National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for Appalachian Power Company – Dresden Energy Facility

Public Notice No.: 187760
Public Notice Date: August 22, 2023
Comment Period Ends: September 21, 2023

Ohio EPA Permit No.: 0IB00031*ED
Application No.: OH0127892

Name and Address of Applicant:
Appalachian Power Company
1 Riverside Plaza
Columbus, OH 43215

Name and Address of Facility Where Discharge Occurs:
Appalachian Power Company – Dresden Energy Facility
9595 McGlade School Road
Dresden, OH 43821
Muskingum County

Receiving Water: Muskingum River

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.

Monitoring for mercury is proposed to continue with a tracking requirement included in Part II of the permit.

Intake monitoring is proposed to change to monitoring station 801 in lieu of the previous station 601 to match the Agency's station numbering practices. The previously used 600 series is typically reserved for internal monitoring stations where technology based effluent limitations are monitored for compliance with federal effluent guidelines. The 800 series is typically used to identify upstream and/or intake monitoring stations. Flow monitoring is proposed to be added to the intake monitoring station.

Monitoring requirements are proposed to be removed for ammonia, chromium, selenium, and zinc because there is no reasonable potential to exceed water quality standards.

Monitoring frequency requirement for Oil and Grease are proposed to be reduced due to the compliance history of the facility.

Monitoring under reporting code for total filterable residue is proposed to replace total dissolved residue. Chemical oxygen demand monitoring is proposed to be removed as total phosphorus and total filterable residue monitoring provides sufficient data to evaluate treatment performance.

In Part II of the permit, special conditions are included that address stormwater compliance; tracking of group 4 parameters; Section 316(b) requirements, treatment additives, drainage points and outfall signage.

Demineralization water is proposed to be added to the list of allowable exceptions to be discharged at stormwater outfalls identified in Part II.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

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

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

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

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

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

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

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

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

For additional information about this fact sheet or the draft permit, contact Aaron Pennington, 740-380-5272, aaron.pennington@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

Appalachian Power Company – Dresden Energy Facility discharges to Muskingum River at River Mile 89.9. Figure 1 shows the approximate location of the facility.

This segment of the Muskingum River is described by Ohio EPA River Code: 17-001, Hydrologic Unit Code: 050400049001, County: Muskingum, Ecoregion: Western Allegheny Plateau. The Muskingum River is designated for the following uses under Ohio's WQS (OAC 3745-1-24): Warmwater Habitat, Agricultural Industrial Water Supply, and Primary Contact Recreation.

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 Appalachian Power Company – Dresden Energy Facility is an electricity generating facility that can provide approximately 550 Megawatts (MW) of capacity to the electrical distribution grid. The facility is a natural gas combined cycle system with a steam generation unit rated at 175 Megawatts (MW). The facility withdraws water from the Muskingum River for process and cooling use and returns treated effluent to the Muskingum River. The industrial process at the facility includes cooling tower blowdown and low volume wastewaters.

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

DESCRIPTION OF EXISTING DISCHARGE

The Appalachian Power Company – Dresden Energy Facility has one continuous discharge outfall (001) that discharges to the Muskingum River. Figure 2 provides a flow schematic of the wastewater sources and supplies associated with Dresden Energy Facility. Process wastewater is treated by the following processes:

- Neutralization
- Filtration
- Mixing
- Dechlorination
- Sand Filters
- Additional Cooling Tower (a.k.a. “trim tower”)

A list of chemical additives used by Dresden Energy Facility is provided as Attachment 2. Drainage points identified for freeze protection on various piping were provided by permittee and shown as Attachment 3.

The sanitary wastewaters are treated by an on-site subsurface wastewater treatment system. The wastewater is percolated into unsaturated soils. This system has no discharge to surface water and is not subject to NPDES requirements.

In review of compliance data over the five-year period (May 2018 through April 2023), there were no effluent violations at outfall 001. The average flow rates for the permit cycle for outfall 001 are shown on Table 1.

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

Table 3 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period May 2018 through April 2023, and current permit limits are provided for comparison.

Table 4 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 5 summarizes the results of acute WET tests of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Muskingum River mainstem watershed assessment unit, which includes the Muskingum River in the vicinity of Dresden Energy Facility, is listed as impaired for Human Health on Ohio’s 303(d) list.

The most recent data available for Muskingum River Human Health (Fish Consumption) is from 2016. Muskingum River is impaired for Polychlorinated Biphenyl Compounds (PCBs) due to the following: historical accumulations from PCBs use within the watershed. The current permit for Dresden Energy Facility contains a special condition prohibiting the discharge of PCBs that is recommended to be maintained in the proposed permit.

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

Ohio EPA conducted biological sampling in the Muskingum River during the summer of 2006. Sites immediately upstream and downstream of the discharge location for Dresden Energy were found to be in attainment of the warmwater habitat use designation, with good to very good fish and macroinvertebrate communities (see Table 6). The complete report can be found on the Agency web site:

https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/muskingum-river-watershed

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 Appalachian Power Company – Dresden Energy Facility 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)	May 2018 through April 2023
NPDES application Form 2C data	2022

Statistical Outliers and Other Non-representative Data

The data were examined and the following value was removed from the evaluation to give a more reliable PEQ: Oil & Grease – 7.9 mg/l, 07/16/2021, this result was more than 3 times larger than the next highest value in a dataset of more than 230 samples.

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 4).

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 7).

Wasteload Allocation

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

Allocations are developed using a percentage of stream design flow as specified in Table 8, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 7 and Table 8. The WLA results to maintain all applicable criteria are presented in Table 9.

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 tests measure survival and mortality of the test organism over a short time period (48- or 96-hours). Chronic WET tests measure survival and mortality, as well as effects on growth and reproduction over a longer period of the test organism's life.

WQS for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (i.e. TUa and TUc) for use in NPDES permits by the associated WQS Implementation Rule (OAC 3745-2-09). The translation results in numeric values of 0.3 TUa and 1.0 TUc. WLAs can then be calculated using these values as if they were water quality 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 Dresden Energy Facility the WLA values for outfall 001 are 24.8 TUa (which defaults to 1.0 TUa) and 86.4 TUc.

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):

TUc = 100/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:

$$TUa = 100/LC50$$

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.

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 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 4, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 10.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for Dresden Energy Facility outfall 001 the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 001

Total Residual Chlorine, Total Residual Oxidants and pH

Limits proposed for total residual chlorine, total residual oxidants and pH are based on water quality standards. Total residual oxidants limit applies when using chemical additives containing bromine. A special condition is provided in the permit regarding the Ohio EPA Quantification Level for total residual chlorine and total residual oxidants.

