

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

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

Public Notice No.: 16-05-010
Public Notice Date: May 3, 2016
Comment Period Ends: June 3, 2016

Ohio EPA Permit No.: **3PD00033*ID**
Application No.: **OH0026182**

Name and Address of Applicant:

City of Louisville
215 South Mill Street
Louisville, OH 44641

Name and Address of Facility Where

Discharge Occurs:

Louisville WWTP
3101 Ravenna Avenue NE
Louisville, OH 44641
Stark County

Receiving Water: **East Branch Nimishillen Creek**

Subsequent Stream Network: **Sandy Creek, Tuscarawas River, Muskingum River, Ohio River**

Introduction

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

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

No antidegradation review was necessary.

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

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

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

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

Summary of Permit Conditions

The effluent limits and monitoring requirements proposed for the following parameters are the same as in the previous permit, although some monitoring frequencies have changed: flow, temperature, dissolved oxygen, 5-day carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids, ammonia, nitrate+nitrite, total Kjeldahl nitrogen, oil and grease, pH, total residual chlorine, cadmium, chromium, dissolved hexavalent chromium, *Escherichia coli* (*E. coli*), lead, and nickel.

New effluent limits are proposed for copper and total filterable residue. For these parameters, the PEQ is greater than 100 percent of the WLA and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). Pollutant Minimization Program (PMP) compliance schedules for copper and total filterable residue are in Part 1, C of the permit.

New monthly monitoring is proposed for dissolved orthophosphate (as P). This monitoring is required by Ohio Senate Bill 1, which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate is proposed to further develop nutrient datasets for dissolved reactive phosphorus and to assist stream and watershed assessments and studies. Ohio EPA monitoring, as well as other in-stream monitoring, is taken via grab sample, orthophosphate is proposed to be collected by grab sample to maintain consistent data to support watershed and stream surveys. Monitoring will be done by grab sample, which must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

Limits are proposed to be removed for mercury and zinc because data support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to continue.

Annual chronic toxicity monitoring with the determination of acute endpoints 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. The percent affected for toxicity are being added for upstream monitoring station 801.

This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. As soon as possible, the permittee must begin using either ASTM D7237-10 or OIA-1677-09 both of which are approved methods for free cyanide listed in 40 CFR 136.

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; and outfall signage.

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Procedures for Participation in the Formulation of Final Determinations

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

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

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

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

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

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

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

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

For additional information about this fact sheet or the draft permit, contact Elizabeth Buening, (614) 644-2138, Elizabeth.buening@epa.ohio.gov.

Information Regarding Certain Water Quality Based Effluent Limits

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

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

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

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

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, written notification 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 3745-1-35. 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 Louisville WWTP discharges to the East Branch of Nimishillen Creek at River Mile (RM) 4.64. Figure 1 shows the approximate location of the facility.

This segment of the East Branch of Nimishillen Creek is described by Ohio EPA River Code: 17-463, County: Stark, Ecoregion: Erie Drift Plain. The East Branch of Nimishillen Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-24): Warmwater Habitat (WWH), Industrial Water Supply (IWS), Class B Primary Contact Recreation (PCR).

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

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

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (PCR) and wading only (Secondary Contact 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 IWS.

Facility Description

The Louisville WWTP was constructed in 1972 and last upgraded in 2008. The average design flow is 2.0 million gallons per day (MGD) and the peak hydraulic capacity is 6.2 MGD. The Louisville WWTP serves the City of Louisville for a total of 8,300 customers. The Louisville WWTP has the following treatment processes:

- Influent Pumping
- Bar Screen
- Flow Equalization
- Primary Clarifiers
- Conventional Activated Sludge
- Final Clarifiers
- Chlorination
- Dechlorination

The Louisville WWTP has no bypasses. The Louisville WWTP has 100 percent separated sewers in the collection system. The Louisville WWTP does not have an approved pretreatment program. The Louisville WWTP has one significant industrial user that discharges approximately 35,000 gallons per day of flow.

