National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for Duke Energy Ohio, Inc. Walter C. Beckjord Station

Public Notice No.: 13-10-009
Public Notice Date: October 2, 2013
Comment Period Ends: November 1, 2013

Ohio EPA Permit No.: 1IB00000*MD
Application No.: OH0009865

Name and Address of Applicant:
Duke Energy Ohio, Inc.
Walter C. Beckjord Station
139 East Fourth Street, Room EM740
Cincinnati, Ohio 45202

Name and Address of Facility Where Discharge Occurs:
Duke Energy Ohio, Inc.
Walter C. Beckjord Station
757 State Route 52
New Richmond, Ohio 45157
Clermont County

Receiving Water: Pond Run Creek
Tenmile Creek, Ohio 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.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by the United States EPA (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 monitoring requirements in this permit are mostly the same as the previous permit.

New copper limits are proposed at Outfalls 002 and 005 based on the reasonable potential to exceed WQS. New *E. coli* limits are proposed at Outfall 005 in accordance with new WQS. New monitoring for arsenic, barium, and zinc is proposed at Outfall 025 based on the reasonable potential to exceed WQS.

The limit for zinc is proposed to be removed at Outfall 009. Monitoring for strontium is proposed to be removed at Outfall 012. Monitoring for boron is proposed to be removed at Outfall 025. None of these parameters have the reasonable potential to exceed WQS.

In Part II of the permit, special conditions are included that operator certification, minimum staffing and operator of record; outfall signage; and thermal loading calculations.

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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 addressed 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 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 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 Sara Hise, (614) 644-4824, sara.hise@epa.ohio.gov.

Location of Discharge/Receiving Water Use Classification

The Duke Energy Ohio, Inc. Walter C. Beckjord Station (Beckjord) discharges to the Ohio River at Mile Point 528.2. Beckjord also discharges to Pond Run Creek and Tenmile Creek near their confluence with the Ohio River. Figure 1 shows the approximate location of the facility.

This segment of the Ohio River is described by Ohio EPA River Code: 25-100, U.S. EPA River Reach #: 05030201, County: Clermont, Ecoregion: Interior Plateau. The Ohio River is designated for the following uses under Ohio's WQS (Ohio Administrative Code [OAC] 3745-1-32): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Public Water Supply (PWS), and Bathing Waters (BW). Pond Run Creek and Tenmile Creek are designated for the following uses under OAC 3745-1-17: WWH, AWS, IWS, and Class B Primary Contact Recreation (PCR).

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 (PCR) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

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

Facility Description

Beckjord is a coal-fired steam electric generation station owned by Duke Energy Ohio, Inc. This facility is involved in the generation, transmission, and distribution of electric power. Beckjord's processes generate wastewaters which are regulated by the federal effluent guidelines (FEGs) listed in 40 CFR 423, "Steam Electric Power Generating Point Source" Category. The process operations at this facility are also defined by the standard industrial classification (SIC) code 4911 – Electric Services.

The facility has six power-generating units built between 1949 and 1969. Plans are underway to retire the power-generating units by the end of 2015, although some processes will still be active.

Description of Existing Discharge

Beckjord has several outfalls, which are described as follows:

Outfall #	Wastewater Source	Treatment System	Discharge Point
001	Condenser cooling water, boiler blowdown, filter backwash, heat	Disinfection, dechlorination	Ohio River

	exchangers		
002	Ash Pond B (North Ash Pond), Reverse osmosis, coal pile runoff, ash and pyrite conveying, drains, car rinse, ash landfill leachate collection	Sedimentation, flocculation/coagulation, neutralization, skimming	Ohio River
003	Ash Pond C (South Ash Pond), drains, ash and pyrite conveying, boiler tube chemical cleaning, oil and grease separator	Sedimentation, flocculation/coagulation, neutralization, skimming	Ohio River
005	Sanitary sewage treatment plant	Aerobic digestion, activated sludge, disinfection	Ohio River
006	Roof drainage collection tank #1	None	Ohio River
007	Roof drainage collection tank #2	None	Ohio River
008	Coal pile runoff emergency overflow	None	Ohio River
009	Storm water	Oil/Water separator	Ohio River
010	Ash Pond C extension	Sedimentation, neutralization, skimming	Ohio River
011	Ash Pond C dike south leak collection	None	Pond Run Creek
012	Ash Pond C dike north leak collection	None	Pond Run Creek
013	Storm water	None	Pond Run Creek
014	Storm water	None	Pond Run Creek
016	Storm water	None	Ohio River
017	Storm water	None	Ohio River
018	Storm water	None	Ohio River
019	Storm water	None	Ohio River
020	Storm water	None	Ohio River
021	Storm water	None	Tenmile Creek
022	Storm water	None	Pond Run Creek
023	Ground water interceptor well	None	Ohio River
024	Coal pile runoff emergency overflow	None	Ohio River
025	Storm water from Pond Run Ash Landfill Sedimentation Pond	Sedimentation, skimming	Unnamed tributary of Pond Run Creek
026	Storm water from Pond Run Ash Landfill (west side)	None	Unnamed tributary of Pond Run Creek
027	Storm water from Pond Run Ash Landfill (east side)	None	Unnamed tributary of Pond Run Creek
611	Boiler blowdown from Units 1 through 6	None	Outfall 001
612	Effluent from boiler tube chemical waste treatment pond	pH adjustment, settling	Outfalls 002 and 003
631	Discharge from miscellaneous heat exchangers (non-contact cooling water)	Dechlorination	Outfall 001

The approximate location of the outfalls is shown on Figure 2. Outfall 001 discharges the most wastewater of any outfall at the facility. The wastewater is composed primarily of condenser cooling water, with smaller amounts of boiler blowdown, filter backwash, and heat exchanger discharge. Intake water from the Ohio River is continuously chlorinated prior to use at the plant. Dechlorination is included in the treatment system prior to discharge at Outfall 001.

Outfalls 002 and 003 receive wastewater from the North ("B") and South ("C") Ash Ponds, respectively. Wastewater is neutralized by lowering the pH as it enters the ponds. Solids settle to the bottom and oil and grease is skimmed off as the wastewater leaves the ponds. Beckjord Ash Pond A formerly discharged through

Outfall 004 to the Ohio River. However, the pond has been inactive since 1985, the last year the ash was sluiced there, and has not discharged since that time. Despite the absence of a discharge, Outfall 004 has remained in Beckjord's NPDES permit as a contingency, for dredging or other emergency ash storage. Based on current plant operations and historical non-use of the pond, Beckjord has determined that it will not need this contingency and the outfall is no longer required. Outfall 010 also discharges from the Ash Pond C, but it is not currently in use. Outfall 012 discharges wastewater collected from dike leaks surrounding Ash Pond C.

The on-site sanitary sewerage treatment plant discharges through Outfall 005. The treatment system uses ultraviolet disinfection with chlorine as a back-up. Discharge is dechlorinated if chlorine is used.

Contaminated groundwater is pumped through a groundwater interceptor well and discharged at Outfall 023.

Outfalls 025 discharges landfill runoff from the Pond Run Ash Landfill sedimentation pond.

The remainder of external outfalls are associated with storm water runoff. Runoff from roof drains is collected and discharged through outfalls 006 and 007. Waste oil from the primary oil/water separator collects in a below-ground storage tank while the wastewater flows through Outfall 009. Storm water from the Pond Run Ash Landfill flows through outfalls 025, 026, and 027. Storm water runoff from the closed landfill north of Beckjord Road discharges through Outfall 021. Outfalls 008, 009, 010, 011, 012, and 024 do not currently discharge.

Beckjord has three active internal stations. Boiler blowdown discharges through internal station 611 and is sent to Outfall 001 without treatment. Boiler tube cleaning occurs every three to four years and is monitored at internal station 612. The boiler tubes are cleaned by introducing a weak organic acid to the tubes, which are then flushed with water and a caustic solution. The wastewater from this process is treated in a large above-ground tank by neutralization and the addition of a polymer to remove metals. The treated wastewater flows to the ash ponds for further settling. Internal station 631 discharges cooling water used to operate several large pumps and other equipment; the wastewater is sent through Outfall 001. Internal station 621 formerly monitored the regeneration waste stream. Beckjord no longer uses demineralizers and this station is no longer required.

Beckjord obtains water from three sources. Most of the water is supplied by the Ohio River and used for condenser cooling water. On-site wells provide water from cooling transformers, boiler water, and other miscellaneous cooling activities. The local public water supply distribution system provides potable water.

Consistent with 40 CFR 122.45(h), the current permit includes monitoring and limits at internal stations 611, 612, and 631. Effluent guideline limits are applied at these outfalls to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution.

Table 1 presents chemical specific data compiled from the NPDES renewal application Form 2C.

Table 2 presents chemical specific data compiled from the Ohio EPA bioassay testing.

Table 3 presents a summary of unaltered Discharge Monitoring Report (DMR) data. Data are presented for the period January 2008 through December 2012, and current permit limits are provided for comparison.

Table 4 presents average and maximum PEQ values.

Table 5 summarizes the acute toxicity results of Ohio EPA bioassay testing.

