National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Barnesville WWTP

Public Notice No.: 178786
Public Notice Date: March 8, 2023
Comment Period Ends: April 7, 2023

Ohio EPA Permit No.: 0PC00001*KD
Application No.: OH0024015

Village of Barnesville
126 East Church Streat
Barnesville, OH 43713

Village of Barnesville WWTP
60235 Cross Road
Barnesville, OH 43713
Belmont County

Receiving Water: North Fork Captina Creek

Subsequent Stream Network: Captina Creek to Ohio River

INTRODUCTION

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

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

Antidegradation provisions in Ohio Administrative Code (OAC) Chapter 3745-1 describe the conditions under which water quality may be lowered in surface waters. No antidegradation review was necessary.

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

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the

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

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

SUMMARY OF PERMIT CONDITIONS

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

New effluent limits are proposed for Copper, Lead, and Selenium based on reasonable potential to exceed the wasteload allocation. New effluent limits and increased monitoring are proposed for Chronic Toxicity, *Ceriodaphnia dubia* – TUc, based on sampling results. Details are in the Schedule of Compliance summary. Annual acute and chronic toxicity monitoring is proposed for *Pimephales promelas* – Tuc for the life of the permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

Copper, Lead, and Selenium are being added to influent monitoring station 601 based on the proposed effluent limits for Copper, Lead, and Selenium at outfall 001.

This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. As soon as possible, the permittee must begin using ASTM D7237-10, OIA-1677-09, and ASTM D4282-02. (Note: The use of ASTM D4282-02 requires supporting documentation that it meets the requirement of a "sufficiently sensitive" test procedure as defined in 40 CFR 122.44(i)(1)(iv)).

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; tracking of group 4 parameters; and outfall signage.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding copper, lead and selenium, a special condition is proposed in Part II of the permit that provides guidance on the analytical method detection limits (MDLs) the permittee should use in analyzing for these contaminants.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

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

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

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

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

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted by email to epa.dswcomments@epa.ohio.gov (preferred method) or delivered 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 James Morris, (614) 644-2146, James.Morris@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

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

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

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

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

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

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

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

LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION

The village of Barnesville WWTP discharges to the North Fork Captina Creek at River Mile 10.5. Figure **1** shows the approximate location of the facility.

This segment of the North Fork Captina Creek is described by Ohio EPA River Code: 06-123, Hydrologic Unit Code: 05030106-09-01, County: Belmont, Ecoregion: Western Allegheny Plateau. The North Fork Captina Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-07): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and 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 (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

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

FACILITY DESCRIPTION

The Barnesville WWTP was constructed in 1950 and last upgraded in 2011. The Barnesville WWTP serves the Village of Barnesville. The Village is planning for a major upgrade to the WWTP in the near future with installation of new headworks, oxidation ditches and secondary clarifiers. Barnesville WWTP has the following treatment processes:

- Bar Screens
- Imhoff Tank
- Two Oxidation Ditches
- Two secondary settling tanks
- Ultraviolet Disinfection

The Barnesville WWTP does not have an approved pretreatment program. The Barnesville WWTP does not have any industrial users.

Barnesville WWTP disposes of sludge by following management practices based on OAC 3745-40: land application, removal to sanitary landfill or transfer to another facility with a NPDES permit. (Figure 3)

DESCRIPTION OF EXISTING DISCHARGE

Table 1 shows the last five years of sludge removed from Barnesville WWTP. Treated sludge is disposed of in a landfill.

Table 2 presents the effluent violations for Barnesville WWTP during the previous five years. These violations were partly attributed to reoccurring rotor bearing issues on the oxidation ditches in addition to a sludge wasting incident that erroneously moved sludge to an incorrect tank. The Village and operator(s) have been able to address each of the issues that caused the violations.

Table 3 presents the average annual effluent flow rate for Barnesville WWTP for the previous five years. Barnesville WWTP has an estimated infiltration/inflow (I/I) rate of 0.050 MGD that does not cause known problems in the collection system.

Table 4 presents the number of SSOs reported by Barnesville WWTP for the previous five years. SSOs are reported at station 300.

Table 5 presents data characterizing the annual total phosphorus load from Barnesville during the previous five years.

Table 6. Presents chemical specific data compiled from the renewal application and Ohio EPA sampling data.

Table 7 presents a summary of unaltered Discharge Monitoring Reports (DMR). Data are presented for the period October 2017 – November 2022, and current permit limits are provided for comparison.

Table 8 summarizes the chemical specific data for outfall 001by presenting the average and maximum PEQ values.

Table 9 summarizes the results of acute and chronic Whole Effluent Toxicity (WET) tests of the final effluent, using the water flea (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*) as test organisms.

Table 10 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

Pursuant to Section 303(d) of the Clean Water Act, each state is required to develop and submit a list to US EPA of its impaired and threatened waters (e.g. stream/river segments, lakes). For each water on the list, the state identifies the pollutant(s) causing the impairment, when known. The 05030106-09-01watershed assessment unit, which includes the North Fork Captina Creek in the vicinity of Barnesville WWTP, is not listed as impaired on Ohio's 303(d). The HUC-8 is listed as impaired in the *Ohio 2022 Integrated Water Quality Monitoring and Assessment Report*.

The attainment status of North Fork Captina Creek is reported in the Final *Ohio 2022 Integrated Water Quality Monitoring and Assessment Report*. An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-1). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity and modified Index of Well-Being, which indicate the response of the fish community, and the Invertebrate Community Index, which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 11) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location. North Fork Captina Creek is in full attainment of its' designated aquatic life uses, Warmwater habitat near the plant (WWH), and Exception Warmwater Habitat (EWH), downstream of the plant.

In the 2022 *Ohio Integrated Water Quality Monitoring and Assessment Report*, North Fork Captina Creek was listed as impaired due to *e. coli* for primary contact recreation. Data used in this assessment stem from four samples taken from station number C02S56, River Mile 5.28, in North Fork Captina Creek in 2013 as part of a multi-watershed TMDL project currently being developed. In 2010, OEPA published *Biological and Water Quality Study of the Captina Creek Watershed, 2009. Belmont County, Ohio.* It listed the North Fork Captina Creek watershed as in attainment of primary contact recreation goals at that time. Within the past five years, Barnesville WWTP has had eleven effluent violations regarding *e. coli* (table 2). Barnesville WWTP has also repaired the bearings on their rotors in the oxidation issues. Barnesville WWTP is planning a substantial improvement to replace the oxidation ditch.