The Louisville WWTP utilizes the following sewage sludge treatment processes:

- Aerobic Digestion
- Belt Filter Press
- Polymer Addition

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

Description of Existing Discharge

The Louisville WWTP had several effluent violations which are shown on Table 2. These violations were not caused by a known process error or upset condition.

The average annual effluent flow rate for the Louisville WWTP for the previous five years is presented on Table 3.

The Louisville WWTP reports SSOs at station 300. No SSOs were reported over the past five years.

Table 4 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfall 001. Data are presented for the period January 2010 through December 2014, and current permit limits are provided for comparison.

Table 5 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Assessment of Impact on Receiving Waters

A Total Maximum Daily Load (TMDL) report was approved for the Nimishillen Creek watershed in December 16, 2009. The March 24, 2015, Supreme Court of Ohio decision *Fairfield Cty. Bd. of Commrs. v. Nally, Slip Opinion No. 2015-Ohio-991* vacated all previously approved TMDLs. As this time, this TMDL is considered a technical guidance document pending final TMDL approval.

The East Branch Nimishillen Creek watershed assessment unit, which includes the East Branch Nimishillen Creek in the vicinity of the Louisville WWTP, is listed as impaired for human health (TMDL needed), recreation (TMDL complete) and aquatic life (TMDL needed) on Ohio's 303(d) list.

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

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

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). These criteria apply to rivers

and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), which indicate the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 6) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index (QHEI), and comments and observations for each sampling location.

The Nimishillen Creek Watershed is impaired for aquatic life due to nutrients and ammonia (total), and municipal point source discharges are listed as one of the sources of impairment.

The full TMDL report can be found at this website:

<http://epa.ohio.gov/dsw/tmdl/MuskingumRiver.aspx#120213153-nimishillen-creek>

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

Self-monitoring data (DMR)

October 2010 through September 2015

Outliers

The data were examined and the following values were removed from the evaluation as non-representative data: lead value of 120 µg/l reported on December 4, 2013 and lead value of 121 µg/l reported on March 5, 2014, both excluded as an outliers greater than three times higher than the next values.

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 5).

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 10 for a summary of the screening results.

Wasteload Allocation

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations. Republic Engineered Products, LLC is a discharger in the East Branch of Nimishillen Creek that is considered interactive.

The available assimilative capacity was distributed among them using the conservative substance wasteload allocation (CONSWLA) water quality model for conservative parameters. CONSWLA is the model Ohio EPA typically uses in multiple discharger situations. CONSWLA model inputs for flow are fixed at their critical low levels and inputs for effluent flow are fixed at their design or 50th percentile levels. Background concentrations are fixed at a representative value (generally a 50th percentile). A mass balancing method is then used to allocate effluent concentrations that maintain WQS under these conditions. This technique is appropriate when data bases are unavailable to generate statistical distributions for inputs and if the parameters modeled are conservative.

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

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 8, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 7 and Table 8. The WLA results to maintain all applicable criteria are presented in Table 9.

Dissolved Metals Translators

A DMT is the factor used to convert a dissolved metal aquatic life criterion to an effective total recoverable aquatic life criterion with which a total recoverable aquatic life allocation can be calculated as required by NPDES permit rules [OAC 3745-33-05(C)(2)]. Currently, a DMT is based on site- or area-specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement.

For the East Branch of Nimishillen Creek, there were paired samples available applicable to copper, lead, nickel and zinc. To account for the limited quantity of data, the DMT for each of these metals was determine as the lower end of the 95 percent confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. Each DMT is metal-specific and is applied by multiplying the dissolved criteria by the DMT, resulting in total effective recoverable criteria which are used in the WLA procedures.

In some cases, it is possible that the use of a DMT may result in instream concentrations of metals that may increase the risk of non-attainment of the aquatic life use designation. This was evaluated for the Louisville

WWTP. The application of the dissolved metal translators resulted in effective total recoverable criteria for copper that were lower than the total recoverable criteria listed in OAC 3745-1.