Assessment of Impact on Receiving Waters

In 2007, the Ohio River Valley Water Sanitation Commission (ORSANCO) conducted a biological survey in the Meldahl dam pool, which includes the Beckjord discharges. The survey showed that the biological condition of the pool is rated as "good" and that the entire pool meets its aquatic life-use designation. The complete report for the Meldahl pool can be found at this ORSANCO webpage:
http://www.orsanco.org/images/stories/files/biologicalSurveys/2007/2007MeldahlPoolReport.pdf

Further information on the Ohio River can be found in the *2012 Biennial Assessment of Ohio River Water Quality Conditions*. The entire river is impaired for fish consumption due to polychlorinated biphenyl and dioxin contamination; potential impairment due to mercury has yet to be evaluated. This area is also only in partial attainment of the contact recreation use. More information can be found at this ORSANCO webpage:
http://www.orsanco.org/images/stories/files/publications/305b/docs/2012/2012ohioriver305breport.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 Beckjord were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA - Discharge Monitoring Report (DMR) data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	January 2008 through December 2012
NPDES Application data	2013
Ohio EPA compliance sampling data	2011

Outliers
The data were examined, and the following values were removed from the evaluation to give a more reliable PEQ: Outfall 002 – mercury (96.5 ng/L on 12/1/09), Outfall 009 – zinc (879 µg/L on 3/3/08), total filterable residue (dissolved solids) (240 mg/L on 6/2/08, 11.65 mg/L on 5/3/10, 8.55 mg/L on 9/6/11).

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. The average and maximum PEQ values are presented in 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 9 for a summary of the screening results.

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. 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.

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

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	10% of annual 7Q10
	Maximum	1% of annual 1Q10
AWS		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 7, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

Ohio's WQS implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet WQS at the end-of-pipe, which are 12 ng/l (average) and 1700 ng/l (maximum) in the Ohio River basin.

A WLA has been calculated for thermal loading at Outfall 001. The thermal WLA was calculated using this equation:

BTU/hr = (7Q10 * percent of stream flow of 001 * conversion factor of cfs to MGD * conversion factor of gallons to pounds * temperature difference in °F)/24

The average design flow at Outfall 001 is approximately 10% of the Ohio River's 7Q10 flow rate. The conversion of cubic feet/second (cfs) to MGD is 0.646. The conversion of gallons to pounds is 8.34. The temperature difference is the difference between the 2012 ORSANCO pollution control standards maximum temperature minus the average of the daily maximum intake temperatures at the facility. A conversion factor of 24 hours per day is also applied. The seasonal facility averages were calculated using the intake temperature data from January 2012 to December 2012. The thermal WLA for the mixing zone is:

Season	*Facility Intake (°F)*	*ORSANCO Max (°F)*	*Thermal Load (BTU/hr)*
Summer	82	89	1675
Winter	54	60	1435

Beckjord's PEQ_{avg} is 2525 BTU/hr and it's PEQ_{max} is is 3461 BTU/hr. Both of these are greater than the available thermal loading of the Ohio River as shown by the above calculation. Beckjord therefore has reasonable potential to exceed temperature standards on the Ohio River.

The data used in the WLA are listed in Tables 6 and 7. The WLA results to maintain all applicable criteria are presented in Table 8.

Whole Effluent Toxicity WLA

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.

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 (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs 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 (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Beckjord, the WLA values are:

Outfall 002: 1.0 TU_a and 161 TU_c
Outfall 003: 1.0 TU_a and 58 TU_c
Outfall 005: 1.0 TU_a and 341936 TU_c
Outfall 009: 1.0 TU_a and 58 TU_c
Outfall 012: 1.0 TU_a and 706667 TU_c
Outfall 023: 1.0 TU_a and 2677 TU_c
Outfall 025: 0.3 TU_a and 1.0 TU_c

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

$$TU_c = 100/IC_{25}$$

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/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

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

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

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

When the acute WLA is less than 1.0 TU_a, it may be defined as:

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

The acute WLA for the is 30 percent mortality in 100 percent effluent based on the dilution ratio of 2 to 1.

Reasonable Potential/ Effluent Limits/Hazard 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 6. 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 9.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 10 presents the final effluent limits and monitoring requirements proposed for Beckjord Outfalls 001, 002, 003, 005, 009, 012, 023, and 025 and the basis for their recommendation.

Outfall 001

Water Temperature, Flow Rate, and Station Operating Input
Monitoring for these parameters is proposed to continue. Data from these parameters are utilized for thermal loading and mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Thermal Discharge
The thermal load limits for Outfall 001 are based on the Beckjord's Clean Water Act 316(a) demonstration. This thermal limit is still appropriate because the number of units discharging once-through cooling water have not changed since the demonstration was performed. Even though the thermal limit exceeds the thermal WLA, this section of the Ohio River is meeting its attainment criteria, indicating that a higher thermal load is not adversely impacting the stream ecology.

Chlorination/Bromination Duration and Chlorine – Total Residual
Limits for these parameters are required by the FEGs in 40 CFR 423 and listed in Attachment 1. Continuous chlorination is necessary at Beckjord; therefore, it is proposed that the limit of total residual chlorine at the WQS be continued.

Outfall 002

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Total Suspended Solids and Oil & Grease
Limits for oil & grease are proposed to continue from the existing permit. The limits are based on the best practicable control technology currently available (BPT) FEGs in 40 CFR 423.12(b)(4) and are listed in Attachment 1. The average limit for total suspended solids (TSS) is also proposed to be continued. The maximum limits for TSS is proposed to be lowered slightly. Coal pile runoff, which discharges to Outfall 002, is subject to 40 CFR 423.12(b)(9), which is listed in Attachment 1. To account for the lower TSS limit for coal pile runoff (50 mg/L), the following calculations were performed to determine the appropriate flow-weighted concentration:

$C_{wgt} = [(Qw * 100) + (Qc * 50)] / Qmax$
Where:

C_{wgt} = the flow-weighted concentration
Q_w = maximum flow rate of wastewater without the coal pile runoff flow rate (Qmax – Qc)
Q_c = maximum flow rate of coal pile runoff
Q_{max} = maximum flow rate of Outfall 002

Maximum flow rates were based on the values presented on the water balance diagram included in the facility's NPDES permit renewal application. The maximum flow rate for the coal pile runoff was utilized because in nearly all cases all runoff will be eventually routed to Outfall 002.

C_{wgt} = [(3.865 MGD *100 mg/L) + (0.03 MGD * 50 mg/L)] / 3.865 MGD = 99.6 mg/L

The maximum TSS loading limit will decrease slight based on the new proposed TSS concentration limit.

Cadmium, Chlorine – Total Residual, Iron, Lead, Molybdenum, Sulfates, Strontium, Zinc
The Ohio EPA risk assessment (Table 9) places these parameters in group 3. This placement, as well as the data in Tables 1 - 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 monitoring is proposed.

Barium, Boron, and Iron
The Ohio EPA risk assessment (Table 9) places these parameters in group 3. This placement, as well as the data in Tables 1 - 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 at a low frequency of once per quarter is proposed to document that these pollutants continue to remain at low levels.

Mercury
Ohio EPA risk assessment (Table 9) places this parameter in group 4. This placement, as well as the data in Tables 1 - 4, supports 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). The monitoring frequency is proposed to be increased to once per month.

Copper
The Ohio EPA risk assessment (Table 9) places this parameter in group 5. This placement, as well as the data in Tables 1 - 4, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). A maximum daily concentration and loading limit are proposed.

Outfall 003

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Total Suspended Solids and Oil & Grease
Limits for TSS and oil & grease are proposed to continue from the existing permit. The concentration limits are based on BPT FEGs in 40 CFR 423.12(b)(4) and listed in Attachment 1. Loading limits are proposed to remain the same as in the previous permit due to anti-backsliding rules.

Aluminum, Arsenic, Barium, Chlorine – Total Residual, Iron, Magnesium, Molybdenum, Strontium, Total Filterable Residue (dissolved solids), Vanadium, and Zinc
The Ohio EPA risk assessment (Table 9) places these parameters in groups 1, 2, or 3. This placement, as well as the data in Tables 1 - 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 monitoring is proposed.

Mercury
The Ohio EPA risk assessment (Table 9) places this parameter in group 3. This placement, as well as the data in Tables 1 - 4, supports 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 low frequency is proposed to document that this pollutant continues to remain at low levels.

Copper
Ohio EPA risk assessment (Table 9) places this parameter in group 4. This placement, as well as the data in Tables 1 - 4, supports 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). The monitoring frequency is proposed to be increased to once per month.

Outfall 005

Color, Odor, and Turbidity Severity
Monitoring for color and odor severity is proposed to be removed based on updated guidance documents for sanitary sewage monitoring. Monitoring for turbidity severity will continue.

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Total Suspended Solids and Carbonaceous Biochemical Oxygen Demand (5-day)
Limits for these two parameters are based on plant design and are proposed to continue.

Fecal Coliform and E. Coli
New *E. coli* limits are being proposed based on ORSANCO's 2012 pollution control standards. These limits will be in effect from April to October. The winter fecal coliform limits are based on WQS and are proposed to continue for the months of November through March. Based on best engineering judgment, it is expected the facility will be able to comply with the new limits without a schedule of compliance.

Zinc
Ohio EPA risk assessment (Table 9) places this parameter in group 4. This placement, as well as the data in Tables 1 - 4, supports 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). The monitoring frequency is proposed to be increased to once per month.

Mercury

The Ohio EPA risk assessment (Table 9) places mercury in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring instead of limits is being proposed. The PEQ values calculated for mercury (Table 4) may not be representative of its actual levels in the plant effluent as they were based on four data points. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

Copper
The Ohio EPA risk assessment (Table 9) places this parameter in group 5. This placement, as well as the data in Tables 1 - 4, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). A maximum daily concentration and loading limit are proposed.

Outfall 009

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Oil & Grease
Limits are based on FEGs for low-volume wastewater listed in 40 CFR 423 and are proposed to continue.

