

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio  
for the **City of East Liverpool Wastewater Treatment Plant (WWTP)**

Public Notice No.: 205448  
Public Notice Date: August 19, 2024  
Comment Period Ends: September 18, 2024

Ohio EPA Permit No.: **3PD00009\*ND**  
Application No.: **OH0024970**

Name and Address of Applicant:

**City of East Liverpool**  
**110 West 6<sup>th</sup> Street**  
**East Liverpool, OH 43290**

Name and Address of Facility Where  
Discharge Occurs:

**City of East Liverpool WWTP**  
**500 West 4<sup>th</sup> Street Extension**  
**East Liverpool, OH 43920**  
**Columbiana County**

Receiving Water: **Ohio River**

Subsequent Stream Network: **Mississippi 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.

Limits are proposed to be removed for mercury because of the reasonable potential analysis placing them in group 2. Monitoring is proposed to continue with a tracking provision in Part II of the permit.

Annual acute toxicity monitoring 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.

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; tracking of group 4 parameters; pretreatment program requirements; downstream public water supply notification; supplemental effluent data; pollutant minimization program; and outfall signage.

Updates to Parts IV, V and VI to maintain consistency with the renewed Industrial Stormwater Multi-Sector General Permit.

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## PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

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

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

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be emailed to [HClerk@epa.ohio.gov](mailto: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](mailto:epa.dswcomments@epa.ohio.gov) (preferred method) or delivered in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

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

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

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

For additional information about this fact sheet or the draft permit, contact James Morris, (614) 644-2146, [James.morris@epa.ohio.gov](mailto:James.morris@epa.ohio.gov).

## INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants: [https://epa.ohio.gov/static/Portals/35/pretreatment/Pretreatment\\_Program\\_Priority\\_Pollutant\\_Detection\\_Limits.pdf](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](mailto: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 East Liverpool WWTP discharges to Ohio River via outfall 3PD00009001 (hereinafter referred to as “outfall 001”) at River Mile 936.9 (Ohio River Mile Point 44.5). Figure 1 shows the approximate location of the facility.

This segment of the Ohio River is described by Ohio EPA River Code: 25-700, Hydrologic Unit Code: 05030101-11-03. County: Columbiana, Ecoregion: Western Allegheny Plateau. The Ohio River is designated for the following uses under Ohio’s WQS (OAC 3745-1-32): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Bathing Waters (BW), and Public Water Supply.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

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

## FACILITY DESCRIPTION

The East Liverpool WWTP was constructed in 1955 and last upgraded in 1988. The average design flow is 3.1 million gallons per day (MGD) and the peak hydraulic capacity is 7.0 MGD. East Liverpool WWTP serves a population of approximately 21,836 people in the City of East Liverpool, as well as parts of Liverpool Township and St. Clair Township. The collection system is comprised of 100% separate sewers. The City of East Liverpool is responsible for maintenance of the collection system within the City limits, including five pump stations. Columbiana County Water and Sewer District maintains the part of the system in the outlying townships.

The East Liverpool WWTP has the following treatment processes (Figure 2):

- Influent Pumping
- Comminution
- Grit Removal
- Flow Equalization
- Pre- Aeration
- Primary Settling

- Rotating Biological Contractors (RBC)
- Secondary Clarification
- Ultraviolet Disinfection

A bypass is a diversion of a waste stream from any portion of the treatment facility. Bypasses are prohibited except in very rare circumstances. The overflow for the equalization basin, i.e. Outfall 3PD00009002, functions as a bypass at the head of the WWTP during periods of substantial rain. This acts as a direct outfall to the Ohio River. Monitoring for TSS and CBOD5 as well as bypass occurrence, duration, and volume is required for this bypass.

The City of East Liverpool has an approved pretreatment program. The City of East Liverpool has 12 industrial users that discharge approximately 0.3 MGD of flow. Of these dischargers, 3 are classified as non-categorical significant industrial users (SIUs) and there are no categorical SIUs. Non-categorical SIUs contribute approximately 0.1 MGD of flow. SIUs are defined as any industry discharging more than 25,000 gallons per day, industries subject to federal categorical standards for wastewater discharges, or any other industry classified as “significant” by the local pretreatment program due to the nature of the effluent from the industry.

The City of East Liverpool’s potable water comes from the Ohio River. Surface water is withdrawn from the Ohio River at River Mile 40.2 and treated at the East Liverpool Water Treatment Plant, 2220 Michigan Ave, East Liverpool, Ohio.

The East Liverpool WWTP utilizes the following sewage sludge treatment processes:

- Anaerobic digestion
- Polymer, lime, ferric-chloride, and alum addition
- Mechanical dewatering-filter press
- Landfilling

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

## **DESCRIPTION OF EXISTING DISCHARGE**

Table 2 presents the effluent violations for the East Liverpool WWTP during the previous five years. These violations were not caused by a known process error or upset condition.

Table 3 presents the annual effluent flow rate for the East Liverpool WWTP for the previous five years. The East Liverpool WWTP has an estimated infiltration/inflow (I/I) rate of 0.2 MGD that does not cause known problems in the collection system.

Table 4 presents the number of sanitary sewer overflows (SSOs) reported by the East Liverpool WWTP for the previous five years. SSOs are reported at Station 3PD00009300.

Table 5 presents data characterizing bypass activity at the East Liverpool WWTP for the previous five years. Bypasses are reported at Station 3PD00009002. Based on the frequency and magnitude of the bypass events, a No Feasible Alternatives Analysis (NFA), consistent with the requirements in 40 CFR 122.41(m)(4)(i)(A)-(C), is recommended to address this issue.

Table 6 presents data characterizing the annual total phosphorus load from the East Liverpool WWTP during the previous five years.

Table 7 presents chemical specific data compiled from data reported in annual pretreatment reports. Because this data is substantially identical to the application requirements in CFR 122.21(j), the Director has waived the requirement for submittal of supplemental effluent testing data as part of the NPDES renewal application.

Table 8 presents a summary of unaltered Discharge Monitoring Report (DMR) data. Data are presented for the period January 2019 to January 2024; the current permit limits are provided for comparison.

Table 9 summarizes the chemical specific data for Outfall 3PD00009001 by presenting the average and maximum PEQ values.

Table 10 summarizes the results of acute 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**

The East Liverpool WWTP discharges directly to the Ohio River in the New Cumberland dam pool. This pool extends 22.7 miles from the Montgomery Locks and Dam (ORM 31.7) to the New Cumberland Locks and Dam (ORM 54.4).

Water quality monitoring on the Ohio River is performed by the Ohio River Valley Water Sanitation Commission (ORSANCO). ORSANCO was created in 1948 with the signing of the Ohio River Valley Water Sanitation Compact. The Compact commits each state to, “place and maintain the waters of the basin in a satisfactory sanitary condition, available for safe and satisfactory use by public and industrial water supplies after reasonable treatment, suitable for recreation, capable of maintaining fish and other aquatic life...” ORSANCO conducts water quality monitoring and assessments on behalf of Ohio River main stem states (Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia) on a regular basis. Every two years, ORSANCO completes an assessment of Ohio River designated uses in cooperation with the Ohio River 305(b) Coordinators Work Group composed of representatives from each of the main stem states. This biennial assessment reports the conditions of Ohio River water quality and the ability to which the river supports each of its four designated uses; warm water aquatic life, public water supply, contact recreation, and fish consumption. The 305(b) report fulfills the following requirements of the Compact:

- To survey the district to determine water pollution problems.
- To identify instances in which pollution from a state(s) injuriously affects waters of another state(s).