The East Branch of Nimishillen Creek near the Louisville WWTP is not attaining its designated use. In addition, the Louisville WWTP has not requested any increase in permitted load. Therefore, the facility can receive permit limits that maintain all numeric criteria, up to their current limits, without undergoing any further review to ensure that the limits for the metals will protect the aquatic life and other uses.

Whole Effluent Toxicity WLA

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio’s narrative “free from” WQS rule [OAC 3745-1-04(D)]. These “free froms” are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For the Louisville WWTP, the WLA values are 0.4 TU_a and 1.21 TU_c.

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

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

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

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

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

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

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

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

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

The acute WLA for the Louisville WWTP is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.2 to 1.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 5, 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 10.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for the Louisville 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.

Flow Rate and Water Temperature

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

Dissolved Oxygen, Total Suspended Solids, Ammonia and 5-Day Carbonaceous Biochemical Oxygen Demand

The limits proposed for dissolved oxygen, total suspended solids, ammonia and 5-day carbonaceous biochemical oxygen demand are all based on plant design criteria. These limits are 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 3745-1-07). Class B PCR *E. coli* standards apply to the East Branch of Nimishillen Creek.

Copper and Total Filterable Residue

The Ohio EPA risk assessment (Table 10) places these parameters in group 5. This placement, as well as the data in Tables 4 and 5, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). There are PMP compliance schedules for copper and total filterable residue in Part 1, C of the permit.

Total Residual Chlorine

The limit proposed for total residual chlorine is based on the WLA (Table 9) and is a continuation of the existing permit limit.

Mercury

The Ohio EPA risk assessment (Table 10) places in group 4. This placement, as well as the data in Tables 4 and 5, 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). Limits for mercury are proposed to be removed but monitoring will continue at the same frequency.

Free Cyanide, Dissolved Hexavalent Chromium, Cadmium, Zinc, Lead, Chromium, and Nickel

The Ohio EPA risk assessment (Table 10) places these parameters in groups 2 and 3. This placement, as well as the data in Tables 4 and 5, 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 reduced frequency is

proposed to document that these pollutants continue to remain at low levels. Limits for zinc are proposed to be removed.

Arsenic, Selenium, Molybdenum, and Silver

The Ohio EPA risk assessment (Table 10) places these parameters in groups 2 and 3. This placement, as well as the data in Tables 4 and 5, 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.

Phosphorus, Nitrate + Nitrite, and Total Kjeldahl Nitrogen

Continued monitoring is also proposed for total Kjeldahl nitrogen and nitrate+nitrite to provide information on the discharge of nutrients and provide supplemental data for the ongoing evaluation of East Branch Nimishillen Creek water quality nutrient loading in the Ohio River basin.

The 2014 Ohio Integrated Water Quality Monitoring and Assessment Report (Ohio EPA) lists the Nimishillen Creek watershed as impaired for aquatic life. Nutrients and organic enrichment/dissolved oxygen are listed as “high magnitude” causes, and major municipal point sources are listed among the “high magnitude” sources. Considering this information and the fact that municipal WWTPs discharge a nutrient load to the river, phosphorus limits are proposed to continue based on best technical judgment.

Dissolved Orthophosphate

New monthly monitoring is proposed for dissolved orthophosphate (as P). This monitoring is required by Ohio Senate Bill 1, which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate is proposed to further develop nutrient datasets for dissolved reactive phosphorus and to assist stream and watershed assessments and studies. Ohio EPA monitoring, as well as other in-stream monitoring, is taken via grab sample, orthophosphate is proposed to be collected by grab sample to maintain consistent data to support watershed and stream surveys. Monitoring will be done by grab sample, which must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

Whole Effluent Toxicity Reasonable Potential

Annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the life of the permit. Annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). 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.

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

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 adopted in December 2006 (OAC 3745-7-02). These rules require the Louisville 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”.

Low-Level Free Cyanide Testing

Currently there are two approved methods for free cyanide listed in 40 CFR 136.3 that have quantification levels lower than any water quality-based effluent limits:

- ASTM D7237-10 and OIA-1677-09 - Flow injection followed by gas diffusion amperometry

These methods will allow Ohio EPA 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.