Water Temperature and Thermal Discharge

Thermal WLA demonstrates that the Dresden Energy Facility does not have reasonable potential to cause exceedances of temperature WQS in the Muskingum River. Monitoring for water temperature is proposed to continue from the existing permit to document that there continues to be no temperature reasonable potential to violate WQS. Attachment 4 summarizes the thermal WLA.

Total Suspended Solids, Oil & Grease and Polychlorinated Biphenyl Compounds

Federal effluent guideline limitations (ELGs) 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. The limits recommended for total suspended solids and oil & grease are based on the ELGs found in 40 CFR Part 423. Water quality based effluent limits for oil & grease are determined by assessing the outside mixing zone maximum water quality standard for protection against adverse aesthetic conditions of 10 mg/L in combination with the narrative “free from floating oil, sheen and color film” condition. The projected effluent quality maximum for oil & grease was determined to be less than 2 mg/l, and there have been no reported permit violations or sheen incidents observed within the mixing zone. Thus, the ELGs for oil & grease of 20mg/L maximum and 15mg/l monthly applied at end of pipe have been determined to adequately protect against adverse aesthetic conditions and proposed to remain in the current permit. Due to compliance history of the facility with 228 of 233 samples reported at less than method detection, oil & grease monitoring has been reduced from 1/week to 1/month. All limits are shown as concentration limits in Attachment 1.

The NSPS requirements for polychlorinated biphenyl compounds (PCBs) and cooling tower maintenance chemicals are in Part II of the permit. NSPS require that PCBs not be discharged from plant operations, and that

cooling tower maintenance chemicals be free from priority pollutants other than chromium and zinc. Based on BPJ, Ohio EPA has extended the "free from priority pollutants" requirement to include chromium and zinc.

Mercury
The Ohio EPA risk assessment (Table 10) places mercury in group 4. This placement, as well as the data in Table 3 and Table 4, 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 for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Monitoring for mercury is proposed to continue. Mercury effluent quality falls within 75 percent of the WLA. Under OAC 3745-33-07(A)(2), parameters in this range must have a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

Ammonia, Antimony, Barium, Boron, Cadmium, Chloroform, Chromium, Cobalt, Copper, Free Cyanide, Fluoride, Iron, Lead, Molybdenum, Nickel, Nitrate + Nitrite, Selenium, Silver, Tin and Zinc
The Ohio EPA risk assessment (Table 10) places ammonia, antimony, barium, boron, cadmium, chloroform, chromium, cobalt, copper, free cyanide, fluoride, iron, lead, molybdenum, nickel, nitrate + nitrite, selenium, silver, tin, and zinc in groups 2 and 3. This placement, as well as the data in Table 3 and Table 4, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Monitoring for ammonia, chromium, selenium and zinc is proposed to be removed.

Total Phosphorus and Total Filterable Residue
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment at the facility. The reporting code for total filterable residue is proposed to replace total dissolved residue. Chemical Oxygen Demand monitoring is proposed to be removed as the Total Phosphorus and Total Filterable Residue monitoring provides sufficient data to evaluate the performance of the treatment system.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the WET data presented in Table 5 and reasonable potential analysis shown in Attachment 5 and other pertinent data under the provisions of OAC 3745-33-07(B), the Dresden Energy Facility is placed in Category 4 with respect to WET. The previous permit issuance did not require monitoring. No monitoring is proposed at this time.

Additional Monitoring Requirements
Additional monitoring requirements proposed at the final effluent, influent, intake/upstream and 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. Intake monitoring is proposed to change to monitoring station 801 in lieu of the previous station 601 to match the Agency's station numbering practices. The previously used 600 series is typically reserved for internal monitoring stations where technology based effluent limitations are monitored for compliance with federal effluent guidelines. The 800 series is typically used to identify upstream and/or intake monitoring stations. Flow monitoring is proposed to be added to the intake monitoring station.

OTHER REQUIREMENTS

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 is included in Attachment 6.

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. This BTJ conclusion has been reached based on utilization of a closed-cycle recirculating cooling water system.

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

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

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

Storm Water Compliance
To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on December 23, 2020. The certification number is 0GRN00391*AG. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than December 23, 2025, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations. Demineralization water is proposed to be added to the list of allowable exceptions to be discharged at stormwater outfalls identified in Part II.

Maintenance Operations
A special condition is proposed to be maintained in the permit to authorize the draining of the cooling tower basin, clarifier, clearwell, demineralizer tank, thickeners and service / fire water systems in addition to the drainage points included in the renewal application for maintenance operations. Permittee shall monitor total residual chlorine and pH for compliance with outfall 0IB00031001 limits before draining the cooling tower basin, clarifier, clearwell, demineralizer tank, thickeners, service/fire water systems for maintenance operations. The draining event shall be performed in a manner not to cause erosion, and documentation shall be kept on file for a minimum of three years.

“Trim Tower” Operations
A special condition is proposed to remain in the permit regarding the operation of the trim tower. Permittee maintains a cooling tower designated as "trim tower" that may be operated to reduce effluent temperature. The permittee is authorized to bypass the trim tower without providing notice per Part III, Item 11 of the permit. Effluent monitoring during these conditions shall continue as specified in the permit.

Ohio EPA Quantification Level
A special condition is provided in the permit regarding the Ohio EPA Quantification Level for total residual chlorine and total residual oxidants.