Three classifications are used in this assessment to describe the attainment of Ohio River designated uses: fully supporting (good water quality), partially supporting (fair water quality), and not supporting (poor water quality). This information can be found in the 2022 Biennial Assessment of Ohio River Water Quality Conditions (305b) Report and/or biological survey results/pool reports.

ORSANCO evaluates the Ohio River for four uses: aquatic life, contact recreation impairment, public water supply, and fish consumption. The entire Ohio River is in partial support for fish consumption due to legacy polychlorinated biphenyl (PCBs) and dioxins contamination but meets the other use designations.

The determination that the Ohio River is not fully supportive of fish consumption use means that either 1) fish caught in the Ohio River had tissue samples containing pollutants at levels which present a health risk if consumed in certain amounts or 2) chemistry results from the water exceeded the human health criteria for fish consumption. ORSANCO determined that all sites are not supportive of fish consumption use within the Ohio River.

The East Liverpool WWTP has no known discharges of PCBs and dioxins and therefore is not contributing to the conditions of the Ohio River. The East Liverpool WWTP has had four violations for mercury in the past five years, however, the biennial reports states that:

“There were exceedances of the total mercury water quality criterion in excess of ten percent of samples (for total mercury in water, not fish tissue) primarily in the lower half of the river. The water quality criterion for total mercury in the water column is established to protect against undesirable accumulation in fish tissue. Using the USEPA’s methodology for assessing the fish consumption use for methylmercury with fish tissue data, all pools had a fish consumption weighted methylmercury fish tissue average below 0.3 mg/kg. As a result, employing the WOE (Weight of Evidence) approach relying on the fish tissue data as more reliable assessment methodology, the entire river is classified as fully supporting the fish consumption use for methylmercury. The entire river remains impaired for dioxin and PCBs”

Based on this information, the East Liverpool WWTP is not considered to be contributing to the fish consumption impairment in the Ohio River.

The segment of the Ohio River that the East Liverpool WWTP discharges to is also impaired for contact uses. For contact use, the New Cumberland Dam pool, from upstream river mile 38.9 to downstream river mile 82.2, is not supporting the contact recreation use due to *E. Coli* criteria being exceeded more than 25% of the time it was sampled for. The East Liverpool WWTP has had no effluent violations for *E. Coli* over the past five years, indicating that it is not contributing to impairments in the Ohio River for contact recreation.

The New Cumberland Dam Pool was last assessed for aquatic life criteria in 2017. The pool was assessed as “fair” with a rating of 27.8. The fish condition rating was scored higher than the 2011 assessment (24), and lower than the 2005 assessment (36.3). The 2017 assessment cited *Hydrilla verticillata*, an invasive aquatic plant, as a reason for the lower aquatic life metric score since 2005. Any score above 20 is considered to be fully supporting aquatic life uses.

The most recent pool report can be found here:

<https://www.orsanco.org/wp-content/uploads/2019/02/2017-Combined-Pool-Assessment-FINAL-1.pdf>

The ORSANCO Biennial Report can be found at this website:

[https://www.orsanco.org/wp-content/uploads/2016/07/ORSANCO\\_2022\\_305b\\_Report.pdf](https://www.orsanco.org/wp-content/uploads/2016/07/ORSANCO_2022_305b_Report.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 East Liverpool 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)  
Pretreatment program data

January 2019 through January 2024  
2019 - 2023

### **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<sub>avg</sub>) values represent the 95<sup>th</sup> percentile of monthly average data, and maximum PEQ (PEQ<sub>max</sub>) values represent the 95<sup>th</sup> percentile of all data points (see Table 9). See Modeling Guidance #1 for more information on PEQ calculations, available through the Ohio EPA, Division of Surface Water website at: <https://www.epa.ohio.gov/portals/35/guidance/model1.pdf>

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ<sub>avg</sub> or PEQ<sub>max</sub> is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 12).

### **Wasteload Allocation**

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not break down in the receiving water. By rule, mixing zones are not authorized for pollutants, such as mercury, which have been designated as bioaccumulative chemicals of concern (BCCs). For BCCs, the WLA is set equal to the respective WQS value.

The methodology employed generally depends on whether the facility is considered a direct discharger to a (1) free-flowing receiving water/stream or (2) non-flowing receiving water/lake.

For free-flowing streams, WLAs for both average and maximum criteria are performed using the following general equation:

$$\text{Discharger WLA} = (\text{Downstream Flow} \times \text{WQS}) - (\text{Upstream Flow} \times \text{Background Concentration}).$$

Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

WLAs for direct discharges to lakes are performed using the following equation for average criteria:

$$\text{Discharger WLA} = (11 \times \text{WQS}) - (10 \times \text{Background Concentration}).$$

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

Aquatic life (Warmwater Habitat)

|                                 |         |                           |
|---------------------------------|---------|---------------------------|
| Toxics (metals, organics, etc.) | Average | 10% of annual 7Q10        |
|                                 | Maximum | 1% of annual 1Q10         |
| Agricultural Water Supply       |         | 10% of harmonic mean flow |
| Human Health (carcinogens)      |         | 10% of harmonic mean flow |
| Human Health (non-carcinogens)  |         | 100% of 7Q10              |

The data used in the WLA are listed in Table 12 and Table 13. The WLA results to maintain all applicable criteria are presented in Table 14.

**Whole Effluent Toxicity Wasteload Allocation**

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent. WQC for WET are 0.3 TUa for acute toxicity and 1.0 TUc for chronic toxicity (OAC 3745-1-44).

There are two separate reasonable potential procedures in Ohio - one for the Lake Erie watershed and one for the Ohio River watershed. Dischargers in the Ohio River watershed are assessed using OAC 3745-33-07(B). Dischargers in the Lake Erie watershed are assessed in accordance with the “Great Lakes Water Quality Initiative Implementation Procedures” contained in 40 CFR Part 132, Appendix F, Procedure 6.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TUc) and 7Q10 flow for the average and the acute toxicity unit (TUa) and 1Q10 flow for the maximum. WET WLAs are based on meeting the values of 0.3 TUa and 1.0 TUc downstream of the discharge, and include any available dilution. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. WLAs for acute toxicity are capped at 1.0 TUa unless the discharger demonstrates that an Area-of-Initial-Mixing (AIM) exists under OAC 3745-1-06, or that one of the factors in OAC 3745-33-07(B)(5)-(9) allows a higher TUa limit to be granted. For the purposes of establishing WET limitations, the values of 1.0 TUa and 1.0 TUc are the most restrictive limitations that can be applied in NPDES permits [OAC 3745-33-07(B)(10)].

