

National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Revised 6/26/14

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the Mill Creek Wastewater Treatment Plant

Public Notice No.: 14-05-005
Public Notice Date: May 1, 2014
Comment Period Ends: June 2, 2014

Ohio EPA Permit No.: 1PM00001*MD
Application No.: OH0025461

Name and Address of Applicant:

Board of Commissioners, Hamilton County
c/o Metropolitan Sewer District of Greater
Cincinnati
1600 Gest Street
Cincinnati, Ohio 45204

Name and Address of Facility Where
Discharge Occurs:

Mill Creek Wastewater Treatment Plant
1600 Gest Street
Cincinnati, Ohio

Receiving Water: Ohio River

Subsequent
Stream Network: Mississippi River

Introduction

Development of a fact sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency, 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 and Ohio Water Pollution Control Law, Chapter 6111 of the Ohio Revised Code (ORC). 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.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by 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 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 wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. 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

Station 1PM00001604 (Secondary Treatment Effluent Before Combining With Internal Secondary Treatment Bypass)

The limits and monitoring proposed at this station are the same as in the current permit with the following exceptions:

- Current monitoring for heptachlor has been removed because effluent data show that it is not an environmental concern in the Mill Creek effluent.
- New monitoring requirements are proposed for selenium and total filterable residue (total dissolved solids) based on an evaluation of effluent data.

Station 1PM00001002 (Plant Effluent to Ohio River) and Station 1PM00001004 (Plant Effluent to Mill Creek)

The limits and monitoring proposed at these stations are the same as in the current permit.

Compliance Schedule

In addition to a schedule for evaluating local industrial user limits, a schedule is proposed for updating the plant's wet weather operating plan.

Special Conditions

In Part II of the permit, special conditions are included that address operator certification, minimum staffing and operator of record; whole effluent toxicity testing; tracking of group 4 parameters; outfall signage; pretreatment program requirements; and yearly evaluation of the outfall diffuser.

Table of Contents

	Page
Introduction	1
Summary of Permit Conditions	2
Table of Contents	3
Procedures for Participation in the Formulation of Final Determinations	4
Information Regarding Certain Water Quality Based Effluent Limits	4
Location of Discharge/Receiving Water Use Classification	5
Facility Description	6
Description of Existing Discharge	7
Assessment of Impact on Receiving Waters	7
Development of Water Quality Based Effluent Limits	8
Reasonable Potential / Effluent Limits / Hazard Management Decisions	9
Other Requirements	11

List of Figures

Figure 1. Location of Mill Creek Wastewater Treatment Plant	13
Figure 2. Diagram of Wastewater Treatment Processes	14

List of Tables

Table 1. Effluent Characterization Using Ohio EPA and Pretreatment Data	15
Table 2. Effluent Characterization Using Self-Monitoring Data	16
Table 3. Projected Effluent Quality Values.....	17
Table 4. Discharges Through Internal Bypass Station 603	18
Table 5. Summary of Acute Toxicity Test Results	19
Table 6. Water Quality Criteria in the Study Area.....	20
Table 7. Instream Conditions and Discharger Flow.....	21
Table 8. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria.....	22
Table 9. Parameter Assessment.....	23
Tables 10, 11, 12. Final Effluent Limits and Monitoring Requirements, Stations 604, 002, 004.....	24-26

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 Gary Stuhlfauth, (614) 644-2026, Gary.Stuhlfauth@epa.ohio.gov.

Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed water quality based effluent limitations 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 Ohio Revised Code Section 6111.03(J)(3), the Director established these water quality based effluent limits 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 National Pollutant Discharge Elimination System (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 water quality based effluent limitations 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 water quality standard(s) used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in Ohio Administrative Code (OAC) Rule 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 water quality standard(s) pursuant to OAC Rule 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific water quality standards 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 Mill Creek wastewater treatment plant discharges through outfall 1PM00001002 to the Ohio River at Ohio River mile point 472.5. Station 1PM00001004 is an auxiliary outfall that discharges to Mill Creek. It is used when the Ohio River stage reaches 41 feet and the plant effluent can no longer be discharged directly to the Ohio River through outfall 002. Figure 1 shows the approximate location of this facility.