The full integrated report is available through the Ohio EPA, Division of Surface Water website at:

https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ohio-integrated-water-quality-monitoring-and-assessment-report

The full Biological and Water Quality study of the Captina Creek Watershed is available here:

https://epa.ohio.gov/static/Portals/35/documents/CaptinaCreekTSD2009.pdf

DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS

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

Parameter Selection

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

Self-monitoring data (DMR)	October 2017 through November 2022
NPDES renewal application data	September and October 2022
Ohio EPA sampling data	November 2022

Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation as non-representative data:
Zinc – 164 µg/L from06/02/2020, and 163 µg/L from 08/04/2020; both values were approximately three times larger than the next highest value in the dataset.
Cadmium – 21 µg/L from 12/21/2021; value was more than twice the MDL of 10 µg/L with no other above MDL present amongst the dataset.
*All values from the Priority Pollutant Scan sampled 10/04/2022 were excluded from the PEQ, as interferences appeared to be present.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points (see Table 8). See Modeling Guidance #1 for more information on PEQ calculations, available through the Ohio EPA, Division of Surface Water website at:
https://www.epa.ohio.gov/portals/35/guidance/model1.pdf

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 12).

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 break down in the receiving water. For free flowing streams, WLAs using this method are calculated 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 (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 13, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

Whole Effluent Toxicity Wasteload Allocation

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 the Barnesville WWTP, the WLA values are 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 all designated waters.

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

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

2.7 to 3.3 50

$$\text{Downstream Dilution Ratio} = \frac{\text{1Q10 + Barnesville WWTP Flow Rate}}{\text{Barnesville WWTP Flow Rate}} = \frac{\text{0 CFS + 2.014 cfs}}{\text{2.014 cfs}} = 1$$

The acute WLA for Barnesville WWTP is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1. In accordance with OAC 3745-33-07(B)(10), the acute toxicity limit cannot be any lower than 1.0 TUa.

REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 8, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) 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 15.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 16 presents the final effluent limits and monitoring requirements proposed for the Barnesville WWTP outfall 00PC00001001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Ammonia - Summer
The limits proposed for summer ammonia are based on the previous wasteload allocation. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

Carbonaceous Biochemical Oxygen Demand (Five Day) and Total Suspended Solids
The limits recommended for total suspended solids and 5-day carbonaceous biochemical oxygen demand are technology-based treatment standards included in 40 CFR Part 133, Secondary Treatment Regulation. Secondary treatment is defined by the Best Practicable Waste Treatment Technology criteria, which are minimum standards required of all publicly owned treatment works. Summer limits are based on plant design and therefore are more restrictive.

Dissolved Oxygen, Oil and Grease , pH, and Escherichia coli
Limits proposed for dissolved oxygen, oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-35 and 37). Primary contact recreation *E. coli* standards apply to the North Fork Captina Creek.

Copper, Lead, and Selenium
The Ohio EPA risk assessment (Table 15) places Copper, Lead, and Selenium in group 5. This placement, as well as the data in Table 8, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The thirty-day average concentration limit for Copper, Lead, and Selenium is based on the threat to harm aquatic life, as is the thirty day average loading limit. The maximum concentration limit for Copper, Lead, and Selenium is based on the threat to harm aquatic life, as is the daily loading limit.

Mercury
The Ohio EPA risk assessment (Table 15) places Mercury in group 4. This placement, as well as the data in Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Mercury is proposed to be monitored once a month.

Chronic Toxicity, Ceriodaphnia dubia – TUc
Monitoring is proposed to increase from annually to quarterly during the life of the permit for Chronic Toxicity, *Ceriodaphnia dubia* – TUc. The last three years of samples have all shown exceedance of 1.0 TUc for *Ceriodaphnia dubia*. After 36 months, a limit of 1.0 TUc will be imposed.

Ammonia - Winter, Free Cyanide, Cadmium, Nickel, Chromium, Nitrate + Nitrite, Total Filterable Residue, and Zinc The Ohio EPA risk assessment (Table 15) places, Ammonia - Winter, Free Cyanide, Cadmium, Nickel, Chromium, Nitrate + Nitrite, Total Filterable Residue, and Zinc in groups 2 and 3. This placement, as well as the data in Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to continue to document that these pollutants continue to remain at low levels.

Antimony, Silver, Arsenic, Barium, Carbon Tetrachloride, and Thallium The Ohio EPA risk assessment (Table 15) places Antimony, Silver, Arsenic, Barium, Carbon Tetrachloride, and Thallium, in groups 2 and 3. This placement, as well as the data in Table 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Data submitted as part of the NPDES permit renewal application will provide data for these pollutants in future reasonable potential analysis.

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

Dissolved Orthophosphate and Total Phosphorus
Monitoring for dissolved orthophosphate (as P) and total phosphorus is required by ORC 6111.03. This monitoring will further develop nutrient datasets that are used in stream and watershed assessments and studies. Because Ohio EPA monitoring, as well as other in-stream monitoring, for dissolved orthophosphate is taken by grab sample, grab samples are proposed for orthophosphate to maintain consistent data. The grab samples must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the WET data presented in Table 9, Table 10, Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the Barnesville WWTP is placed in Category 2 and 4 with respect to WET. The toxicity results for *Ceriodaphnia dubia* indicate category 2, while the results for *Pimephales promelas* indicate category 4. Annual toxicity testing is proposed for *Pimephales promelas* consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Quarterly toxicity reporting is proposed for *Ceriodaphnia dubia.* Annual acute toxicity monitoring is proposed for the life of the permit. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Additional Monitoring Requirements
New monitoring for Copper, Lead, and Selenium is being proposed at influent monitoring station 601 because of the new effluent limits for the 001 station.

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

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

OTHER REQUIREMENTS

Compliance Schedule
New Limits - A 36 month compliance schedule is proposed for the Barnesville WWTP to meet the proposed limits for Copper, Lead, Selenium, and *Ceriodaphnia dubia* toxicity.

Sanitary Sewer Overflow Reporting
Provisions for reporting SSOs are again proposed in this permit. These provisions include: the reporting of the system-wide number of SSO occurrences on monthly operating reports; telephone notification of Ohio EPA and the local health department, and 5-day follow up written reports for certain high risk SSOs; and preparation of an annual report that is submitted to Ohio EPA and made available to the public. Many of these provisions were already required under the "Noncompliance Notification", "Records Retention", and "Facility Operation and Quality Control" general conditions in Part III of Ohio NPDES permits.