Iron and Sulfates
Ohio EPA risk assessment (Table 9) places these parameters in groups 2 and 3. This placement, as well as the data in Tables 1 - 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 is not proposed.

Zinc
The Ohio EPA risk assessment (Table 9) places this parameter in group 3. This placement, as well as the data in Tables 1 - 4, supports that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Limits are proposed to be removed and monitoring at a low frequency is proposed to document that this pollutant continues to remain at low levels.

Outfall 012

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Total Suspended Solids and Oil & Grease
Concentration limits for TSS and oil & grease are proposed to continue from the existing permit. Loading limits are proposed to be removed. Discharge at this outfall is intermittent and it has not discharged in the past five years. The concentration limits are based on the best practicable control technology currently available (BPT) FEGs in 40 CFR 423.12(b)(4).

Arsenic, Barium, Chlorine – Total Residual, Molybdenum, Sulfates, Strontium, and Vanadium
The Ohio EPA risk assessment (Table 9) places these parameters in groups 2 or 3. This placement, as well as the data in Tables 1 - 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 strontium is proposed to be removed and no new monitoring is proposed.

Total Filterable Residue (Dissolved Solids) and Zinc.
The Ohio EPA risk assessment (Table 9) places these parameters in group 3. This placement, as well as the data in Tables 1 - 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. Limits for total filterable residue are proposed to be removed and monitoring at a low frequency is proposed to document that both pollutants continue to remain at low levels.

Mercury
Ohio EPA risk assessment (Table 9) places this parameter in group 4. This placement, as well as the data in Tables 1 - 4, supports 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). The monitoring frequency is proposed to be increased to once per month.

Copper
The Ohio EPA risk assessment (Table 9) places this parameter in group 5. This placement, as well as the data in Tables 1 - 4, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The maximum daily concentration in the WLA is higher than the current permit limit. Due to antibacksliding rules, the current limits are proposed to continue.

Outfall 023

Flow Rate
Monitoring is proposed to continue. Data is utilized for mass loading limit calculations.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

Antimony, Boron, Sulfates, and Zinc
The Ohio EPA risk assessment (Table 9) places these parameters in groups 2 or 3. This placement, as well as the data in Tables 1 - 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 monitoring is proposed.

Outfall 025

Flow Rate and Total Precipitation
Monitoring is proposed to continue.

pH
The limits from the existing limits are proposed to continue. The outside mixing zone WQS of 6.5 to 9.0 S.U. is maintained in the receiving stream.

TSS

Limits are based on FEGs for low-volume wastewater listed in 40 CFR 423 and are proposed to continue.

Boron, Iron, Manganese, Molybdenum, and Phosphorus
The Ohio EPA risk assessment (Table 9) places these parameters in groups 1 or 2. This placement, as well as the data in Tables 1 - 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, and monitoring for boron is proposed to be removed.

Mercury
Ohio EPA risk assessment (Table 9) places this parameter in group 4. This placement, as well as the data in Tables 1 - 4, supports 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). The monitoring frequency is proposed to be increased to once per quarter.

Arsenic, Barium, and Zinc
The Ohio EPA risk assessment (Table 9) places these parameters in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring instead of limits is being proposed. The PEQ values calculated for these parameters (Table 4) may not be representative of its actual levels in the plant effluent as they were based on one data point for each parameter. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the whole effluent toxicity (WET) data presented in Table 5 and other pertinent data under the provisions of OAC 3745-33-07(B), Beckjord is placed in Category 4 with respect to WET. No monitoring is proposed.

Internal Stations
Monitoring and limits are proposed at internal stations 611, 612, and 631. Effluent guideline limits are applied at this outfall to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution. All limits are based upon 40 CFR 423. FEGs applicable to these stations are listed in Attachment 1.

Other Requirements

Compliance Schedule
A schedule of compliance is included in Part I.C for meeting new copper limits at outfalls 002 and 005.

Operator Certification
Operator certification requirements have been included in Part II of the permit in accordance with rules adopted in December 2006. These rules require the Beckjord to have a Class A wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 005.

Operator of Record
In December 2006, OAC rule revisions became effective that affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II of this NPDES permit is included to implement OAC 3745-7-02. It requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Public Water Supply Notice
An addition to rule 3745-33-08 of the OAC requires that permittees discharging wastewater within ten miles of a downstream public water supply intake located on the same waterway, must develop spill (or bypass) notification procedures in conjunction with the downstream public water supply operator. Since the City of Cincinnati operates a public water supply intake less than ten miles downstream from Beckjord, Part II of the draft permit requires the development of notification procedures within six months after the effective date of the permit.

Storm Water Compliance
Parts IV, V, and VI have been included with the draft permit in order to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, Beckjord may seek permit coverage under the general permit for industrial stormwater (permit # OHR000005) or submit a "No Exposure Certification." Parts IV, V, and VI will be removed from the final permit if: 1) Beckjord 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.

Parts IV, V, and VI have been updated to make individual permits consistent with Ohio EPA's Industrial Storm Water General Permit. The language includes more detail on storm water pollution prevention requirements, and benchmark values that define the goals of pollution prevention efforts. These are not discharge limitations; if pollution prevention measures cannot achieve the benchmarks, the facility may provide information to document this.

Outfall Signage
Part II.P of the permit includes requirements for the permittee to maintain a sign at each permitted outfall to the Ohio River, Tenmile Creek, and unnamed tributary of Pond Run Creek providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Section 316(a) Compliance
A schedule of compliance to update the Section 316(a) demonstration is presented in Part I.C of the permit.

Section 316(b) Compliance
Under rules which were promulgated July 9, 2004 under Section 316(b) of the federal Clean Water Act (33 United States Code [USC] section 1326), the permittee was required to collect and/or compile the following information pertaining to the facility's cooling water intake structure(s):

- source water physical data [40 CFR 122.21(r)(2)];
- cooling water intake structure data [40 CFR 122.21(r)(3)];
- cooling water system data [40 CFR 122.21(r)(5)]; and
- rates of impingement and/or entrainment of fish and shellfish at the facility's cooling water intake structure(s) based upon sampling conducted at the facility.

The permit requires all of this information listed above to be submitted with the permittee's next NPDES permit renewal application unless federal rules are promulgated which require the submittal of the information at an earlier date.

