

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

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

Public Notice No.: 15-12-038
Public Notice Date: December 24, 2015
Comment Period Ends: January 23, 2016

Ohio EPA Permit No.: **3PD00041*HD**
Application No.: **OH0021776**

Name and Address of Applicant:
City of Columbiana
28 West Friend Street
Columbiana, OH 44408

Name and Address of Facility Where
Discharge Occurs:
Columbiana Wastewater Treatment Plant
601 Cross Street
Columbiana, OH 44408
Columbiana County

Receiving Water: Mill Creek

Subsequent Stream Network: Mahoning River, Beaver 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, phosphorus, pH, cadmium, chromium, dissolved hexavalent chromium, copper, *Escherichia coli* (*E. coli*), nickel, total filterable residue (total dissolved solids), and zinc.

Limits are proposed to be removed for lead and mercury because 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.

In accordance with Ohio Administrative Code (OAC) 3745-33-07, it has been determined that the effluent from Columbiana WWTP shows a possible chronic toxicity issue to *Ceriodaphnia Dubia*. Increased monitoring frequency is proposed for *C. dubia*. Annual chronic toxicity testing with the determination of acute endpoints is proposed to continue for *Pimephales promelas* (fathead minnows).

A new monitoring requirement for dissolved orthophosphate (as phosphorus) has been added to the permit. Dissolved orthophosphate monitoring is required by ORC 6111.03 and will occur on a monthly basis.

Monitoring for metals is proposed to be removed at downstream monitoring station 901 because the data isn't necessary for future water quality analysis.

Special conditions are proposed in Part II, Item T of the permit for cadmium, dissolved hexavalent chromium, and copper to ensure that data is obtained that allows Ohio EPA to make water quality-related decisions. Part II, Item T provides guidance on the analytical method detection limits (MDLs) the permittee should use in analyzing for these contaminants.

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 Columbiana WWTP discharges to Mill Creek at River Mile (RM) 19.45. Figure 1 shows the approximate location of the facility.

This segment of Mill Creek is described by Ohio EPA River Code: 18-020, County: Columbiana, Ecoregion: Erie Drift Plain. Mill Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-25): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and 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 AWS and IWS.

Facility Description

The Columbiana WWTP was constructed in 1940 and last upgraded in 2005. The average design flow is 2.35 million gallons per day (MGD) and the peak hydraulic capacity is 4.7 MGD. The Columbiana WWTP serves the City of Columbiana for a total of 7,800 customers. The Columbiana WWTP has the following treatment processes:

- Flow equalization
- Screening and grit removal
- Activated sludge aeration using an oxidation ditch
- Final clarification
- Tertiary filtration
- Ultraviolet disinfection

The Columbiana WWTP has an internal bypass. The City of Columbiana has 100 percent separated sewers in the collection system. The City of Columbiana does not have an approved pretreatment program. The City of Columbiana has 11 industrial users that discharge 0.038 MGD of flow though none are categorical or significant non-categorical industrial users.

The Columbiana WWTP utilizes the following sewage sludge treatment processes:

- Aerobic Digestion
- Mechanical Dewatering – Filter Press
- Four Drying Beds

Treated sludge is land applied or disposed of in a solid waste landfill.

Description of Existing Discharge

The Columbiana WWTP had several effluent violations which are shown on Table 1. These violations were not caused by a known process error or upset condition.

The Columbiana WWTP estimates there is an infiltration/inflow (I/I) rate to the collection system of 0.511 MGD. The median annual effluent flow rate for the Columbiana WWTP for the previous five years is presented on Table 2. The Columbiana WWTP plans to initiate the following activities to minimize I/I: a sewer evaluation study to find the best plan of action.

The Columbiana WWTP reports SSOs at station 300. No SSOs were reported over the past five years. The Columbiana WWTP reports bypasses at station 602. Station 602 is an emergency overflow on the flow equalization tanks that bypasses all treatment and recombines with fully treated effluent prior to compliance monitoring at station 001. Six bypasses were recorded in the past five years and all occurred in 2011: February 28, March 10-12, and April 16-17.

Table 3 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 4 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 5 summarizes the results of acute and chronic WET tests of the final effluent.

Assessment of Impact on Receiving Waters

Mill Creek has been identified as a priority impaired water on Ohio's 303(d) list.

As noted, the Headwaters Mill Creek assessment unit is considered impaired pending monitoring scheduled for 2013 and the completion of a TMDL (total maximum daily loads) study for all pollutants causing the impairment.