Figure 1. Location of Appalachian Power Company – Dresden Energy Facility

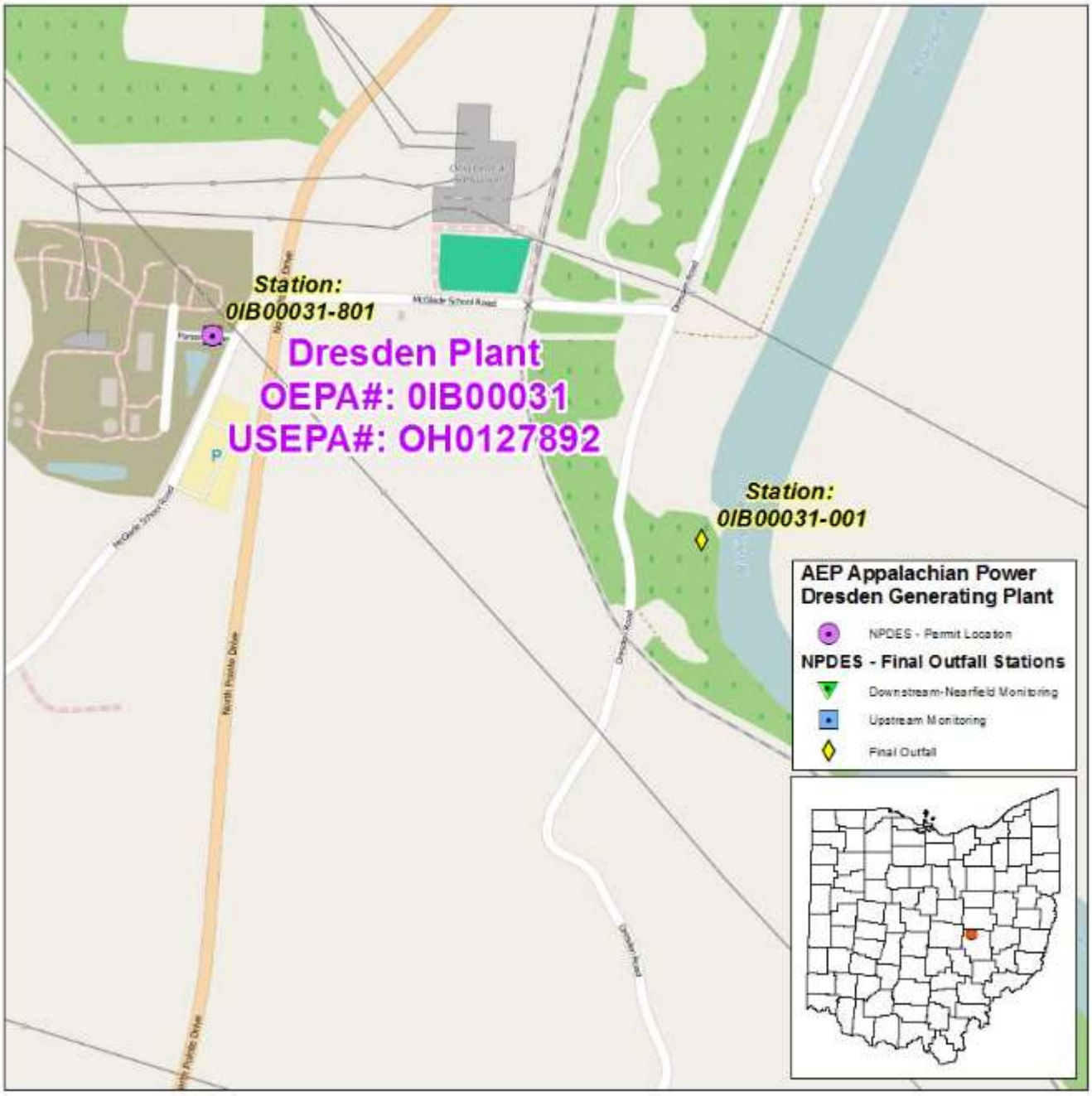

Figure 2. Water Balance Diagram

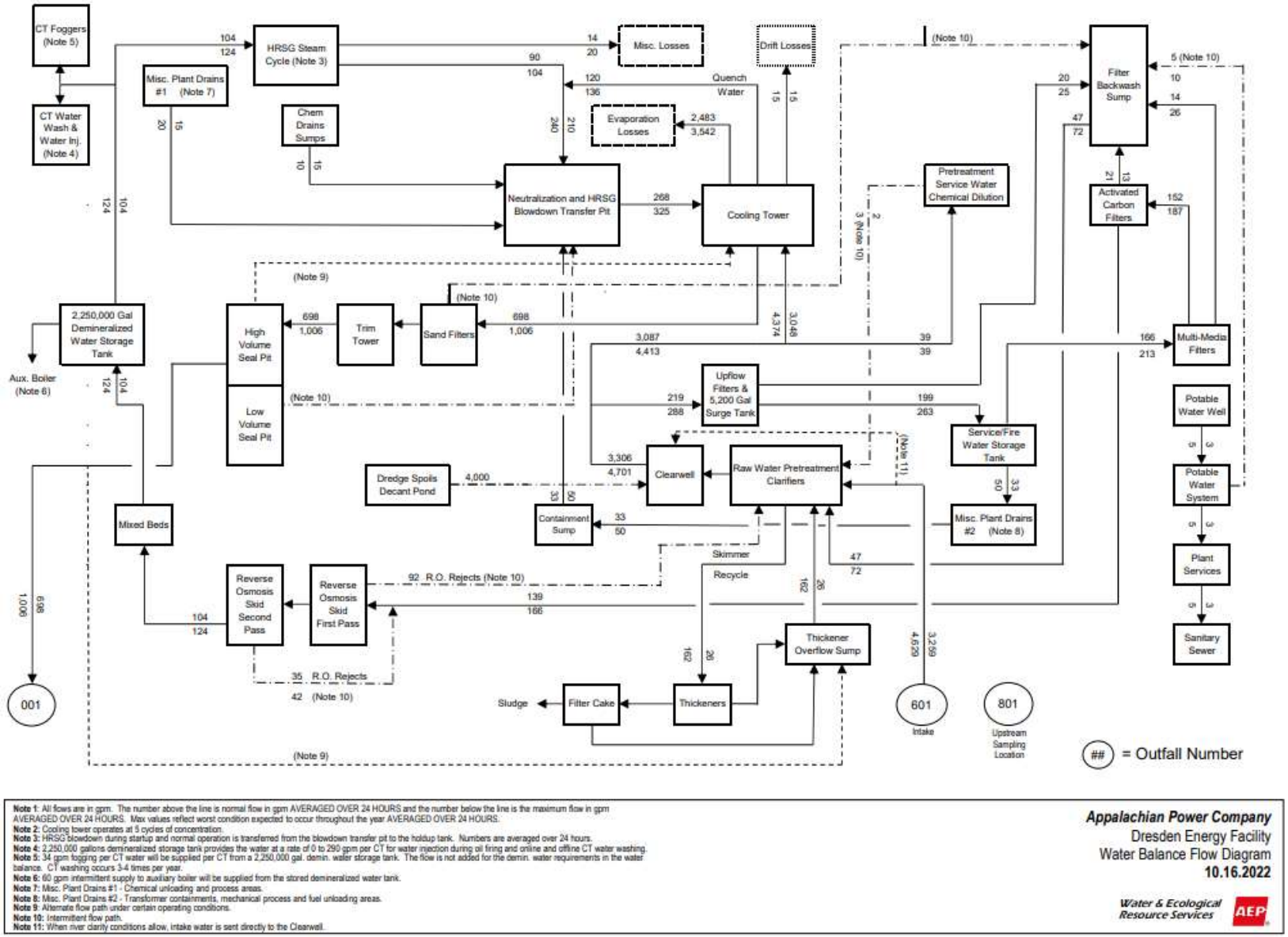

Table 1. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
May-Dec 2018	0.85	1.05	1.33
2019	0.86	1.06	1.22
2020	0.97	1.19	1.22
2021	0.97	1.10	834.00[a]
2022	1.02	1.14	1.20
Jan-April 2023	1.06	1.17	1.19

MGD = million gallons per day

[a] Entered result appears to be a decimal entry error – (likely intended to be entered as 0.834 MGD)