Figure 1. Approximate Location of Duke Energy Inc., Beckjord Station

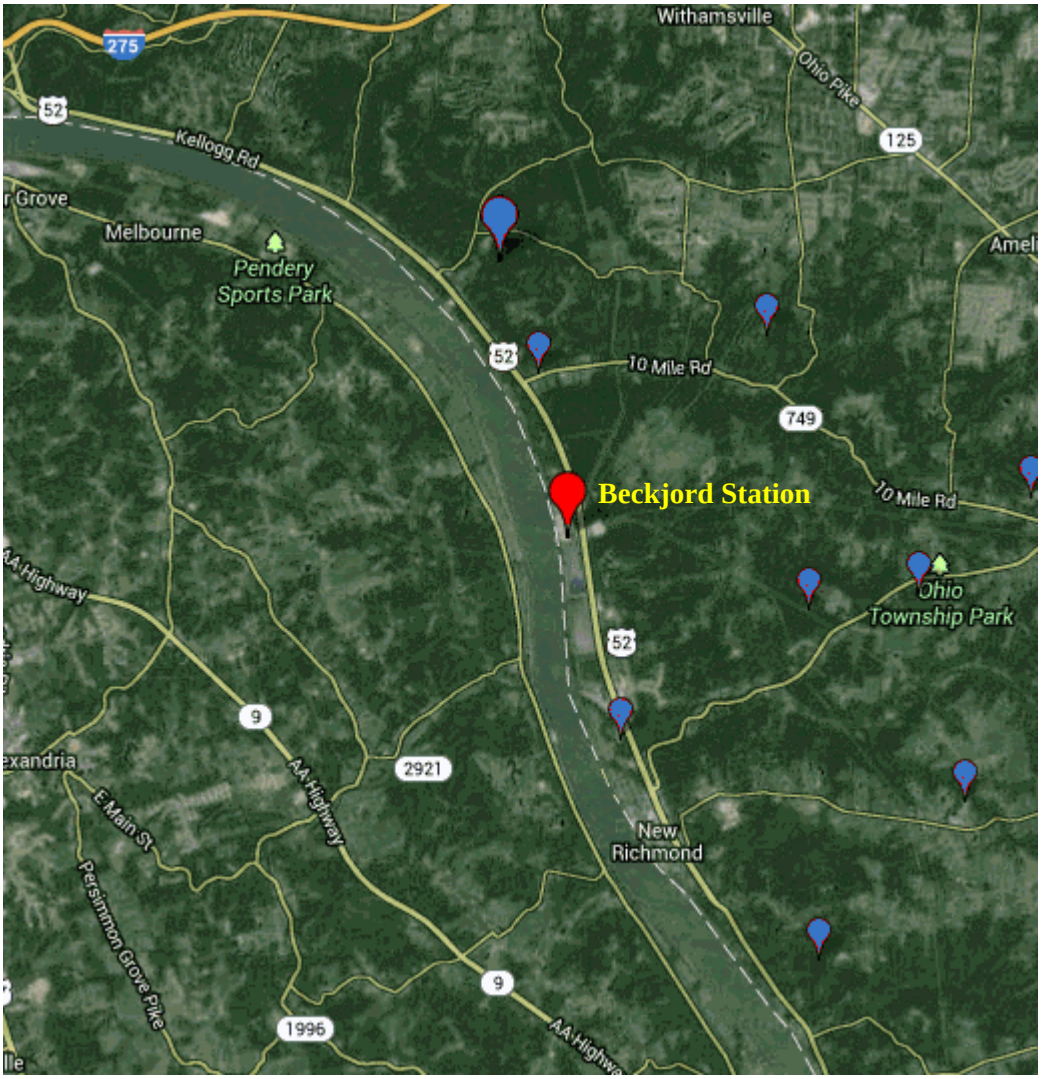

Figure 2. Approximate Location of Beckjord Outfalls

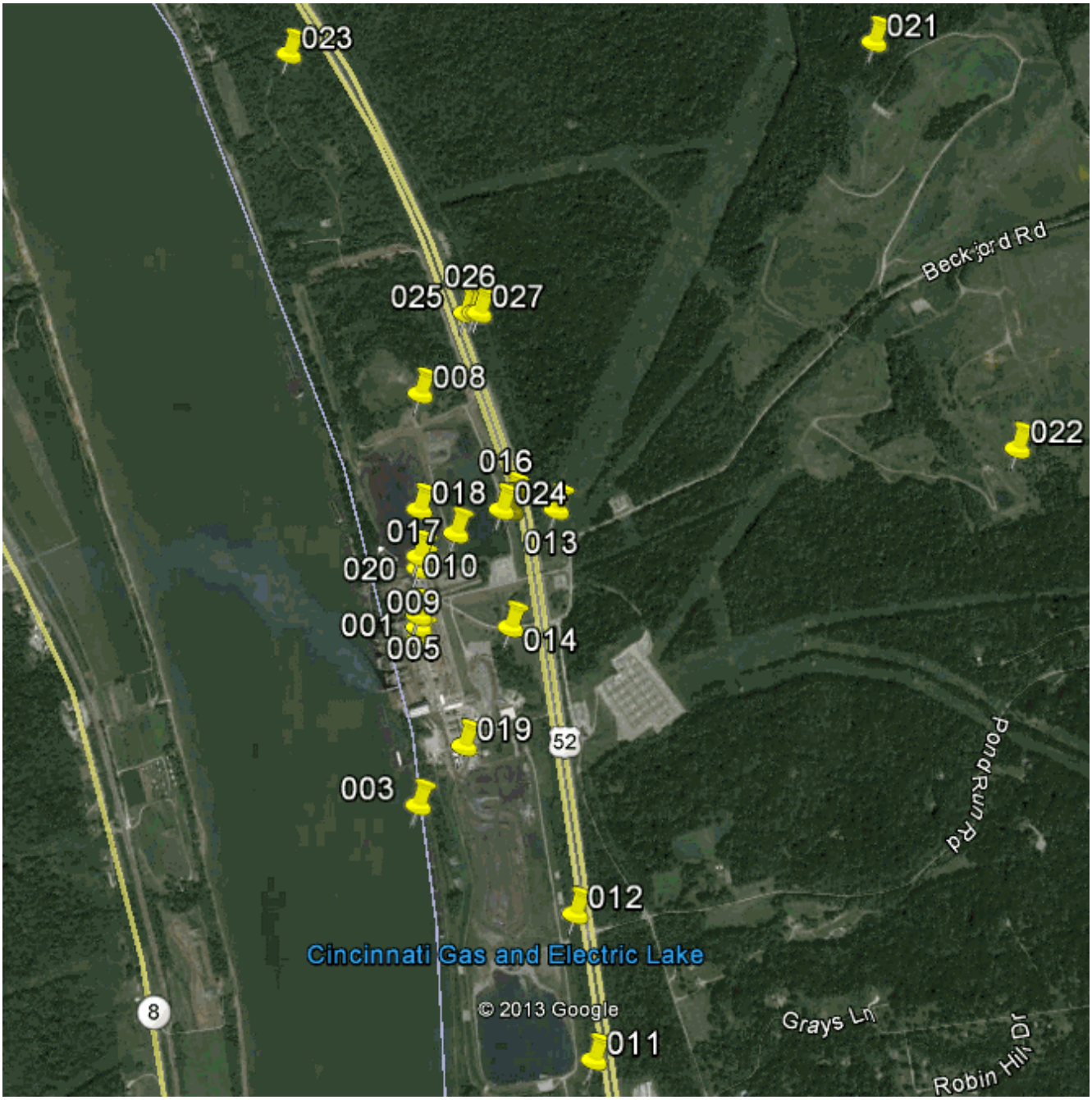

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Outfall 001								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 9395	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	< 20	< 93950	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	3.1	14562	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	6	28185	-	-	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2.0	< 9395	-	-	< 2.0	< 12663
Flow Rate	MGD	-	563		490		759	
Temperature-Winter	°F	-	85.1		85.1		-	
Temperature-Summer	°F	-	81.1		81.1		-	
pH	S.U.	-	7.42 - 8.0		7.42 - 8.0		-	
Aluminum	mg/L	lb/day	0.26	1221	-	-	0.29	1836
Antimony	mg/L	lb/day	< 0.002	< 9.4	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	< 0.005	< 23	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.054	254	-	-	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 4.7	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	0.13	611	-	-	0.14	886
Bromide	mg/L	lb/day	< 0.50	< 2349	-	-	<0.5	<3166
Cadmium	mg/L	lb/day	< 0.001	< 4.7	-	-	< 0.001	< 6.3
Chlorine, Total Residual	mg/L	lb/day	0.038	179	0.038	155	< 0.01	< 63
Chromium	mg/L	lb/day	< 0.002	< 9.4	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 4.70	-	-	< 0.001	< 6.3
Copper	mg/L	lb/day	0.0036	17	-	-	< 0.002	< 13
Cyanide	mg/L	lb/day	< 0.01	< 47	-	-	< 0.01	< 63
Fluoride	mg/L	lb/day	< 1.0	< 4697	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	0.35	1644	-	-	0.48	3039
Lead	mg/L	lb/day	0.0028	13	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	14	65765	-	-	14	88638
Manganese	mg/L	lb/day	0.036	169	-	-	0.042	266
Mercury	ng/L	lb/day	1.7	0.008	-	-	4.85	0.0307
Molybdenum	mg/L	lb/day	0.0048	22.5	-	-	0.0061	39
Nickel	mg/L	lb/day	0.0021	9.9	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	0.607	2851	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	< 4.7	< 22078	-	-	< 5.1	< 32290
Phenols	mg/L	lb/day	< 0.04	< 188	-	-	< 0.04	< 253
Phosphorus	mg/L	lb/day	< 0.1	< 470	-	-	< 0.1	< 633

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Selenium	mg/L	lb/day	< 0.005	< 23	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 4.7	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	100	469750	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	<4697	-	-	< 1	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 2349	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 141	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	< 0.002	< 9.4	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 47	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	< 0.01	< 47	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 14092	-	-	< 3	< 18994
Zinc	mg/L	lb/day	< 0.01	< 47	-	-	< 0.01	< 63
Outfall 002								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 58	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	< 20	< 583	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	2.2	64	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	18.6	542	-	-	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2.0	< 58	-	-	< 2.0	< 12663
Flow Rate	MGD	-	3.49		3.49		759	
Temperature-Winter	°F	-	NA		NA		NA	
Temperature-Summer	°F	-	74.8		-	-	-	-
pH	S.U.	-	7.36-8.19		7.36-8.19		-	
Aluminum	mg/L	lb/day	0.35	10.2	-	-	0.29	1836
Antimony	mg/L	lb/day	< 0.002	< 0.058	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	< 0.005	< 0.15	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.118	3.44	0.118	3.44	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 0.029	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	4.01	117	4.01	117	0.14	886
Bromide	mg/L	lb/day	<0.05	< 15	-	-	< 0.5	< 3166
Cadmium	mg/L	lb/day	< 0.001	< 0.029	-	-	< 0.001	< 6.3
Chlorine, Total Residual	mg/L	lb/day	< 0.01	< 0.29	-	-	< 0.01	< 63
Chromium	mg/L	lb/day	< 0.002	< 0.058	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 0.029	-	-	< 0.001	< 6.3
Copper	mg/L	lb/day	0.0105	0.306	0.0105	0.306	< 0.002	< 13

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	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Cyanide	mg/L	lb/day	< 0.01	< 0.29	-	-	< 0.001	< 6.3
Fluoride	mg/L	lb/day	< 1.0	< 29	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	1.68	49	1.68	49	0.48	3039
Lead	mg/L	lb/day	< 0.001	< 0.029	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	19	553	-	-	14	88638
Manganese	mg/L	lb/day	0.17	4.95	-	-	0.042	266
Mercury	ng/L	lb/day	2.4	0.00007	2.4	0.00007	4.85	0.0307
Molybdenum	mg/L	lb/day	0.014	0.408	-	-	0.0061	39
Nickel	mg/L	lb/day	0.0037	0.11	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	0.244	7.11	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	< 5.0	< 146	< 5.0	< 146	< 5.1	< 32390
Phenols	mg/L	lb/day	< 0.04	< 1.2	-	-	< 0.04	< 253
Phosphorus	mg/L	lb/day	< 0.1	< 2.9	-	-	< 0.1	< 633
Selenium	mg/L	lb/day	0.005	0.15	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 0.03	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	170	4952	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	< 29	-	-	< 1.0	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 15	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 0.874	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	< 0.002	< 0.06	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 0.291	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	0.015	0.437	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 87	-	-	< 3.0	< 18994
Zinc	mg/L	lb/day	< 0.01	< 0.29	-	-	< 0.001	< 6.3
Outfall 003								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 200	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	< 20	< 2002	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	1.6	160	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	19.6	1961	19.6	1961	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2.0	< 200	-	-	< 2.0	< 12663
Flow Rate	MGD	-	12		12		759	
Temperature-Winter	°F	-	NA		NA		NA	
Temperature-Summer	°F	-	75.6		-		-	
pH	S.U.	-	7.26-8.95		7.26-8.95		-	