Operator Certification and Operator of Record
Operator certification requirements have been included in Part II of the permit in accordance with rules effective on August 15, 2018 (OAC 3745-7). These rules require the Barnesville WWTP to have a Class II wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works and sewerage system.

Low-Level Free Cyanide Testing
Currently there are three approved methods for free cyanide listed in 40 CFR 136 that have a quantification level lower than water quality-based effluent limits:

- ASTM D7237-10, OIA-1677-09, and ASTM D4282-02. (Note: The use of ASTM D4282-02 requires supporting documentation that it meets the requirement of a "sufficiently sensitive" test procedure as defined in 40 CFR 122.44(i)(1)(iv)).

These methods will allow Ohio EPA to make more reliable water quality-related decisions regarding free cyanide. Because the quantification levels are lower than any water quality-based effluent limits, it will also be possible to directly evaluate compliance with free cyanide limits.

Method Detection Limit Reporting
When submitting monitoring results in eDMR, the permittee must report all detected concentration values above the method detection limit (MDL), even if that value is below the quantification level, as indicated in Permit Guidance 9: *Limits below Quantification*. A detection above the MDL indicates the presence of a pollutant with

strong confidence, which must be considered in reasonable potential analyses. Per OAC 3745-33-07(C)(2)(c), for the purpose of assessing compliance, any value reported below the quantification level shall be considered in compliance with an effluent limit.