For the East Liverpool WWTP, the WLA value for outfall 001 is 3.4 TUa.

The chronic toxicity unit (TUc) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC25):

$$TUc = 100/IC25$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

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

The acute toxicity unit (TUa) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC50) for the most sensitive test species:

$$TUa = 100/LC50$$

This equation applies outside the mixing zone for all designated waters. Based on the above, a value of 1.0 TUa is the lowest value that can be calculated using the equation. TUa values between 0.2 and 1.0 are based on an interpolation of toxic effects where an LC50 cannot be identified.

## **REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS**

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 14. The average PEL ( $PEL_{avg}$ ) is compared to the average PEQ ( $PEQ_{avg}$ ) from Table 9, and the  $PEL_{max}$  is compared to the  $PEQ_{max}$ . Based on the calculated percentage of the allocated value [ $(PEQ_{avg} \div PEL_{avg}) \times 100$ , or  $(PEQ_{max} \div PEL_{max}) \times 100$ ], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 15.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 16 presents the final effluent limits and monitoring requirements proposed for East Liverpool 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. Additional information on permit guidance is available at the following webpage:

[https://epa.ohio.gov/static/Portals/35/guidance/npdes\\_permit\\_guidance%201.pdf](https://epa.ohio.gov/static/Portals/35/guidance/npdes_permit_guidance%201.pdf)

### **Water Temperature and Flow Rate**

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

### **Dissolved Oxygen, Total Suspended Solids (TSS), and 5-day Carbonaceous Biochemical Oxygen Demand (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 are more stringent than the Secondary Treatment Standards in 40 CFR Part 133. The concentration limits for TSS and CBOD5 are based upon the anti-backsliding provisions of the Ohio Administrative Code which prevent granting less stringent limits without meeting certain requirements including an anti-degradation review. For the last permit renewal, the design flow for the facility was increased to 3.1 MGD, however, the loadings were not increased since an anti-degradation review was not performed. Consequently, the concentration limits for these parameters had to be reduced to be consistent with the higher design flow. Limits and monitoring requirements for these parameters are proposed to continue from the existing permit.

### **Oil & Grease and pH**

Limits for oil & grease and pH are based on WQS and are proposed to continue.

### **Fecal Coliform and E. Coli**

The existing permit limits for fecal coliform (winter) are based on ORSANCO standards and are proposed to continue. Limits proposed for *E. coli* are based on WQS (OAC 3745-1-35 and 37) and are more restrictive than ORSANCO standards during the summer. Bathing waters recreation *E. coli* and fecal coliform standards apply to the Ohio River.

### **Cadmium, Copper, Mercury and Zinc**

The Ohio EPA risk assessment (Table 15) places cadmium, copper, mercury and zinc in group 4. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Limits for mercury are proposed to be removed but monitoring will continue at the same frequency.

In addition, the cadmium, copper, and mercury effluent quality falls within 75 percent of the WLA. Under OAC 3745-33-07(A)(2), parameters in this range must have a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

### **Ammonia, Chromium, Dissolved Hexavalent Chromium, Total Filterable Residue (aka Total Dissolved Solids), Lead, and Nickel**

The Ohio EPA risk assessment (Table 15) places ammonia, chromium, cyanide (free) dissolved hexavalent chromium, total filterable residue, lead, and nickel in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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.

### **Arsenic, Barium, Bis(2-ethylhexyl) Phthalate, Chloroform, and Toluene**

The Ohio EPA risk assessment (Table 15) places arsenic, barium, bis(2-ethylhexyl) phthalate, chloroform, and toluene in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed. Data collected as part of the annual pretreatment program pollutant scans will provide information for future wasteload allocations analysis.

### **Total Kjeldahl Nitrogen and Nitrate plus Nitrite**

Monitoring requirements for nitrite+nitrate and TKN are proposed in accordance with Ohio EPA guidance. The purpose of the monitoring is to provide data on nutrient loads discharged to the Ohio River system. Additionally, monitoring will ensure that a nutrient data set is maintained for use in future stream studies and/or development of a TMDL.

Municipal WWTPs discharge a nutrient load to the river, monthly monitoring for nitrate + nitrite, and total Kjeldahl nitrogen is proposed.

### **Dissolved Orthophosphate and Total Phosphorus**

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

### **Whole Effluent Toxicity (WET) Reasonable Potential**

Based on evaluating the WET data presented in Table 10, Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the East Liverpool WWTP is placed in Category 4 with respect to WET. 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 acute toxicity monitoring is proposed. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

### **Additional Monitoring Requirements**

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.

### **Bypass Station 3PD00009002**

Monitoring for TSS and CBOD5, as well as bypass occurrence, duration, and volume, is proposed based on best technical judgment. The purpose of the monitoring is to obtain data that will assist in evaluating plant operations and in characterizing the pollutant loads that are discharged during wet weather.

### **Mercury Pollutant Minimization Program**

Based on mercury being placed in group 4, it is proposed that East Liverpool WWTP continue with the pollutant minimization program described in Part II of the permit.

### **Sludge**

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: disposal in a licensed solid waste landfill or transfer to another facility with an NPDES permit.

## **OTHER REQUIREMENTS**

### **Compliance Schedule(s)**

***Pretreatment Local Limits Review*** - A 6-month compliance schedule is proposed for the East Liverpool WWTP to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. Details are in Part I.C of the permit.

***NFA Development and Implementation*** - A compliance schedule is included in the permit for development and implementation of any required improvements to address wet weather bypasses and overflows. Details are in Part I.C of the permit.

### **Sanitary Sewer Overflow Reporting**

Provisions for reporting collection system SSOs are again proposed in this permit. These provisions include: the reporting of the number of SSO occurrences on monthly Discharge Monitoring Reports (DMRs); 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 East Liverpool 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 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 Ohio River providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

### **Public Water Supply Notification**

An addition to OAC 3745-33-08 requires that permittees discharging wastewater within ten miles of a downstream public water supply intake located on the same waterway must develop and implement notification procedures in conjunction with the downstream public water supply operator in the event of a spill, separate sewer overflow, bypass or upset that reaches waters of the state. Since Buckeye Water District - Wellsville, Ohio operates a public water supply intake ten miles downstream from the East Liverpool WWTP, an item in Part II of the permit requires the development of notification procedures within six months after the effective date of the permit *OR* requires the continuation of established notification procedures.