New NPDES permits no longer authorize the use of method 4500 CN-I from Standard Methods for free cyanide testing. The new permits require permittees to begin using one of these approved methods as soon as possible. If a permittee must use method 4500 CN-I during the transition to an approved method, they are instructed to report the results on their DMR and enter “Method 4500 CN-I” in the remarks section.

Storm Water Compliance

To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on June 15, 2011. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than June 15, 2016, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations.

Outfall Signage

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

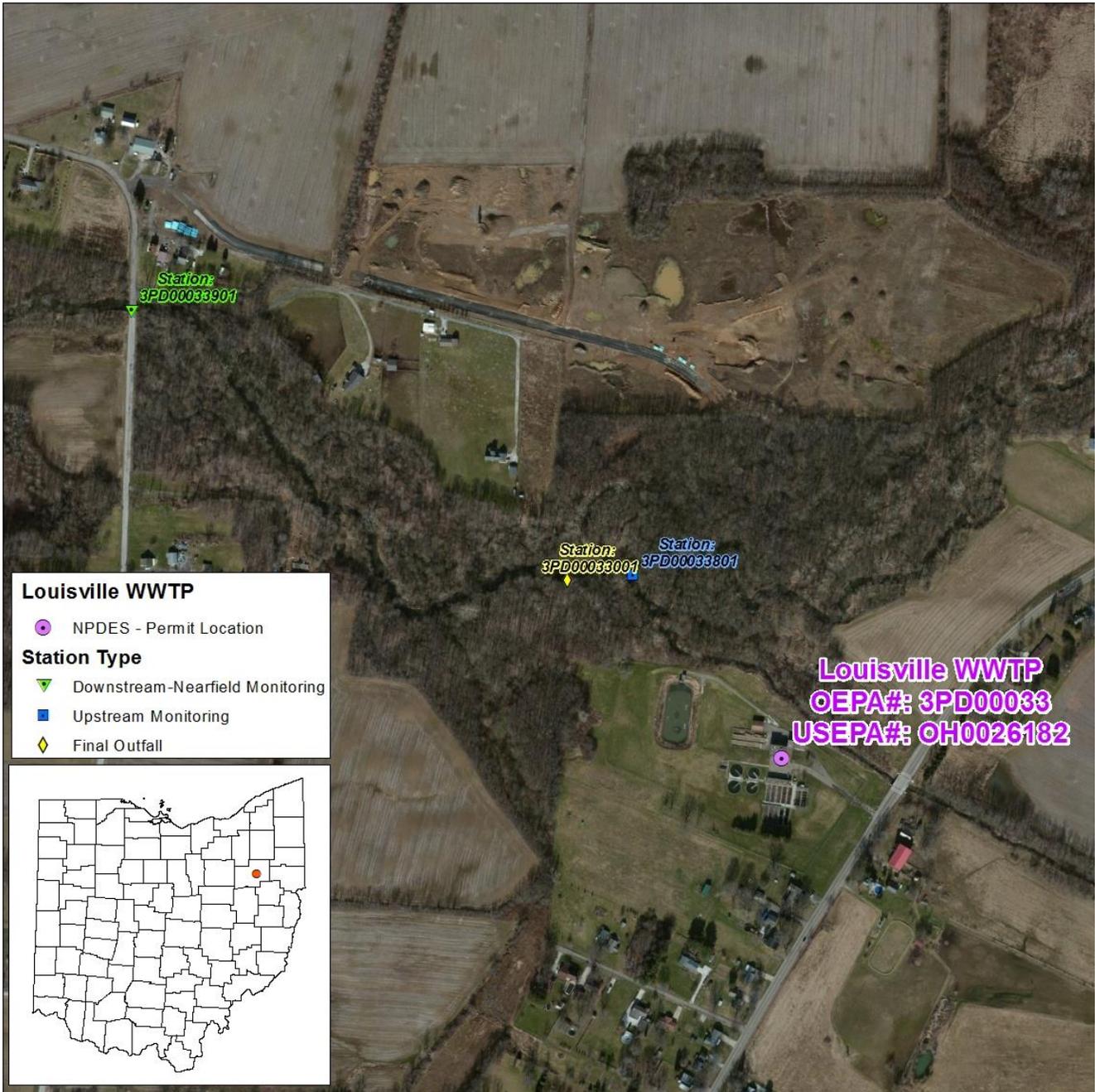


Figure 1. Location of Louisville WWTP

Table 1. Sewage Sludge Removal

Sampling Station	Dry Tons Removed				
	2010	2011	2012	2013	2014
581	0	0	0	228.39	105
586	156.9	159	0	56.63	61.1
<i>Total</i>	<i>156.9</i>	<i>159</i>	<i>0</i>	<i>285.02</i>	<i>166.1</i>

Table 2. Effluent Violations for Outfall 001

Parameter	2010	2011	2012	2013	2014
Oil & Grease Concentration	0	1	0	0	0
Oil & Grease Frequency	0	1	0	0	0
Total Phosphorus Concentration	0	4	7	2	0
Total Phosphorus Loading	0	1	2	1	0
<i>Total</i>	<i>0</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>0</i>

Table 3. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2010	1.19	2.364	4.51
2011	1.43	3.078	6.52
2012	1.07	1.92	3.61
2013	1.19	1.958	5.03
2014	1.34	2.934	4.72