Table 2. Effluent Characterization Based on Form 2C Data

	Units		Max daily		No. of
Parameter	Conc	Mass	Conc	Mass	Analyses
Nitrate/Nitrite	mg/l	lb/day	3.91	30.83	1
Sulfate	mg/l	lb/day	511	4029	1
Aluminum	mg/l	lb/day	0.193	1.522	1
Barium	µg/l	lb/day	131	1.03	1
Boron	mg/l	lb/day	0.120	0.95	1
Cobalt	µg/l	lb/day	0.615	0.00485	1
Fluoride	mg/l	lb/day	0.4	3.15	1
Iron	mg/l	lb/day	0.649	5.12	1
Magnesium	mg/l	lb/day	53	418	1
Molybdenum	µg/l	lb/day	8.0	0.06	1
Manganese	mg/l	lb/day	0.0302	0.24	1
Antimony	µg/l	lb/day	1.02	0.00804	1
Copper	µg/l	lb/day	8.4	0.067	1
Nickel	µg/l	lb/day	7.25	0.0572	1
Cyanide, Total [a]	µg/l	lb/day	11.5	0.091	1
Phenols	µg/l	lb/day	3.6	0.034	1
Chloroform	µg/l	lb/day	13.3	0.105	1
Tin	µg/l	lb/day	200	1.58	1

[a] Total Cyanide value was added to dataset of free cyanide results to increase the number of observations for determining Projected Effluent Quality. The Total Cyanide value listed above was lower than the highest reported Free Cyanide value.

Table 3. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits 30 day	Current Permit Limits Daily	# Obs.	Percentiles 50th	Percentiles 95th	Data Range
Outfall 001								
Water Temperature	Annual	F	--	--	1723	74	82	53-91
Chemical Oxygen Demand (Low Level)	Annual	mg/l	--	--	60	33.1	54.7	15.5-109
pH	Annual	S.U.	6.5 to 9.0		1723	7.7	8	6.9-8.7
Residue, Total Dissolved	Annual	mg/l	--	--	233	1290	2040	276-3430
Total Suspended Solids	Annual	mg/l	30.0	100	233	6.5	13	0-22
Oil and Grease, Total	Annual	mg/l	15	20	233	0	0	0-7.9
Nitrogen, Ammonia (NH3)	Summer	mg/l	--	--	17	0.185	0.282	0.104-0.312
Nitrogen, Ammonia (NH3)	Winter	mg/l	--	--	10	0.128	0.333	0-0.456
Phosphorus, Total (P)	Annual	mg/l	--	--	19	1.93	2.6	0-3.11
Cyanide, Free	Annual	mg/l	--	--	2	0.00961	0.0118	0.00721-0.012
Selenium, Total Recoverable	Annual	ug/l	--	--	21	1.17	2	0-2
Silver, Total Recoverable	Annual	ug/l	--	--	2	0	0	0-0
Zinc, Total Recoverable	Annual	ug/l	--	--	21	0	18.5	0-18.7
Cadmium, Total Recoverable	Annual	ug/l	--	--	2	0	0	0-0
Lead, Total Recoverable	Annual	ug/l	--	--	2	0	0	0-0
Chromium, Total Recoverable	Annual	ug/l	--	--	21	5.71	14.1	0-15.9
Copper, Total Recoverable	Annual	ug/l	--	--	2	8.78	10.1	7.35-10.2
Oxidants, Total Residual	Annual	mg/l	0.0048	--	286	0	0	0-0
Flow Rate	Annual	MGD	--	--	1723	0.953	1.13	0.018-834
Chlorine, Total Residual	Annual	mg/l	0.038	--	1723	0	0	0-0
Mercury, Total (Low Level)	Annual	ng/l	--	--	60	6.9	10.2	1.86-14.8
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	--	--	2	0.3	0.57	0-0.6
Acute Toxicity, Pimephales promelas	Annual	TUa	--	--	2	0.2	0.38	0-0.4

Parameter	Season	Units	Current Permit Limits 30 day	Current Permit Limits Daily	# Obs.	Percentiles 50th	Percentiles 95th	Data Range
Outfall 601								
Water Temperature	Annual	F	--	--	1724	61	79	41-86
Phosphorus, Total (P)	Annual	mg/l	--	--	19	0.176	0.714	0-1.44
Mercury, Total (Low Level)	Annual	ng/l	--	--	60	1.58	8.42	0-13
Outfall 801								
48-Hr. Acute Toxicity Ceriodaphnia dubia	Annual	% Affected	--	--	2	0	0	0-0
96-Hr. Acute Toxicity Pimephales promelas	Annual	% Affected	--	--	2	7.5	9.75	5-10

Table 4. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Outfall 001					
Aluminum	µg/L	1	1	873.5	1196.6
Ammonia-Summer	mg/L	13	13	0.228	0.298
Ammonia-Winter	mg/L	5	5	0.766	1.049
Antimony	µg/L	1	1	4.617	6.324
Barium	µg/L	1	1	592.9	812.2
Cadmium - TR	µg/L	2	0	--	--
Chlorine, Total Residual	mg/L	1723	0	--	--
Chloroform (Trichloromethane)	µg/L	1	1	60.2	82.5
Chromium - TR	µg/L	21	18	10.86	16.82
Cobalt	µg/L	1	1	2.78	3.81
Copper - TR	µg/L	3	3	22.3	30.6
Cyanide - free	µg/L	3	3	26.28	36
Total Filterable Residue	mg/L	233	233	1842	2396
Fluoride	mg/L	1	1	1.81	2.48
Iron - TR	µg/L	1	1	2937	4024
Lead - TR	µg/L	2	0	--	--
Magnesium	mg/L	1	1	239.9	328.6
Manganese - TR	µg/L	1	1	136.7	187.2
Mercury - TR	ng/L	60	60	9.515	12.329
Molybdenum	µg/L	1	1	36.2	49.6
Nickel - TR	µg/L	1	1	32.81	44.95
Nitrate-N + Nitrite-N	mg/L	1	1	17.7	24.24
Oil & grease	mg/L	232	4	1.23	1.68
Selenium - TR	µg/L	21	18	1.9	2.6
Silver	µg/L	2	0	--	--
Sulfates	mg/L	1	1	2313	3168
Tin	µg/L	1	1	905	1240
Zinc - TR	µg/L	21	4	17.75	24.31
Boron	µg/L	1	1	543	744

MDL = analytical method detection limit
PEQ = projected effluent quality
TR = total recoverable

Table 5. Summary of Acute Toxicity Results

	Ceriodaphnia Dubia	*Pimephales promelas*
Date	TU_a	TU_a
5/2/2018	AA	AA
6/12/2018	0.6	0.4

AA = non-detection; analytical method detection limit of 0.2 TU_a although 1.0 was reported as method detection limit in monthly report.
TU_a = acute toxicity unit