### **Part III**

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

### **Stormwater Compliance**

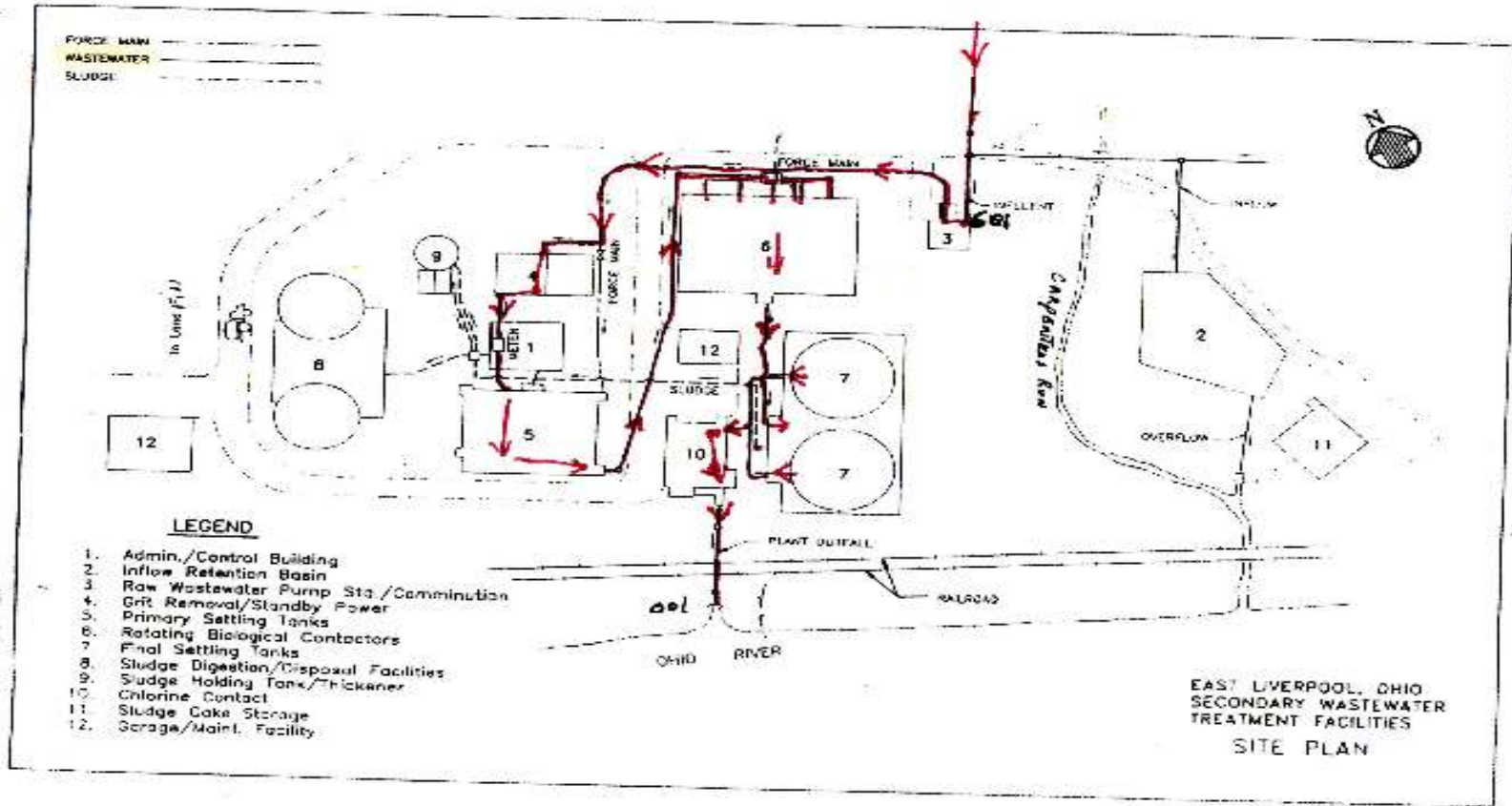
Parts IV, V, and VI have been included with the draft permit to ensure that any stormwater flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the East Liverpool WWTP may seek permit coverage under the general permit for industrial stormwater (permit # OHR000007) or submit a “No Exposure Certification.” Parts IV, V, and VI will be removed from the final permit if: 1) the East Liverpool WWTP submits a Notice of Intent (NOI) for coverage under the general permit for industrial stormwater or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

**Figure 1. Location of East Liverpool WWTP**



\*Upstream and downstream outfall are not included in the permit

Figure 2. Diagram of Wastewater Treatment System



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**Table 1. Sewage Sludge Removal**

| Year | Dry Tons Removed |
|------|------------------|
| 2019 | 395              |
| 2020 | 348              |
| 2021 | 194              |
| 2022 | 304              |
| 2023 | 294              |

**Table 2. Effluent Violations for Outfall 001**

| Parameter      | 2019     | 2020     | 2021     | 2022     | 2023     | 2024*    | Total    |
|----------------|----------|----------|----------|----------|----------|----------|----------|
| Mercury, Total | 2        | 1        | 0        | 1        | 0        | 0        | 4        |
| Oil & Grease   | 0        | 1        | 0        | 0        | 0        | 0        | 1        |
| <b>Total</b>   | <b>2</b> | <b>2</b> | <b>0</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>5</b> |

\*2024 Data only includes the month of January

**Table 3. Annual Effluent Flow Rates**

| Year | Annual Flow (MGD) |                 |         |
|------|-------------------|-----------------|---------|
|      | 50th Percentile   | 95th Percentile | Maximum |
| 2019 | 2.44              | 5.14            | 7.77    |
| 2020 | 2.00              | 4.50            | 6.98    |
| 2021 | 2.09              | 4.10            | 6.47    |
| 2022 | 2.28              | 5.25            | 8.02    |
| 2023 | 2.21              | 3.90            | 6.31    |

MGD = million gallons per day.

**Table 4. Sanitary Sewer Overflows Discharges**

| Year | Occurrences |
|------|-------------|
| 2019 | 2           |
| 2020 | 4           |
| 2021 | 2           |
| 2022 | 5           |
| 2023 | 4           |

**Table 5. Bypass Discharges**

| Outfall | Year              | Number of days | Total Volume (Million Gallons) | Median Volume (Million Gallons) | Median TSS (mg/L) | Median CBOD5 (mg/L) |
|---------|-------------------|----------------|--------------------------------|---------------------------------|-------------------|---------------------|
| 002     | 2019 <sup>a</sup> | 12             | 6.85                           | 0.18                            | 18                | 9                   |
| 002     | 2020              | 4              | 1.28                           | 0.41                            | 12                | 11                  |
| 002     | 2021              | 5              | 0.197                          | 0.04                            | 17.9              | 9.35                |
| 002     | 2022 <sup>b</sup> | 6              | 3.38                           | 0.30                            | 16                | 8.5                 |

<sup>a</sup> = data set begins on 1/1/19

<sup>b</sup> = data set ends on 1/31/24

\*No bypass discharges were recorded for years 2023-2024

**Table 6. Calculated Annual Total Phosphorus Loadings**

| Year              | n  | Median Phosphorus (mg/L) | Median Flow (MGD) | Median Loading (kg/day) |
|-------------------|----|--------------------------|-------------------|-------------------------|
| 2019 <sup>a</sup> | 24 | 2.15                     | 2.25              | 17.7                    |
| 2020              | 26 | 1.57                     | 1.68              | 9.85                    |
| 2021              | 26 | 1.64                     | 1.91              | 12.7                    |
| 2022              | 25 | 1.83                     | 2.07              | 13.5                    |
| 2023 <sup>b</sup> | 27 | 1.42                     | 1.99              | 10.4                    |

