

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Bellefontaine Wastewater Treatment Plant (WWTP)

Public Notice No.: 21-11-024
Public Notice Date: November 12, 2021
Comment Period Ends: December 13, 2021

Ohio EPA Permit No.: 1PD00000*QD
Application No.: OH0024066

Name and Address of Applicant:

City of Bellefontaine
135 North Detroit Street
Bellefontaine, Ohio 43311

Name and Address of Facility Where

Discharge Occurs:

Bellefontaine WWTP
610 South Troy Street
Bellefontaine, Ohio 43311
Logan County

Receiving Water: Opossum Run

Subsequent Stream Network: Blue Jacket Creek, Bokengehalas Creek, Great Miami River, 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.

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

New monitoring is proposed for bis (2-ethylhexyl) phthalate because data has shown the reasonable potential to exceed WQS. Additional monitoring data is needed to determine if limits are appropriate for bis (2-ethylhexyl) phthalate.

The Ammonia – Summer weekly limit has been adjusted to align with the 30-day average limit. This is to correct an omission from the prior permit. Loading limits have also been adjusted accordingly.

Increased monitoring is proposed for barium because data has shown the reasonable potential to exceed WQS. Increased monitoring is proposed for phosphorus due to the size of the facility. Nutrient data is required to aid in future stream studies.

Limits and monitoring requirements are proposed to be removed for selenium because this parameter does not have the reasonable potential to contribute to WQS exceedances.

Monitoring requirements are proposed to be removed for thallium because this parameter does not have the reasonable potential to contribute to WQS exceedances.

In accordance with Ohio Administrative Code (OAC) 3745-33-07, it has been determined that the effluent from Bellefontaine WWTP shows chronic toxicity to *Ceriodaphnia dubia*. A limit of 1.01 TUc and increased monitoring frequency is proposed for *C. dubia*. A toxicity reduction evaluation is proposed within a 3-year compliance schedule to meet this limit.

Monitoring requirements are proposed to be removed for temperature, dissolved oxygen and pH in the upstream 801 monitoring station. Hardness monitoring is proposed to be added to the downstream 901 monitoring station.

Total filterable residue is being added to the influent monitoring station 601 to determine removal efficiencies.

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)).

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.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding dissolved hexavalent chromium, a special condition is proposed in Part II of the permit that provides guidance on the analytical method detection limit (MDL) the permittee should use in analyzing for this contaminant.

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; pretreatment program requirements; toxicity reduction evaluation (TRE); and outfall signage.

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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 Mary Osika, (937) 285-6446, mary.osika@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:

http://epa.ohio.gov/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 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 Bellefontaine Wastewater Treatment Plant (WWTP) discharges to Opossum Run at River Mile 0.5. Figure 1 shows the approximate location of the facility.

This segment of Opossum Run is described by Ohio EPA River Code: 14-077-001, Hydrologic Unit Code: 05080001-03-04, County: Logan, Ecoregion: Eastern Corn Belt Plains. Opossum Run is designated for the following uses under Ohio's WQS (OAC 3745-1-21): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation. Opossum Run discharges to Blue Jacket Creek. Blue Jacket Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-21): Coldwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation upstream from confluence of Opossum Run and Warmwater Habitat downstream from Opossum Run to the mouth.

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

Bellefontaine WWTP was constructed in 1985 and last upgraded in 2010. The average design flow is 4.5 million gallons per day (MGD). Bellefontaine WWTP serves Bellefontaine for a total population of 13,000 customers. Bellefontaine WWTP has the following treatment processes which are shown on Figure 2:

- Fine Screens
- Scum Removal
- Oxidation Ditches
- Secondary Clarification
- Ultraviolet Disinfection
- Post Aeration

Bellefontaine WWTP has no bypasses. Bellefontaine has 100% separated sanitary sewers in the collection system.

Bellefontaine does have an approved pretreatment program. Bellefontaine has 2 significant non-categorical users that discharge 0.3 MGD of flow. The Bellefontaine WWTP's potable water comes from groundwater well fields.

The Bellefontaine WWTP utilizes the following sewage sludge treatment processes:

- Aerobic Sludge Holding
- Mechanical Dewatering – Belt Filter Press
- Gravity Thickening
- Polymer Addition
- Lime Stabilization
- Sand Bed Dewatering

Treated sludge is land applied at agronomic rates or disposed in a municipal landfill. Table 1 shows the last five years of sludge removed from Bellefontaine WWTP.

Bellefontaine WWTP is covered under the following additional NPDES permit: industrial storm water general permit 1GR00630*FG.

DESCRIPTION OF EXISTING DISCHARGE

Bellefontaine WWTP had no effluent violations from 9/1/16 to 3/1/21.

Bellefontaine WWTP has an estimated infiltration/inflow (I/I) rate of 0.3 MGD but performs the following activities to minimize I/I: continuing program of sewer pipe lining and manhole restoration.

Bellefontaine WWTP reports SSOs at station 300. Only two SSOs were reported; one in 2019 and one in 2020.

Table 2 presents the annual average effluent flow rates from the Bellefontaine WWTP for the past five years. Table 3 presents the annual phosphorus loadings to Opossum Run from Bellefontaine WWTP for the past five years.