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Aluminum	mg/L	lb/day	1.6	160	-	-	0.29	1836
Antimony	mg/L	lb/day	0.0057	0.57	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	0.024	2.4	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.13	13	-	-	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 0.1	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	2.1	210	-	-	0.14	886
Bromide	mg/L	lb/day	< 0.5	< 50	-	-	< 0.5	< 3166
Cadmium	mg/L	lb/day	< 0.001	< 0.1	-	-	< 0.001	< 6.3
Chlorine, Total Residual	mg/L	lb/day	< 0.01	< 1.0	-	-	< 0.01	< 63
Chromium	mg/L	lb/day	0.021	2.1	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 0.1	-	-	< 0.001	< 6.3
Copper	mg/L	lb/day	0.0051	0.51	-	-	< 0.002	< 13
Cyanide	mg/L	lb/day	< 0.01	< 1	-	-	< 0.001	< 6.3
Fluoride	mg/L	lb/day	< 1.0	< 100	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	0.3	30	-	-	0.48	3039
Lead	mg/L	lb/day	0.0013	0.13	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	13	1301	-	-	14	88638
Manganese	mg/L	lb/day	0.0084	0.84	-	-	0.042	266
Mercury	ng/L	lb/day	3.1	0.00031	3.1	0.00031	4.85	0.0307
Molybdenum	mg/L	lb/day	0.3	30	-	-	0.0061	39
Nickel	mg/L	lb/day	0.0023	0.23	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	0.431	43.1	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	69.5	6955	69.5	6955	< 5.1	< 32390
Phenols	mg/L	lb/day	< 0.04	4	-	-	< 0.04	< 253
Phosphorus	mg/L	lb/day	< 0.1	< 10	-	-	< 0.1	< 633
Selenium	mg/L	lb/day	0.017	1.7	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 0.1	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	200	20015	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	< 100	-	-	< 1.0	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 50	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 3.0	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	0.0028	0.28	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 1.0	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	0.023	2.3	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 300	-	-	< 3.0	< 18994
Zinc	mg/L	lb/day	< 0.01	< 1	-	-	< 0.001	< 6.3

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Outfall 005								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 0.1	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	< 20	< 0.83	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	3.3	0.14	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	20.5	0.856	20.5	0.405	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2.0	< 0.08	-	-	< 2.0	< 12663
Flow Rate	MGD	-	0.005		0.002		759	
Temperature-Winter	˚F	-	NA		NA		NA	
Temperature-Summer	˚F	-	75.4		-		-	-
pH	S.U.	-	7.0 - 7.81		7.0 - 7.81		-	-
Aluminum	mg/L	lb/day	0.05	0.0021	-	-	0.29	1836
Antimony	mg/L	lb/day	< 0.002	< 0.00008	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	< 0.005	< 0.00021	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.017	0.00071	-	-	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 0.00004	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	0.12	0.00501	-	-	0.14	886
Bromide	mg/L	lb/day	< 0.5	< 0.02	-	-	< 0.5	< 3166
Cadmium	mg/L	lb/day	< 0.001	< 0.00004	-	-	< 0.001	< 6.3
Chlorine, Tot Res	mg/L	lb/day	< 0.01	< 0.004	-	-	< 0.01	< 63
Chromium	mg/L	lb/day	< 0.002	< 0.0001	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 0.00004	-	-	< 0.001	< 6.3
Copper	mg/L	lb/day	0.022	0.0009	0.022	0.0004	< 0.002	< 13
Cyanide	mg/L	lb/day	< 0.01	< 0.00042	-	-	< 0.001	< 6.3
Fluoride	mg/L	lb/day	< 1.0	< 0.042	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	0.29	0.0121	-	-	0.48	3039
Lead	mg/L	lb/day	0.0011	0.00005	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	12	0.5008	-	-	14	88638
Manganese	mg/L	lb/day	0.024	0.001	-	-	0.042	266
Mercury	ng/L	lb/day	29	0.000001	-	-	4.85	0.0307
Molybdenum	mg/L	lb/day	0.011	0.00046	-	-	0.0061	39
Nickel	mg/L	lb/day	< 0.002	< 0.00008	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	18.3	0.764	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	< 4.7	< 0.2	-	-	< 5.1	< 32390
Phenols	mg/L	lb/day	< 0.04	< 0.0017	-	-	< 0.04	< 253

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Phosphorus	mg/L	lb/day	1.7	0.071	-	-	< 0.1	< 633
Selenium	mg/L	lb/day	< 0.005	< 0.00021	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 0.00004	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	75	3.1	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	< 0.042	-	-	< 1.0	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 0.02	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 0.00125	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	< 0.002	< 0.0001	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 0.00042	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	< 0.01	< 0.00042	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 0.13	-	-	< 3.0	< 18994
Zinc	mg/L	lb/day	0.131	0.005	-	-	< 0.001	< 6.3
Outfall 023								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 4.1	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	< 20	< 41	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	< 1.0	< 2.0	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	< 4.0	< 8.1	-	-	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2.0	< 4.1	-	-	< 2.0	< 12663
Flow Rate	MGD	-	0.244		-	-	759	
Temperature-Winter	°F	-	NA		NA		NA	
Temperature-Summer	°F	-	64.8		-	-	-	-
pH	S.U.	-	7.34 - 7.83		-	-	-	-
Aluminum	mg/L	lb/day	< 0.05	< 0.1	-	-	0.29	1836
Antimony	mg/L	lb/day	< 0.002	< 0.0041	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	< 0.005	< 0.01	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.029	0.059	-	-	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	1.1	2.24	-	-	0.14	886
Bromide	mg/L	lb/day	< 0.5	< 1.0	-	-	< 0.5	< 3166
Cadmium	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Chlorine, Total Residual	mg/L	lb/day	< 0.01	< 0.02	-	-	< 0.01	< 63
Chromium	mg/L	lb/day	< 0.002	< 0.0041	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Copper	mg/L	lb/day	< 0.002	< 0.0041	-	-	< 0.002	< 13
Cyanide	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Fluoride	mg/L	lb/day	< 1.0	< 2.0	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	< 0.05	< 0.01	-	-	0.48	3039
Lead	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	12	24.439	-	-	14	88638
Manganese	mg/L	lb/day	0.099	0.2	-	-	0.042	266
Mercury	ng/L	lb/day	< 0.5	<0.000001	-	-	4.85	0.0307
Molybdenum	mg/L	lb/day	0.016	0.033	-	-	0.0061	39
Nickel	mg/L	lb/day	< 0.002	< 0.0041	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	0.254	0.517	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	< 4.8	< 9.8	-	-	< 5.1	< 32390
Phenols	mg/L	lb/day	< 0.04	< 0.081	-	-	< 0.04	< 253
Phosphorus	mg/L	lb/day	< 0.1	< 0.2	-	-	< 0.1	< 633
Selenium	mg/L	lb/day	< 0.005	< 0.01	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	160	326	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	< 2.0	-	-	< 1.0	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 1.0	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 0.0611	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	< 0.002	< 0.0041	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 0.02	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	< 0.01	< 0.02	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 6.1	-	-	< 3.0	< 18994
Zinc	mg/L	lb/day	< 0.001	< 0.002	-	-	< 0.001	< 6.3
Outfall 025								
Biological Oxygen Demand	mg/L	lb/day	< 2.0	< 2.9	-	-	< 2.0	< 12663
Chemical Oxygen Demand	mg/L	lb/day	20	29	-	-	< 20	< 126626
Total Organic Carbon	mg/L	lb/day	6.2	9	-	-	3.1	19627
Total Suspended Solids	mg/L	lb/day	64	92.9	-	-	< 4.0	< 25325
Ammonia	mg/L	lb/day	< 2	< 2.9	-	-	< 2.0	< 12663
Flow Rate	MGD	-	0.174		-		759	
Temperature-Winter	°F	-	NA		NA		NA	
Temperature-Summer	°F	-	83.8		-		-	

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
pH	S.U.	-	7.58-8.83		-		-	
Aluminum	mg/L	lb/day	0.11	0.16	-	-	0.29	1836
Antimony	mg/L	lb/day	< 0.0002	< 0.0003	-	-	< 0.002	< 13
Arsenic	mg/L	lb/day	0.071	0.1	-	-	< 0.005	< 32
Barium	mg/L	lb/day	0.075	0.11	-	-	0.053	336
Beryllium	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Boron	mg/L	lb/day	0.39	0.566	0.39	0.285	0.14	886
Bromide	mg/L	lb/day	< 0.5	< 0.73	-	-	< 0.5	< 3166
Cadmium	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Chlorine, Total Residual	mg/L	lb/day	< 0.01	< 0.015	-	-	< 0.01	< 63
Chromium	mg/L	lb/day	< 0.002	< 0.0029	-	-	< 0.002	< 13
Cobalt	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Copper	mg/L	lb/day	< 0.002	< 0.0029	-	-	< 0.002	< 13
Cyanide	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Fluoride	mg/L	lb/day	< 1.0	< 1.5	-	-	< 1.0	< 6331
Iron	mg/L	lb/day	2.2	3.195	-	-	0.48	3039
Lead	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Magnesium	mg/L	lb/day	12	17.428	-	-	14	88638
Manganese	mg/L	lb/day	2.2	3.195	-	-	0.042	266
Mercury	ng/L	lb/day	4.45	0.000006	4.45	0.000003	4.85	0.0307
Molybdenum	mg/L	lb/day	0.0093	0.014	-	-	0.0061	39
Nickel	mg/L	lb/day	< 0.002	< 0.0029	-	-	< 0.002	< 13
Nitrate+Nitrite	mg/L	lb/day	0.266	0.386	-	-	0.595	3767
Oil & Grease	mg/L	lb/day	< 4.8	< 7.0	-	-	< 5.1	< 32390
Phenols	mg/L	lb/day	< 0.04	< 0.58	-	-	< 0.04	< 253
Phosphorus	mg/L	lb/day	0.49	0.71	-	-	< 0.1	< 633
Selenium	mg/L	lb/day	< 0.005	< 0.0073	-	-	< 0.005	< 32
Silver	mg/L	lb/day	< 0.001	< 0.0015	-	-	< 0.001	< 6.3
Sulfate	mg/L	lb/day	52	76	-	-	100	633130
Sulfide	mg/L	lb/day	< 1.0	< 1.5	-	-	< 1.0	< 6331
Sulfite	mg/L	lb/day	< 0.5	< 0.7	-	-	< 0.5	< 3166
Surfactants	mg/L	lb/day	< 0.03	< 0.0436	-	-	< 0.03	< 190
Thallium	mg/L	lb/day	< 0.002	< 0.0029	-	-	< 0.002	< 13
Tin	mg/L	lb/day	< 0.01	< 0.015	-	-	< 0.01	< 63
Titanium	mg/L	lb/day	< 0.01	< 0.015	-	-	< 0.01	< 63
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 4.4	-	-	< 3.0	< 18994