<sup>a</sup> = data set begins on 1/1/19

<sup>b</sup> = data set ends on 12/31/23

MGD = million gallons per day

n = number of samples

**Table 7. Effluent Characterization Using Pretreatment Data**

| Parameter                    | Units | 5/21/2019 | 6/7/2020 | 5/19/2021 | 5/11/2022 | 5/30/2023 |
|------------------------------|-------|-----------|----------|-----------|-----------|-----------|
| Arsenic                      | µg/L  | AA (10)   | AA (10)  | AA (10)   | AA (10)   | 12        |
| Barium                       | µg/L  | 36        | NT       | NT        | NT        | NT        |
| Bis (2-ethylhexyl) phthalate | µg/L  | 4.9       | AA (4)   | AA (4)    | AA (4)    | AA (4)    |
| Cadmium                      | µg/L  | AA (10)   | AA (10)  | AA (10)   | AA (10)   | 4.44      |
| Chromium                     | µg/L  | AA (10)   | AA (10)  | AA (10)   | AA (10)   | AA (10)   |
| Chloroform                   | µg/L  | 4.03      | AA (1)   | 1.17      | AA (1)    | AA (1)    |
| Copper                       | µg/L  | AA (10)   | AA (10)  | 10        | 16        | AA (10)   |
| Lead                         | µg/L  | AA (10)   | 15       | AA 10     | AA (10)   | AA (10)   |
| Nickel                       | µg/L  | NT        | AA (10)  | AA (10)   | AA (10)   | AA (10)   |
| Toluene                      | µg/L  | 2.07      | 2.3      | 3.01      | AA (1)    | AA (1)    |
| Zinc                         | µg/L  | 44        | AA (10)  | 30        | 57        | AA (10)   |

AA = not-detected (analytical method detection limit)

NT = Not Tested

**Table 8. Effluent Characterization Using Self-Monitoring Data**

| Effluent Monitoring Data for 3PD00009*MD between 1/1/2019 and 1/31/2024 - Outfall 001 |          |                 |                   |        |             |          |                      |
|---|----------|-----------------|-------------------|--------|-------------|----------|----------------------|
| Parameter   | Unit     | Current Limits  |                   | # Obs. | Percentiles |          | Data Range           |
|   |          | 30 Day          | Daily             |        | 50th        | 95th     |                      |
| Water Temperature   | °C       | Monitoring Only |                   | 1826   | 15          | 22       | 7 - 1920             |
| Dissolved Oxygen  | mg/L     | --              | 5.0 <sup>m</sup>  | 1826   | 7.5         | 6.3**    | 5.2 - 72             |
| Total Suspended Solids  | kg/day   | 306             | 460 <sup>w</sup>  | 783    | 49.1        | 154      | 6.51 - 520           |
| Total Suspended Solids  | mg/L     | 26.1            | 39.2 <sup>w</sup> | 783    | 6           | 13       | 2 - 30               |
| Oil and Grease  | mg/L     | --              | 10                | 127    | < 1         | 3.97     | 0 - 11.9             |
| Nitrogen, Ammonia   | mg/L     | Monitoring Only |                   | 780    | 4           | 12.2     | .4 - 24.2            |
| Nitrogen Kjeldahl, Total  | mg/L     | Monitoring Only |                   | 60     | 4.96        | 11.5     | 0 - 144              |
| Nitrite Plus Nitrate, Total   | mg/L     | Monitoring Only |                   | 60     | 6.14        | 12.4     | .818 - 13.8          |
| Orthophosphate, Total   | mg/L     | Monitoring Only |                   | 3      | 3.56        | 4.06     | 2.52 - 4.11          |
| Phosphorus, Total   | mg/L     | Monitoring Only |                   | 259    | 1.51        | 2.8      | 0 - 4.79             |
| Orthophosphate, Dissolved   | mg/L     | Monitoring Only |                   | 60     | 2.6         | 8.65     | .52 - 21.8           |
| Cyanide, Free   | mg/L     | Monitoring Only |                   | 3      | < .01       | .036     | 0 - .04              |
| Nickel, TR  | µg/L     | Monitoring Only |                   | 22     | < 10        | 10.7     | 0 - 20               |
| Zinc, TR  | µg/L     | Monitoring Only |                   | 22     | 30.4        | 65.2     | 0 - 136              |
| Cadmium, TR   | µg/L     | Monitoring Only |                   | 60     | < 1         | 6.35     | 0 - 11               |
| Lead, TR  | µg/L     | Monitoring Only |                   | 22     | < 10        | 1.16     | 0 - 16               |
| Chromium, TR  | µg/L     | Monitoring Only |                   | 22     | < 10        | 1.96     | 0 - 20               |
| Copper, TR  | kg/day   | --              | 0.388             | 3      | --          | --       | < .0936              |
| Copper, TR - 2019-2019  | µg/L     | --              | 33.0              | 3      | --          | --       | < 10                 |
| Copper, TR - 2019-2023  | µg/L     | Monitoring Only |                   | 57     | < 10        | 23       | 0 - 912              |
| Chromium, Dissolved Hexavalent  | µg/L     | Monitoring Only |                   | 22     | --          | --       | < 2                  |
| Fecal Coliform - Nov. - March   | #/100 mL | 1000            | 2000 <sup>w</sup> | 38     | 12          | 119      | 1 - 209              |
| Fecal Coliform - Winter   | #/100 mL | 1000            | 2000 <sup>w</sup> | 348    | 20          | 166      | 1 - 1160             |
| E. coli - Summer  | #/100 mL | 126             | 284 <sup>w</sup>  | 395    | 22          | 136      | 1 - 666              |
| Flow Rate   | MGD      | Monitoring Only |                   | 1826   | 2.22        | 4.59     | .43 - 8.02           |
| Mercury, Total - 2019-2019  | kg/day   | 0.00014         | 0.02              | 3      | .000115     | .000328  | .0000872 - .000352   |
| Mercury, Total - 2019-2023  | kg/day   | 0.00014         | 0.02 <sup>w</sup> | 59     | .0000282    | .0000904 | .000000881 - .000477 |
| Mercury, Total - 2019-2019  | ng/L     | 12              | 1700              | 3      | 9.42        | 23.5     | 7.75 - 25.1          |
| Mercury, Total - 2019-2023  | ng/L     | 12              | 1700 <sup>w</sup> | 59     | 3.48        | 9.8      | .128 - 69.5          |
| Cyanide, Free (Low-Level)   | µg/L     | Monitoring Only |                   | 19     | --          | --       | < 10                 |
| Acute Toxicity, <i>Ceriodaphnia dubia</i>   | TUa      | Monitoring Only |                   | 5      | --          | --       | < .2                 |
| Acute Toxicity, <i>Pimephales promelas</i>  | TUa      | Monitoring Only |                   | 5      | < .2        | .32      | 0 - .4               |
| pH, Maximum - 2019-2019   | S.U.     | --              | 9.0               | 90     | 7           | 7.2      | 6.8 - 7.7            |
| pH, Maximum - 2019-2023   | S.U.     | Monitoring Only |                   | 1736   | 7.1         | 7.3      | 6.5 - 8.2            |