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from Ohio EPA effluent testing conducted.

Table 4 presents chemical specific data compiled from data reported in annual pretreatment reports.

Table 5 presents chemical specific data compiled from data collected by Ohio EPA.

Table 6 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period 9/1/16-2/28/2019, and current permit limits are provided for comparison.

Table 7 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 8 summarizes the results of acute and chronic WET tests of the final effluent.

Table 9 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Blue Jacket Creek watershed assessment unit (05080001-03-04), which includes the Opossum Run in the vicinity of Bellefontaine WWTP, is not listed as impaired on Ohio's 303(d) list for Aquatic Life Use but is listed as impaired for Recreation and Human Health (fish tissue) uses on Ohio's 303(d) list.

A Total Daily Maximum Load (TMDL) report was approved for the Great Miami River in February 2012.

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 10) 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.

The direct receiving stream, Opossum Run, has not been assessed for attainment. The TMDL notes that non-attainment of the recreation use criteria was documented at Blue Jacket Creek, which Opossum Run discharges to at River Mile 5.80. Agricultural runoff is the suspected source of the impairment.

Aquatic life use was in full attainment but nutrient impacts from the Bellefontaine WWTP discharge were documented in the Blue Jacket Creek. Blue Jacket Creek did not exceed the target values for phosphorus and nitrate+nitrite upstream from the Bellefontaine WWTP. Both sites downstream from the Bellefontaine WWTP

exceeded the target values for phosphorus and nitrate+nitrite. The site at RM 5.39 had 7.05 mg/l nitrate-nitrite and 1.125 mg/L total phosphorus and at RM 0.72 had 3.25 mg/L nitrate-nitrite and 0.432 mg/L total phosphorus.

The sampling site on Blue Jacket Creek upstream of the confluence of Opossum Run was strongly influenced by ground water recharge and was classified as a coldwater habitat stream. No specific recommendations were made as part of the TMDL for Bellefontaine WWTP, so the plant will continue to have nutrient monitoring to determine if future action to reduce nutrients should be taken.

The TMDL report is available through the Ohio EPA, Division of Surface Water website at: <https://epa.ohio.gov/dsw/tmdl/GreatMiamiRiver>

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 Bellefontaine 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)	September 2016 through February 2021
Pretreatment data	2017 - 2021
Ohio EPA compliance & bioassay sampling data	2019

Statistical Outliers and Other Non-representative Data

The data were examined, and no values were removed from the evaluation. 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 7).

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 14).

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

The data used in the WLA are listed in Table 11 and Table 12. The WLA results to maintain all applicable criteria are presented in Table 13.

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 Bellefontaine WWTP, the WLA values are 0.3 TU_a and 1.01 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 (IC₂₅):

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

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):

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

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 (LC₅₀) 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:

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

$$\text{Stream Dilution Ratio} = \frac{1Q10 + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{0.045 \text{ cfs} + 6.96 \text{ cfs}}{6.96 \text{ cfs}} = 1.0$$

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

REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 13. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 7, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [(PEQ_{avg} ÷ PEL_{avg}) X 100, or (PEQ_{max} ÷ PEL_{max}) X 100], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 6.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 15 presents the final effluent limits and monitoring requirements proposed for Bellefontaine WWTP outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Dissolved Oxygen, Total Suspended Solids, CBOD5, Ammonia

The limits proposed for dissolved oxygen, total suspended solids, and 5-day carbonaceous biochemical oxygen demand (CBOD5) are all based on plant design criteria. PTI no. 710010 issued on 10/15/2009 for the WWTP expansion listed these parameters/limits in the design. These limits are protective of WQS. The TSS and CBOD5 limits are more stringent than the Secondary Treatment Standards in 40 CFR Part 133.

Ammonia limits are based on WLA and ABS. The 7-day average summer limit of 1.7 mg/l has been revised to 1.5 mg/l in accordance with the 30-day average limit (1.5 x 30-day average). The corresponding loading limit has been revised also. This was an omission from the prior permit when the summer 30-day average limit changed from 1.1 mg/l to 1.0 mg/l. The 7-day average limit should have also been adjusted at that time. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

Although the current WLA would allow slightly higher limits for Ammonia, anti-backsliding provisions in the OAC prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of the Bellefontaine WWTP, none of those conditions have been satisfied, so the existing limits are proposed to continue. The anti-backsliding provisions of OAC 3745-33-05(F) require that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.

Oil & Grease, pH, E. coli

Limits proposed for 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 Opossum Run and Blue Jacket Creek.

Total Filterable Residue

The Ohio EPA risk assessment (Table 6) places total filterable residue in group 5. This placement, as well as the data in Table 7 and Table 13, indicates that the reasonable potential to exceed WQS exists, and limits are necessary to protect water quality. For this parameter, the PEQ is between 75 and 100 percent of the WLA and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The thirty-day average concentration limit for total filterable residue is based on OMZA aquatic life. The thirty-day average loading limit for total filterable residue is based on the concentration limit and design flow of the WWTP.

Bis (2-ethylhexyl) phthalate

The Ohio EPA risk assessment (Table 14) places bis (2-ethylhexyl) phthalate in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for these parameters. The PEQ values calculated for bis (2-ethylhexyl) phthalate (Table 7) may not be representative of its actual levels in the plant effluent since they were based on one positive data point. 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.

Barium

The Ohio EPA risk assessment (Table 14) places barium in group 4. This placement, as well as the data in Table 7 and Table 13, support that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Monitoring for barium is proposed to increase to determine frequency of occurrence and variability.

Chromium, Lead, Mercury, Hexavalent Chromium (diss.), Cyanide-free, Nickel, Zinc, Copper, Nitrate+Nitrite

The Ohio EPA risk assessment (Table 14) places these parameters in groups 2 and 3. This placement, as well as the data in Table 7 and Table 13, 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 document that these pollutants continue to remain at low levels.

Antimony, Arsenic, Thallium, Selenium, Strontium, Silver, Molybdenum

The Ohio EPA risk assessment (Table 14) places these parameters in groups 2 and 3. This placement, as well as the data in Table 7 and Table 13, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Monitoring and limits for selenium are proposed to be removed.

Dissolved Orthophosphate, Total Phosphorous, Total Kjeldahl Nitrogen (TKN)

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

Monitoring of total phosphorus in the effluent as well as upstream and downstream of their discharges will continue. TKN will continue to be monitored to aid in nutrient studies of the stream. Increased monitoring for phosphorus is proposed due to the size of the wastewater treatment facility.

Temperature, Flow

Monitoring for these parameters is proposed to continue to evaluate the performance of the treatment plant.

Whole Effluent Toxicity Reasonable Potential for *C. dubia*

Based on evaluating the WET data for *Ceriodaphnia dubia* presented in Table 8 and Table 9 and other pertinent data (See Attachment 1) under the provisions of OAC 3745-33-07(B), the Bellefontaine WWTP is placed in Category 1 with respect to WET for this testing organism. Limits for chronic toxicity and an increased testing frequency are proposed. It is proposed that the final effluent limits for *C. dubia* chronic toxicity become effective 36 months from the effective date of the permit. A compliance schedule to perform a Toxicity Reduction Evaluation (TRE) is included in Part I.C. of the permit.

Whole Effluent Toxicity Reasonable Potential for *P. promelas*

Based on evaluating the WET data for *Pimephales promelas* presented in Table 8 and Table 9 and other pertinent data under the provisions of OAC 3745-33-07(B), the Bellefontaine WWTP is placed in Category 4 with respect to WET for this testing organism. No limits and annual biomonitoring are proposed to continue for this test species.

Additional Monitoring Requirements

New monitoring for total filterable residue is being proposed at influent monitoring station 601 to determine removal efficiencies. New monitoring for hardness is being proposed at downstream station 901 due to metals monitoring in the effluent.

Monitoring for temperature, dissolved oxygen and pH is proposed to be removed at upstream monitoring station 801. Monitoring for dissolved oxygen is proposed to be removed at downstream monitoring station 901. *E. coli* monitoring in the up and downstream stations is proposed to be altered to collect data between June and August.

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.

OTHER REQUIREMENTS

Compliance Schedule

Pretreatment Local Limits Review - A 6-month compliance schedule is proposed for the city to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If revisions to local limits are required, the city must also submit a pretreatment program modification request. Details are in Part I.C of the permit.

New Limit - A 36-month compliance schedule is proposed for the Bellefontaine WWTP to meet the new WLA limit for *C. dubia* TUc.

TRE – Within 3 months, the permittee shall initiate a TRE to reduce WET toxicity. Details are in Part I.C of the permit.

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 Bellefontaine WWTP to have a Class III 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

Part II of the permit includes a condition requiring the Bellefontaine WWTP to use laboratory analytical methods with an appropriate MDL.

Outfall Signage

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

Part III

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

Storm Water Compliance

To comply with industrial storm water regulations, the permittee requested coverage under the industrial storm water general permit. Permit 1GR00630*FG became effective on 6/25/18. No later than 90 days after the effective date of the renewed general permit, the permittee must request renewed coverage under the industrial storm water general permit or make other provisions to comply with the industrial storm water regulations.

Figure 2. Diagram of Wastewater Treatment System

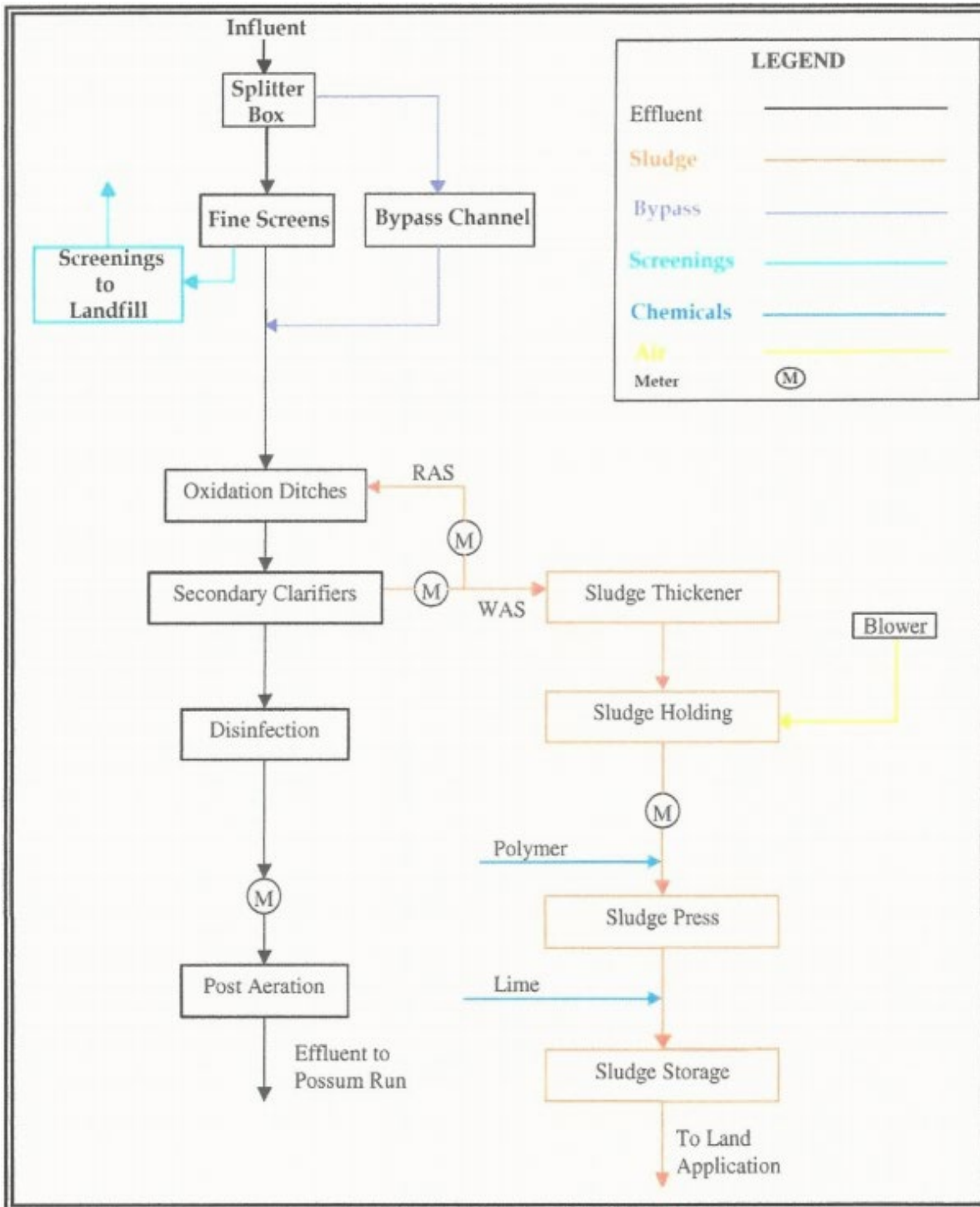


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2017	472
2018	373
2019	446
2020	484

Table 2. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2017	2.478	4.381	9.796
2018	2.529	5.12	11.666
2019	2.7	5.618	14.78
2020	2.451	4.206	10.817

MGD = million gallons per day.

Table 3. Calculated Phosphorus Loadings from 2017 - 2020

Year	Obs.	Median Flow (MGD)	Median Phosphorus (mg/L)	Median Loading (kg/day)
2017	6	2.596	1.4	13.7
2018	25	2.207	1.83	14.2
2019	24	2.301	1.49	14.4
2020	23	2.011	1.45	12.2

MGD = million gallons per day

Table 4. Effluent Characterization Using Pretreatment Data

Parameter (µg/L)	1/6/2017	1/4/2018	1/11/2019	1/9/2020	1/21/2021
Antimony	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)
Arsenic	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)
Beryllium	AA (3.0)	AA (3.0)	AA (3.0)	AA (3.0)	AA (3.0)
Cadmium	AA (3.0)	AA (3.0)	AA (3.0)	AA (3.0)	AA (3.0)
Chromium	AA (7.0)	AA (7.0)	AA (7.0)	AA (7.0)	AA (7.0)
Copper	AA (8.0)	10	8.3	9	10
Lead	AA (10)	AA (10)	AA (10)	AA (10)	AA (10)
Mercury	0.000539	AA (0.0005)	0.0005	NT	NT
Nickel	AA (8.0)	AA (8.0)	AA (8.0)	AA (8.0)	AA (8.0)
Selenium	AA (4.0)	AA (4.0)	AA (4.0)	AA (4.0)	AA (4.0)
Silver	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)
Thallium	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)
Zinc	17	33	23	25	25
Phenolics	50	AA (50)	AA (50)	190	AA (50)
bis(2-ethylhexyl)Phthalate	6.4	AA (5.0)	AA (5.0)	AA (5.0)	AA (5.0)

AA = not-detected (analytical method detection limit)

Table 5. Effluent Characterization Using Ohio EPA data

Parameter	Units	10/22/2019
Acetone	µg/L	1.87
Aluminum	µg/L	25.8
Ammonia	mg/L	0.237
Antimony	µg/L	0.291
Arsenic	µg/L	3.19
Barium	µg/L	143
Beryllium	µg/L	AA (0.132)
Bis (2-ethylhexyl) phthalate	µg/L	AA (2.23)
Cadmium	µg/L	AA (0.0343)
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	2.06
Chemical Oxygen Demand	mg/L	23.9
Chloride	mg/L	510
Chromium	µg/L	0.374
Copper	µg/L	12.5
Cyanide, Free	µg/L	AA(2.13)
Iron	µg/L	34.1
Lead	µg/L	0.165
Magnesium	mg/L	43.1
Manganese	µg/L	9.18
Nickel	µg/L	5.73
Nitrate+Nitrite	mg/L	17.6
Oil & Grease	mg/L	AA (0.659)
Phenolics	µg/L	AA (6.78)
Phosphorus	mg/L	2.08
Selenium	µg/L	1.51
Silver	µg/L	AA (0.023)
Strontium	µg/L	1570
Thallium	µg/L	AA (0.089)
Total Filterable Residue	mg/L	1350.0
Total Kjeldahl Nitrogen	mg/L	0.461
Total Suspended Solids	mg/L	AA (5.0)
Zinc	µg/L	32

AA = not detected (analytical method detection limit)

Table 6. Effluent Characterization Using Self-Monitoring Data between 9/1/2016 and 3/1/2021

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°C	----- Monitor -----		1171	15	22	6 - 24
Dissolved Oxygen	Annual	mg/L	--	5.0 ^m	1171	7.6	6.1*	5.2 - 10.6
Total Suspended Solids	Annual	mg/L	12	18 ^w	756	2.5	6	0 - 16
		kg/day	204	307 ^w	756	24.9	75.2	0 - 707
Oil and Grease	Annual	mg/L	--	10	110	< 5	< 5	0 - 7.7
Ammonia (Summer)	Summer	mg/L	1.0	1.7 ^w	354	.11	.63	0 - 1.72
		kg/day	17.1	29 ^w	354	.912	6.79	0 - 70.4
Ammonia (Winter)	Winter	mg/L	2.2	3.3 ^w	396	.09	.868	0 - 4.35
		kg/day	37.5	56.2 ^w	396	.884	14.3	0 - 48.9
Total Kjeldahl Nitrogen	Annual	mg/L	----- Monitor -----		54	< .5	1.55	0 - 4.18
Nitrate + Nitrite	Annual	mg/L	----- Monitor -----		54	11.3	16.9	.87 - 87.9
Phosphorus	Annual	mg/L	----- Monitor -----		171	1.32	2.35	.1 - 3.44
Orthophosphate,								
Dissolved	Annual	mg/L	----- Monitor -----		47	1.25	1.96	.2 - 2.42
Selenium	Annual	µg/L	5.0	--	54	--	--	< 4
		kg/day	0.0852	--	54	--	--	< .0000269
Cyanide, Free	Annual	mg/L	----- Monitor -----		17	--	--	< 3
Thallium	Annual	µg/L	----- Monitor -----		17	--	--	< 5
Barium	Annual	µg/L	----- Monitor -----		17	130	141	110 - 143
Nickel	Annual	µg/L	----- Monitor -----		17	--	--	< 8
Zinc	Annual	µg/L	----- Monitor -----		17	18	24.2	14 - 25
Cadmium	Annual	µg/L	----- Monitor -----		17	--	--	< 3
Lead	Annual	µg/L	----- Monitor -----		17	--	--	< 10
Chromium	Annual	µg/L	----- Monitor -----		17	--	--	< 7
Copper	Annual	µg/L	----- Monitor -----		17	10	12	0 - 12

Table 6. Effluent Characterization Using Self-Monitoring Data between 9/1/2016 and 3/1/2021

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Hexavalent Chromium (Dissolved)	Annual	µg/L	----- Monitor -----		17	--	--	< 10
<i>E. coli</i>	Annual	#/100 ml	126	284 ^a	360	2	12.2	0 - 60
Flow Rate	Annual	MGD	----- Monitor -----		1642	2.44	4.77	.689 - 14.8
Mercury	Annual	ng/L	----- Monitor -----		17	< .5	.887	0 - .951
Acute Toxicity, <i>Ceriodaphnia dubia</i>	Annual	TU _a	----- Monitor -----		5	--	--	< .2
		TU _c	----- Monitor -----		9	< 1	3.14	0 - 3.5
Acute Toxicity, <i>Pimephales promelas</i>	Annual	TU _a	----- Monitor -----		5	--	--	< .2
		TU _c	----- Monitor -----		5	--	--	< 1
pH, Maximum	Annual	S.U.	--	9.0	1171	7.8	8	7.1 - 8.6
pH, Minimum	Annual	S.U.	--	6.0	1171	7.7	7.3*	6.7 - 8.1
Residue, Total Filterable	Annual	kg/day	25700	--	55	10300	14700	7530 - 22900
		mg/L	1507	--	55	1050	1310	695 - 1340
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	mg/L	10	15 ^w	646	1.46	3.35	.05 - 6.74
		kg/day	170	255 ^w	646	13.8	43	.348 - 298

* = For minimum pH and dissolved oxygen, 5th percentile shown in place of 95th percentile.

^a = weekly average.

^m = Minimum limit

Table 7. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	232	229	0.512	1.074
Ammonia (Winter)	mg/L	208	206	0.223	0.494
Antimony	µg/L	1	1	1.317	1.804
Arsenic	µg/L	6	1	7.665	10.5
Barium	µg/L	18	18	141.23	152.36
Bis(2-ethylhexyl) Phthalate	µg/L	6	1	10.39	14.24
Cadmium	µg/L	17	0	--	--
Hexavalent Chromium, Dissolved	µg/L	17	0	--	--
Chromium	µg/L	23	0	--	--
Copper	µg/L	23	16	11.665	13.908
Cyanide, Free	µg/L	17	0	--	--
Lead	µg/L	23	0	--	--
Mercury	µg/L	20	9	0.793	1.165
Molybdenum	µg/L	1	1	26.251	35.96
Nickel	µg/L	23	0	--	--
Residue, Total Filterable	mg/L	56	56	1247.8	1433.7
Selenium	µg/L	60	0	--	--
Silver	µg/L	6	0	--	--
Strontium	µg/L	1	1	7106	9734
Thallium	µg/L	17	0	--	--
Zinc	µg/L	23	23	26.656	33.774

MDL = analytical method detection limit

PEQ = projected effluent quality

Table 8. Summary of Acute and Chronic Toxicity Results from 9/1/2016 to 3/1/2021

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales promelas</i>	
	TU _a	TU _c	TU _a	TU _c
9/26/2016	AA		AA	AA
10/18/2016		AA		
6/13/2017		AA		
9/18/2017	AA		AA	AA
10/9/2017		2.6		
6/11/2018		AA		
9/13/2018	AA			
9/18/2018			AA	AA
10/15/2018		1.4		
6/10/2019		AA		
9/9/2019	AA		AA	AA
10/18/2019		3.5		
6/8/2020		AA		
9/3/2020	AA			
9/8/2020			AA	AA
10/13/2020		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 9. Ohio EPA Toxicity Screening Results for Outfall 001

Date	Acutely Toxic (Y/N)	<i>Pimephales promelas</i>	<i>Ceriodaphnia dubia</i>
		TU _a	TU _a
10/21/19-10/22/19 ^a	N	AA	AA

^a = 24-hour composite sample

AA = non-detection; analytical method detection limit of 0.2 TU_a,

TU_a = acute toxicity unit

Table 10. Use Attainment Table

Location	River Mile	Use	Status
BLUE JACKET CREEK AT BELLEFONTAINE @ TROY ST. (upst Opossum Run)	6.31	CWH	FULL
BLUE JACKET CREEK @ CR 11 (UPSTREAM CROSSING), (dst Opossum Run)	5.39	WWH	FULL
BLUE JACKET CREEK DST. BELLEFONTAINE @ TWP. RD. 31	0.72	WWH	FULL

CWH = coldwater habitat
WWH = warmwater habitat

Table 11. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Human Health	Average		Maximum Aquatic Life	
			Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	1.1	--	--
Ammonia (Winter)	mg/L	--	--	2.3	--	--
Antimony	µg/L	640	--	190	900	1800
Arsenic	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Bis(2-ethylhexyl) phthalate	µg/L	3.7 ^c	--	8.4	1100	2100
Cadmium	µg/L	--	50	7.3	22	43
Chromium	µg/L	--	100	270	5600	11000
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper	µg/L	--	500	30	52	100
Cyanide - free	µg/L	400	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Lead	µg/L	--	100	37	710	1400
Mercury	ng/L	12	10000	910	1700	--
Molybdenum	µg/L	--	--	200000	190000	370000
Nickel	µg/L	4600	200	170	1500	3000
Phenol	µg/L	300000	--	400	4700	9400
Selenium	µg/L	4200	50	5	62	120
Silver	µg/L	--	--	1.3	17	35
Strontium	µg/L	--	--	21000	40000	81000
Thallium	µg/L	--	--	17	79	160
Zinc	µg/L	26000	25000	390	390	780

^c = carcinogen

Table 12. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.045	USGS 03260700, Bokengehalas Ck - 2010 calcs by GS
7Q10	cfs	annual	0.052	USGS 03260700, Bokengehalas Ck - 2010 calcs by GS
30Q10	cfs	summer	0.063	USGS 03260700, Bokengehalas Ck - 2010 calcs by GS
		winter	0.095	USGS 03260700, Bokengehalas Ck - 2010 calcs by GS
Harmonic Mean	cfs	annual	0.194	USGS 03260700, Bokengehalas Ck - 2010 calcs by GS
Mixing Assumption	%	average	100	
	%	maximum	100	
Downstream Chemistry				
Hardness	mg/l	annual	400	Bellefontaine WWTP 901 data, 2011-2015
pH	S.U.	summer	8.1	Bellefontaine WWTP 901 data for 9/2016 - 2/2021
		winter	8.2	Bellefontaine WWTP 901 data for 9/2016 - 2/2021
Temperature	°C	summer	19	Bellefontaine WWTP 901 data for 9/2016 - 2/2021
		winter	7.5	Bellefontaine WWTP 901 data for 9/2016 - 2/2021
Bellefontaine WWTP flow	cfs	annual	6.9625	Bellefontaine NPDES Application form 2A.
Background Water Quality				
Ammonia (summer)	mg/L		0.09	eDMR; 2016-2020; n=17; 0<MDL; facility 801 data. median
Ammonia (winter)	mg/L		0.11	eDMR; 2016-2020; n=15; 0<MDL; facility 801 data. median
Antimony	µg/L			No representative data available.
Arsenic	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2
Barium	µg/L		136	STORET; 2008; n=3; 0<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=15, mean
Bis(2-ethylhexyl)phthalate	µg/L			No representative data available.
Cadmium	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=0.2
Chromium	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2
Hexavalent Chromium (dissolved)	µg/L		5.33	2018 BWQR; 2005-2017; n=18; 17<MDL; statewide, mean
Copper	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2
Cyanide - free	µg/L		2.89	2018 BWQR; 2005-2017; n=14; 13<MDL; statewide, mean

Table 12. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Total Filterable Residue	mg/L		510	STORET; 2008; n=7; 0<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=10, mean
Lead	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2
Mercury	ng/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2 ug/L
Nickel	µg/L		1.8	STORET; 2008; n=3; 1<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2 ug/L, mean
Phenol	µg/L			No representative data available.
Selenium	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=2
Strontium	µg/L		781	STORET; 2008; n=3; 0<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=30, mean
Thallium	µg/L			No representative data available.
Zinc	µg/L		0	STORET; 2008; n=3; 3<MDL; Blue Jacket Cr @ Troy St (upst Oposum Run), 2008 survey data, RL=10

BWQR= background water quality report
 MDL = analytical method detection limit
 n = number of samples
 NPDES = National Pollutant Discharge Elimination System
 Ohio EPA = Ohio Environmental Protection Agency
 RL= reporting limit
 WWTP = wastewater treatment plant

Table 13. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri- culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	1.11	--	--
Ammonia (Winter)	mg/L	--	--	2.33	--	--
Antimony	µg/L	658	--	191	906	1800
Arsenic	µg/L	--	103	151	342	680
Barium	µg/L	--	--	221	2012	4000
Bis(2-ethylhexyl)phthalate	µg/L	3.8	--	8.5	1107	2100
Cadmium	µg/L	--	51	7.4	22	43
Chromium	µg/L	--	103	272	5636	11000
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper	µg/L	--	514	30	52	100
Cyanide - free	µg/L	411	--	12	46	92
Total Filterable Residue	mg/L	--	--	1507	--	--
Lead	µg/L	--	103	37	715	1400
Mercury	ng/L	12	10000	910	1700	--
Molybdenum	µg/L	--	--	20149	191228	370000
Nickel	µg/L	4728	206	171	1510	3000
Phenol	µg/L	308359	--	403	4730	9400
Selenium	µg/L	4317	51	5	62	120
Silver	µg/L	--	--	1.3	17	35
Strontium	µg/L	--	--	21151	40253	81000
Thallium	µg/L	--	--	17	80	160
Zinc	µg/L	26724	25697	393	393	780

Table 14. Parameter Assessment

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

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

Antimony	Arsenic	Cadmium
Chromium	Mercury	Cyanide - free
Lead	Thallium	Nickel
Selenium	Hexavalent Chromium (Dissolved)	Zinc
		Silver
		Molybdenum

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

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

Barium

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

<u>Parameter</u>	<u>Units</u>	<u>Recommended Effluent Limits</u>	
		<u>Average</u>	<u>Maximum</u>
Bis (2-ethylhexyl) phthalate ^a	µg/L	3.8	1107
Total Filterable Residue (dissolved solids)	mg/L	1507	--

^a = See reasonable potential discussion, pg. [X]
 PEL = preliminary effluent limit
 PEQ = projected effluent quality
 WLA = wasteload allocation
 WQS = water quality standard

Table 15. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Water Temperature	°C	----- Monitor -----		-----		M ^c
Dissolved Oxygen	mg/L	--	5.0 ^e	--	--	PD
Total Suspended Solids	mg/L	12	18 ^d	204	307 ^d	PD
Oil & Grease	mg/L	--	10	--	--	WQS
Ammonia						
Summer	mg/L	1.0	1.5 ^d	17.1	25.6 ^d	WLA/ABS
Winter	mg/L	2.2	3.3 ^d	37.5	56.2	WLA/ABS
Total Kjeldahl Nitrogen	mg/L	----- Monitor -----		-----		M
Nitrate+Nitrite	mg/L	----- Monitor -----		-----		M
Phosphorus	mg/L	----- Monitor -----		-----		PMR
Orthophosphate, Dissolved (as P)	mg/L	----- Monitor -----		-----		PMR
Barium	µg/L	----- Monitor -----		-----		RP
Nickel	µg/L	----- Monitor -----		-----		M
Zinc	µg/L	----- Monitor -----		-----		M
Cadmium	µg/L	----- Monitor -----		-----		M
Lead	µg/L	----- Monitor -----		-----		M
Chromium	µg/L	----- Monitor -----		-----		M
Copper	µg/L	----- Monitor -----		-----		M
Hex. Chromium (dissolved)	µg/L	----- Monitor -----		-----		M
<i>E. coli</i>	#/100 ml	126	284 ^d	--	--	WQS
Bis (2-ethylhexyl) phthalate	µg/L	----- Monitor -----		-----		RP
Flow Rate	MGD	----- Monitor -----		-----		M ^c
Mercury	ng/L	----- Monitor -----		-----		M
Cyanide, Free	µg/L	----- Monitor -----		-----		M
Acute Toxicity						
<i>Ceriodaphnia dubia</i>	TU _a	----- Monitor -----		-----		WET
<i>Pimephales promelas</i>	TU _a	----- Monitor -----		-----		WET
Chronic Toxicity						
<i>Ceriodaphnia dubia</i>	TU _c	1.01	--	--	--	WLA
<i>Pimephales promelas</i>	TU _c	----- Monitor -----		-----		WET
pH	SU	6.5 - 9.0		--	--	WQS
Total Filterable Residue	mg/L	1507	--	25700	--	WLA
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	10	15 ^d	170	255 ^d	PD

^a Effluent loadings based on average design discharge flow of 4.5 MGD.

b Definitions:

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)

RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))

WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)] OR

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.

e Minimum

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

Attachment 1. Table 1 Criteria For Potential Environmental Hazard Categories; WET Evaluation

Facility: Bellefontaine 1PD00000; *C.dubia* chronic toxicity; WLA=1.01 TUc

Attribute Evaluated	Category/Degree of Toxicity Problem			
	1 Adequately Documented	2 Strongly Suspected	3 Possible	4 None
A: Effluent Toxicity Minimum Number of Tests (Actual # 17)	3 YES	1	0-1	0-1
% of Tests >WLA (Actual % 33)	>30 YES	20-30	10-20	<10
Effluent Geometric Mean TU TUA (0.3) TUC (1.3)				
<i>Average Exceedance 33% x 1.3 TUc=0.43</i>				
Without B and/or C Available				
Acute ^b	>0.3	>0.3	>0.2	<0.2
Chronic	>0.3 x WLA	>0.3 x WLA	>0.2 x WLA	<0.2 x WLA
With B and/or C Available				
Acute ^b	>0.5	>0.3	>0.3	<0.3
Chronic	>0.67 x WLA	>0.5 x WLA	>0.5 x WLA	<0.5 x WLA
<i>Maximum TU value</i>				
Without B and/or C Available	>3 x WLA	>1 x WLA	>1 x WLA	<1 x WLA
See Notes Below.				
With B and/or C Available And Confirming Toxic Impact	>1 x WLA	>1 x WLA	>0.5 x WLA	<0.5 x WLA
B: Near-field Impact Mortality Within Mixing Zone (TUa only)	>20%	<20%	<20%	<20%
<i>Stream Community Impact Within Mixing Zone</i>				
Implied Chemically ^d	>3 x IMZM	>1.5 x IMZM	> IMZM	<0.5 x IMZM
Implied Toxicologically ^d	>1.0 TUa	>1.0 TUa	>1.0 TUa	<1.0 TUa
Measured Biologically	Toxic or Severe Unknown Signature	Fair/Poor Community	Slight Impact or Unknown Impact Signature	None or Non-Toxic Signature
C: Far-field Impact Aquatic Life Use Impairment (Ohio EPA Biological Criteria)	Yes ^c	Yes or Partial ^c	Partial	None or Non-Toxic Signature

Stream Community Impact Implied Toxicologically c	Significant Effect	Significant Effect	Unknown or Slight Effect	None
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Other Indicators	Stress Indicated	Stress Indicated	Stress Indicated	No Stress
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^a Compare (% Exceedances X Geo. Mean TU) To Table Factor.

^b Use 0.3 X WLA For Situations Where Aim Exists.

^c 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.

^d Based On Effluent Data. May Not Be Appropriate For Situations Where Aim Exists.

^e Lack Of Attainment Due To Toxic, Complex Or Unidentifiable Type Of Impact.

Notes

Excluded B due to chronic criteria being evaluated.

Excluded C due to Bellefontaine WWTP expansion (2010) happened after the Biological Stream Survey (2008-9). Results from survey below. Opossum Run is a small tributary of Blue Jacket Creek.

Blue Jacket Creek (14-077)

WWH Aquatic Life Use (Existing) / CWH Headwaters to Opossum Run (Recommended)

6.3 ^H – T-216, ust Bellefontaine WWTP	04	40	NA	36 #	70.0	FULL
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WWH Aquatic Life Use (Existing) / WWH Opossum Run to mouth (Recommended)

5.5 ^H – CR 11, dst. Bellefontaine WWTP	04	44	NA	36 #	84.5	FULL
0.72 ^H – T-31	04	56	NA	40 #	69.5	FULL