This segment of the Ohio River is described by Ohio EPA River Code: 25-050, U.S. EPA River Reach #: 05090203, County: Hamilton, Ecoregion: Interior Plateau. The Ohio River is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-32): Warmwater Habitat, Public Water Supply, Agricultural Water Supply, Industrial Water Supply, and Bathing Waters.

Mill Creek is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-30): Modified Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Class B Primary Contact Recreation.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are

set, numeric water quality standards 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 Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact) and wading only (Secondary Contact - 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 and industrial water supply.

Facility Description

The Mill Creek plant is a secondary treatment facility with an average design flow of 130 million gallons per day (MGD). Under wet weather conditions, flows up to 430 MGD receive preliminary and primary treatment. Flows up to 240 MGD can be taken through secondary treatment for a short period of time. For extended high flow periods, the flow through secondary treatment is controlled using secondary treatment turbidity as an operating guide.

Wet stream processes include coarse screening, grit removal and fine screening, preaeration, primary settling, conventional activated sludge aeration, secondary clarification, and chlorination. The treated effluent discharges to the Ohio River through a diffuser.

The plant's wet stream monitoring stations include:

- Station 002 is the plant effluent to the Ohio River. It is the combined flows of secondary treatment effluent and the internal primary and secondary treatment bypasses.
- Station 004 is an auxiliary outfall to Mill Creek. It is used when the effluent cannot discharge by gravity through station 002 to the Ohio River because of high river stage. Station 004 was not used during 2009, 2012 and 2013. It was used on 5 days during 2010 and on 30 days during 2011.
- Station 005 is an external influent bypass to Mill Creek. Also known as H-gate, it is located on the chamber where the interceptors converge. This gate normally is closed for high water protection from Mill Creek, but bypasses did occur during 2012 when construction at the plant reduced its wet weather capacity. Once construction is complete, bypasses through this station should be rare.
- Station 602 is the influent monitoring station.
- Station 603 is the internal secondary treatment bypass. Flows through station 603 receive preliminary and primary treatment before they bypass secondary treatment. They recombine with fully treated effluent after secondary chlorination. The combined flows receive disinfection prior to discharge. See Table 4 for a summary of flows discharged through station 603.

- Station 604 is the secondary treatment effluent before it combines with the internal secondary treatment bypass. The average daily flows through station 604 were: 2009 – 103.65 MGD; 2010 – 97.952 MGD; 2011 – 110.73 MGD; 2012 – 97.208 MGD; and 2013 – 107.53 MGD.

Solid stream processes are mechanical dewatering of waste activated sludge using centrifuges, gravity thickening of primary sludge, mechanical dewatering of the combined sludge stream by centrifugation and sludge disposal by multiple hearth incineration with the ash going to lagoons for storage. Back up sludge disposal is by landfilling.

Figure 2 includes diagrams of the plant's treatment processes. It shows the location of internal monitoring station 604. This station is for secondary treatment effluent before it combines with flow from station 603, the internal secondary treatment bypass.

The Mill Creek plant has a service area of approximately 88,572 acres. Approximately 39 percent of Mill Creek's collection system is combined sewers and approximately 61 percent has separate sanitary sewers. There are approximately 130 combined sewer overflows (CSOs) in the Mill Creek service area that are regulated under Ohio EPA permit 1PX00022. The current permit for the CSOs expired March 31, 2014 and may be viewed at the following Ohio EPA web site: http://wwwapp.epa.ohio.gov/dsw/permits/permit_list_district.html. (Choose "Southwest" district; scroll down to "Cincinnati Galbraith Road MSD Site".) A renewal permit went to public notice on February 25, 2014, and the comment period ended March 26, 2014. Additional information is available on request.

Abatement of combined sewer overflows and sanitary sewer overflows in the Mill Creek service area is being addressed under the *Consent Decree on Combined Sewer Overflows, Wastewater Treatment Plants and Implementation of Capacity Assurance Program Plan for Sanitary Sewer Overflows* (Civil Action Number C-1-02-107; U.S. District Court for the Southern District of Ohio Western Division; June 9, 2004). The complete decree and accompanying exhibits are available at the following Ohio EPA web site: <http://epa.ohio.gov/dsw/enforcement/enf.aspx> [use the "Federal and State Consent Agreements . . . (2001 – 2014)" link; listed alphabetically under "Hamilton County, Board of County Commissioners and City of Cincinnati (CSO)"].