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

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

Figure 1. Location of Barnesville WWTP

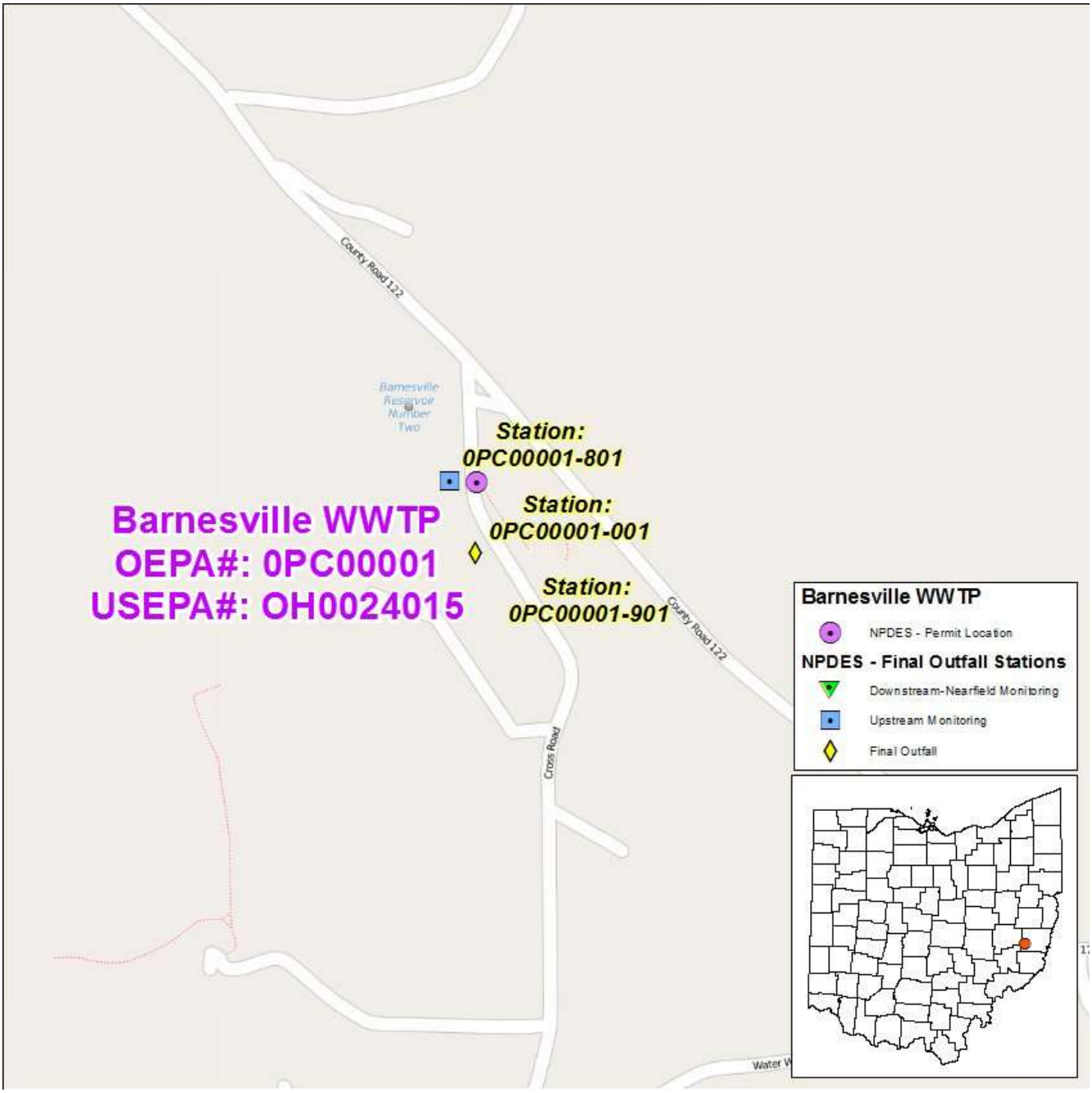

Figure 2. Diagram of Wastewater Treatment System

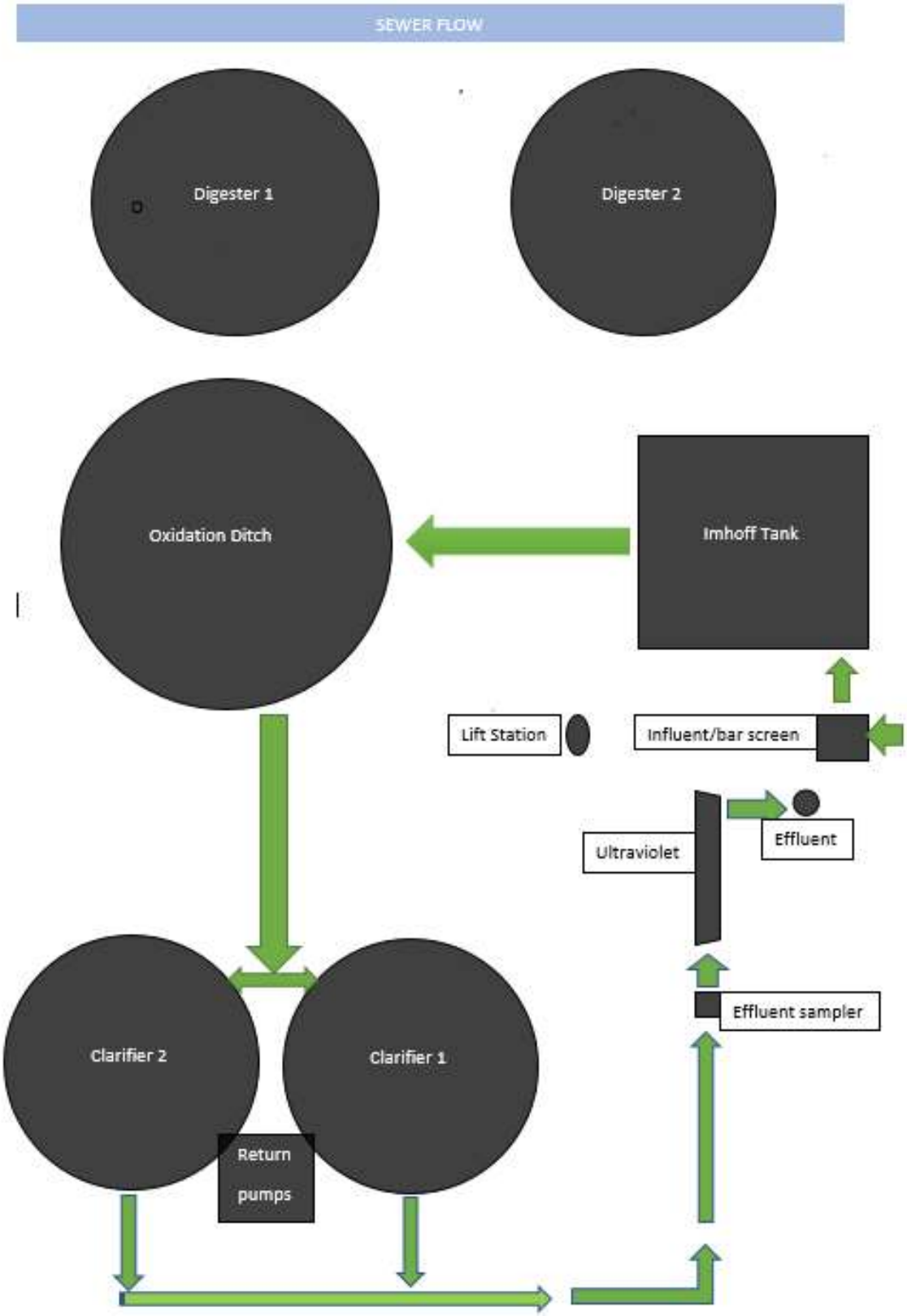

Figure 3. Diagram of Sludge Treatment System

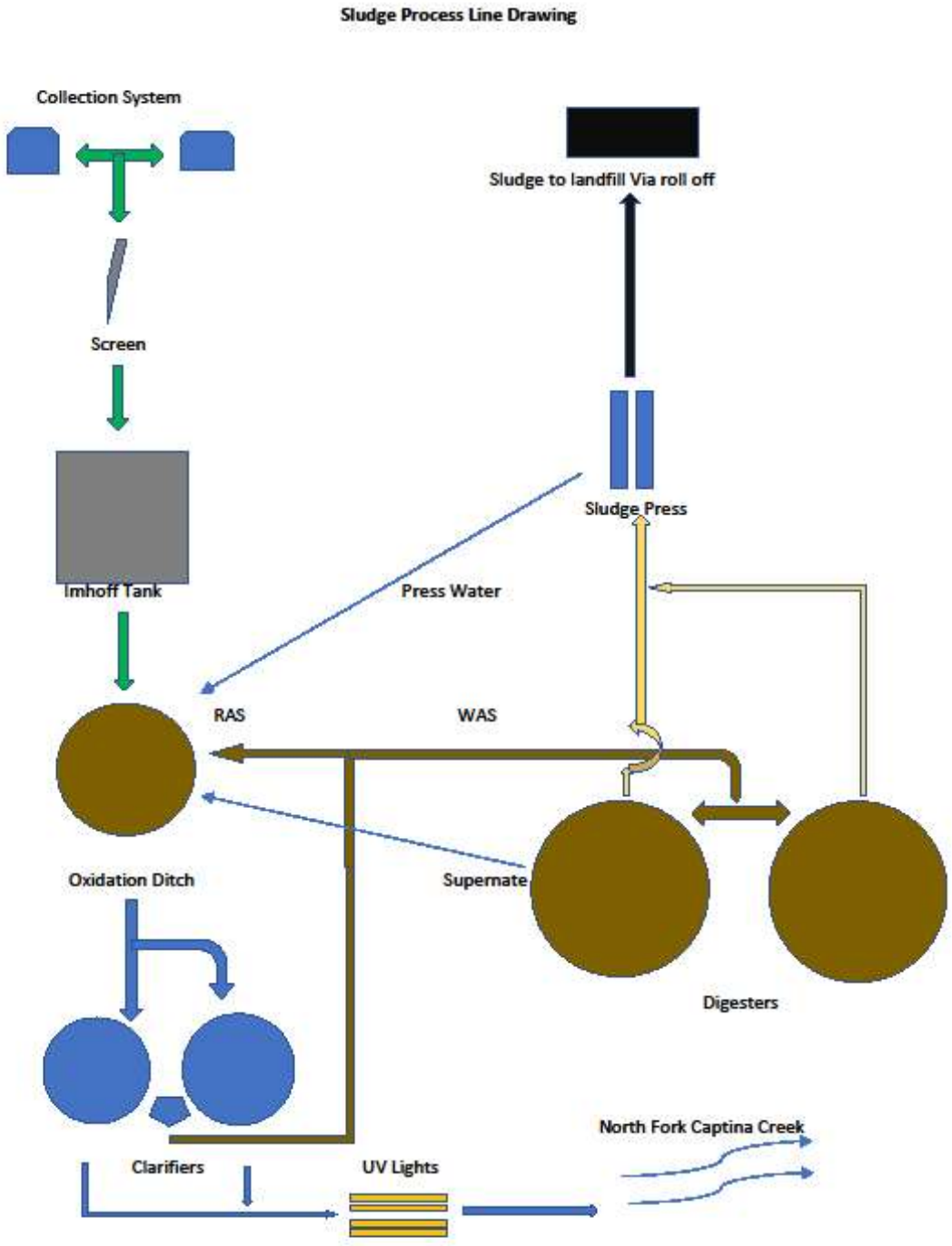

Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2017	174
2018	119
2019	139
2020	155
2021	78.1
2022	65.2