U.S. EPA conducted a TMDL for bacteria in the Mahoning River basin, which included Mill Creek. No reductions in bacteria discharges were recommended for wastewater plants in the Mill Creek watershed. The TMDL report is available at the following Ohio EPA web site:
<http://www.epa.state.oh.us/dsw/tmdl/MahoningRiver.aspx>

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 Columbiana 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)

January 2010 through December 2014

Outliers

The data were examined, and the following value was removed from the evaluation to give a more reliable PEQ: Total Filterable Residue of 320 µg/L in December 1, 2010.

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 4).

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 9 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.

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
AWS		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 6, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

Ohio’s WQS implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet WQS at the end-of-pipe, which for mercury are 12 ng/L (average) and 1700 ng/L (maximum) in the Ohio River basin.

The data used in the WLA are listed in Table 6 and Table 7. The WLA results to maintain all applicable criteria are presented in Table 8.

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 Columbiana WWTP, the WLA values are 0.3 TU_a and 1.03TU_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 Columbiana WWTP is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1 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 3. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 4, 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 9.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 10 presents the final effluent limits and monitoring requirements proposed for the Columbiana 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, Oil and Grease, Ammonia and 5-Day Carbonaceous Biochemical Oxygen Demand

The limits proposed for these parameters are all based on plant design criteria. These limits are protective of WQS. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity. The limit proposed for oil and grease is a continuation of the existing permit limit.

Escherichia coli and pH

Limits proposed for pH and *Escherichia coli* are based on WQS (OAC 3745-1-07). Class B PCR *E. coli* standards apply to Mill Creek.

Copper, Lead, Mercury, and Total Filterable Residue

The Ohio EPA risk assessment (Table 9) places copper, lead, mercury, and total filterable residue in group 4. This placement, as well as the data in Tables 3 and 4, 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 lead and mercury are proposed to be removed but monitoring will continue at the same frequency. Increased monitoring is proposed for total filterable residue.

Nitrate+Nitrite, Cadmium, Chromium, Dissolved Hexavalent Chromium, Nickel, and Zinc

The Ohio EPA risk assessment (Table 9) places nitrate+nitrite, cadmium, chromium, dissolved hexavalent chromium, nickel, and zinc in groups 2 and 3. This placement, as well as the data in Tables 3 and 4, 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 the current frequency is proposed to document that these pollutants continue to remain at low levels.

Arsenic, Free Cyanide, Molybdenum, and Selenium

The Ohio EPA risk assessment (Table 9) places arsenic, free cyanide, molybdenum, and selenium in group 2; this placement, as well as the data in Tables 3 and 4, 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 and Total Kjeldahl Nitrogen

The 2014 Ohio Integrated Water Quality Monitoring and Assessment Report (Ohio EPA) lists the Mahoning River 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, weekly

monitoring for phosphorus and monthly monitoring for total Kjeldahl nitrogen is proposed based on BPJ. Monitoring for phosphorus and nitrate + nitrite at the upstream and downstream stations also is proposed. The purpose of the monitoring is to maintain a nutrient data set for use in the future total maximum daily loads (TMDL) study.

Whole Effluent Toxicity Reasonable Potential

Based on evaluating the WET data presented in Table 5 and other pertinent data under the provisions of OAC 3745-33-07(B), the Columbiana WWTP is placed in Category 3 with respect to WET. No limits are proposed, but increased chronic toxicity testing with the determination of acute endpoints is proposed for *Ceriodaphnia dubia* for the duration of the permit. Annual chronic toxicity testing with the determination of acute endpoints is proposed to continue for *Pimephales promelas* (fathead minnows).

Dissolved Orthophosphate (aka Dissolved Reactive Phosphorus)

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 and incorporated into ORC 6111.03. 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.

Additional Monitoring Requirements

Toxicity monitoring for the upstream monitoring station 801 is necessary to evaluate the validity of effluent toxicity because upstream sampling is used as a control in WET testing.

Monitoring for metals is proposed to be removed at downstream monitoring station 901 because the data isn't necessary for future water quality analysis.

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 or removal to solid waste landfill. Monitoring at a reduced frequency is proposed for land application based on dry tons used.

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 Columbiana 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".