Table 1. Effluent Characterization Using NPDES Application Form 2C

	Units		Effluent				Intake	
			Max daily		30 day max		Long term avg	
Parameter	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**	**Conc**	**Mass**
Zinc	mg/L	lb/day	0.087	0.13	-	-	< 0.001	< 6.3

Table 2. Effluent Characterization Using Ohio EPA Data

Parameter	Units	Outfall 002	Outfall 003
Aluminum	mg/L	AA (200)	506
Ammonia	mg/L	0.054	0.066
Arsenic	µg/L	AA (2)	AA (10)
Barium	µg/L	90	174
Cadmium	µg/L	AA (0.2)	1.75
Calcium	mg/L	129	76
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	AA (2)	AA (2)
Chloride	mg/L	40.3	23.2
Chromium	µg/L	AA (2)	15.3
Copper	µg/L	2.1	3.9
Cyanide, Free	mg/L	AA (5)	AA (5)
Iron	mg/L	1010	307
Lead	µg/L	AA (2)	AA (2)
Magnesium	µg/L	27	12
Manganese	µg/L	528	32
Mercury	µg/L	AA (0.2)	AA (0.2)
Nickel	µg/L	11.4	11.1
Nitrate+Nitrite	mg/L	0.34	0.78
Oil & Grease	mg/L	NA	AA (2.1)
Phenolics	mg/L	AA (10)	AA (10)
Phosphorus	mg/L	0.039	0.035
Selenium	µg/L	2.5	AA (10)
Strontium	µg/L	712	447
Total Filterable Residue (Dissolved Solids)	mg/L	638	362
Total Kjeldahl Nitrogen	mg/L	0.43	AA (0.2)
Total Suspended Solids	mg/L	6	10
Zinc	µg/L	23	22

AA = non-detection (method detection limit)

Table 3. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°F	Monitor		855	76.5	95.7	43.2-102
Thermal Discharge	Annual	Million BTU/Hr	-	5880	1796	3020	4770	0-5770
Station Operating Output	Annual	Megawatts	Monitor		1796	645	1020	0-1260
pH	Annual	S.U.	6.0 - 9.0		59	7.66	7.96	6.8-8.1
Flow Rate	Annual	MGD	Monitor		1781	373	683	0-718
Chlorine, Total Residual	Annual	mg/L	-	0.038	108	0	0	0-0
Chlorination/ Bromination Duration	Annual	Minutes	Monitor		1795	0	720	0-1080
Outfall 002								
pH	Annual	S.U.	6.0 - 9.0		59	7.69	8.27	6.57-8.5
Total Suspended Solids	Annual	mg/L	30	100	68	12	30.7	5-37
Oil and Grease	Annual	mg/L	15	20	60	0	0	0-10.4
Iron	Annual	µg/L	Monitor		15	563	1510	183-1680
Boron	Annual	µg/L	Monitor		15	1170	3650	470-4010
Barium	Annual	µg/L	Monitor		18	98.5	135	67.8-157
Copper	Annual	µg/L	Monitor		45	2.85	10.8	0-17.5
Flow Rate	Annual	MGD	Monitor		1796	1.48	4.82	0-7.48
Mercury	Annual	ng/L	Monitor		10	2.53	56.2	0.93-96.5
Outfall 003								
pH	Annual	S.U.	6.0 - 9.0		59	7.55	8.88	6.2-8.96
Total Suspended Solids	Annual	mg/L	30	100	70	13.1	38.3	0-78.8
Oil and Grease	Annual	mg/L	15	20	59	0	0	0-7.4
Copper	Annual	µg/L	Monitor		18	3.53	20	0-30.9
Flow Rate	Annual	MGD	Monitor		1796	12	12	1.79-12
Mercury	Annual	ng/L	Monitor		9	2.8	3.76	1.4-3.9
Outfall 005								
Color, Severity	Annual	Units	Monitor		1243	0	0	0-3
pH	Annual	S.U.	6.0 - 9.0		59	7.21	7.55	6.35-7.78
Total Suspended Solids	Annual	mg/L	30	45	64	12	28	0-44

Table 3. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Zinc	Annual	µg/L	Monitor		51	88.3	194	16-262
Copper	Annual	µg/L	Monitor		51	20	48.1	2-72.9
Odor, Severity	Annual	Units	Monitor		423	0	0	0-1
Turbidity, Severity	Annual	Units	Monitor		422	1	1	0-3
Fecal Coliform	Annual	#/100 mL	-		59	1	11	1-100
	Summer	#/100 mL	200	400				
	Winter	#/100 mL	1000	2000				
Flow Rate	Annual	MGD	Monitor		1788	0.002	0.011	0.001-0.02
Carbonaceous Biochemical Oxygen Demand (5 day)	Summer	mg/L	25	40	29	2.1	5.2	1-5.8
Carbonaceous Biochemical Oxygen Demand (5 day)	Winter	mg/L	25	40	30	3.25	11.4	1-12.6
Outfall 009								
pH	Annual	S.U.	6.0 - 9.0		53	7.47	7.63	7.1-8.47
Oil and Grease	Annual	mg/L	15	20	53	0	5.77	0-8
Zinc	Annual	µg/L	-	430	17	96.7	296	17.7-879
Flow Rate	Annual	MGD	Monitor		427	0.002	0.0461	0.001-0.407
Outfall 012								
pH	Annual	S.U.	6.0 - 9.0		44	6.68	6.9	6.4-7.1
Total Filterable Residue (Dissolved Solids)	Annual	mg/L	1500	-	34	1090	1350	8.55-1470
Total Suspended Solids	Annual	mg/L	30	100	48	0	10.7	0-15
Oil and Grease	Annual	mg/L	15	20	44	0	6.03	0-6.7
Strontium	Annual	µg/L	Monitor		9	1170	1580	878-1710
Zinc	Annual	µg/L	Monitor		13	85.4	110	33-113
Copper	Annual	µg/L	15	24	15	2.81	36.1	0-68.6
Flow Rate	Annual	MGD	Monitor		831	0.001	0.001	0.001-0.015
Mercury	Annual	ng/L	Monitor		8	0	0.656	0-0.675
Outfall 023								
pH	Annual	S.U.	6.0 - 9.0		59	7.44	7.67	7.05-7.83
Flow Rate	Annual	MGD	Monitor		1763	0.204	0.256	0-0.329

Table 3. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 025								
Total Precipitation	Annual	Inches	Monitor		1582	0	0.739	0-2.76
pH	Annual	S.U.	6.0 - 9.0		101	8.06	8.67	7.5-8.87
Total Suspended Solids	Annual	mg/L	30	100	114	7.8	39.7	0-95
Boron	Annual	µg/L	Monitor		12	171	323	130-389
Flow Rate	Annual	MGD	Monitor		115	0.005	0.29	0.0005-4.45
Mercury	Annual	ng/L	Monitor		6	1.9	4.06	0.61-4.4
Outfall 611								
Total Suspended Solids	Annual	mg/L	30	100	20	0	0	0-0
Oil and Grease	Annual	mg/L	15	20	20	0	0.4	0-8
Flow Rate	Annual	MGD	Monitor		1743	0.0135	0.118	0-0.507
Outfall 612								
Copper, Total	Annual	µg/L	1000	1000	2	247	277	212-281
Iron, Total	Annual	µg/L	1000	1000	2	314	498	110-519
Flow Rate	Annual	MGD	Monitor		61	0	0	0-0.146
Outfall 631								
Flow Rate	Annual	MGD	Monitor		1783	38.9	63.4	0-4310

All values are based on annual records unless otherwise indicated.
* = For minimum pH, 5th percentile shown in place of 50th percentile

Table 4. Projected Effluent Quality for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