MGD = million gallons per day

Table 4. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report for Louisville outfall 3PD00033001 (October 2010 - September 2015). All values are based on annual records unless otherwise indicated.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 th	95 th	
Water Temperature	Annual	°C	--	Monitor	1826	16	21	9-22
Dissolved Oxygen	Summer	mg/L	--	5.0 min	920	8.18	9.03	6.95-12.7
Dissolved Oxygen	Winter	mg/L	--	5.0 min	906	9.46	10.6	5.84-11.6
Total Filterable Residue	Annual	mg/L	--	Monitor	53	2140	2650	1060-2820
Total Suspended Solids	Annual	mg/L	20	30 ^a	723	5	10	1-19
Total Suspended Solids	Annual	kg/day	151	227 ^a	723	26.3	65.9	1.41-394
Oil and Grease	Annual	mg/L	--	10	120	1.7	4.81	1-15.7
Ammonia	Summer	mg/L	1.0	1.5 ^a	360	0.09	0.511	0.03-1.12
Ammonia	Winter	mg/L	3.0	4.5 ^a	363	0.08	0.657	0.01-0.95
Ammonia	Summer	kg/day	7.6	11.4 ^a	360	0.422	2.55	0.0149-8.67
Ammonia	Winter	kg/day	22.7	34.1 ^a	363	0.42	4.81	0.0632-12.4
Kjeldahl Nitrogen, Total	Annual	mg/L	--	Monitor	60	2.81	9.8	1-25
Nitrate+Nitrite	Annual	mg/L	--	Monitor	60	10.2	20.3	0.2-24.1
Phosphorus	Annual	mg/L	1.0	--	241	0.83	2.23	0.05-3.49
Phosphorus	Annual	kg/day	7.56	--	241	4.36	9.2	0.329-19
Cyanide, Free	Annual	mg/L	Monitor	--	20	0.02	0.02	0.01-0.02
Nickel	Annual	µg/L	Monitor	--	20	10	10	1-10
Zinc	Annual	µg/L	335	444	60	19.5	53.3	1-69
Zinc	Annual	kg/day	2.5	3.4	60	0.0872	0.253	0.00503-0.325
Cadmium	Annual	µg/L	Monitor	--	20	10	10	1-10
Lead	Annual	µg/L	Monitor	--	20	10	120	1-121