Table 6. Use Attainment Table

Location	Upstream/Downstream Discharge	Use	River Mile	Status	IBI	ICI	QHEI	Year Assessed
Muskingum River at Dresden at State Route 208	Upstream	WWH	92.0	Full	46	44	83.00	2006
Muskingum River upstream Ellis Dam, just downstream Symmes Creek	Downstream	WWH	87.0	Full	36	42	60.50	2006

IBI = Index of Biotic Integrity
ICI = Invertebrate Community Index
WWH = Warmwater Habitat
QHEI = Qualitative Habitat Evaluation Index

Table 7. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Aluminum	µg/L	--	--	--	--	--
Ammonia-Summer	mg/L	--	--	1.1	--	--
Ammonia-Winter	mg/L	--	--	2.1	--	--
Antimony	µg/L	640	--	190	900	1800
Barium	µg/L	--	--	1500	6400	13000
Cadmium - TR	µg/L	--	50	5.2	13	27
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chloroform (Trichloromethane)	µg/L	20000c	--	140	1300	2600
Chromium - TR	µg/L	--	100	190	4000	7900
Cobalt	µg/L	--	--	24	220	440
Copper - TR	µg/L	--	500	21	35	69
Cyanide - free	µg/L	400	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Fluoride	mg/L	--	2	--	--	--
Iron - TR	µg/L	--	5000	--	--	--
Lead - TR	µg/L	--	100	22	420	830
Magnesium	mg/L	--	--	--	--	--
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nickel - TR	µg/L	4600	200	120	1100	2100
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Oil & grease	mg/L	--	--	--	10	--
Selenium - TR	µg/L	4200	50	5	62	120
Silver	µg/L	--	--	1.3	8.4	17
Sulfates	mg/L	--	--	--	--	--
Tin	µg/L	--	--	180	1600	3200
Zinc - TR	µg/L	26000	25000	270	270	540
Boron	µg/L	--	--	3900	33000	65000

TR= total recoverable

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	550	03144500 Muskingum River at Dresden
7Q10	cfs	annual	576	03144500 Muskingum River at Dresden
30Q10	cfs	summer	635	03144500 Muskingum River at Dresden
		winter	1150	03144500 Muskingum River at Dresden
Harmonic Mean	cfs	annual	2500	03144500 Muskingum River at Dresden
Mixing Assumption	%	average	25	
	%	maximum	25	
Hardness, OMZ	mg/l	annual	262	STORET 611750 upstream at SR 208, (2006-2020), n=11, median
Hardness, IMZ	mg/l	annual	262	STORET 611750 upstream at SR 208, (2006-2020), n=11, median
pH	S.U.	summer	8.01	Background Water Quality Report 2018, Muskingum Watershed, n=2293, 75th%
		winter	8.23	Background Water Quality Report 2018, Muskingum Watershed, n=116, 75th%
Temperature	C	summer	22.28	Background Water Quality Report 2018, Muskingum Watershed, n=2298, 75th%
		winter	5.74	Background Water Quality Report 2018, Muskingum Watershed, n=118, 75th%
Dresden Energy Facility flow	cfs	annual	1.6865	95th% of average monthly flow (May 2018 - April 2023)
Background Water Quality				
Aluminum	µg/L	annual	231	EA3; 2006-2020; n=11; 1<MDL; 611750, Median
Ammonia-Summer	mg/L	annual	0.025	EA3; 2006-2020; n=11; 6<MDL; 611750, Median of Annual data
Ammonia-Winter	mg/L	annual	0.025	EA3; 2006-2020; n=11; 6<MDL; 611750, Median of Annual data
Antimony	µg/L	annual	0	No representative data available.
Barium	µg/L	annual	59	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Cadmium - TR	µg/L	annual	0.0709	EA3; 2006-2020; n=11; 10<MDL; 611750, Median
Chlorine, Total Residual	mg/L	annual	0	No representative data available.
Chloroform (Trichloromethane)	µg/L	annual	0	No representative data available.
Chromium - TR	µg/L	annual	1	EA3; 2006-2020; n=11; 5<MDL; 611750, Median
Cobalt	µg/L	annual	0	No representative data available.

Parameter	Units	Season	Value	Basis
Copper - TR	µg/L	annual	1.28	EA3; 2006-2020; n=11; 5<MDL; 611750, Median
Cyanide - free	µg/L	annual	0	No representative data available.
Total Filterable Residue	mg/L	annual	412	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Fluoride	mg/L	annual	0	No representative data available.
Iron - TR	µg/L	annual	621	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Lead - TR	µg/L	annual	1	EA3; 2006-2020; n=11; 3<MDL; 611750, Median
Magnesium	mg/L	annual	21.6	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Manganese - TR	µg/L	annual	124	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Mercury - TR	ng/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Nickel - TR	µg/L	annual	3.65	EA3; 2006-2020; n=11; 5<MDL; 611750, Median
Nitrate-N + Nitrite-N	mg/L	annual	1.37	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Oil & grease	mg/L	annual	0	No representative data available.
Selenium - TR	µg/L	annual	0.795	EA3; 2006-2020; n=11; 6<MDL; 611750, Median
Silver	µg/L	annual	0	No representative data available.
Sulfates	mg/L	annual	102	EA3; 2006-2020; n=11; 0<MDL; 611750, Median
Tin	µg/L	annual	0	No representative data available.
Zinc - TR	µg/L	annual	5	EA3; 2006-2020; n=11; 6<MDL; 611750, Median
Boron	µg/L	annual	0	No representative data available.

TR = total recoverable
MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
Ohio EPA = Ohio Environmental Protection Agency
STORET = United States Environmental Protection Agency Storage and Retrieval Data Warehouse

Table 9. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Aluminum	µg/L	--	--	--	--	--
Ammonia-Summer	mg/L	--	--	102.29	--	--
Ammonia-Winter	mg/L	--	--	355.83	--	--
Antimony	µg/L	237818	--	16413	74277	1800
Barium	µg/L	--	--	124538	523380	13000
Cadmium - TR	µg/L	--	18553	443	1067	27
Chlorine, Total Residual	mg/L	--	--	0.95	1.6	0.038
Chloroform (Trichloromethane)	µg/L	7431800	--	12094	107289	2600
Chromium - TR	µg/L	--	36788	16328	330038	7900
Cobalt	µg/L	--	--	2073	18157	440
Copper - TR	µg/L	--	185321	1705	2784	69
Cyanide - free	µg/L	148636	--	1037	3796	92
Total Filterable Residue	mg/L	--	--	94398	--	--
Fluoride	mg/L	--	743	--	--	--
Iron - TR	µg/L	--	1627814	--	--	--
Lead - TR	µg/L	--	36788	1815	34581	830
Magnesium	mg/L	--	--	--	--	--
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	1727679	15680661	370000
Nickel - TR	µg/L	1707961	72965	10054	90485	2100
Nitrate-N + Nitrite-N	mg/L	--	36651	--	--	--
Oil & grease	mg/L	--	--	--	825	--
Selenium - TR	µg/L	1560383	18285	364	5052	120
Silver	µg/L	--	--	112	693	17
Sulfates	mg/L	--	--	--	--	--
Tin	µg/L	--	--	15549	132048	3200
Zinc - TR	µg/L	9659487	9287897	22897	21875	540
Boron	µg/L	--	--	336897	2723483	65000