Table 2. Effluent Violations for Outfall 001 October 2017 through November 2022

Parameter	2017	2018	2019	2020	2021	2022	Total
Dissolved Oxygen	0	3	0	0	0	0	**3**
E. coli	0	6	0	0	3	2	**11**
Nitrogen, Ammonia (NH3)	0	5	0	0	2	0	**7**
Oil and Grease, Hexane	0	0	0	1	1	0	**2**
Total	**0**	**14**	**0**	**1**	**6**	**2**	**23**

Table 3. Average Annual Effluent Flow Rates October 2017 through November 2022

	Annual Flow (MGD)		
Year	50th Percentile	95th Percentile	Maximum
2017	0.31	0.66	1.66
2018	0.42	1.17	3.82
2019	0.42	1.04	1.66
2020	0.57	1.09	1.63
2021	0.53	1.10	1.94
2022	0.57	1.03	1.34

MGD = million gallons per day.

Table 4. Sanitary Sewer Overflows Discharges

Year	Occurrences
2017	0
2018	0
2019	5
2020	8
2021	6
2022	6

Table 5. Calculated Seasonal (May – October) Total Phosphorus Loadings

Year	n	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2017 [a]	1	0.61	0.30	0.68
2018	6	1.06	0.32	1.30
2019	6	1.22	0.33	1.43
2020	5	1.13	0.42	1.81
2021	6	1.06	0.46	1.65
2022 [b]	6	1.24	0.55	3.18

Define season months, if applicable
[a] = data set begins on 10/1/17
[b] = data set ends on 10/31/22
MGD = million gallons per day
n = number of samples

Table 6. Effluent Characterization Using Supplemental Data from 2022 NPDES Application and Ohio EPA Sampling Data

Parameter	Units	Permittee 9/27/22	Permittee 10/4/22[A]	Permittee 10/11/22	Ohio EPA 11/15/22
Antimony	µg/L	AA (10)	14[A]	AA (10)	0.327
Arsenic	µg/L	AA (10)	44 [A]	20	0.41
Beryllium	µg/L	AA (10)	AA (10)A	AA (10)	AA (0.0096)
Barium	µg/L	-	-	-	36.4
Cadmium	µg/L	AA (10)	10 [A]	AA (10)	AA (0.0221)
Chromium	µg/L	AA (10)	23 [A]	20	AA (0.163)
Copper	µg/L	AA (10)	27 [A]	AA (10)	1.34
Lead	µg/L	AA (10)	29 [A]	20	0.175
Mercury	ng/L	AA (200)	AA (200)[A]	AA (200)	AA (134)
Molybdenum	µg/L	AA (10)	--	25	--
Nickel	µg/L	AA (10)	24 [A]	AA (10)	AA (0.168)
Selenium	µg/L	AA (10)	36 [A]	20	0.341
Silver	µg/L	AA (10)	6 [A]	AA (10)	AA (0.0128)
Thallium	µg/L	AA (10)	28 [A]	AA (10)	AA (0.0656)
Zinc	µg/L	AA (10)	AA (10)[A]	20	14.3
Carbon tetrachloride	µg/L	1.03	AA (1.0)[A]	AA (1.0)	AA (0.381)
Phenol	µg/L	AA (4.0)	AA (4.0)[A]	AA (4.0)	AA (1.82)

AA = not detected (analytical method detection limit), MDL = method detection limit, PEQ = Preliminary Effluent Quality, [A] = Sample was not include in PEQ statistical analysis because MDL was above the recommended mdl.

Table 7. Effluent Characterization Using Self-Monitoring Data October 2017 through November 2022

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
001							
Water Temperature	°C	Monitoring Only		1273	15	22.8	4.4 - 24
Total Precipitation	Inches	Monitoring Only		151	0	.825	0 - 2.75
Dissolved Oxygen	mg/L	--	5.0[m]	1273	6.9	5.3*	3.3 - 11
Total Suspended Solids - Summer	kg/day	98	148[w]	339	2.35	12.6	0 - 74.8
Total Suspended Solids - Summer	mg/L	20	30[w]	373	1.6	9.32	0 - 47.2
Total Suspended Solids - Winter	kg/day	148	221[w]	351	4.77	30.6	.366 - 442
Total Suspended Solids - Winter	mg/L	30	45[w]	360	2.3	8.51	.3 - 79
Oil and Grease, Total	mg/L	--	10	10	1.05	2.07	0 - 2.2
Oil and Grease	mg/L	--	10	114	< 1	5.33	0 - 20.4
Nitrogen, Ammonia - Summer - 2018-2022	kg/day	6.7	13.8[w]	334	.527	4.31	0 - 18.5
Nitrogen, Ammonia - Summer - 2017-2017	kg/day	7.4	15[w]	13	.157	2.33	.0482 - 4.61
Nitrogen, Ammonia - Summer - 2018-2022	mg/L	1.4	2.8[w]	368	.31	2.6	0 - 12.6
Nitrogen, Ammonia - Summer - 2017-2017	mg/L	1.5	3.0[w]	13	.13	2.25	.06 - 4.13
Nitrogen, Ammonia - Winter	kg/day	6.7	13.8[w]	51	.0744	1.17	0 - 5.26
Nitrogen, Ammonia - Winter - 2017-2018	mg/L	1.4	2.8[w]	51	.06	.75	0 - 3.3
Nitrogen, Ammonia - Winter - 2018-2022	mg/L	Monitoring Only		316	.19	1.99	0 - 5.91
Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		63	4.86	9.4	.753 - 13.1
Phosphorus, Total	mg/L	Monitoring Only		63	.87	2.24	0 - 3.32
Orthophosphate, Dissolved	mg/L	Monitoring Only		61	1.74	7.57	0 - 10.3
Cyanide, Free	mg/L	Monitoring Only		5	--	--	< 2
Barium, TR	µg/L	Monitoring Only		5	31	38.2	0 - 39
Nickel, TR	µg/L	Monitoring Only		24	< 10	.017	0 - .02