Method Detection Limit

The reported data for cadmium, copper, and dissolved hexavalent chromium shows that the Columbiana WWTP used an analytical method with a MDL that is not sensitive enough to properly evaluate the discharge with regard to the WLA for this parameter. As a result, Part II of the permit includes a condition requiring the Columbiana WWTP to use an analytical method with an appropriate MDL.

Storm Water Compliance

To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on March 9, 2012. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than March 9, 2017, 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 Mill Creek providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Additional Permit Provisions

In addition to facility-specific requirements, Part III of the permit contains "boilerplate" requirements. Boilerplate is standard regulatory language that applies to all permittees and must be included in NPDES permits. Because the boilerplate requirements are based on regulations, they cannot be challenged in the context of an NPDES permit action. The boilerplate covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and general requirements.

Parameter	2010	2011	2012	2013	2014
Ammonia Concentration	0	0	0	6	0
Ammonia Loading	0	0	0	4	0
Carbonaceous Biochemical Oxygen Demand (5 day)	0	0	0	1	0
<i>Escherichia coli</i>	0	0	0	1	0
Dissolved Oxygen	0	0	0	0	1
pH (minimum)	1	0	2	0	1
<i>Total</i>	<i>1</i>	<i>0</i>	<i>2</i>	<i>12</i>	<i>2</i>

Table 2. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2010	0.96	2.3232	3.434

2011	1.44	3.574	5.25
2012	1.07	1.9025	3.06
2013	0.91	1.842	3.56
2014	1.03	2.282	3.67

MGD = Million gallons per day

Table 3. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report for the Columbiana outfall 3PD00041001 (January 2010 - December 2014). 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	Monitoring Only		1823	14.4	23.1	4.7-24.4
Dissolved Oxygen	Summer	mg/L	--	5.4 min	920	8.55	9.6	6.06-10.4
Dissolved Oxygen	Winter	mg/L	--	5.4 min	903	9.89	11.2	6.78-12.2
Total Filterable Residue	Annual	mg/L	Monitoring Only		44	660	856	505-1300
Total Suspended Solids	Annual	mg/L	6.7	10.1 ^a	725	1.25	2.8	0-14.8
Total Suspended Solids	Annual	kg/day	60	90 ^a	725	4.93	17.7	0-280
Oil and Grease	Annual	mg/L	--	5.6	120	0	1.3	0-4.6
Ammonia	Summer	mg/L	0.83	1.2 ^a	362	0	0.0936	0-12.9
Ammonia	Winter	mg/L	1.66	2.5 ^a	362	0	0.22	0-10.6
Ammonia	Summer	kg/day	7.4	11.0 ^a	362	0	0.587	0-38.6
Ammonia	Winter	kg/day	14.8	22.2 ^a	362	0	1.14	0-34.9
Kjeldahl Nitrogen, Total	Annual	mg/L	Monitoring Only		60	0.717	1.6	0-11.1
Nitrate+Nitrite	Annual	mg/L	Monitoring Only		60	8.55	13.1	2.8-19
Phosphorus	Annual	mg/L	Monitoring Only		104	2	5.25	0.02-6.41
Nickel	Annual	µg/L	Monitoring Only		31	0	0	0-0
Zinc	Annual	µg/L	Monitoring Only		20	26.5	51.1	0-52
Cadmium	Annual	µg/L	Monitoring Only		20	0	0	0-0
Lead	Annual	µg/L	17	324	60	0	0	0-14
Lead	Annual	kg/day	0.152	2.89	60	0	0	0-0.0493

Table 3. (Continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 th	95 th	
Chromium	Annual	µg/L	Monitoring Only		49	0	0	0-28
Copper	Annual	µg/L	Monitoring Only		60	0	0	0-10
Dissolved Hexavalent Chromium	Annual	µg/L	Monitoring Only		20	0	0	0-0

<i>E. coli</i>	Annual	#/100 mL	161	362 ^a	265	5	145	0-816
Flow Rate	Summer	MGD	Monitoring Only		920	0.968	1.86	0.28-4.27
Flow Rate	Winter	MGD	Monitoring Only		906	1.18	2.9	0.49-5.25
Flow Rate	Annual	MGD	Monitoring Only		1826	1.06	2.57	0.28-5.25
Mercury	Annual	ng/L	12	1700	62	0.572	3.7	0-18.4
Mercury	Annual	kg/day	0.000107	0.0152	62	0.00000214	0.0000255	0-0.000121
pH, Maximum	Annual	S.U.	--	9.0	1823	7.47	8.26	6.72-8.92
pH, Minimum	Annual	S.U.	--	6.5	1821	7.42	8.13	6.03-8.79
CBOD ₅	Annual	mg/L	5.6	8.4 ^a	588	0	2.71	0-13.8
CBOD ₅	Annual	kg/day	50	75 ^a	588	0	12.8	0-116