| Effluent Monitoring Data for 3PD00009*MD between 1/1/2019 and 1/31/2024 - Outfall 001 |        |                 |                   |        |             |      |            |
|---|--------|-----------------|-------------------|--------|-------------|------|------------|
| Parameter   | Unit   | Current Limits  |                   | # Obs. | Percentiles |      | Data Range |
|   |        | 30 Day          | Daily             |        | 50th        | 95th |            |
| pH, Minimum - 2019-2019   | S.U.   | --              | 6.5 <sup>m</sup>  | 90     | 6.9         | 6.7* | 6.6 - 7.1  |
| pH, Minimum - 2019-2023   | S.U.   | Monitoring Only |                   | 1736   | 7           | 6.8* | 6 - 7.6    |
| Residue, Total Filterable   | mg/L   | Monitoring Only |                   | 131    | 364         | 533  | 15 - 734   |
| CBOD 5 day  | kg/day | 256             | 409 <sup>w</sup>  | 779    | 47.3        | 106  | 0 - 263    |
| CBOD 5 day  | mg/L   | 21.8            | 34.9 <sup>w</sup> | 779    | 6           | 10   | 0 - 16     |

\* = For minimum pH, 5th percentile shown in place of 50th percentile.

\*\* = For dissolved oxygen, 5th percentile shown in place of 95th percentile.

<sup>w</sup> = weekly average.

<sup>m</sup> = Minimum

**Table 9. Projected Effluent Quality for Outfall 001**

| Parameter                       | Units | Number of Samples | Number > MDL | PEQ Average | PEQ Maximum |
|---------------------------------|-------|-------------------|--------------|-------------|-------------|
| Ammonia (Summer)                | mg/L  | 261               | 261          | 7.99        | 15.3        |
| Ammonia (Winter)                | mg/L  | 207               | 207          | 6.1         | 12.1        |
| Arsenic - TR                    | µg/L  | 5                 | 1            | 20.15       | 27.6        |
| Barium                          | µg/L  | 1                 | 1            | 162.94      | 223.2       |
| Bis(2-ethylhexyl)phthalate      | µg/L  | 5                 | 1            | 8.23        | 11.27       |
| Cadmium - TR                    | µg/L  | 66                | 6            | 5.73        | 7.58        |
| Chloroform (Trichloromethane)   | µg/L  | 5                 | 2            | 6.77        | 9.27        |
| Chromium - TR                   | µg/L  | 27                | 2            | 17.52       | 24          |
| Hexavalent Chromium (Dissolved) | µg/L  | 22                | 0            | --          | --          |
| Copper - TR                     | µg/L  | 66                | 18           | 15.6        | 24.6        |
| Cyanide - free                  | µg/L  | 19                | 0            | --          | --          |
| Dissolved Solids                | mg/L  | 133               | 133          | 428.66      | 587.2       |
| Lead - TR                       | µg/L  | 27                | 3            | 14.02       | 19.2        |
| Mercury - TR                    | ng/L  | 63                | 63           | 9.42        | 14.7        |
| Nickel - TR                     | µg/L  | 26                | 3            | 18.98       | 26          |
| Toluene                         | µg/L  | 5                 | 3            | 5.05        | 6.92        |
| Zinc - TR                       | µg/L  | 27                | 21           | 119.14      | 163.2       |

MDL = analytical method detection limit

PEQ = projected effluent quality

TR = total recoverable

**Table 10. Summary of Acute and Chronic Toxicity Results**

| Date      | Acute Toxicity, <i>Ceriodaphnia dubia</i> | Acute Toxicity, <i>Pimephales promelas</i> |
|-----------|---|--|
| 9/9/2019  | AA (0.2)                                  | 0.4  |
| 9/14/2020 | AA (0.2)                                  | AA (0.2)                                   |
| 9/21/2021 | AA (0.2)                                  | AA (0.2)                                   |
| 9/26/2022 | AA (0.2)                                  | AA (0.2)                                   |

AA = non-detection; analytical method detection limit of 0.2 TU<sub>a</sub>

TU<sub>a</sub> = acute toxicity unit

**Table 11. Ohio River Use Attainment Table**

| State        | River Mile (Total Miles) | ALU Impairment | CRU Impairment | PWSU Impairment | FCU Impairment |
|--------------|--------------------------|----------------|----------------|-----------------|----------------|
| PA           | 0.0-40.2 (40.2)          | 0.0            | 40.2           | 0.0             | 40.2           |
| OH-WV        | 40.2-317.1 (276.9)       | 0.0            | 245.0          | 0.0             | 276.9          |
| OH-KY        | 317.1-491.3 (174.2)      | 0.0            | 60.8           | 0.0             | 174.2          |
| IN-KY        | 491.3-848.0 (356.7)      | 0.0            | 243.3          | 0.0             | 356.7          |
| IL-KY        | 848.0-981.0 (133.0)      | 0.0            | 40.6           | 0.0             | 133.0          |
| <b>TOTAL</b> | <b>981.0</b>             | <b>0.0</b>     | <b>629.9</b>   | <b>0.0</b>      | <b>981.0</b>   |

\*Data Gathered from ORSANCO Assessment of Ohio River Water Quality Conditions (2022)

ALU = Aquatic Life Use

CRU = Contact Recreation Use

PWSU = Public Water Supply Use

FCU = Fish Consumption Use

**Table 12. 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  | --                           | --           | 1.2          | --                   | --                         |
| Ammonia (Winter)                | mg/L  | --                           | --           | 1.2          | --                   | --                         |
| Arsenic - TR                    | µg/L  | 50                           | 100          | 150          | 340                  | 680                        |
| Barium                          | µg/L  | 1000                         | --           | 610          | 2600                 | 5200                       |
| Bis(2-ethylhexyl)phthalate      | µg/L  | 3.2 <sup>c</sup>             | --           | 8.4          | 1100                 | 2100                       |
| Cadmium - TR                    | µg/L  | --                           | 50           | 2.4          | 4.3                  | 8.5                        |
| Chloroform (Trichloromethane)   | µg/L  | 57 <sup>c</sup>              | --           | 140          | 1300                 | 2600                       |
| Chromium - TR                   | µg/L  | --                           | 100          | 83           | 1700                 | 3500                       |
| Hexavalent Chromium (Dissolved) | µg/L  | --                           | --           | 11           | 16                   | 31                         |
| Copper - TR                     | µg/L  | --                           | 500          | 8.9          | 13                   | 27                         |
| Cyanide - free                  | µg/L  | 4                            | --           | 5.2          | 22                   | 44                         |
| Dissolved Solids                | mg/L  | --                           | --           | 1500         | --                   | --                         |
| Lead - TR                       | µg/L  | --                           | 100          | 6            | 110                  | 230                        |
| Mercury - TR                    | ng/L  | 12                           | 10000        | 910          | 1700                 | 3400                       |
| Nickel - TR                     | µg/L  | 610                          | 200          | 50           | 450                  | 900                        |
| Toluene                         | µg/L  | 57                           | --           | 62           | 560                  | 1100                       |
| Zinc - TR                       | µg/L  | 7400                         | 25000        | 110          | 110                  | 230                        |