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Zinc, TR	µg/L	Monitoring Only		24	7.53	134	0 - 164
Cadmium, TR	µg/L	Monitoring Only		24	< 10	< 10	0 - .021
Lead, TR	µg/L	Monitoring Only		24	< 10	22.1	0 - 42
Chromium, TR	µg/L	Monitoring Only		24	< 10	.0128	0 - .018
Copper, TR	kg/day	0.079	0.124[w]	5	< .0106	.0117	0 - .0146
Copper, TR - 2017-2018	µg/L	16	25	5	< 10	5.44	0 - 6.8
Copper, TR - 2018-2022	µg/L	Monitoring Only		57	< 10	.0026	0 - .029
Chromium, Dissolved Hexavalent	µg/L	Monitoring Only		5	--	--	< 10
E. coli - 2018-2022	#/100 mL	126	284[w]	362	23.5	410	0 - 6300
E. coli - 2017-2017	#/100 mL	161	362[w]	12	92.5	1200	0 - 2420
Flow Rate	MGD	Monitoring Only		1745	.5	1.09	.022 - 3.82
Mercury, Total	kg/day	0.000059	0.008	1	.000000996	.000000996	.000000996 - .000000996
Mercury, Total - 2017-2017	ng/L	12	1700	1	1.11	1.11	1.11 - 1.11
Mercury, Total - 2018-2022	ng/L	Monitoring Only		9	1.65	6.6	.65 - 8.22
Cyanide, Free (Low-Level)	µg/L	Monitoring Only		9	--	--	< .01
Acute Toxicity, Ceriodaphnia dubia	TUa	Monitoring Only		5	--	--	< .2
Chronic Toxicity, Ceriodaphnia dubia	TUc	Monitoring Only		5	1.7	2	0 - 2
Acute Toxicity, Pimephales promelas	TUa	Monitoring Only		5	--	--	< .2
Chronic Toxicity, Pimephales promelas	TUc	Monitoring Only		5	--	--	< 1
pH, Maximum	S.U.	--	9.0	1273	7.4	7.6	7 - 8.1
pH, Minimum	S.U.	--	6.5[m]	1273	7.3	7.1*	6.9 - 7.8
Residue, Total Filterable	mg/L	Monitoring Only		61	349	556	122 - 785
CBOD 5 day - Summer	kg/day	74	108[w]	337	2.78	13.2	.772 - 30.2
CBOD 5 day - Summer	mg/L	15	22[w]	372	1.7	5.9	.6 - 12.8

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
CBOD 5 day - Winter	kg/day	123	197[w]	351	3.87	17.5	.189 - 85
CBOD 5 day - Winter	mg/L	25	40[w]	360	1.8	5.51	.2 - 21.6
300							
Overflow Occurrence	No./Month	Monitoring Only		23	1	2.9	.0002 - 4
586							
Sludge Fee Weight	dry tons	Monitoring Only		5	119	167	65.7 - 174
Sludge Weight	Dry Tons	Monitoring Only		439	1.1	2.1	.16 - 84.3
601							
Water Temperature	°C	Monitoring Only		102	11.9	20.1	5.3 - 20.8
pH	S.U.	Monitoring Only		1274	7.4	7.5	5 - 75
Total Suspended Solids	mg/L	Monitoring Only		733	102	314	.4 - 1080
Flow, Peak Rate	MGD	Monitoring Only		151	.45	1.55	.25 - 2.2
CBOD 5 day	mg/L	Monitoring Only		732	73.9	183	2.2 - 742
801							
Water Temperature	°C	Monitoring Only		63	10.3	22	.9 - 23.4
Dissolved Oxygen	mg/L	Monitoring Only		63	11.1	7.31*	4.4 - 68
pH	S.U.	Monitoring Only		63	7.9	8.29	7.2 - 8.6
Nitrogen, Ammonia	mg/L	Monitoring Only		63	< .18	2.98	0 - 8.48
Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		56	.997	2.22	0 - 2.86
Phosphorus, Total	mg/L	Monitoring Only		56	.025	.47	0 - 2.06
E. coli	#/100 mL	Monitoring Only		31	228	1920	0 - 42000
48-Hr. Acute Toxicity Ceriodaphnia dubia	% Affected	Monitoring Only		5	--	--	< 10
96-Hr. Acute Toxicity Pimephales promela	% Affected	Monitoring Only		5	7.5	9.54	0 - 10
7-Day Chronic Toxicity Ceriodaphnia dubia	% Affected	Monitoring Only		5	--	--	< 10

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
7-Day Chronic Toxicity Pimephales promelas	% Affected	Monitoring Only		5	7.7	12	2.5 - 12.5
901							
Water Temperature	°C	Monitoring Only		63	12.4	22.7	4 - 23
Dissolved Oxygen	mg/L	Monitoring Only		63	9.1	6.8*	6.4 - 12.8
pH	S.U.	Monitoring Only		63	7.6	7.8	7.3 - 7.9
Nitrogen, Ammonia	mg/L	Monitoring Only		63	.03	3.71	0 - 6.62
Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		56	2.78	6.01	.65 - 10.7
Phosphorus, Total	mg/L	Monitoring Only		56	.47	2.61	0 - 2.8
Hardness, Total (CaCO3)	mg/L	Monitoring Only		57	180	240	120 - 260
Fecal Coliform	#/100 mL	Monitoring Only		1	1730	1730	1730 - 1730
E. coli	#/100 mL	Monitoring Only		30	219	1050	20 - 43000

* = For minimum pH, 5th percentile shown in place of 50th percentile.
** = For dissolved oxygen, 5th percentile shown in place of 95th percentile.
[a] = weekly average.