TR = total recoverable

Table 10. Parameter Assessment

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

Aluminum	Magnesium	Manganese - TR
Sulfates		

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

Ammonia-Summer	Antimony	Cadmium - TR
Chlorine, Total Residual	Chromium - TR	Cobalt
Lead - TR	Molybdenum	Nitrate-N + Nitrite-N
Oil & grease	Silver	Zinc - TR
Boron		

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

Ammonia-Winter	Barium	Chloroform (Trichloromethane)
Copper - TR	Cyanide - free	Total Filterable Residue
Fluoride	Iron - TR	Nickel - TR
Selenium - TR	Tin	

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 - TR

Mercury - TR requires a permit tracking requirement in accordance with OAC 3745-33-07(A)(2) since the PEQ is > or = 75 percent of the PEL.

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 meet Group 5 criteria

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

Table 11. Final Effluent Limits

		Concentration		Loading (kg/day)		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[a]
Outfall 001						
Water Temperature	°F	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - -		M[b]
pH	S.U.	6.5 - 9.0		--	--	WQS
Flow Rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - -		M[b]
Total Suspended Solids	mg/L	30.0	100.0	--	--	NSPS
Total Filterable Residue	mg/L	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - -		BTJ
Total Phosphorus	mg/L	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - -		BTJ
Oxidants, Total Residual	mg/L	--	0.0048	--	--	WLA/IMZM
Chlorine, Total Residual	mg/L	--	0.038	--	--	WLA/IMZM
Mercury, Total Recoverable	ng/L	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - -		RP
Oil & Grease	mg/L	15.0	20.0	--	--	NSPS

[a] Definitions:

BTJ = Best Technical Judgment
M = BEJ of Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges

NSPS = New Source Performance Standard, 40 CFR Part 423
OAC = Ohio Administrative Code
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)

[b] 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 423.15 - New Source Performance Standards

Parameter	Daily Maximum	30-Day Average
	mg/L	mg/L
Low volume waste sources		
Total Suspended Solids [a]	100.0	30.0
Oil & Grease [a]	20.0	15.0
Cooling Tower Blowdown		
Chlorine, Free Available [b]	0.5	0.2
Chromium, Total [c]	0.2	0.2
Zinc, Total [c]	1.0	1.0

[a] The concentration limits applied to low volume wastewaters have been extended to apply to cooling tower blowdown similar to the existing permit. Previous versions of the permit included the same oil & grease limits and average total suspended solids concentration limit collectively to low volume waste sources and cooling tower blowdown.

[b] Chlorination and Bromination limits in 40 CFR 423.15 are less stringent than water quality standards, thus the proposed limit for total residual chlorine is a water quality based effluent limit. Dresden Energy Facility has stated it does not use or intend to use bromine compounds. In addition, chlorination occurs 24 hours per day and dechlorination is routinely provided.

[c] Based on BPJ, Ohio EPA has extended the "free from priority pollutants" requirement to include chromium and zinc.

The NSPS requirements for polychlorinated biphenyl compounds (PCBs) and cooling tower maintenance chemicals are in Part II of the permit. NSPS require that PCBs not be discharged from plant operations, and that cooling tower maintenance chemicals be free from priority pollutants other than chromium and zinc.

Attachment 2. List of Approved Boiler/Cooling Water System Additives

Product	Feed Point	Description	Product Concentration (mg/L)
Magnesium chloride	N/A	Road deicer	N/A
19% Aqueous Ammonia	SCR and HRSG	pH Control	Aqueous Ammonia
Gengard GN7004	Cooling Tower Water	Biocide	6.0
Continuum AT3242	Cooling Tower Water	Biocide	6.0
Biomate MBC2881	Reverse Osmosis System	Biocide	0.05
Foamtrol AF2220	Cooling Water System	Antiform	1.0
Gengard GN7300	Cooling Water System	Cooling Tower Mild Steel Corrosion	2.8
Hypersperse MDC775	Reverse Osmosis System	RO Antiscalant	3.0
Klaraid CDP1360	Wastewater Treatment	Influent Clarifier	3.0
Klaraid IC1172	Wastewater Treatment	Pretreatment Filter Aide	5.0
Novus CE7090	Wastewater Treatment	Flocculant	0.1
Polyfloc AE1123	Wastewater Treatment	Influent Clarifier	0.1
Polyfloc AE1125	Wastewater Treatment	Influent Clarifier	0.1
Depositrol BL6501	Cooling Water System	Cooling Tower Antiscalant	50
Corrshield MD4100	Cooling Water System	Closed Cooling Corrosion Control	0.0*
ChemTreat P8285L	Contact Clarifier Inlet	Coagulant	Ferric Chloride Blend
ChemTreat CL-5437	Cooling Water Tower	Scale/Corrosion Inhibitor	N/A
ChemTreat CT-775	Cooling Water Tower	Scale/Corrosion Inhibitor	Otrho-Phosphate
ChemTreat CL-241	Cooling Water Tower	Anti-foam	N/A
ChemTreat BL-1302	DI Inlet Feed	Sodium Hydroxide	Sodium Hydroxide
ChemTreat RL-124	RO Treatment	Dichlorination	Non-catalyzed Sodium Sulfite
ChemTreat RL-9007	RO Treatment	Anti-Scalant	N/A
ChemTreat BL-126	Trim Towers	Biocide	Hydrogen Peroxide
ChemTreat RL-120	River Intake	Filter aid	Poly (diallyldimethylammonium chloride)
ChemTreat CL-206	RO Treatment	Biocide	2-2-dibromo-3-nitrilopropionamide

*No product residual remaining after use

Approved ChemTreat additives from 2016 NDPES Renewal. Supply chain issues may require future use.