a = Weekly average

CBOD₅ = 5-day carbonaceous biochemical oxygen demand

MGD = Million gallons per day

Table 4. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	242	85	0.07	0.127
Ammonia (Winter)	mg/L	180	80	0.066	0.139
Cadmium	µg/L	20	0	--	--
Chromium	µg/L	49	1	20.44	28
Dissolved Hexavalent Chromium	µg/L	20	0	--	--
Copper	µg/L	26	1	9.49	13
Cyanide, Free	mg/L	16	0	--	--

Total Filterable Residue	mg/L	48	48	825.09	977.04
Lead	µg/L	60	1	10.22	14
Mercury	ng/L	62	34	7.1821	9.6758
Nickel	µg/L	31	0	--	--
Nitrate+Nitrite	mg/L	60	60	12.974	17.595
Zinc	µg/L	20	16	49.092	75.94

PEQ = Projected Effluent Quality
MDL = Method Detection Limit

Table 5. Summary of Acute and Chronic Toxicity Test Results

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales Promelas</i>	
	Acute Toxicity (TU _a)	Chronic Toxicity (TU _c)	Acute Toxicity (TU _a)	Chronic Toxicity (TU _c)
10/1/2011	AA	1.1	AA	AA
10/8/2012	AA	AA	AA	AA
10/15/2013	AA	1.7	AA	AA
10/14/2014	AA	1.1	AA	AA

AA = Non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c

Table 6. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.9	--	--
Ammonia (Winter)	mg/L	--	--	4.6	--	--
Arsenic	µg/L	--	100	150	340	680
Cadmium	µg/L	--	50	4.6	11	22
Chromium	µg/L	--	100	160	3400	6900
Dissolved Hexavalent Chromium	µg/L	--	--	11	16	31
Copper	µg/L	1300	500	18	29	59
Cyanide, Free	mg/L	220	--	0.012	0.046	0.092
Total Filterable Residue	mg/L	--	--	1500	--	--
Lead	µg/L	--	100	18	330	670
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000

Nickel	µg/L	4600	200	100	910	1800
Nitrate+Nitrite	mg/L	--	100	--	--	--
Selenium	µg/L	11000	50	5	--	--
Zinc	µg/L	69000	25000	230	230	470

Table 7. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
1Q10	cfs	annual	0.051	USGS 03089500, 0309-2000 and 3000
7Q10	cfs	annual	0.099	USGS 03089500, 0309-2000 and 3000
30Q10	cfs	summer	0.1408	USGS 03089500, 0309-2000 and 3000
30Q10	cfs	winter	0.5029	USGS 03089500, 0309-2000 and 3000
Harmonic Mean	cfs	annual	0.5812	USGS 03089500, 0309-2000 and 3000
Mixing Assumption	%	average	100	
Mixing Assumption	%	maximum	100	
Hardness	mg/L	annual	220	DMR Station 901, 2010-2014, n=60
pH	S.U.	summer	7.71	DMR Station 901, 2010-2014, n=20
pH	S.U.	winter	7.8225	DMR Station 901, 2010-2014, n=14
Temperature	°C	summer	21.625	DMR Station 901, 2010-2014, n=20
Temperature	°C	winter	9.25	DMR Station 901, 2010-2014, n=14
Columbiana WWTP flow	cfs	annual	3.64	Current Permit
Ammonia	mg/L	summer	0.048	DMR; 2009-2014; n=21; 7<MDL; Station 801
Ammonia	mg/L	winter	0.01135	DMR; 2009-2014; n=14; 7<MDL; Station 801
Arsenic	µg/L	annual	--	No representative data available.