Table 8. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	257	172	1.7012	3.3348
Ammonia (Winter)	mg/L	186	76	1.0057	1.4508
Barium	µg/L	7	5	56.94	78
Cadmium - TR	µg/L	27	0	0	0
Chromium - TR	µg/L	28	3	17.52	24
Copper - TR	µg/L	66	5	21.17	29
Cyanide, Free	µg/L	6	0	--	--
Total Filterable Residue	mg/L	61	61	573.05	785
Lead - TR	µg/L	25	4	39.858	54.6
Mercury	ng/L	10	10	6.9517	13.677
Nickel - TR	µg/L	26	2	18.98	26
Nitrate-N + Nitrite-N	mg/L	64	64	8.9212	13.07
Zinc - TR	µg/L	26	20	35.74	51.932
Antimony	µg/L	3	0	0	0
Arsenic - TR	µg/L	3	1	43.8	60
Carbon tetrachloride	µg/L	3	1	2.2557	3.09
Selenium - TR	µg/L	3	1	43.8	60
Silver	µg/L	3	0	0	0
Thallium	µg/L	3	0	0	0
Phenol	µg/L	3	0	0	0

MDL = analytical method detection limit
PEQ = projected effluent quality

Table 9. Summary of Acute and Chronic Toxicity Results

	Ceriodaphnia Dubia		*Pimephales promelas*	
Date	**TU_a**	**TU_c**	**TU_a**	**TU_c**
7/24/2018	AA	AA	AA	AA
7/1/2019	AA	1.0	AA	AA
7/21/2020	AA	2.0	AA	AA
7/20/2021	AA	1.7	AA	AA
7/26/2022	AA	2.0	AA	AA

AA = non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c
TU_a = acute toxicity unit
TU_c = chronic toxicity unit

Table 10. Ohio EPA Toxicity Screening Results for Outfall 001

		Pimephales promelas	*Ceriodaphnia dubia*
Date	**Acutely Toxic (Y/N)**	**%M**	**%M**
11/16/2022	N	0	0

%M = percent mortality in 100% effluent

Table 11. Use Attainment Table

Location	**RM**	**Sampling Type**	**Eco-region**	**Aquatic Life Use Designation**	**Aquatic Life Attainment Status**
North Fork Captina Creek	6.6	Headwater	WAP	WWH	FULL
North Fork Captina Creek	3.9	Wading	WAP	EWH	FULL
North Fork Captina Creek	0.4	Wading	WAP	EWH	FULL

Data gathered from *[Biological and Water Quality Study of the Captina Creek Watershed, 2009. Belmont County, Ohio]*
RM = River mile
WWH = Warmwater habitat
EWH = Exceptional warmwater habitat

Table 12. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.8	--	--
Ammonia (Winter)	mg/L	--	--	6.6	--	--
Cadmium - TR	µg/L	--	50	3.9	8.8	18
Chromium - TR	µg/L	--	100	140	2900	5800
Copper - TR	µg/L	1300	500	15	24	49
Cyanide, Free	µg/L	22000	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Lead - TR	µg/L	--	100	14	260	520
Mercury	ng/L	12	10000	910	1700	--
Nickel - TR	µg/L	4600	200	86	770	1500
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Nitrite-N	mg/L	--	--	--	--	--
Zinc - TR	µg/L	69000	25000	200	200	390
Antimony	µg/L	640	--	190	900	1800
Arsenic - TR	µg/L	--	100	150	340	680
Cadmium - TR	µg/L	--	50	3.9	8.8	18
Carbon tetrachloride	µg/L	50[c]	--	240	2200	4400
Selenium - TR	µg/L	4200	50	5	62	120
Silver	µg/L	--	--	1.3	4.4	8.8
Thallium	µg/L	--	--	17	79	160
Phenol	µg/L	300000	--	400	4700	9400

[c] = carcinogen

Table 13. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0	USGS 03114000; 1997 doc adjusted for area
7Q10	cfs	annual	0	USGS 03114000; 1997 doc adjusted for area
30Q10	cfs	summer	0.004	USGS 03114000; 1997 doc adjusted for area
		winter	0.19	USGS 03114000; 1997 doc adjusted for area
Harmonic Mean	cfs	annual	0.05	USGS 03114000; 1997 doc adjusted for area
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	180	Station 901, 2018-22, n= 56, median
Hardness, IMZ	mg/L	annual	180	Station 901, 2018-22, n= 56, median
pH	S.U.	summer	7.6	Station 901, 2017-22, n= 22, median
		winter	7.625	Station 901, 2017-22, n= 16, median
Temperature	ºC	summer	22.6	Station 901, 2017-22, n= 22, median
		winter	7.8	Station 901, 2017-22, n= 16, median
Barnesville WWTP flow	cfs MGD	annual	.509 1.3	NPDES application Form 2A
Background Water Quality				
Cadmium	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Ammonia (Summer)	mg/L		0.105	801 MORstats 22 samples 2017-2022
Ammonia (Winter)	mg/L		0	801 MORstats 16 samples 2017-2022
Chromium	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Copper	µg/L		1.55	EA3 Station C02W01; average 7 samples, 2009-2015
Cyanide - free	µg/L		--	No representative data available.
Total Filterable Residue	mg/l		3	EA3 Station C02W01; average 7 samples, 2009-2015
Lead – TR	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Mercury – TR (BCC)	ng/l		0	EA3 Station C02W01; average 7 samples, 2009-2015
Nickel – TR	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Nitrate – N +Nitrite-N	mg/l		1.03	801 MORstats, 55 samples, 2017-2022
Zinc – TR	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Antimony	µg/L		0	No Representative Data Available
Arsenic – TR	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Carbon Tetrachloride	µg/L		0	No Representative Data Available
Selenium – TR	µg/L		0	EA3 Station C02W01; average 7 samples, 2009-2015
Silver	µg/L		0	No Representative Data Available
Thallium	µg/L		0	Priority Pollutant Scan 09/2022-10/2022 avg, 3 samples
Phenol	µg/L		0	No Representative Data Available
Barium	µg/L		69.57	EA3 Station C02W01; average 7 samples, 2009-2015

MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
Ohio EPA = Ohio Environmental Protection Agency
WWTP = wastewater treatment plant

Table 14. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.8	--	--
Ammonia (Winter)	mg/L	--	--	7.22	--	--
Barium	µg/L	--	--	1100	4600	9200
Cadmium - TR	µg/L	--	51	3.9	8.8	18
Chromium - TR	µg/L	--	102	140	2900	5800
Copper - TR	µg/L	1332	512	15	24	49
Cyanide, Free	µg/L	22547	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Lead - TR	µg/L	--	102	14	260	520
Mercury [A]	ng/L	12	10000	910	1700	--
Nickel - TR	µg/L	4714	205	86	770	1500
Nitrate-N + Nitrite-N	mg/L	--	102	--	--	--
Zinc - TR	µg/L	70715	25621	200	200	390
Antimony	µg/L	656	--	190	900	1800
Arsenic - TR	µg/L	--	102	150	340	680
Cadmium - TR	µg/L	--	51	3.9	8.8	18
Carbon tetrachloride	µg/L	51	--	240	2200	4400
Selenium - TR	µg/L	4304	51	5	62	120
Silver	µg/L	--	--	1.3	4.4	8.8
Thallium	µg/L	--	--	17	79	160
Phenol	µg/L	307457	--	400	4700	9400