Table 4. (Continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 th	95 th	
Chromium	Annual	µg/L	Monitor	--	20	10	10.3	1-16
Copper	Annual	µg/L	Monitor	--	20	10	21	1-40
Dissolved Hexavalent Chromium	Annual	µg/L	Monitor	--	20	10	10.3	1-16
E. coli	Annual	#/100 mL	161	362 ^a	723	10	120	0-1480
Flow Rate	Summer	MGD	--	Monitor	920	1.13	2.33	0.0927-5.25
Flow Rate	Winter	MGD	--	Monitor	906	1.4	2.72	0.806-6.52
Flow Rate	Annual	MGD	--	Monitor	1826	1.24	2.54	0.0927-6.52
Mercury	Annual	ng/L	12	1700	20	1.98	6.81	0.5-7.32
Mercury	Annual	ng/L	0.000091	0.0129	20	0.0000104	0.0000337	0.00000248-0.0000449
pH, Maximum	Annual	S.U.	--	9.0	1826	7.56	7.71	7.14-8.01
pH, Minimum	Annual	S.U.	--	6.5	1826	7.54	7.69	7.12-7.99
CBOD ₅	Annual	mg/L	16	24 ^a	360	1	3	1-7
CBOD ₅	Annual	kg/day	121	181 ^a	363	2	4	1-7

a = weekly average

CBOD₅ = 5-day carbonaceous biochemical oxygen demand

MGD = Million gallons per day

Table 5. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	240	240	0.213	0.420
Ammonia (Winter)	mg/L	183	183	0.170	0.344
Cadmium	µg/L	20	0	--	--
Chlorine, Total Residual	µg/L	920	920	8.76	12.0
Chromium	µg/L	20	0	--	--
Copper	µg/L	20	5	40.88	56.0
Cyanide, Free	mg/L	20	0	--	--
Dissolved Hexavalent Chromium	µg/L	20	0	--	--
Lead	µg/L	18	3	15.33	21
Mercury	ng/L	20	20	8.273	14.58
Nickel	µg/L	20	0	--	--
Nitrate+Nitrite	mg/L	60	60	17.59	24.1
Phosphorus	mg/L	241	241	1.701	2.494
Total Filterable Residue	mg/L	53	53	2550	3068
Zinc	µg/L	60	60	83.97	126.0

PEQ = Projected Effluent Quality

Table 6. Use Attainment Table

Location	Year(s)	River Mile	Attainment Status	Causes of Impairment*
East Branch Nimishillen Creek - Erie Ontario Lake Plain Ecoregion - WWH existing				
Meese Road	2003-04	8.6	PARTIAL	Unknown
State Route 153	2003-04	6.4	NON	Organic Enrichment
Upstream of Louisville WWTP	2003-04	5.9	NON	Nutrients
Downstream of Louisville WWTP at Back Road	2003-04	4.2	NON	Nutrients, Ammonia
Harmont Road	2003-05	1.9	PARTIAL/NON	Nutrients, Ammonia
Cook Park	2005	0.1	NON	Nutrients, Flow Alteration

WWH = Warmwater Habitat

WWTP = Wastewater Treatment Plant

* = Sources of impairment were not listed

Table 7. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria			Inside Mixing Zone Maximum
		Average		Maximum Aquatic Life	
		Human Health	Aquatic Life		
Arsenic	µg/L	--	150	340	680
Cadmium	µg/L	--	6.7	19	38
Chlorine, Total Residual	µg/L	--	11	19	38
Chromium	µg/L	--	250	5200	10000
Copper	µg/L	1300	28*	47*	94*
Cyanide, Free	mg/L	220000	12	46	92
Dissolved Hexavalent Chromium	µg/L	--	11	16	31
Lead	µg/L	--	57*	1100*	2200*
Mercury	ng/L	12	910	1700	3400
Molybdenum**	µg/L	--	20000	190000	370000
Nickel	µg/L	4600	160*	1400*	2900*
Nitrate+Nitrite	mg/L	--	--	--	--
Phosphorus	mg/L	--	--	--	--
Selenium**	µg/L	11000	5.0	--	--
Silver	µg/L	--	1.3	15	29
Total Filterable Residue	mg/L	--	1500	--	--
Zinc	µg/L	69000	400*	400*	800*