TR = total recoverable

**Table 13. Instream Conditions and Discharger Flow**

| <b>Parameter</b>                | <b>Units</b> | <b>Season</b> | <b>Value</b> | <b>Basis</b>   |
|---------------------------------|--------------|---------------|--------------|--|
| <b>Stream Flows</b>             |              |               |              |  |
| 1Q10                            | cfs          | annual        | 5000         | Direct Ohio River dischargers use 7Q10 instead of 1Q10; Orsanco 2019 Pollution Control Standards |
| 7Q10                            | cfs          | annual        | 5880         | Ohio EPA Modeling guidance 8 - 2019  |
|                                 |              | summer        | 0            |  |
|                                 |              | winter        | 0            |  |
| 30Q10                           | cfs          | summer        | 5880         | Assumed for Ammonia toxicity   |
|                                 |              | winter        | 5880         | Assumed for Ammonia toxicity   |
| 90Q10                           | cfs          | annual        | 0            |  |
| Harmonic Mean                   | cfs          | annual        | 20500        | Ohio EPA Modeling guidance 8 - 2019  |
| Mixing Assumption               | %            | average       | 10           | (***WLA's for non-carcinogens are developed using 100 percent of the 7Q10.)                      |
|                                 |              | maximum       | 1            |  |
| <b>Hardness, OMZ</b>            |              |               |              |  |
| Hardness, OMZ                   | mg/L         | annual        | 111          | Ohio EPA Modeling guidance 8 - 2019  |
| <b>Hardness, IMZ</b>            |              |               |              |  |
| Hardness, IMZ                   | mg/L         | annual        | 111          | Ohio EPA Modeling guidance 8 - 2019  |
| <b>pH</b>                       |              |               |              |  |
| pH                              | S.U.         | summer        | 7.8          | ORSANCO bimonthly sampling (New Cumberland); 2019-23 n=5   |
|                                 |              | winter        | 8.5          | ORSANCO bimonthly sampling (New Cumberland); 2019-23 n=3   |
| <b>Temperature</b>              |              |               |              |  |
| Temperature                     | °C           | summer        | 26.6         | ORSANCO bimonthly sampling (New Cumberland); 2019-23 n = 7                                       |
|                                 |              | winter        | 8.1          | ORSANCO bimonthly sampling (New Cumberland); 2019-23 n =3  |
| <b>East Liverpool WWTP flow</b> |              |               |              |  |
| East Liverpool WWTP flow        | cfs          | annual        | 4.7964       | Average Design Flow  |
| <b>Background Water Quality</b> |              |               |              |  |
| Ammonia (Summer)                | mg/L         | summer        | 0.06         | ORSANCO; 2019-2023; N=8; 1<MDL; Median   |
| Ammonia (Winter)                | mg/L         | winter        | 0.06         | ORSANCO; 2019-2023; N=8; 1<MDL; Median   |
| Arsenic - TR                    | µg/L         |               | 0.5          | ORSANCO; 2019-2023; N=12; 11<MDL; Median   |
| Barium                          | µg/L         | annual        | 39           | ORSANCO; 2019-2023; N=12; 0<MDL; Median  |
| Bis(2-ethylhexyl)phthalate      | µg/L         | annual        |              | No representative data available.  |
| Cadmium - TR                    | µg/L         | annual        | 0            | ORSANCO; 2019-2023; N=12; 12<MDL; Median   |
| Chloroform (Trichloromethane)   | µg/L         | annual        |              | No representative data available.  |
| Chromium - TR                   | µg/L         | annual        | 0.5          | ORSANCO; 2019-2023; N=12; 11<MDL; Median   |
| Hexavalent Chromium (Dissolved) | µg/L         | annual        | 0            | No representative data available.  |

|                  |      |        |      |  |
|------------------|------|--------|------|--|
| Copper - TR      | µg/L | annual | 1.13 | ORSANCO; 2019-2023; N=12; 5<MDL; Median  |
| Cyanide - free   | µg/L | annual |      | No representative data available.        |
| Dissolved Solids | mg/L | annual | 174  | ORSANCO; 2019-2023; N=9; 1<MDL; Median   |
| Lead - TR        | µg/L | annual | 0.5  | ORSANCO; 2019-2023; N=12; 11<MDL; Median |
| Mercury - TR     | ng/L | annual | 0.75 | ORSANCO; 2019-2023; N=12; 10<MDL; Median |
| Nickel - TR      | µg/L | annual | 1.62 | ORSANCO; 2019-2023; N=12; 0<MDL; Median  |
| Toluene          | µg/L | annual |      | No representative data available.        |
| Zinc - TR        | µg/L | annual | 2.31 | ORSANCO; 2019-2023; N=12; 0<MDL; Median  |

ORSANCO = Ohio River Valley Water Sanitation Commission

MDL = Method Detection Limit

N = Number of samples

TR = total recoverable

**Table 14. 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                 | Agriculture | Aquatic Life |                      |                            |
| Ammonia (Summer)                | mg/L  | --                           | --          | 140.95       | --                   | --                         |
| Ammonia (Winter)                | mg/L  | --                           | --          | 140.95       | --                   | --                         |
| Arsenic - TR                    | µg/L  | 60733                        | 42627       | 18477        | 4502                 | 680                        |
| Barium                          | µg/L  | 1179109                      | --          | 81733        | 39299                | 6000                       |
| Bis(2-ethylhexyl)phthalate      | µg/L  | 1371                         | --          | 1038         | 14585                | 2100                       |
| Cadmium - TR                    | µg/L  | --                           | 21420       | 334          | 68                   | 10                         |
| Chloroform (Trichloromethane)   | µg/L  | 24419                        | --          | 17303        | 17237                | 2600                       |
| Chromium - TR                   | µg/L  | --                           | 42627       | 11556        | 26512                | 3900                       |
| Cyanide - free                  | µg/L  | 4908                         | --          | 643          | 292                  | 44                         |
| Dissolved Solids                | mg/L  | --                           | --          | 164057       | --                   | --                         |
| Hexavalent Chromium (Dissolved) | µg/L  | --                           | --          | 1360         | 212                  | 31                         |
| Copper - TR                     | µg/L  | --                           | 213719      | 1097         | 185                  | 31                         |
| Lead - TR                       | µg/L  | --                           | 42627       | 841          | 1850                 | 280                        |
| Mercury                         | ng/L  | 12                           | 10000       | 910          | 1700                 | 3400                       |
| Nickel - TR                     | µg/L  | 746435                       | 84988       | 6846         | 6742                 | 1000                       |
| Toluene                         | µg/L  | 69934                        | --          | 7663         | 7425                 | 1100                       |
| Zinc - TR                       | µg/L  | 9076372                      | 10709110    | 15784        | 1695                 | 260                        |

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum

<sup>B</sup> 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)

