.3	3.77	WLA

^a Effluent loadings based on an average design flow of (MGD):
019 – 12.58; ammonia effluent loading based on a maximum flow of 15.16 MGD

^b Definitions: **AD** = Antidegradation Rule OAC 3745-1-05
BEJ = Best Engineering Judgment
BPT = Best Practicable Technology, 40 CFR Part 423, Steam Electric Power Generating regulations
EP = Existing Permit
M = BEJ of Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A))
WLA = Wasteload Allocation procedures (OAC 3745-2)
WQS = Ohio Water Quality Standards (OAC 3745-1)

- ^c Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.
- ^d 7 day average limit.