Attachment 3. Drainage Points for Freeze Protection

Number	Dresden Plant System	DWG No.	Sheet	Valve Number	Pipe Dia (in)	Pipe L (ft)	Gallons	ISO No.
1	High Pressure Steam Piping	M201	Sheet 1	1AHP031	10	3	12.24	M401/1
2	High Pressure Steam Piping	M201	Sheet 1	1AHP032	10	55	224.38	M401/1
3	High Pressure Steam Piping	M201	Sheet 1	1AHP033	10	1	4.08	M401/2
4	High Pressure Steam Piping	M201	Sheet 1	1BHP031	10	3	12.24	M401/3
5	High Pressure Steam Piping	M201	Sheet 1	1BHP032	10	55	224.38	M401/3
6	Aux Boiler System	M202	Sheet 1	1SAS006	4	4	2.61	M402/2
7	Low Pressure Steam System	M203	Sheet 1	1ALD003	18	1	13.22	M403/1
8	Low Pressure Steam System	M203	Sheet 1	1ALP019	10	4.5	18.36	M403/1
9	Low Pressure Steam System	M203	Sheet 2	1SLP008	10	5	20.40	M403/4
10	Condensate System	M206	Sheet 2	1BCD-DR01	10	158	644.59	M406/4
11	Condensate System	M206	Sheet 2	1ACD-DR01	10	90	367.17	M406/4
12	Circ Cooling Water and Aux Circ Cooling Wtr	M207	Sheet 1	1CCC-DR01	24	50	1174.96	M407/9
13	Plant Water System	M208	Sheet 1	V-1302	3	2	0.73	M408/49
14	Plant Water System	M208	Sheet 1	V-1004	16	32	334.21	M408/44
					12	8	47.00	M408/44
15	Plant Water System	M208	Sheet 1	V-1003	16	32	334.21	M408/44
					12	14	82.25	M408/44
16	Plant Water System	M208	Sheet 1	V-1007	16	19	198.44	M408/40
					12	12	70.50	M408/40
17	Plant Water System	M208	Sheet 1	V-1009	16	19	198.44	M408/40
					12	7	41.12	M408/40
18	Service Water System	M226	Sheet 1	1CDR-SW003	3	40	14.69	M426/2
19	Service Water System	M226	Sheet 1	1CDR-SW004	3	7	2.57	M426/2
20	Service Water System	M226	Sheet 1	1CDR-SW001	6	49	71.97	M426/2
21	Demin Water System	M238	Sheet 1	1CDW042	6	10	14.69	M438/2
22	Demin Water System	M238	Sheet 1	1CDW034	8	49	127.94	M438/1
23	Demin Water System	M238	Sheet 1	1CDW-DR03	4	93	60.71	M438/3
24	Demin Water System	M238	Sheet 1	1CDW-DR05	6	58	85.18	M438/4
25	Demin Water System	M238	Sheet 1	1CDW-DR08	4	34	22.19	M438/7
26	Demin Water System	M238	Sheet 1	1CDW-DR07	4	34	22.19	M438/7
27	Demin Water System	M238	Sheet 1	1CDW-DR04	4	84	54.83	M438/3
28	Cold Reheat System	M255	Sheet 1	1BCR004	12	1	5.87	M455/2
29	Cold Reheat System	M255	Sheet 1	1SCR008	12	1	5.87	M455/3
30	Cold Reheat System	M255	Sheet 1	1ACR004	12	2	11.75	M455/1
31	Hot Reheat System	M256	Sheet 1	1BHR013	12	1	5.87	M456/2
32	Hot Reheat System	M256	Sheet 1	1AHR013	12	1	5.87	M456/1
33	High Pressure Steam Piping	M214	Sheet 1	1ABD023	2	40	261.6	M414/20
34	High Pressure Steam Piping	M214	Sheet 1	1ABD024	2	80	116.7	M414/17
35	High Pressure Steam Piping	M214	Sheet 1	1ABD025	2/2.5	80	38.7	M414/7

Number	Dresden Plant System	DWG No.	Sheet	Valve Number	Pipe Dia (in)	Pipe L (ft)	Gallons	ISO No.
36	High Pressure Steam Piping	M214	Sheet 6	1ABD030	3	40	45	M414/8
37	High Pressure Steam Piping	M214	Sheet 6	1ABD031	3	40	58.9	M414/19
38	High Pressure Steam Piping	M214	Sheet 6	1ABD032	1.5	40	32.3	M414/16
39	Low Pressure Steam System	M204	Sheet 1	1ACD508	6	40	31.2	NEM 442-06
40	Low Pressure Steam System	M204	Sheet 1	1ACD511	4	40	90.7	NEM 442-06
41	Low Pressure Steam System	M204	Sheet 1	1ACD513	6	40	31.2	NEM 442-05
42	Low Pressure Steam System	M204	Sheet 1	1ACD516	4	40	90.7	NEM 442-05
43	High Pressure Steam Piping	M214	Sheet 4	1BBD023	2	40	261.6	M414/44
44	High Pressure Steam Piping	M214	Sheet 4	1BBD024	2	40	116.7	M414/41
45	High Pressure Steam Piping	M214	Sheet 4	1BBD025	2/2.5	80	38.7	M414/31
46	High Pressure Steam Piping	M214	Sheet 6	1BBD030	3	40	45	M414/32
47	High Pressure Steam Piping	M214	Sheet6	1BBD031	3	40	58.9	M414/43
48	High Pressure Steam Piping	M214	Sheet 6	1BBD032	1.5	40	32.3	M414/40
49	Low Pressure Steam System	M204	Sheet 6	1BCD508	6	40	31.2	NEM 442-06
50	Low Pressure Steam System	M204	Sheet 6	1BCD511	4	40	90.7	NEM 442-06
51	Low Pressure Steam System	M204	Sheet 6	1BCD513	6	40	31.2	NEM 442-05
52	Low Pressure Steam System	M204	Sheet 6	1BCD516	4	40	90.7	NEM 442-05
53	Demin Water System	M238	Sheet 1	1CDW-DR04 (1CDW06C)	4	40	597.8	M438/3
54	Demin Water System	M238	Sheet 1	1CDW-DR05	6	40	95	M438/9
						Total Water Volume:	6824.53	

Attachment 4. Thermal Wasteload Allocation

Background flows:	Average = Summer 30Q10 =	635	cfs
	Maximum = Summer 1Q10 =	548	cfs
25% of flows:	Average =	158.75	cfs
	Maximum =	137	cfs

Facility flow: 1.09 MGD 1.69 cfs

	Summer Temperature (F) Maximum	Average	
Upstream	78	73.5	Muskingum River 75th percentile 601 Monitoring Station (Summer)
WQS	89	85	

Upstream temperature data at 0IB00031601 from June 2018 through September 2022

Average = 75th percentile of monthly averages June through September
Maximum = 75th percentile of data from June through September

WQS from OAC 3745-1-35 E

Summer Maximum = (137 cfs)X(0.646 MGD/cfs)X(8.34lb/day)X(89-78)=	8,119	MBTU/day
	338	MBTU/hr
Summer Average = (158.75 cfs)X(0.646 MGD/cfs)X(8.34lb/day)X(85-73.5)=	9,836	MBTU/day
	410	MBTU/hr

Reasonable Potential Analysis
From same period June-Sept for 2018 -2022, For each day: (001 Temp – 601 Temp) X (001 Flow in MGD) X (8.34lb/day) / 24hrs/day = MBTU/hr. Negative values removed to calculate PEQmax and PEQaverage

	Allocation MBTU/hr	PEQ MBTU/hr	PEQ% of WLA	Group
Maximum	338	2.551	0.75%	3
Average	410	1.862	0.45%	3

Attachment 5. Whole Effluent Toxicity Reasonable Potential Analysis

Reasonable potential analyses were performed for *Ceriodaphnia dubia* acute (TUa Cd) and *Pimephales promelas* acute (TUa Pp).