TR = total recoverable

**Table 15. 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.  |                               |                                    |
|  | Chromium - TR  | Dissolved Hexavalent Chromium | Cyanide (free)                     |
|  | Chloroform   | Toluene                       | Barium                             |
| Group 3:   | PEQ <sub>max</sub> < 50 percent of maximum PEL and PEQ <sub>avg</sub> < 50 percent of average PEL. No limit recommended; monitoring optional.  |                               |                                    |
|  | Lead - TR  | Nickel - TR                   | Arsenic - TR                       |
|  | Ammonia (Summer)   | Bis(2-ethylhexyl)phthalate    | Dissolved Solids                   |
|  |  | Ammonia (Winter)              |                                    |
| Group 4:   | PEQ <sub>max</sub> ≥ 50 percent, but < 100 percent of the maximum PEL or PEQ <sub>avg</sub> ≥ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.   |                               |                                    |
|  | Cadmium – TR   | Copper - TR                   | Zinc - TR                          |
|  | Mercury - TR   |                               |                                    |
| 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. |                               |                                    |
| <b><u>Limits to Protect Numeric Water Quality Criteria</u></b> |  |                               |                                    |
|  | <i>Parameter</i>   | <i>Units</i>                  | <i>Recommended Effluent Limits</i> |
|  |  |                               | <i>Average</i> <i>Maximum</i>      |

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

**Table 16. Final Effluent Limits for Outfall 001**

| Parameter                                  | Units    | Concentration       |                | Loading (kg/day) <sup>a</sup> |                | Basis <sup>b</sup> |
|--|----------|---------------------|----------------|-------------------------------|----------------|--------------------|
|  |          | Daily Maximum       | 30 Day Average | Daily Maximum                 | 30 Day Average |                    |
| Water Temperature                          | °C       | ----- Monitor ----- |                |                               |                | M <sup>c</sup>     |
| Dissolved Oxygen                           | mg/L     | 5.0 <sup>m</sup>    | --             | --                            | --             | PD                 |
| TSS  | mg/L     | 39.2 <sup>d</sup>   | 26.1           | 460 <sup>d</sup>              | 306            | PD                 |
| Oil & Grease                               | mg/L     | 10                  | --             | --                            | --             | WQS                |
| Ammonia                                    | mg/L     | ----- Monitor ----- |                |                               |                | M                  |
| 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                  |
| 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                  |
| Fecal Coliform                             | #/100 mL | 2000 <sup>d</sup>   | 1000           | --                            | --             | ORS                |
| <i>E. coli</i>                             | #/100 mL | 284 <sup>d</sup>    | 126            | --                            | --             | WQS                |
| Flow Rate                                  | MGD      | ----- Monitor ----- |                |                               |                | M <sup>c</sup>     |
| Mercury                                    | ng/L     | ----- Monitor ----- |                |                               |                | M                  |
| Free Cyanide                               | µg/L     | ----- Monitor ----- |                |                               |                | M                  |
| Acute Toxicity, <i>Ceriodaphnia dubia</i>  | TUa      | ----- Monitor ----- |                |                               |                | WET                |
| Acute Toxicity, <i>Pimephales promelas</i> | TUa      | ----- Monitor ----- |                |                               |                | WET                |
| pH, maximum                                | SU       | 9.0                 | --             | --                            | --             | WQS                |
| pH, minimum                                | SU       | 6.5 <sup>m</sup>    | --             | --                            | --             | WQS                |
| Total Filterable Residue                   | mg/L     | ----- Monitor ----- |                |                               |                | M                  |
| CBOD5                                      | mg/L     | 34.9 <sup>d</sup>   | 21.8           | 409 <sup>d</sup>              | 256            | PD                 |

<sup>a</sup> Effluent loadings based on average design discharge flow of 3.1 MGD.

<sup>b</sup> Definitions:

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

ORS = ORSANCO Pollution Control Standards

PD = Plant Design (OAC 3745-33-05(E))

PMR = Phosphorus monitoring requirements (ORC 6111.03)

WQS = Ohio Water Quality Standards (OAC 3745-1)

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

<sup>c</sup> Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

<sup>d</sup> 7 day average limit.

<sup>m</sup> minimum limit

### Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

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

#### Hazard Category Summary

|                             | <i>Ceriodaphnia dubia</i> |    | <i>Pimephales promelas</i> |    |
|-----------------------------|---------------------------|----|----------------------------|----|
|                             | Acute                     | -- | Acute                      | -- |
| Effluent Toxicity (Table A) | 4                         | -- | 4                          | -- |
|                             | 4                         |    | 4                          |    |

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

Table A. Effluent Toxicity

|   | <i>Ceriodaphnia dubia</i> |    | <i>Pimephales promelas</i> |    |
|---|---------------------------|----|----------------------------|----|
|   | Acute                     | -- | Acute                      | -- |
| WLA   | 1.0                       | -- | 1.0                        | -- |
| # of tests  | 5                         | -- | 5                          | -- |
| Maximum value   | --                        | -- | 0.4                        | -- |
| Percent of tests >WLA                                   | --                        | -- | 0                          | -- |
| Geometric mean  | --                        | -- | 0.23                       | -- |
| Average Exceedance<br>(Geomean * Percent of tests >WLA) | --                        | -- | 0                          | -- |
| Average Exceedance / WLA                                | --                        | -- | 0                          | -- |

| Attribute Evaluated  | Hazard Category 1     | Hazard Category 2  | Hazard Category 3 | Hazard Category 4 |
|--|-----------------------|--------------------|-------------------|-------------------|
| Degree of Toxicity   | Adequately Documented | Strongly Suspected | Possible          | None              |
| (1) Minimum number of tests  | 3                     | 1                  | 0 or 1            | 0 or 1<br>TUa Pp  |
| (2) Percent of tests >WLA  | >30                   | 20 to 30           | 10 to 20          | 10<br>TUa Pp      |
| (3) Average Exceedance/WLA <sup>1</sup><br>(Tables B and C data not available) |                       |                    |                   |                   |
| (a) Acute <sup>2</sup>   | > 0.3                 | ≥ 0.3              | ≥ 0.2             | < 0.2<br>TUa Pp   |
| (4) Maximum TU value<br>(Tables 3B and 3C data not available)                  | ≥(3xWLA)              | ≥WLA               | ≥WLA              | <WLA<br>TUa Pp    |

<sup>1</sup> Compare (per cent exceedances x geometric mean TU) to table factor.

<sup>2</sup> Use 0.3 x WLA for situations where AIM exists.

## **Addendum 1. Acronyms**

|          |   |
|----------|---|
| ABS      | Anti-backsliding                                |
| CFR      | Code of Federal Regulations                     |
| CWA      | Clean Water Act                                 |
| DMR      | Discharge Monitoring Report                     |
| IMZM     | Inside mixing zone maximum                      |
| 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                  |
| SSO      | Sanitary sewer overflow                         |
| TMDL     | Total Daily Maximum Load                        |
| TU       | Toxicity unit                                   |
| U.S. EPA | United States Environmental Protection Agency   |
| WET      | Whole effluent toxicity                         |
| WLA      | Wasteload allocation                            |
| WQS      | Water Quality Standards                         |
| WWTP     | Wastewater Treatment Plant                      |