* = WLA based on applicable dissolved metals translator

** = This parameter was found in the effluent of another discharger in this interactive segment

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
1Q10	cfs	annual	0.62	USGS Station 03117500; 1938-1997
7Q10	cfs	annual	0.66	USGS Station 03117500; 1938-1997
30Q10	cfs	summer	0.81	USGS Station 03117500; 1938-1997
30Q10	cfs	winter	1.61	USGS Station 03117500; 1938-1997
Harmonic Mean	cfs	annual	5.47	USGS Station 03117500; 1938-1997
Mixing Assumption	%	average	100	
Mixing Assumption	%	maximum	100	
Hardness	mg/L	annual	361	STORET; 2004-2006; n=10; 0<MDL
Republic Steel outfall 003 flow	cfs	annual	0.894	NPDES Permit Renewal Application
Republic Steel outfall 009 flow	cfs	annual	0.542	NPDES Permit Renewal Application
Republic Steel outfall 010 flow	cfs	annual	2.63	NPDES Permit Renewal Application
Republic Steel outfall 011 flow	cfs	annual	0.347	NPDES Permit Renewal Application
Louisville WWTP flow	cfs	annual	3.09	NPDES Permit Renewal Application
Ammonia	mg/L	summer	0.09	DMR; 2010-2015; n=20; 0<MDL; Station 801; Median
Ammonia	mg/L	winter	0.12	DMR; 2010-2015; n=15; 0<MDL; Station 801; Median
Arsenic	µg/L	annual	1.5	STORET; 2003-2006; n=24; 12<MDL
Cadmium	µg/L	annual	0.1	STORET; 2003-2006; n=24; 23<MDL
Chlorine, Total Residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	0	STORET; 2003-2006; n=24; 24<MDL
Copper	µg/L	annual	5	STORET; 2003-2006; n=24; 22<MDL
Cyanide, Free	mg/L	annual	0	No representative data available.
Dissolved Hexavalent Chromium	µg/L	annual	0	No representative data available.

Table 8. (Continued)

Parameter	Units	Season	Value	Basis
Lead	µg/L	annual	1	STORET; 2003-2006; n=24; 21<MDL
Mercury	ng/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	0	STORET; 2003-2006; n=24; 24<MDL
Selenium	µg/L	annual	0	STORET; 2003-2006; n=24; 24<MDL
Silver	µg/L	annual	0	No representative data available.
Total Filterable Residue	mg/L	annual	396	STORET; 2003-2006; n=25; 0<MDL
Zinc	µg/L	annual	5	STORET; 2003-2006; n=24; 18<MDL
Copper (DMT)		annual	1.045	1998; n=5; 0<MDL
Lead (DMT)		annual	2.197	1998; n=5; 0<MDL
Nickel (DMT)		annual	1.037	1998; n=5; 0<MDL
Zinc (DMT)		annual	1.153	1998; n=5; 0<MDL

WWTP = Wastewater Treatment Plant

DMR = Discharge Monitoring Report

USGS = United States Geological Survey

MDL = Method Detection Limit

STORET = United States Environmental Protection Agency STOrage and RETrieval Data Warehouse

NPDES = National Pollution Discharge Elimination System

DMT = Dissolved Metals Translator

Table 9. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria			Inside Mixing Zone Maximum
		Average		Maximum	
		Human Health	Aquatic Life	Aquatic Life	
Arsenic	µg/L	--	182	408	680
Cadmium	µg/L	--	8.1	23	38
Chlorine, Total Residual	µg/L	--	13	22	38
Chromium	µg/L	--	291	6007	10000
Copper	µg/L	2726	32*	54*	94*
Cyanide, Free	µg/L	609000	15	55	92
Dissolved Hexavalent Chromium	µg/L	--	13	18	31
Lead	µg/L	--	66*	1271*	2200*
Mercury	ng/L	12	910	1700	3400
Molybdenum	µg/L	--	23305	219476	370000
Nickel	µg/L	9657	186*	1617*	2900*
Nitrate+Nitrite	mg/L	--	--	--	--
Phosphorus	mg/L	--	--	--	--
Selenium	µg/L	23094	5.8	--	--
Silver	µg/L	--	1.6	18	29
Total Filterable Residue	mg/L	--	1736	--	--
Zinc	µg/L	144852	465*	461*	800*