[A] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless requirements for an exception are met as listed in OAC 3745-2-05(A)(2)(e)(ii)

Table 15. Parameter Assessment

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

No Parameters

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

Ammonia (Winter)	Cadmium - TR	Chromium - TR
Cyanide, Free	Nickel - TR	Nitrate-N + Nitrite-N
Antimony	Phenol	Cadmium - TR
Carbon tetrachloride	Silver	Thallium

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

Total Filterable Residue	Zinc - TR	Arsenic - TR

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*	*Average*	*Maximum*
Copper - TR	µg/L	15	24
Lead - TR	µg/L	14	260
Selenium - TR	µg/L	5	62

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

TR = Total Recoverable

Table 16. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		Daily Maximum	30 Day Average	Daily Maximum	30 Day Average	
Water Temperature	°C	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/L	5.0[m]	--	--	--	WQS
TSS (summer)	mg/L	30[d]	20	148[d]	98	PD
TSS (winter)	mg/L	45[d]	30	221[d]	148	PD/BPT
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (summer)	mg/L	2.8[d]	1.4	13.8[d]	6.7	PD
Ammonia (winter)	mg/L	--	--	--	--	PD
Nitrate plus Nitrite	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Phosphorus	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Orthophosphate	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Selenium	µg/L	62	5	.31	.025	WLA
Nickel	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Zinc	µg/L	-	--	--	-	M
Cadmium	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Lead	µg/L	260	14	1.3	.069	WLA
Chromium	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Copper	µg/L	24	15	.12	.074	WLA
E. coli	#/100 mL	284[d]	126	--	--	WQS
Flow Rate	MGD	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Free Cyanide	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Acute Toxicity, *Ceriodaphnia dubia*	TUa	1.0	--	--	--	WET
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	--	1.0	--	--	WET
Acute Toxicity, *Pimephales promelas*	TUa	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Chronic Toxicity, *Pimephales promelas*	TUc	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Total Filterable Residue	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
pH, maximum	SU	9.0	--	--	--	WQS
pH, minimum	SU	6.5[m]	--	--	--	WQS
CBOD5 (summer)	mg/L	22[d]	15	108[d]	74	PD
CBOD5 (winter)	mg/L	40[d]	25	197[d]	123	PD

[a] Effluent loadings based on average design discharge flow of 1.3 MGD.

[b] Definitions:

BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation
M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges
PD = Plant Design (OAC 3745-33-05(E))
PMR = Phosphorus monitoring requirements (ORC 6111.03)
WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)] and Reasonable potential for requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [OAC 3745-33-07(B)]
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.
[m] minimum limit

Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

Whole effluent toxicity testing produced only non-detection results for acute and chronic toxicity in *Pimephales promelas* and acute toxicity in *Ceriodaphnia dubia*and therefore fall under Hazard Category 4. The reasonable potential analyses in Tables 3B, 3C, and 3D were only performed for *Ceriodaphnia dubia* chronic toxicity (TUc Cd).

Hazard Category Summary

	Ceriodaphnia dubia		***Pimephales promelas***	
	Acute	**Chronic**	**Acute**	**Chronic**
Effluent Toxicity (Table A)	4	1	4	4
Near-Field Impact (Table B)	NA		NA	
Far-field Impact (Table C)		NA		NA
	2		4	

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

Table A. Effluent Toxicity

	Ceriodaphnia dubia		***Pimephales promelas***	
	Acute	**Chronic**	**Acute**	**Chronic**
WLA	0.3	1.00	0.3	1.00
# of tests	5	5	5	5
Maximum value	AA	2	AA	AA
Percent of tests >WLA	0	60		
Geometric mean		0.5		
Average Exceedance (Geomean * Percent of tests >WLA)		0.78		
Average Exceedance / WLA		0.78		

Attribute Evaluated	**Hazard Category 1**	**Hazard Category 2**	**Hazard Category 3**	**Hazard Category 4**
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Minimum number of tests	3 TUc Cd	1	0 or 1	0 or 1
(2) Percent of tests >WLA	>30 TUc Cd	20 to 30	10 to 20	10
(3) Average Exceedance/WLA[1] (Tables B and C data not available)				
(a) Acute[2]	> 0.3	≥ 0.3	≥ 0.2	< 0.2
(b) Chronic	> 0.3 TUc Cd	≥ 0.3	≥ 0.2	< 0.2
(3) Average Exceedance/WLA[1] (Tables B and C data available)				
(a) Acute[2]	> 0.5	≥ 0.3	≥ 0.3	< 0.3

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

* *Pimephales promelas not shown in table due to non-detections of WET results. Hazard Category 4.*

Table B. Near-Field Toxicity

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Mortality within mixing zone[3]	≥ 20%	≤ 20%	≤ 20%	< 20%
(2) Stream community impact				
(a) implied chemically[4, 6]	≥3xIMZM or >LC50	≥1.5xIMZM or >LC50	≥0.75xIMZM or >0.75xLC50	≤0.5xIMZM or ≤0.75xLC50
(b) implied toxicologically[4]	≥1.0 TUa	≥1.0 TUa	≥1.0 TUa	<1.0 TUa
(c) implied biologically	Toxic	Fair/poor community	Slight impact	None

(This table is not being used for this permit)

Table C. Far-Field Toxicity

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Aquatic life use impairment (Ohio EPA biological criteria)	Yes[5]	Yes or partial[5]	Partial	None
(2) Stream community impact implied toxicologically[3]	Significant effect	Significant effect	Unknown or slight effect	None
(3) Other indicators	Stress indicated	Stress indicated	Stress indicated	No stress

(This table is not being used for this permit)

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

Addendum 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CONSWLA	Conservative substance wasteload allocation
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
LTCP	Long-term Control Plan
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SSO	Sanitary sewer overflow
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WPCF	Water Pollution Control Facility
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant