National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

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

Public Notice No.: 173400
Public Notice Date: January 30, 2023
Comment Period Ends: March 2, 2023

Ohio EPA Permit No.: 1PC00007*ND
Application No.: OH0027472

Name and Address of Applicant:
City of Springboro
320 West Central Avenue
Springboro, OH 45066

Name and Address of Facility Where Discharge Occurs:
Springboro WWTP
275 West Mill Street
Springboro, OH 45066
Warren County

Receiving Water: Unnamed Tributary of Clear Creek

Subsequent Stream Network: Clear Creek, Great Miami 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.

Lower limits are proposed for ammonia because the current plant design and water quality-based limits are not protective of WQS based on the updated wasteload allocation (WLA).

A new limit is proposed for carcinogen additivity based on effluent data available for benzo-a-pyrene and 3,4-benzofluoranthene and the procedures in 3745-33-07(A)(8). A 36-month compliance schedule is proposed in Part I, C of the permit.

New monitoring is proposed for benzo-a-pyrene, 3,4-benzofluoranthene, free cyanide, and silver because of reasonable potential to exceed WQS. A new Part II tracking provision is proposed to ensure that levels of these pollutants remain below the applicable criteria.

Increased monitoring frequency is proposed for total filterable residue because effluent data categorizes it as a Group 4 pollutant, requiring monitoring.

Increased monitoring frequency is proposed for nitrate + nitrite and total Kjeldahl nitrogen, consistent with the recommendations in Ohio EPA Permit Guidance 1.

Limits are proposed to be removed for copper because recent effluent data indicates that there is not reasonable potential to exceed WQS. Monitoring is proposed to decrease to quarterly.

Monitoring requirements are proposed to be removed for barium because recent effluent data indicates that there is not reasonable potential to exceed WQS.

In accordance with Ohio Administrative Code (OAC) 3745-33-07, it has been determined that the effluent from the Springboro WWTP shows chronic toxicity to *Ceriodaphnia dubia* and limits are proposed. Increased monitoring is proposed to further characterize the toxicity of the effluent.

For toxicity to *Pimephales promelas*, annual chronic toxicity monitoring with the determination of acute endpoints is proposed 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.

Monitoring is proposed to increase to quarterly for all parameters at sludge monitoring station 1PC00007581, consistent with the recommendations in Permit Guidance 11.

New monitoring is proposed for total cyanide and silver at influent monitoring station 1PC00007601 to correspond with the new effluent monitoring requirements.

Barium is being removed from influent monitoring station 1PC00007601 because effluent data does not indicate reasonable potential to exceed WQS.

Decreased monitoring frequency is proposed for copper at influent monitoring station 1PC00007601 because effluent data does not indicate reasonable potential to exceed WQS.

New monitoring is proposed for total Kjeldahl nitrogen at upstream monitoring station 1PC00007801 and downstream monitoring station 1PC00007901 to collect additional data on the plant's contribution of nutrients to the receiving stream.

Monitoring for temperature, dissolved oxygen, and pH at upstream monitoring station 1PC00007801 is proposed to be removed because this data is not used in permitting determinations for this or future renewals.

Monitoring for toxicity to *C. dubia* at upstream monitoring station 1PC00007801 is proposed to increase, consistent with the effluent monitoring requirement.

The monitoring frequency for *E. coli* at upstream monitoring station 1PC00007801 and downstream monitoring station 1PC00007901 is proposed to increase to 1/2 weeks to be consistent with the recommendations in Ohio EPA Permit Guidance 1. In addition, the monitoring months are proposed to change to June through August.

Monitoring for dissolved oxygen and copper at downstream monitoring station 1PC00007901 is proposed to be removed because this data is not used in permitting determinations for this or future renewals.

Currently there are three approved methods for free cyanide listed in 40 CFR 136 that have a quantification level lower than any 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)).The permittee must use one of these approved methods.

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 5 parameters; supplemental effluent data; outfall signage; and minimum detection limits.

Table of Contents

List of Figures

List of Tables

List of Attachments

List of Addendums

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 Chris Monroe, (614) 644-2007, Christopher.monroe@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 Springboro WWTP discharges to an unnamed tributary of Clear Creek at River Mile 0.3. Figure 1 shows the approximate location of the facility.

This segment of the unnamed tributary is described by Ohio EPA River Code: 14-094, Hydrologic Unit Code: 05080002-04-03, County: Warren, Ecoregion: Eastern Corn Belt Plains. The unnamed tributary is not listed in Ohio's water quality standards, therefore, warmwater habitat (WWH) aquatic life criteria and non-drinking human health criteria apply.

The tributary flows into Clear Creek at RM 7.10. Clear Creek 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.

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

Springboro WWTP underwent a major plant upgrade in 2006. The average design flow is 4.0 million gallons per day (MGD). Springboro WWTP serves the City of Springboro, Clearcreek Township, and parts of Warren and Montgomery Counties, a total population of 20,000. The Springboro WWTP has the following treatment processes (Figure 2):

- Influent pumping
- Bar screen
- Grit removal
- Oxidation ditch
- Biological nitrification – separate stage
- Secondary clarification
- Tertiary Filtration
- Ultraviolet disinfection

Springboro WWTP has no bypasses. The City of Springboro has 100% separate sewers in the collection system.

The City of Springboro does not have an approved pretreatment program. The City has one significant categorical user that discharges 42,000 gallons per day (GPD).

The potable water tributary to the collection system comes from the Springboro and Franklin municipal water supplies.

Springboro WWTP utilizes the following sewage sludge treatment processes (Figure 3):

- Aerobic digestion
- Mechanical dewatering (centrifuge)

Table 1 shows the last five years of sludge removed from Springboro WWTP. Treated sludge is disposed of in a municipal landfill. The City is also authorized to dispose of sludge via land application.

DESCRIPTION OF EXISTING DISCHARGE

The Springboro WWTP had three effluent violations for CBOD in 2020 and 2021. These violations were not caused by a known process error or upset condition.

Table 2 presents the average annual effluent flow rate for Springboro WWTP for the previous five years. Springboro WWTP has an estimated infiltration/inflow (I/I) rate of 25,000 GPD that does not cause known problems in the collection system. Springboro WWTP conducts regular sewer/manhole inspections to minimize I/I.

Table 3 presents the number of SSOs reported by Springboro WWTP for the previous five years. SSOs are reported at station 300.

Table 4 presents chemical specific data compiled from supplemental effluent testing data submitted as part of the NPDES renewal application.

Table 5 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period September 2017 to August 2022, and current permit limits are provided for comparison.

Table 6 summarizes the chemical specific data for outfall 1PC00007001 by presenting the average and maximum PEQ values.

Table 7 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.

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 Clear Creek watershed assessment unit, which includes the tributary to which Springboro WWTP discharges, is listed as impaired for recreation on Ohio's 303(d) list.

The most recent data available for Clear Creek and its tributaries is from 2010. Clear Creek is impaired for bacteria. Recent effluent *E. coli* data from the Springboro WWTP does not indicate that the facility is a significant source of bacteria. The biological and water quality report speculates the high levels of bacteria are from urban and agricultural sources upstream.

Clear Creek is in full attainment of aquatic life use at all sampling sites. However, a longitudinal pattern of impact and recovery was evident in relation to the Springboro WWTP, and the macroinvertebrate community was rated as marginal downstream of the plant. The effluent results in elevated concentrations of total dissolved solids, total phosphorus, and inorganic nitrogen. The report indicates that, should the shading provided by the robust tree canopy of Clear Creek be cleared, "significant, localized adverse impacts due to effects from [nutrient] enrichment could be expected."

The full Integrated Report is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/static/Portals/35/tmdl/2022intreport/Full-2022-IR.pdf

The most recent biological and water quality report is available at:
https://epa.ohio.gov/static/Portals/35/documents/GMR2012TSD.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 Springboro 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 2017 through August 2022
NPDES renewal application data	2021 – 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:
Total Filterable Residue – Non-Detect, 7/2/18, uncharacteristically low result
Mercury – Non-Detect, 12/30/21, inadequate MDL
Mercury – Non-Detect, 1/14/22, inadequate MDL
Mercury – Non-Detect, 2/2/22, inadequate MDL

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 6). See Modeling Guidance #1 for more information on PEQ calculations, available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/static/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 11).

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
Wildlife		Annual 90Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 10, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 9 and Table 10. The WLA results to maintain all applicable criteria are presented in Table 11.

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 Springboro 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 (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

$$\text{Downstream Dilution Ratio} = \frac{1Q10 + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{0.039 \text{ cfs} + 6.19 \text{ cfs}}{6.19 \text{ cfs}} = 1.0$$

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

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 11. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 6, 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 12.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. **Error! Reference source not found.** presents the final effluent limits and monitoring requirements proposed for Springboro WWTP outfall 1PC00007001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Dissolved Oxygen, TSS, and CBOD5

The limits proposed for dissolved oxygen, total suspended solids, and 5-day carbonaceous biochemical oxygen demand (CBOD5) are all based on plant design criteria. The TSS and CBOD5 limits were established in PTI# 05-13146 and went into effect in 2006 (1PC00007*JD), following completion of the last major plant upgrade. The TSS and CBOD5 limits are more stringent than the Secondary Treatment Standards in 40 CFR Part 133. The current dissolved oxygen limit is protective of WQS.

Oil and Grease, pH, and *Escherichia 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 the receiving stream.

Ammonia
The current plant design-based ammonia limits have been evaluated using the WLA procedures and are not protective of WQS for ammonia toxicity. Lower concentration and loading limits are proposed based on the WLA. The new limits are proposed to be effective immediately, as past sampling data are considerably lower than the new values.

Benzo-A-Pyrene, 3,4-BenzoFluoranthene, Free Cyanide, and Silver
The Ohio EPA risk assessment (Table 12) places benzo-a-pyrene, 3,4-benzofluoranthene, free cyanide, and silver 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 these parameters (Table 6) may not be representative of their actual levels in the plant effluent since they were based on limited datasets. 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.

Considering the magnitude of the reported values compared to the WLA, a tracking provision is proposed in Part II of the permit that requires the Springboro WWTP to notify Ohio EPA if sample results exceed the preliminary effluent limits (Table 11). If certain conditions are met, the City is required to take steps to reduce the discharge level of these pollutants.

Total Filterable Residue
The Ohio EPA risk assessment (Table 12) places total filterable residue in group 4. This placement, as well as the data in Table 6 and Table 11, 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). Increased monitoring is proposed to collect additional data on the pollutant's presence in the plant's effluent.

Cadmium, Chromium, Copper, Hexavalent Chromium, Lead, Mercury, Nickel, Nitrate + Nitrite, and Zinc
The Ohio EPA risk assessment (Table 12) places cadmium, chromium, copper, hexavalent chromium, lead, mercury, nickel, nitrate + nitrite, and zinc in groups 2 and 3. This placement, as well as the data in Table 6 and Table 11, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a low frequency is proposed to document that these pollutants continue to remain at low levels.

Antimony, Barium, Di-N-Butyl Phthalate, Fluoranthene, Methyl Bromide, Pyrene, and Tetrachloroethylene
The Ohio EPA risk assessment (Table 12) places antimony, barium, di-n-butyl phthalate, fluoranthene, methyl bromide, pyrene, and tetrachloroethylene in groups 2 and 3. This placement, as well as the data in Table 6 and Table 11, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Monitoring for barium is proposed to be removed.

Temperature and Flow Rate
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.

Additivity of Carcinogens

Benzo-a-pyrene and 3,4-benzofluoranthene are carcinogens, for which OAC 3745-33-07(A)(8) requires an evaluation of additivity, the combined toxic effect of carcinogenic pollutants. This evaluation uses an additivity factor equation to determine whether a limit in the permit is necessary to maintain a total carcinogen risk of 1 x 10-5 (1 in 100,000), other limits are protective of carcinogen additivity, or there is no reasonable potential for the total carcinogen risk to be exceeded. In the additivity factor equation, the PEQ average for each additive pollutant is divided by the respective human health WLA and these values are added together. If the sum is equal to or greater than 1.0, reasonable potential is demonstrated and the permit must contain a limit regulating carcinogenic additivity.

Based on the assessment in Attachment 1, the sum of the fractions is greater than 1.0, therefore reasonable potential is demonstrated and a limit on carcinogenic additivity is proposed. Monitoring for benzo-a-pyrene and 3,4-benzofluoranthene is proposed. Compliance with the additivity limit will be assessed using the additivity factor equation, applying the monthly average concentration for each parameter in place of the PEQ average.

Whole Effluent Toxicity Reasonable Potential

Based on evaluating the WET data presented in Table 7 and Attachment 2, and other pertinent data under the provisions of OAC 3745-33-07(B), the Springboro WWTP is placed in Category 1 with respect to WET for *Ceriodaphnia dubia*. Limits for acute and chronic toxicity and an increased testing frequency are proposed. It is proposed that the final effluent limits for toxicity become effective 36 months from the effective date of the permit. A compliance schedule to perform a TRE is included in Part I, C of the permit.

Based on evaluating the WET data presented in Table 7, and Attachment 2, and other pertinent data under the provisions of OAC 3745-33-07(B), the Springboro WWTP is placed in Category 4 with respect to WET for *Pimephales promelas*. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints 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 is proposed for total cyanide and silver at influent monitoring station 1PC00007601 to correspond with the new effluent monitoring requirements.

Monitoring is proposed to be reduced for copper at influent monitoring station 1PC00007601 to match the new effluent monitoring frequency.

Monitoring is proposed to be removed for barium at influent monitoring station 1PC00007601 since there is no longer an effluent monitoring requirement for this pollutant.

Monitoring for *E. coli* at upstream station 1PC00007801 and downstream station 1PC00007901 is proposed to increase in frequency to biweekly during the months of June, July, and August to facilitate impairment assessment.

Monitoring for temperature, dissolved oxygen, and pH is proposed to be removed at upstream monitoring station 1PC00007801 because this data is not essential for future permitting determinations.

Monitoring for dissolved oxygen and copper is proposed to be removed at downstream monitoring station 1PC00007901 because this data is not essential for future permitting determinations.

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 and removal to sanitary landfill.

OTHER REQUIREMENTS

Compliance Schedule

A 36-month compliance schedule is proposed for the Springboro WWTP to meet the new acute and chronic toxicity limits for *Ceriodaphnia dubia*. The compliance schedule also requires the City to conduct a TRE. Details are in Part I, C of the permit.

A 36-month compliance schedule is proposed for the plant to meet the new limit for carcinogen additivity. 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 Springboro WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 1PC00007001. 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.

Sufficiently Sensitive Method
Part II of the permit includes a condition requiring the Springboro WWTP to use laboratory analytical methods with a sufficiently sensitive MDL.

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 unnamed tributary of Clear Creek providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

NPDES Renewal Application Supplemental Effluent Data
The permittee must submit supplemental effluent data as part of the next NPDES permit renewal application. A minimum of three samples must be tested for 101 parameters, each collected within four and one-half years of the application submission date. The complete list of parameters to be analyzed is contained in Table 2 of "Appendix J to Part 122 - NPDES Permit Testing Requirements for Publicly Owned Treatment Works (§122.21(j))." Existing effluent data may be used, if available, in lieu of sampling performed solely for the purpose of the renewal application. See Part II of the permit for details.

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

Storm Water Compliance
To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was issued on 10/29/20. The certification number is 1GRN00975*AG. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than 10/28/25, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations.

Figure 1. Location of Springboro WWTP

Figure 2. Diagram of Wastewater Treatment System

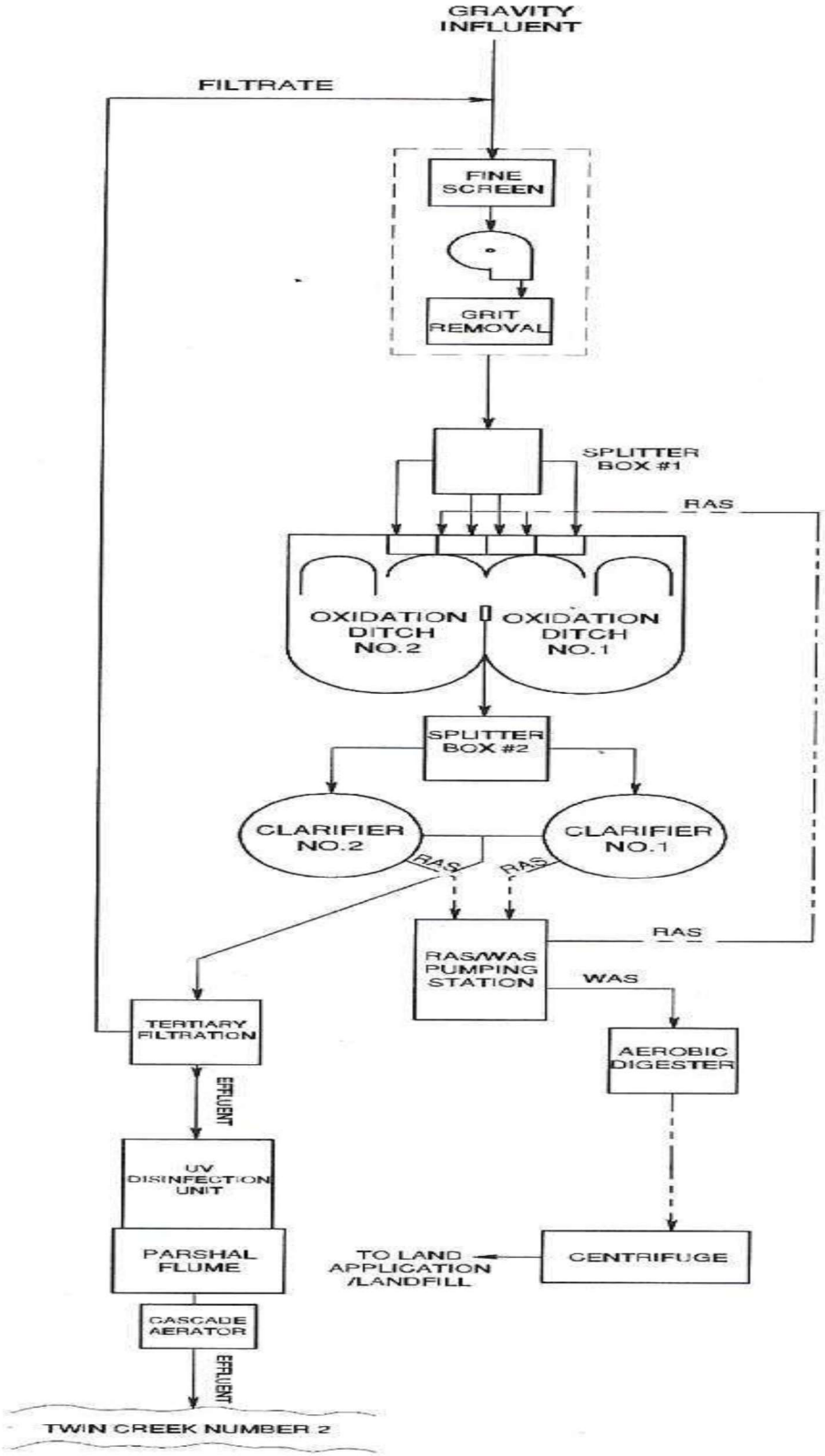

Figure 3. Diagram of Sludge Treatment System

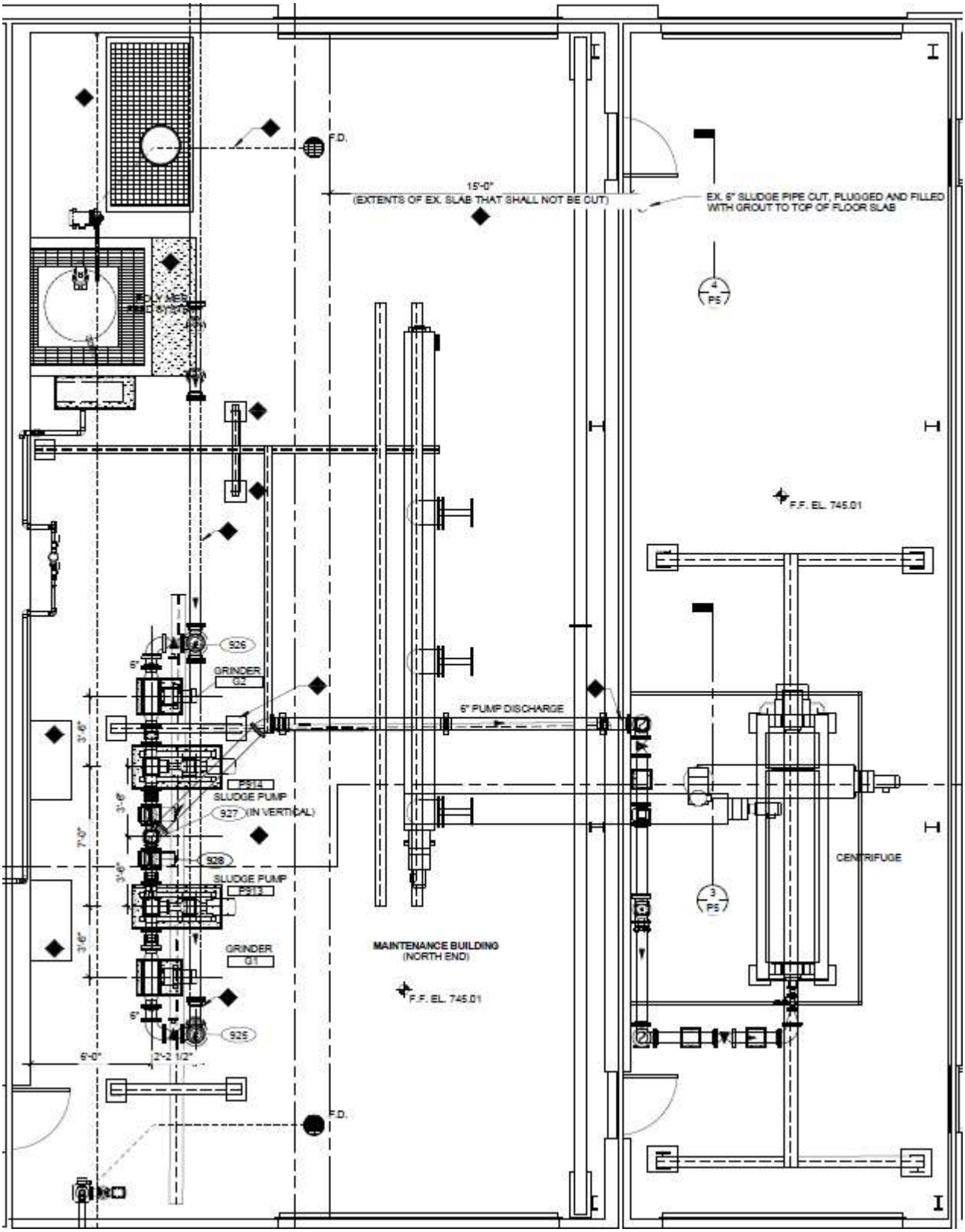

Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2017	391
2018	433
2019	350
2020	435
2021	455

Table 2. Average Annual Effluent Flow Rates

Flow Rate (Million Gallons per Day)					
Year	# obs	Average	Median	95th Percentile	Maximum
2017[a]	122	1.977	1.859	2.671	5.936
2018	365	2.341	2.14	3.923	7.147
2019	365	2.25	2.04	3.429	6.43
2020	366	2.059	1.886	3.073	8.918
2021	365	2.004	1.843	2.968	7.273
2022[b]	243	2.232	2.043	3.623	5.602

[a] DMR data reported beginning September 2017.
[b] DMR data reported through August 2022.
MGD = million gallons per day.

Table 3. Sanitary Sewer Overflows Discharges

Year	Occurrences
2017[a]	1
2018	0
2019	0
2020	0
2021	2
2022[b]	0

[a] DMR data reported beginning September 2017.
[b] DMR data reported through August 2022.

Table 4. Effluent Characterization Using Supplemental Effluent Data

Parameter	Units	12/30/2021	1/14/2022	2/2/2022
Antimony	µg/L	AA (2.4)	AA (2.4)	3.5
Benzo-A-Pyrene	µg/L	0.22	AA (0.07)	AA (0.07)
3,4-BenzoFluoranthene	µg/L	0.29	AA (0.23)	AA (0.23)
Cadmium	µg/L	AA (0.33)	AA (0.33)	AA (0.33)
Chromium	µg/L	AA (1.4)	AA (1.4)	AA (1.4)
Copper	µg/L	AA (4.6)	AA (4.6)	AA (4.6)
Di-N-Butyl Phthalate	µg/L	1.0	AA (0.88)	AA (0.88)
Fluoranthene	µg/L	0.096	AA (0.03)	AA (0.03)
Free Cyanide	µg/L	4.9	5.9	AA (4.9)
Lead	µg/L	AA (3.3)	AA (3.3)	AA (3.3)
Mercury	ng/L	AA (160)	AA (160)	AA (160)
Methyl Bromide	µg/L	AA	0.58	AA
Nickel	µg/L	AA (4.8)	AA (4.8)	5.1
Pyrene	µg/L	0.11	AA (0.08)	AA (0.08)
Silver	µg/L	AA (0.68)	1.2	0.89
Tetrachloroethylene	µg/L	0.96	AA (0.23)	AA (0.23)
Zinc	µg/L	23.6	37.6	58

AA = not-detected (analytical method detection limit)

Table 5. Effluent Characterization Using Self-Monitoring Data

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Water Temperature	°C	Monitoring Only		1784	16.9	23	2 - 30.3
Dissolved Oxygen	mg/L	--	5.0[m]	1246	9.6	8.3*	6.1 - 12
Total Suspended Solids - Summer	kg/day	90.9	137[w]	348	< 32.4	< 32.4	0 - 270
Total Suspended Solids - Summer	mg/L	6.0	9.0[w]	348	< 5	< 5	0 - 8
Total Suspended Solids - Winter	kg/day	152	228[w]	360	< 31.3	< 31.3	0 - 63.1
Total Suspended Solids - Winter	mg/L	10	15[w]	360	< 5	< 5	0 - 6
Oil and Grease	mg/L	--	10	59	< 2.5	2.59	0 - 4.7
Nitrogen, Ammonia - Summer	kg/day	10.6	16.7[w]	348	< 1.3	.678	0 - 2.93
Nitrogen, Ammonia - Summer	mg/L	0.7	1.1[w]	348	< .2	.101	0 - .406
Nitrogen, Ammonia - Winter	kg/day	28.8	44[w]	360	< 1.25	2.02	0 - 14.4
Nitrogen, Ammonia - Winter	mg/L	1.9	2.9[w]	360	< .2	.252	0 - 1.46
Nitrogen Kjeldahl, Total	mg/L	Monitoring Only		20	.815	1.74	0 - 2.4
Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		19	7	9.1	2.8 - 10
Phosphorus, Total	mg/L	Monitoring Only		239	.73	1.38	.04 - 1.9
Orthophosphate, Dissolved	mg/L	Monitoring Only		59	.48	1.28	.06 - 1.45
Barium, TR	µg/L	Monitoring Only		19	120	127	92.3 - 129
Nickel, TR	µg/L	Monitoring Only		19	< 5	6.25	0 - 7.58
Zinc, TR	µg/L	Monitoring Only		19	34	54.1	25.7 - 95.3
Cadmium, TR	µg/L	Monitoring Only		19	--	--	< 2
Lead, TR	µg/L	Monitoring Only		19	--	--	< 5
Chromium, TR	µg/L	Monitoring Only		19	< 5	.0426	0 - .426
Copper, TR	kg/day	0.273	0.44	58	< .0174	.0543	0 - .0728
Copper, TR - 2017-2022	µg/L	18	29	58	< 5	5.62	0 - 8.3
Copper, TR - 2017-2017	µg/L	Monitoring Only		2	3.23	3.36	3.07 - 3.38
Chromium, Dissolved Hexavalent	µg/L	Monitoring Only		19	< 4	.4	0 - 4
E. coli - 2018-2022	#/100 mL	126	284[w]	327	< 1	3.04	0 - 124
E. coli - 2017-2017	#/100 mL	161	362[w]	24	< 1	1	0 - 1
Flow Rate	MGD	Monitoring Only		1795	1.98	3.34	.04 - 8.92
Mercury, Total	ng/L	Monitoring Only		19	< .5	1.46	0 - 1.6

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Acute Toxicity, *Ceriodaphnia dubia*	TUa	Monitoring Only		4	< .2	.17	0 - .2
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	Monitoring Only		4	.605	1.38	0 - 1.41
Acute Toxicity, *Pimephales promelas*	TUa	Monitoring Only		4	--	--	< .2
Chronic Toxicity, *Pimephales promelas*	TUc	Monitoring Only		4	--	--	< 1
pH, Maximum	S.U.	--	9.0	1246	7.9	8	7.5 - 8.6
pH, Minimum	S.U.	--	6.5[m]	1246	7.7	7.4*	7 - 8.1
Residue, Total Filterable	kg/day	22900	--	4	5710	6900	5350 - 7060
Residue, Total Filterable - 2017-2017	mg/L	1506	--	4	904	984	858 - 994
Residue, Total Filterable - 2017-2022	mg/L	Monitoring Only		57	862	1000	0 - 1370
CBOD 5 day - Summer	kg/day	75.7	114[w]	348	< 14.3	42.7	0 - 180
CBOD 5 day - Summer	mg/L	5.0	7.5[w]	348	< 2	5.93	0 - 23.6
CBOD 5 day - Winter	kg/day	114	175[w]	360	< 12.5	39.4	0 - 104
CBOD 5 day - Winter	mg/L	7.5	11.5[w]	360	< 2	4.1	0 - 10.9

DMR data reported for the period September 2017 – August 2022.
* = 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 6. Projected Effluent Quality for Outfall 1PC00007001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	240	10	0.1870	0.2562
Ammonia (Winter)	mg/L	180	18	0.8526	1.168
Antimony	µg/L	3	1	7.665	10.5
Barium	µg/L	20	20	128.6	141
Benzo-A-Pyrene	µg/L	3	1	0.4818	0.66
3,4-BenzoFluoranthene	µg/L	3	1	0.6351	0.87
Cadmium - TR	µg/L	23	0	--	--
Chromium - TR	µg/L	2	1	1.182	1.6188
Hexavalent Chromium (Dissolved)	µg/L	20	1	4.088	5.6
Copper - TR	µg/L	64	24	5.044	7.439
Cyanide, Free	µg/L	3	2	12.92	17.7
Di-n-butyl phthalate	µg/L	3	1	2.19	3
Fluoranthene	µg/L	3	1	0.2102	0.288
Lead - TR	µg/L	23	0	--	--
Mercury	ng/L	20	5	1.546	2.665
Methyl bromide (Bromomethane)	µg/L	3	1	1.27	1.74
Nickel - TR	µg/L	23	7	6.821	11.69
Nitrate-N + Nitrite-N	mg/L	20	20	10.57	15.94
Pyrene	µg/L	3	1	0.2409	0.33
Silver	µg/L	3	2	2.628	3.6
Tetrachloroethylene	µg/L	3	1	2.102	2.88
Total Filterable Residue	mg/L	61	61	1029	1221
Zinc - TR	µg/L	23	23	50.99	68.92

MDL = analytical method detection limit
PEQ = projected effluent quality
* Per OAC 3745-2-04(E)(3), ammonia PEQ is based on data collected during the following months:
Summer – June through September
Winter – December through February

Table 7. Summary of Acute and Chronic Toxicity Results

Date	*Ceriodaphnia Dubia*		*Pimephales Promelas*	
	Acute (Tu_a)	**Chronic (Tu_c)**	**Acute (Tu_a)**	**Chronic (Tu_c)**
8/5/2018	AA (0.2)	1.41	AA (0.2)	AA (1.0)
8/9/2019	0.2	1.21	AA (0.2)	AA (1.0)
8/7/2020	AA (0.2)	AA (1.0)	AA (0.20)	AA (1.0)
8/6/2021	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
8/5/2022	AA (0.2)	4.67	AA (0.2)	AA (1.0)

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 8. Use Attainment Table

Location	RM	Use	Status	Cause	Source
Clear Creek S of Springboro, Upst. WWTP Trib. @ State Route 741	7.57	WWH	Full	N/A	N/A
Clear Creek S of Springboro, Dst. WWTP Trib. @ Weidner Rd.	6.90	WWH	Full	N/A	N/A
Clear Creek at Franklin @ End of Land, at Municipal Park	2.50	WWH	Full	N/A	N/A

Data gathered from *Biological and Water Quality Study of the Lower Great Miami River and Select Tributaries, 2010*
Dst = downstream
Rd = road
RM = River mile
Upst = upstream
WWH = warmwater habitat

Table 9. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	0.5	--	--
Ammonia (Winter)	mg/L	--	--	1.4	--	--
Antimony	µg/L	4300	--	190	900	1800
Barium	µg/L	--	--	1600	6900	14000
Benzo-A-Pyrene	µg/L	0.49[c]	--	--	--	--
3,4-BenzoFluoranthene	µg/L	0.49[c]	--	--	--	--
Cadmium - TR	µg/L	--	50	5.6	15	30
Chromium - TR	µg/L	--	100	200	4300	8600
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper - TR	µg/L	1300	500	23	38	76
Cyanide, Free	µg/L	22000	--	12	46	92
Di-n-butyl phthalate	µg/L	12000	--	--	--	--
Fluoranthene	µg/L	370	--	0.8	3.7	7.4
Lead - TR	µg/L	--	100	25	470	940
Mercury	ng/L	12	10000	910	1700	1700
Methyl bromide (Bromomethane)	µg/L	4000	--	16	38	75
Nickel - TR	µg/L	4600	200	130	1100	2300
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Pyrene	µg/L	11000	--	4.6	42	83
Silver	µg/L	--	--	1.3	9.8	20
Tetrachloroethylene	µg/L	89[c]	--	53	430	850
Total Filterable Residue	mg/L	--	--	1500	--	--
Zinc - TR	µg/L	69000	25000	290	290	590

[c] = carcinogen

Table 10. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.039	USGS Gage 03271700 DA ratio;1997 doc
7Q10	cfs	annual	0.039	USGS Gage 03271700 DA ratio;1997 doc
		summer	0.039	USGS Gage 03271700 DA ratio;1997 doc
		winter	0.145	USGS Gage 03271700 DA ratio;1997 doc
30Q10	cfs	summer	0.058	USGS Gage 03271700 DA ratio;1997 doc
		winter	0.242	USGS Gage 03271700 DA ratio;1997 doc
90Q10	cfs	annual	0.087	USGS Gage 03271700 DA ratio;1997 doc
Harmonic Mean				
Upstream WWTP	cfs	annual	0.363	USGS Gage 03271700/03271000 ratio;1997 doc
Upstream Clear Ck.	cfs	annual	0.489	USGS Gage 03271700/03271000 ratio;1997 doc
Clear Ck.	cfs	annual	2.19	USGS Gage 03271700/03271000 ratio;1997 doc
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	287	DST Station 901; 2017-2022; n=60; 50th%
Hardness, IMZ	mg/L	annual	287	DST Station 901; 2017-2022; n=60; 50th%
pH	S.U.	summer	8.4	DST Station 901; 2017-2022; n=20; 75th%
		winter	8.45	DST Station 901; 2017-2022; n=15; 75th%
Temperature	ºC	summer	22.18	DST Station 901; 2017-2022; n=20; 75th%
		winter	5.2	DST Station 901; 2017-2022; n=15; 75th%
Springboro WWTP flow	cfs	annual	6.189	NPDES Application Form 2A; 2022
Background Water Quality				
Ammonia (Summer)	mg/L		0	DMR; 2017-2022; n=20; 20<MDL; UST Station 801
Ammonia (Winter)	mg/L		0	DMR; 2017-2022; n=14; 14<MDL; UST Station 801
Antimony	µg/L		0	No representative data available.
Barium	µg/L		102	OEPA; 2010; n=3; 0<MDL; STORET H09W49; mean
Benzo-A-Pyrene	µg/L		0	No representative data available.
3,4-BenzoFluoranthene	µg/L		0	No representative data available.
Cadmium - TR	µg/L		0	OEPA; 2010; n=3; 3<MDL; STORET H09W49
Chromium - TR	µg/L		0	OEPA; 2010; n=3; 3<MDL; STORET H09W49
Hexavalent Chromium (Dissolved)	µg/L		0	No representative data available.
Copper - TR	µg/L		0	OEPA; 2010; n=3; 3<MDL; STORET H09W49
Cyanide, Free	µg/L		0	No representative data available.
Di-n-butyl phthalate	µg/L		0	No representative data available.
Fluoranthene	µg/L		0	No representative data available.

Parameter	Units	Season	Value	Basis
Lead - TR	µg/L		0	OEPA; 2010; n=3; 3<MDL; STORET H09W49
Mercury	ng/L		0	No representative data available.
Methyl bromide (Bromomethane)	µg/L		0	No representative data available.
Nickel - TR	µg/L		1.767	OEPA; 2010; n=3; 1<MDL; STORET H09W49; mean
Nitrate-N + Nitrite-N	mg/L		0.38	DMR; 2017-2022; n=20; 1<MDL; UST Station 801; median
Pyrene	µg/L		0	No representative data available.
Silver	µg/L		0	No representative data available.
Tetrachloroethylene	µg/L		0	No representative data available.
Total Filterable Residue	mg/L		473.3	OEPA; 2010; n=6; 0<MDL; STORET H09W49; mean
Zinc - TR	µg/L		10.67	OEPA; 2010; n=3; 2<MDL; STORET H09W49; mean

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 11. 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	--	--	0.5	--	--
Ammonia (Winter)	mg/L	--	--	1.45	--	--
Antimony	µg/L	4552	--	191	906	1800
Barium	µg/L	--	--	1609	6943	14000
Benzo-A-Pyrene	µg/L	0.52	--	--	--	--
3,4-BenzoFluoranthene	µg/L	0.52	--	--	--	--
Cadmium - TR	µg/L	--	72[C]	5.6	15	30
Chromium - TR	µg/L	--	143[C]	201	4327	8600
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper - TR	µg/L	1376	717[C]	23	38	76
Cyanide, Free	µg/L	23290	--	12	46	92
Di-n-butyl phthalate	µg/L	12704	--	--	--	--
Fluoranthene	µg/L	392	--	0.81	3.7	7.4
Lead - TR	µg/L	--	143[C]	25	473	940
Mercury	ng/L	12	10000[C]	910	1700	1700
Methyl bromide (Bromomethane)	µg/L	4235	--	16	38	75
Nickel - TR	µg/L	4870	287[C]	131	1107	2300
Nitrate-N + Nitrite-N	mg/L	--	143[C]	--	--	--
Pyrene	µg/L	11645	--	4.6	42	83
Silver	µg/L	--	--	1.3	9.9	20
Tetrachloroethylene	µg/L	94	--	53	433	850
Total Filterable Residue	mg/L	--	--	1506	--	--
Zinc - TR	µg/L	73046	35826[C]	292	292	590

[A] Allocation must not exceed the Inside Mixing Zone Maximum

[B] 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)

[C] Agricultural Water Supply wasteload allocation calculated for the Clear Creek use designation downstream of the WWTP.

Table 12. Parameter Assessment

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

No parameters fit this group

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

Antimony	Barium	Cadmium - TR
Chromium - TR	Copper - TR	Di-n-butyl phthalate
Lead - TR	Mercury	Methyl bromide (Bromomethane)
Nickel - TR	Nitrate-N + Nitrite-N	Pyrene
Tetrachloroethylene	Zinc - TR	

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

Hexavalent Chromium (Dissolved)	Fluoranthene

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.

Total Filterable Residue

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*
Ammonia (Summer)	mg/L	0.5	--
Ammonia (Winter)	mg/L	1.4	--
Benzo-A-Pyrene	µg/L	0.52	--
3,4-BenzoFluoranthene	µg/L	0.52	--
Cyanide, Free	µg/L	12	46
Silver	µg/L	1.3	9.9

Benzo-A-Pyrene, 3,4-BenzoFluoranthene, Free Cyanide, and Silver require a permit tracking requirement in accordance with OAC 3745-33-07(A)(2).
Benzo-A-Pyrene becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].
PEL = preliminary effluent limit
PEQ = projected effluent quality

WLA = wasteload allocation
WQS = water quality standard

Table 13. Final Effluent Limits for Outfall 1PC00007001

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	9.0[d]	6.0	137[d]	90.9	PD
TSS (winter)	mg/L	15[d]	10	228[d]	152	PD
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (summer)	mg/L	0.75[d]	0.5	11.4[d]	7.57	WLA
Ammonia (winter)	mg/L	2.18[d]	1.4	33[d]	21.2	WLA
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Nitrate plus Nitrite	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Phosphorus	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Orthophosphate	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Nickel	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Silver	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				RP
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
Dissolved Hexavalent Chromium	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
E. coli	#/100 mL	284 [d]	126	--	--	WQS
3,4-BenzoFluoranthene	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				RP
Benzo-A-Pyrene	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				RP
Flow Rate	MGD	- - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Free Cyanide	µg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				RP
Carcinogen Additivity	Units	1.0	--	--	--	OAC
Acute Toxicity, *Ceriodaphnia dubia*	TUa	1.0	--	--	--	WET
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	--	1.01	--	--	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	7.5[d]	5.0	114[d]	75.7	PD
CBOD5 (winter)	mg/L	11.5[d]	7.5	175[d]	114	PD

[a] Effluent loadings based on average design discharge flow of 4.0 MGD.

[b] Definitions: M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges

OAC = Ohio Administrative Code 3745-33-07(A)(8)
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 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. Additivity Equation for Carcinogens

Parameter	No.	Units	PEQ_{avg}	WLA_{HH}	PQL
Benzo(a)pyrene	1	µg/L	0.48	0.52	0.11
Benzo(b)fluoranthene	2	µg/L	0.64	0.52	0.09

WLA = wasteload allocation

The carcinogen additivity equation below is used to determine reasonable potential for the combined toxic effect of carcinogenic pollutants. Benzo(a)pyrene and benzo(b)fluoranthene are included in the equation.

Reasonable potential for additive effects is determined by dividing the PEQ average for each additive pollutant by the human health wasteload allocation for that pollutant and adding these values. The following additivity equation is used:

$$\frac{PEQ_{avg}1}{PEL_{HH}1} + \frac{PEQ_{avg}2}{PEL_{HH}2} =$$

$$\frac{0.48}{0.52} + \frac{0.64}{0.52} = 2.17$$

If the sum is equal to or greater than 1.0, the permit must have a limit regulating carcinogenic additivity. Reasonable potential is demonstrated, therefore an additivity limit of 1.0 is proposed. Compliance with the limit will be assessed by substituting the monthly average concentration for each additive pollutant in place of the PEQ average.

Attachment 2. Whole Effluent Toxicity Reasonable Potential Analysis

Whole effluent toxicity testing produced only non-detection results for acute and chronic toxicity in *Pimephales promelas*, and therefore fall under Hazard Category 4. The reasonable potential analyses were only performed for acute and chronic toxicity to *Ceriodaphnia dubia.*

Hazard Category Summary

	Ceriodaphnia dubia		***Pimephales promelas***	
	Acute	**Chronic**	**Acute**	**Chronic**
Effluent Toxicity (Table A)	3	1	4	4
	1		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	1.01	0.3	1.01
# of tests	5	5	5	5
Maximum value	0.3	4.67	--	--
Percent of tests >WLA	20%	60%	0	0
Geometric mean	0.2	1.51	--	--
Average Exceedance (Geomean * Percent of tests >WLA)	0.04	0.51	--	--
Average Exceedance / WLA	0.13	0.90	--	--

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 TUa/TUc Cd	1	0 or 1	0 or 1
(2) Percent of tests >WLA	>30 TUc Cd	20 to 30 TUa Cd	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 TUa Cd
(b) Chronic	> 0.3 TUc Cd	≥ 0.3	≥ 0.2	< 0.2
(4) Maximum TU value	≥(3xWLA) TUc Cd	≥WLA	≥WLA	<WLA TUa Cd

[1] Compare (per cent exceedances x geometric mean TU) to table factor.
[2] Use 0.3 x WLA for situations where AIM exists.

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