Cadmium	µg/L	annual	0.25	BWQR; 1988; n=1696; 1365<MDL; Basin Median
Chromium	µg/L	annual	15	BWQR; 1988; n=1641; 1388<MDL; Basin Median
Dissolved Hexavalent Chromium	µg/L	annual	--	No representative data available.
Copper	µg/L	annual	5	BWQR; 1988; n=2867; 1597<MDL; Basin Median
Cyanide, Free	mg/L	annual	--	No representative data available.
Total Filterable Residue	mg/L	annual	372	BWQR; 1988; n=104; 0<MDL; Basin Median
Lead	µg/L	annual	2	BWQR; 1988; n=139; 75<MDL; Basin Median
Mercury	ng/L	annual	--	No representative data available.
Molybdenum	µg/L	annual	--	No representative data available.
Nickel	µg/L	annual	20	BWQR; 1988; n=1259; 1105<MDL; Basin Median
Nitrate+Nitrite	mg/L	annual	0.79	DMR; 2010-2014; n=61; 19<MDL; Station 801
Selenium	µg/L	annual	--	No representative data available.
Zinc	µg/L	annual	10	BWQR; 1988; n=107; 58<MDL; Basin Median

WWTP = Wastewater Treatment Plant

DMR = Discharge Monitoring Report

USGS = United States Geological Survey

MDL = Method Detection Limit

BWQR = Background Water Quality and Modeling Data

WLA = Wasteload allocation

Table 8. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	--	--	--
Ammonia (Winter)	mg/L	--	--	--	--	--
Arsenic	µg/L	--	116	154	345	680
Cadmium	µg/L	--	58	4.7	11	22
Chromium	µg/L	--	114	164	3447	6900
Dissolved Hexavalent Chromium	µg/L	--	--	11	16	31
Copper	µg/L	1507	579	18	29	59
Cyanide, Free	mg/L	255	--	0.012	0.047	0.092
Total Filterable Residue	mg/L	--	--	1531	--	--
Lead	µg/L	--	116	18	335	670
Mercury	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20544	192662	370000
Nickel	µg/L	5331	229	102	922	1800
Nitrate+Nitrite	mg/L	--	116	--	--	--

Selenium	µg/L	12756	58	5.1	--	--
Zinc	µg/L	80016	28990	236	233	470

Table 9. 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
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.

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.

Copper	Mercury	Lead	Total Filterable Residue
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Group 5: Maximum PEQ \geq 100 percent of the maximum PEL or average PEQ \geq 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.

No Parameters meet these criteria

PEQ = Projected Effluent Quality

PEL = Projected Effluent Limit

WLA = Wasteload allocation

WQS = Water quality standard

Table 10. 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	
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
Ammonia						
Summer	mg/L	0.83	1.2 ^c	7.4	11.0 ^c	EP, PD
Winter	mg/L	1.66	2.5 ^c	14.8	22.2 ^c	EP, PD
Cadmium	µg/L	----- Monitor -----				EP, M
CBOD ₅	mg/L	5.6	8.4 ^c	50.0	75.0 ^c	EP, PD
Chromium	µg/L	----- Monitor -----				EP, M
Copper	µg/L	----- Monitor -----				RP
Dissolved Oxygen	mg/L	5.4 minimum		--	--	EP, PD
<i>E. coli</i>						
Summer Only	#/100 mL	161	362 ^c	--	--	WQS, EP
Flow Rate	MGD	----- Monitor -----				EP, M

Dissolved Hexavalent Chromium	µg/L	----- Monitor -----				EP, M
Lead	µg/L	----- Monitor -----				RP
Mercury	ng/L	----- Monitor -----				RP
Nickel	µg/L	----- Monitor -----				EP, M
Nitrate+Nitrite	mg/L	----- Monitor -----				EP, M
Oil & Grease	mg/L	--	5.6	--	--	EP

Table 10. (Continued)

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
pH	SU	6.5 - 9.0		--	--	WQS, EP
Phosphorus	mg/L	----- Monitor -----				EP, M
Dissolved Orthophosphate (as P)	mg/L	----- Monitor -----				SB1
Total Filterable Residue	mg/L	----- Monitor -----				RP
Total Kjeldahl Nitrogen	mg/L	----- Monitor -----				EP, M
Total Suspended Solids	mg/L	6.7	10.1 ^c	60.0	90.0 ^c	EP, PD
Water Temperature	°C	----- Monitor -----				EP, M
Zinc	µg/L	----- Monitor -----				EP, M

a = Effluent loadings based on average design discharge flow of 2.35 MGD.

b = Definitions

EP = Existing Permit

M = BEJ 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))

SB1 = Implementation of Senate Bill 1 [ORC 6111.03]

WET = Whole Effluent Toxicity (CFR 40 part 132, Great Lakes Initiative procedure 6 and 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