* = WLA based on applicable dissolved metals translator

Table 10. Parameter Assessment

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

No Parameters meet these criteria

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

Arsenic	Chromium	Nitrate+Nitrite	Silver
Molybdenum	Nickel	Selenium	
Cyanide, Free	Cadmium	Dissolved Hexavalent Chromium	

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

Ammonia	Lead	Zinc
---------	------	------

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

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

Limits to Protect Numeric Water Quality Criteria

<u>Parameter</u>	<u>Units</u>	<u>Period</u>	<u>Recommended Effluent Limits</u>	
			<u>Average</u>	<u>Maximum</u>
Copper	µg/L	Monthly	32*	54*
Total Filterable Residue	mg/L	Monthly	1736	--

* = WLA based on total effective criteria

PEQ = Projected Effluent Quality

PEL = Projected Effluent Limit

WLA = wasteload allocation

WQS = water quality standard

Table 11. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Water Temperature	°C	----- Monitor -----				EP, M
Dissolved Oxygen	mg/L	5.0 minimum		--	--	EP, PD
Total Suspended Solids	mg/L	20	30 ^c	151	227 ^c	EP, PD
Oil & Grease	mg/L	--	10	--	--	WQS, EP
Ammonia (Summer)	mg/L	1.0	1.5 ^c	7.6	11.4 ^c	EP, PD
Ammonia (Winter)	mg/L	3.0	4.5 ^c	22.7	34.1 ^c	EP, PD
Kjeldahl Nitrogen, Total	mg/L	----- Monitor -----				EP, BTJ
Nitrate+Nitrite	mg/L	----- Monitor -----				EP, BTJ
Phosphorus	mg/L	1.0	--	7.56	--	EP, BTJ
Orthophosphate, Dissolved (as P)	mg/L	----- Monitor -----				SB1
Nickel	µg/L	----- Monitor -----				EP, M
Zinc	µg/L	----- Monitor -----				M
Cadmium	µg/L	----- Monitor -----				EP, M
Lead	µg/L	----- Monitor -----				EP, M
Chromium	µg/L	----- Monitor -----				EP, M
Copper	µg/L	32	54	0.243	0.409	WLA, RP
Dissolved Hexavalent Chromium	µg/L	----- Monitor -----				EP, M
<i>E. coli</i> (Summer Only)	#/100 mL	161	362 ^c	--	--	EP, WQS
Flow Rate	MGD	----- Monitor -----				EP, M
Chlorine, Total Residual	mg/L	--	0.022	--	--	WLA, EP
Mercury	ng/L	----- Monitor -----				RP, M
Cyanide, Free	mg/L	----- Monitor -----				EP, M

Table 11. (Continued)

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Acute Toxicity						
<i>Ceriodaphnia dubia</i>	TU _a	----- Monitor -----				WET
<i>Pimephales promelas</i>	TU _a	----- Monitor -----				WET
Chronic Toxicity						
<i>Ceriodaphnia dubia</i>	TU _c	----- Monitor -----				WET
<i>Pimephales promelas</i>	TU _c	----- Monitor -----				WET
pH	SU	6.5 - 9.0		--	--	WQS, EP
Total Filterable Residue	mg/L	1736	--	13100	--	WLA, RP
CBOD ₅	mg/L	16	24 ^c	121	181 ^c	EP, PD

a = Effluent loadings based on average design discharge flow of 2 MGD.

b = Definitions

BTJ = Best Technical Judgment

EP = Existing Permit

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

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

WET = Whole Effluent Toxicity (OAC 3745-33-07(B))

WLA = Wasteload Allocation procedures (OAC 3745-2)

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

c = Weekly average limit

CBOD₅ = 5-day carbonaceous biochemical oxygen demand

PD = Plant Design

MGD = Million gallons per day

S.U. = Standard Units

TU_a = acute toxicity units

TU_c = chronic toxicity units