Parameter	Units	# of Obs.	# of Obs. > MDL	PEQ average	PEQ max.
Outfall 001					
Chlorine, Total Residual	mg/L	108	0	--	--
Outfall 002					
Total Filterable Residue (Dissolved Solids)	mg/L	4	4	1211	1659
Total Suspended Solids	mg/L	68	68	24.06	35.77
Oil and Grease	mg/L	60	2	7.592	10.4
Sulfate	mg/L	4	4	358.7	491.4
Iron	µg/L	17	17	1661.1	2846.9
Selenium	µg/L	9	5	9.29	12.73
Boron	µg/L	15	15	3187.2	5604.8
Barium	µg/L	20	20	128.28	159.7
Strontium, Total	µg/L	4	4	1351	1851
Zinc	µg/L	14	9	36.8	50.42
Cadmium	µg/L	3	0	--	--
Lead	µg/L	4	1	2.809	3.848
Copper	µg/L	47	42	10.938	17.675
Chlorine, Total Residual	mg/L	18	0	--	--
Mercury	ng/L	13	13	8.176	11.2
Molybdenum	µg/L	1	1	63.36	86.8
Outfall 003					
Total Filterable Residue (Dissolved Solids)	mg/L	4	4	730.7	1001
Total Suspended Solids	mg/L	70	69	29.018	43.17
Oil and Grease	mg/L	59	2	5.402	7.4
Arsenic, Total	µg/L	5	1	40.3	55.2
Barium	µg/L	4	4	480.2	657.8
Molybdenum	µg/L	4	4	569.4	780
Strontium, Total	µg/L	4	4	848.4	1162
Copper	µg/L	20	18	20.267	35.727
Vanadium	µg/L	3	0	--	--
Selenium, Total	µg/L	5	2	29.89	40.94
Chlorine, Total Residual	mg/L	18	0	--	--
Mercury	ng/L	10	10	4.2476	6.3199
Iron	mg/L	1	1	1389	1903
Zinc	µg/L	2	1	61.03	83.6

Table 4. Projected Effluent Quality for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

Parameter	Units	# of Obs.	# of Obs. > MDL	PEQ average	PEQ max.
Sulfate	mg/L	1	1	905.2	1240
Magnesium, Total	µg/L	1	1	54.31	74.4
Aluminum	mg/L	2	2	1404	1923
Outfall 005					
Total Suspended Solids	mg/L	64	57	26.105	39.763
Nitrite + Nitrate	mg/L	3	3	96.58	132.3
Cyanide, Free	mg/L	36	6	0.008249	0.013601
Sulfate	mg/L	4	4	193.6	265.2
Boron, Total	µg/L	3	3	451.1	618
Zinc	µg/L	52	52	178.85	274.37
Lead	µg/L	4	3	2.847	3.9
Copper	µg/L	52	52	39.982	60.132
Molybdenum	µg/L	4	4	33.4	45.76
Dibromochloromethane	µg/L	3	0	--	--
Chloroform	µg/L	3	3	106.2	145.5
Chlorine, Total Residual	mg/L	18	0	--	--
Mercury	µg/L	4	1	55.04	75.4
Carbonaceous Biochemical Oxygen Demand (5 day)					
Winter	mg/L	15	15	8.2559	14.001
Summer	mg/L	19	19	3.7393	5.6464
Outfall 009					
Oil and Grease	mg/L	53	5	4.7915	7.2057
Sulfate	mg/L	3	3	221.7	303.8
Iron	µg/L	3	3	2155	2952
Zinc	µg/L	16	16	164.3	225
Outfall 012					
Total Filterable Residue (Dissolved Solids)	mg/L	31	31	1299.2	1494.4
Total Suspended Solids	mg/L	48	10	8.7028	14.04
Oil and Grease	mg/L	44	5	5.2348	6.6397
Sulfate	mg/L	1	1	2976	4077
Arsenic, Total	µg/L	2	0	--	--
Barium	µg/L	2	2	117.9	161.5
Molybdenum	µg/L	2	2	19.31	26.45
Strontium, Total	µg/L	11	11	1653.3	2103.2

Table 4. Projected Effluent Quality for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

Parameter	Units	# of Obs.	# of Obs. > MDL	PEQ average	PEQ max.
Zinc	µg/L	13	13	132.5	181.4
Copper	µg/L	15	11	75.07	102.8
Vanadium	µg/L	2	0	--	--
Selenium, Total	µg/L	2	0	--	--
Chlorine, Total Residual	mg/L	14	0	--	--
Mercury	ng/L	8	2	0.9362	1.283
Outfall 023					
Sulfate	mg/L	4	4	303.7	416
Boron, Total	µg/L	4	4	3511	4810
Lead	µg/L	3	0	--	--
Antimony	µg/L	3	0	--	--
Outfall 025					
Total Suspended Solids	mg/L	114	90	32.48	48.98
Arsenic	µg/L	1	1	321.35	440.2
Barium	µg/L	1	1	339.45	465
Boron	µg/L	13	13	333.71	496.04
Iron	µg/L	1	1	9.96	13.64
Manganese	µg/L	1	1	9.96	13.64
Mercury	ng/L	6	6	6.75	9.24
Molybdenum	µg/L	1	1	42.09	57.66
Phosphorus	mg/L	1	1	2.22	3.038
Zinc	µg/L	1	1	393.8	539.4

MDL = method detection limit
PEQ = projected effluent quality

Table 5. Ohio EPA Bioassay Acute Toxicity Results

11/14/2011	*Pimephales promelas*			*Ceriodaphnia dubia*		
Outfall	**Day 1 grab**	**Day 2 grab**	**Mixing Zone**	**Day 1 grab**	**Day 2 grab**	**Mixing Zone**
002	0	0	0	0	5	0
003	0	0	0	0	0	0

Values shown are percent mortality in 100% effluent

Table 6. Water Quality Criteria in the Study Area

		Outside Mixing Zone Criteria				Inside
		Average			Maximum	Mixing
		Human	Agri-	Aquatic	Aquatic	Zone
Parameter	Units	Health	culture	Life	Life	Maximum
Aluminum	µg/L	--	--	--	--	--
Antimony	µg/L	14	--	190	900	1800
Arsenic	µg/L	50	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Boron	µg/L	--	--	3900	33000	65000
Cadmium	µg/L	--	50	3	6.1	24
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chloroform (Trichloromethane)	µg/L	57c	--	140	1300	2600
Copper	µg/L	1300	500	12	18	51
Cyanide, Free	mg/L	0.7	--	0.0052	0.022	0.044
Dibromochloromethane	µg/L	4.1c	--	--	--	--
Dissolved solids (average)	mg/L	--	--	1500	--	--
Iron	µg/L	--	5000	--	--	--
Lead	µg/L	--	100	9.1	170	550
Magnesium	mg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nitrate + Nitrite	mg/L	10	100	--	--	--
Selenium	µg/L	170	50	5	--	--
Strontium	µg/L	--	--	21000	40000	81000
Sulfates	mg/L	250	--	--	--	--
Vanadium	µg/L	--	--	44	150	300
Zinc	µg/L	9100	25000	150	150	500

Table 7. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows - Ohio River				
1Q10	cfs	annual	10600	ORSANCO - Greenup to Meldahl
7Q10	cfs	annual	10600	ORSANCO - Greenup to Meldahl
Harmonic Mean	cfs	annual	42100	ORSANCO - Greenup to Meldahl
Mixing Assumption	%	average	10	WLAs for non-carcinogens are developed using 100 percent of the 7Q10.
	%	maximum	1	
Stream Flows - Unnamed Tributary (UT) to Pond Run				
1Q10	cfs	annual	0	
7Q10	cfs	annual	0	
Harmonic Mean	cfs	annual	0	
Mixing Assumption	%	average	100	WLAs for non-carcinogens are developed using 100 percent of the 7Q10.
	%	maximum	100	
Hardness - Ohio River	mg/l	annual	131	ORSANCO - Greenup to Meldahl
Hardness - UT Pond Run	mg/l	annual	180	BWQR - Southwest Ohio River Tributaries

Duke Energy Beckjord Flow Rates

Outfall 023	cfs	annual	0.396	95th percentile monthly averages
Outfall 005			0.0031	Form 2C maximum 30 day average
Outfall 002			6.62	95th percentile of monthly averages
Outfall 012			0.0015	Form 2C maximum 30 day average
Outfall 003			18.6	Form 2C maximum 30 day average
Outfall 025			0.296	Form 2C maximum 30 day average
Outfall 009			0.107	Form 2C maximum 30 day average
Background Water Quality - Ohio River				
Aluminum	µg/L		293	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Antimony	µg/L		0	No representative data available.
Arsenic	µg/L		0.79	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Barium	µg/L		50.2	ORSANCO; 2006-2011; n=30; 30<MDL; Clean Metals Program - Meldahl Dam
Boron	µg/L		0	No representative data available.
Cadmium	µg/L		32	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Chlorine, Total Residual	mg/L		0	No representative data available.