Hazard Category Summary

	Ceriodaphnia dubia		*Pimephales promelas*	
	Acute	**Chronic**	**Acute**	**Chronic**
Effluent Toxicity (Table A)	4	--	--	--
Near-Field Impact (Table B)	--		--	
Far-field Impact (Table C)		--		--
	4		4	

Hazard Categories: 1: Toxicity adequately documented 3: Toxicity possible
2: Toxicity strongly suspected 4: No toxicity

Table A. Effluent Toxicity

	Ceriodaphnia dubia		*Pimephales promelas*	
	Acute	**Chronic**	**Acute**	**Chronic**
WLA	1.0	--	1.0	--
# of tests	2	--	2	--
Maximum value	0.6	--	0.4	--
Percent of tests >WLA	0%	--	0%	--
Geometric mean	0.24	--	0.20	--
Average Exceedance (Geomean * Percent of tests >WLA)	0	--	0	--
Average Exceedance / WLA	0	--	0	--

Attribute Evaluated	**Hazard Category 1**	**Hazard Category 2**	**Hazard Category 3**	**Hazard Category 4**
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Minimum number of tests	3	1	0 or 1	0 or 1 TUa Cd TUa Pp
(2) Percent of tests >WLA	>30	20 to 30	10 to 20	<10 TUa Cd TUa Pp
(3) Average Exceedance/WLA[1] (Tables B and C data not available)				
(a) Acute[2]	> 0.3	≥ 0.3	≥ 0.2	< 0.2 TUa Cd TUa Pp
(b) Chronic	> 0.3	≥ 0.3	≥ 0.2	< 0.2
(3) Average Exceedance/WLA[1]				

Attribute Evaluated	**Hazard Category 1**	**Hazard Category 2**	**Hazard Category 3**	**Hazard Category 4**
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(Tables B and C data available)				
(a) Acute[2]	> 0.5	≥ 0.3	≥ 0.3	< 0.3
(b) Chronic	>0.67	≥ 0.5	≥ 0.5	< 0.5
(4) Maximum TU value (Tables 3B and 3C data not available)	≥(3xWLA)	≥WLA	≥WLA	<WLA TUa Cd TUa Pp
(4) Maximum TU value (Tables 3B and 3C data available)	> WLA	≥ WLA	≥ 0.5xWLA	0.5xWLA

[1] Compare (per cent exceedances x geometric mean TU) to table factor.
[2] Use 0.3 x WLA for situations where AIM exists.
[3] Results of ambient toxicity test are not binding or required for classification as to category but, if available, will be interpreted under the weight of evidence principle giving due consideration as to sampling location and conditions.
[4] Based on effluent data. May not be appropriate for situations where AIM exists.
[5] Lack of attainment due to toxic, complex or unidentifiable type of impact.
[6] The LC50-based criteria are used only for pollutant parameters that do not have numeric criteria.

Attachment 6. Cooling Water Intake Structure Compliance

Cooling water intake structure information

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

- The design intake flow (DIF) of the CWIS is 7.78 MGD.
- The use of closed-cycle recirculating cooling (mechanical draft cooling tower), which results in a reduction of approximately 97-percent from the baseline water need (~300 MGD).
- The maximum through-screen intake velocity – 0.5 feet per second (fps).
- Cylindrical wedgewire screens with 0.125-inch openings.
- The maximum design intake flow is roughly 0.3-percent of the annual mean flow of the Muskingum River.

Description of intake structure

The CWIS withdrawals water from three 21-inch diameter cylindrical wedgewire screens, located along the sheet piling wall on the bank of the Muskingum River. The screens are fabricated from coper/nickel and stainless steel and have a slot size of 1/8-inch. Impinged organisms are released from the screens using a pressurized water stream and returned to the intake channel via an 18-inch return flume. Two pumps with a design capacity of 2,700 gpm each pump water from the screen house to the intake basin, from which water passively flows to the plant by gravity. Another pump with the same capacity is available, but not used in unison with the other two pumps.

Fish and wildlife in the vicinity of the intake structure

Federally-Listed Mussel Species
The U.S. Fish and Wildlife Services (USFWS) lists the mussel species in the table below as endangered or threatened.

Common Name	Scientific Name	Listing Status
Fanshell	*Cyprogenia stegaria*	Endangered
Rabbitsfoot	*Quadrula cylindrica cylindrica*	Threatened
Sheepnose	*Plethobasus cyphyus*	Endangered
Snuffbox mussel	*Epioblasma triquetra*	Endangered

Federal Critical Habitat
None were identified.

Other Agency Reviews

The USFWS, Ohio Ecological Services office was provided the facility's 316(b) information submittal for a 60-day review period. No objections regarding the facility's biological data were received by Ohio EPA.

Impingement and Entrainment (I/E)

No facility specific I/E information was included in the application materials because the Dresden Energy Facility utilizes a closed-cycle recirculating system, which reduces raw water need by approximately 97-percent.

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

This facility utilizes the following to minimize adverse environmental impacts:

1. **Impingement**

    a. ***Impingement Mortality BTA - 40 CFR 125.94(c)(5):*** The Dresden Energy Facility proposes closed-cycle recirculating system as the impingement BTA compliance option. The facility operates a mechanical draft cooling tower that meets the definition at 40 CFR 125.92(c).

2. **Entrainment**

    a. ***Site-Specific Entrainment Standards – 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 facility's CWIS reduces entrainment by approximately 97-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. A flow monitoring requirement is proposed for the intake station to characterize makeup water withdrawals.

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

The Director may establish monitoring requirements for entrainment. A flow monitoring requirement is proposed for the intake station to characterize makeup water withdrawals.

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 discharge 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).

The entrainment impacts are expected to be reduced commiserate with the 97-percent reduction in water need achieved by the CWIS. Further, the CWIS contains cylindrical wedgewire screens with narrow openings and a through-screen velocity that does not exceed 0.5 fps. Impacts to aquatic life in the vicinity of the intake are expected to be minimal.

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

The facility is already permitted for emissions associated with the cooling tower.

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

No evaluation was performed on land availability as it relates to additional entrainment reduction technologies.

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.

Summary

The Director considers the Dresden Energy Facility's cooling water intake structure to be BTA to minimize adverse environmental impacts based on the use of closed-cycle recirculation.

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