Table 7. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Chloroform (Trichloromethane)	µg/L		0	No representative data available.
Copper	µg/L		2.3	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Cyanide, Free	mg/L		0	No representative data available.
Dibromochloromethane	µg/L		0	No representative data available.
Dissolved solids (average)	mg/L		252	Ohio EPA; 1988; n=; <MDL; BWQR - Ohio River SW tribs.
Iron	µg/L		577	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Lead	µg/L		0.74	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Magnesium	mg/L		10.2	ORSANCO; 2006-2011; n=30; 0<MDL; Clean Metals Program - Meldahl Dam
Mercury	ng/L		2.2	ORSANCO; 2006-2011; n=29; 8<MDL; Clean Metals Program - Meldahl Dam
Molybdenum	µg/L		0	No representative data available.
Nitrate + Nitrite	mg/L		0.8965	ORSANCO; 2000-2007; n=48; 0<MDL; Bimonthly sampling - Meldahl Dam
Selenium	µg/L		0.7	ORSANCO; 2006-2011; n=30; 4<MDL; Clean Metals Program - Meldahl Dam
Strontium	µg/L		702	Ohio EPA; 1999-2003; n=1728; 0<MDL; Ohio EPA Statewide median.
Sulfates	mg/L		63	ORSANCO; 2000-2007; n=48; 48<MDL; Bimonthly sampling - Meldahl Dam
Vanadium	µg/L		0	No representative data available.
Zinc	µg/L		4.8	ORSANCO; 2006-2011; n=30; 30<MDL; Clean Metals Program - Meldahl Dam
Background Water Quality - UT Pond Run				
Arsenic	µg/L		0	No representative data available.
Barium	µg/L		0	No representative data available.
Boron	µg/L		0	No representative data available.
Iron	µg/L		650	BWQR; ; n=700; 4<MDL; Statewide median
Manganese	µg/L		0	No representative data available.
Mercury	ng/L		0	No representative data available.
Molybdenum	µg/L		0	No representative data available.
Phosphorus	mg/L		0.07	BWQR; ; n=225; 44<MDL; SW tribs median
Zinc	µg/L		15	BWQR; ; n=2284; 1117<MDL; Statewide median

BWQR = *Analysis of Unimpacted Stream Data for the State of Ohio,* 1988
MDL = method detection limit
Ohio EPA = Ohio Environmental Protection Agency
ORSANCO =Ohio River Valley Water Sanitation Commission
WLA = wasteload allocation

Table 8. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

		Outside Mixing Zone Criteria				Inside
		Average			Maximum	Mixing
		Human	Agri-	Aquatic	Aquatic	Zone
Parameter	Units	Health	culture	Life	Life	Maximum
Ohio River						
Aluminum	µg/L	--	--	--	--	--
Antimony	µg/L	374761	--	508776	241809	1800
Arsenic	µg/L	28094	22556	8653	2273	680
Barium	µg/L	--	--	9897	13112	4000
Boron	µg/L	--	--	628371	561399	65000
Cadmium	µg/L	--	11497	3	6.1	24
Chlorine, Total Residual	mg/L	--	--	0.64	0.13	0.038
Chloroform (Trichloromethane)	µg/L	77409734	--	47871108	44452913	2600
Copper	µg/L	740849	113151	565	107	51
Cyanide, Free	mg/L	2393549	--	1778	752	0.044
Dibromochloromethane	µg/L	5568069	--	--	--	--
Dissolved solids (average)	mg/L	--	--	86984	--	--
Iron	µg/L	--	1006120	--	--	--
Lead	µg/L	--	63225	1348	2880	550
Magnesium	mg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	1159785	1272796	370000
Nitrate + Nitrite	mg/L	31128107	134589047	--	--	--
Selenium	µg/L	96653	11209	250	--	--
Strontium	µg/L	--	--	1217774	267957	81000
Sulfates	mg/L	106820	--	--	--	--
Vanadium	µg/L	--	--	2552	1005	300
Zinc	µg/L	5192386	5682516	8425	977	410
Unnamed Tributary of Pond Run						
Arsenic	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Boron	µg/L	--	--	3900	33000	65000
Iron	µg/L	--	5000	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Phosphorus	mg/L	--	--	--	--	--
Zinc	µg/L	69000	25000	200	200	390

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 002

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

No parameters meet this criterion.

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

Chlorine, Total Residual	Cadmium	Molybdenum
Strontium		

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

Boron	Iron	Lead
Barium	Dissolved solids (average)	Sulfates
Zinc		

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.

Mercury

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

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits		
Parameter	*Units*	*Period*	*Average*	*Maximum*
Copper	µg/L		--	64

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 003

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

Aluminum	Magnesium

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

Chlorine, Total Residual	Molybdenum	Strontium
Vanadium		

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

Arsenic	Barium	Selenium
Mercury	Dissolved solids (average)	Zinc
Iron	Sulfates	

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.

No parameters meet these criteria.

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 005

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

No parameters meet this criterion.

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

Dibromochloromethane	Chlorine, Total Residual
Molybdenum	Boron

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

Chloroform (Trichloromethane)	Cyanide, Free	Lead
Nitrate + Nitrite	Sulfates	

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.

Zinc

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

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits		
Parameter	*Units*	*Period*	*Average*	*Maximum*
Copper	µg/L		--	51
Mercury	ng/L		12	1700

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 009

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

No parameters meet this criterion.

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

No parameters meet these criteria.

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

Iron Sulfates Zinc

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.

No parameters meet these criteria.

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 these criteria.

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 012

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

No parameters meet this criterion.

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

Arsenic	Vanadium	Molybdenum
Chlorine, Total Residual		Strontium

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

Barium	Dissolved solids (average)	Sulfates
Zinc		

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.

Mercury

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

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits		
Parameter	*Units*	*Period*	*Average*	*Maximum*
Copper	µg/L		--	64

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 023

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

No parameters meet this criterion.

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

Antimony Zinc

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

Boron Sulfates

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.

No parameters meet these criteria.

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 these criteria.

Table 9. Parameter Assessment for Outfalls 002, 003, 005, 009, 012, 023, and 025

Outfall 025

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

Manganese Phosphorus

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

Boron Iron Molybdenum

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

No parameters meet these criteria.

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.

Mercury

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

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits		
Parameter	*Units*	*Period*	*Average*	*Maximum*
Arsenic	µg/L		100	340
Barium	µg/L		220	2000
Zinc	µg/L		200	200

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

Table 10. Final Effluent Limits for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

		Concentration		Loading (kg/day)[a]		
		30 Day	Daily	30 Day	Daily	
Parameter	**Units**	**Average**	**Maximum**	**Average**	**Maximum**	**Basis[b]**
Outfall 001						
Water Temperature	°F	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
Station Operating Output	MW	-	5880	-	-	316(a) Demo
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
Chlorine, Total Residual	mg/L	-	0.038	-	-	WQS
Chlorination/Bromination Duration	Minutes	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Outfall 002						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Total Suspended Solids	mg/L	30	99.6	231	769	FEG
Oil & Grease	mg/L	15	20	116	154	FEG
Barium	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Boron	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Iron	mg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Mercury	ng/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Copper	µg/L	-	64	-	0.494	WLA
Outfall 003						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Total Suspended Solids	mg/L	30	100	1363	4552	FEG/ABS
Oil & Grease	mg/L	15	20	681	908	FEG/ABS
Mercury	ng/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Copper	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Outfall 005						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Total Suspended Solids	mg/L	30	45	2.27	3.41	EP/PD

Table 10. Final Effluent Limits for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day)[a] 30 Day Average	Loading (kg/day)[a] Daily Maximum	Basis[b]
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	25	40[d]	1.89	3.03[d]	EP/PD
Turbidity Severity	Units	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
E. coli - Summer	#/100 mL	130	292[d]	--	--	WQS
Fecal Coliform - Winter	#/100 mL	1000	2000[d]	--	--	WQS
Zinc	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Mercury	ng/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				WLA
Copper	µg/L	-	51	-	?	WLA
Outfall 009						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Oil & Grease	mg/L	15	20	-	-	FEG
Zinc	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Outfall 012						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Total Suspended Solids	mg/L	30	100	-	-	FEG
Oil & Grease	mg/L	15	20	-	-	FEG
Zinc	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Total Filterable Residue	mg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Mercury	ng/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Copper	µg/L	15	24	-	-	WLA/ABS
Outfall 023						
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Outfall 025						
Total Precipitation	Inches	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP/M[c]

Table 10. Final Effluent Limits for Outfalls 001, 002, 003, 005, 009, 012, 023, and 025

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day)[a] 30 Day Average	Loading (kg/day)[a] Daily Maximum	Basis[b]
pH	S.U.	6.0 - 9.0		-	-	EP/WQS
Total Suspended Solids	mg/L	30	100	-	-	BPJ
Arsenic	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				WLA
Barium	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				WLA
Zinc	µg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				WLA
Mercury	ng/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP

[a] Effluent loadings based on average design discharge flow of:
Outfall 002 – 2.041 MGD
Outfall 003 – 12 MGD (actual average design flow is 18.78 MGD but 12 MGD is used due to ABS rules)
Outfall 005 – 0.02 MGD
Outfall 012 – 0.001 MGD

[b] Definitions:

316(a) Demo. = Alternate thermal limitation developed under Section 316(a) of the Clean Water Act
ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l))
BEJ = Best Engineering Judgment
BPJ = Best Professional Judgment
EP = Existing Permit
FEG = Federal Effluent Guidelines, 40 CFR Part 423, Steam Electric Power Generating Point Source Category
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))
PD = Plant Design
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.

Attachment 1. Applicable Federal Effluent Guidelines

Steam Electric Power Generating Point Source Category

40 CFR 423.12(b)(3) – Low volume wastewater
Best Practicable Control Technology Available (BPT)

Parameter (mg/L)	*Daily Maximum*	*30-Day Average*
Total Suspended Solids	100	30
Oil & Grease	20	15

40 CFR 423.12(b)(4) – Fly and bottom ash transport water
Best Practicable Control Technology Available (BPT)

Parameter (mg/L)	*Daily Maximum*	*30-Day Average*
Total Suspended Solids	100	30
Oil & Grease	20	15

40 CFR 423.13(b)(1) – Once-through cooling water
Best Available Technology Economically Achievable (BAT)

Parameter (mg/L)	*Daily Maximum*	*30-Day Average*
Total Residual Chlorine	0.2	-

40 CFR 423.12(b)(9) – Coal pile runoff
Best Practicable Control Technology Available (BPT)

Parameter (mg/L)	*Daily Maximum*	*30-Day Average*
Total Suspended Solids	50	-