The Sewer District implements an approved industrial pretreatment program. According the 2013 2A NPDES renewal application, 42 categorical industrial users, 21 significant non-categorical industrial users and 73 other industrial users discharge approximately 11.39 MGD to the Mill Creek plant.

Description of Existing Discharge

Table 1 presents chemical specific data compiled from annual pretreatment reports and data collected by Ohio EPA.

Table 2 presents a summary of unaltered discharge monitoring report (DMR) data for Mill Creek stations 1PM00001002 (Ohio River), 1PM00001004 (Mill Creek) and 1PM00001604 (secondary treatment effluent prior to combining with flow from station 1PM00001603). Data are presented for the period January 2009 through December 2013, and current permit limits are provided for comparison.

Table 3 summarizes the chemical specific data for station 604 by presenting the average and maximum Projected Effluent Quality (PEQ) values.

Table 4 presents a summary of flow discharged through station 603, the internal secondary treatment bypass.

Table 5 summarizes the results of acute whole effluent toxicity tests of the plant's final effluent at station 002. The testing was conducted by the Sewer District as a condition of the existing NPDES permit and by Ohio EPA.

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

Assessment of Impact on Receiving Waters

In 2009, ORSANCO, the Ohio River Valley Water Sanitation Commission, conducted an intensive biological survey in the Markland dam pool, which includes the Cincinnati area. The executive summary states: “In 2009, all of the sites assessed in Markland pool had site quality scores >2.0 and the pool had an average quality score of 3.8 (out of 5.0). This score indicates the pool is in “Good” biological condition. Therefore, Markland pool will be reported to EPA as meeting its aquatic life-use designation.” The entire report is available at the following ORSANCO web site (see the detailed pool assessment reports): <http://www.orsanco.org/biological-programs-55/10-mainpages/orsanco-programs/115-biological-surveys> .

The 2012 305(b) report for the Ohio River, *2012 Biennial Assessment of Ohio River Water Quality Conditions* (ORSANCO) is available at this ORSANCO web site: <http://www.orsanco.org/biennial-assessment-of-ohio-river-water-quality-conditions-305b> .

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 Mill Creek wastewater treatment plant were used to determine what parameters should undergo wasteload allocation. 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 2009 through December 2013
Pretreatment data	2009 through 2012
Ohio EPA compliance sampling data	2009 and 2010

The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: silver – one high value.

This data is evaluated statistically, and Projected Effluent Quality (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. The average and maximum PEQ values are presented in Table 3.

The PEQ values are used according to Ohio rules to compare to applicable water quality standards (WQS) and allowable wasteload allocation (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 water quality standards (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. Wasteload allocations 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	10 percent of annual 7Q10
	Maximum	1 percent of annual 1Q10
Agricultural Water Supply		10 percent of harmonic mean flow
Human Health (carcinogens)		10 percent of harmonic mean flow
Human Health (noncarcinogens)		100 percent 7Q10

Allocations cannot exceed the Inside Mixing Zone Maximum criteria.

Ohio's water quality standard 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 water quality standards at the end-of-pipe, which are 12 ng/l (average) and 1700 ng/l (maximum) in the Ohio River basin.

The data used in the WLA are listed in Tables 6 and 7. The wasteload allocation 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.

Water quality standards 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). Wasteload allocations can then be calculated using TUs as if they were water quality criteria.

The wasteload allocation calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 10 percent of the 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1 percent of the 7Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions.

The chronic wasteload allocation calculated for Mill Creek outfall 002 is 6.27 TU_c . A previous evaluation by Ohio EPA showed that 3.0 TU_a was an appropriate maximum allocation for acute toxicity. Considering the results of the *Mixing Zone Study for the Mill Creek WWTP Outfall Diffuser* (Final Report; March 1994), this value is protective for acute toxicity.

The chronic toxicity unit (TU_c) is defined as 100 divided by the IC_{25} :

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

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

$$TU_c = 100/\text{geometric mean of NOEC and LOEC}$$

The acute toxicity unit (TU_a) is defined as 100 divided by the LC_{50} 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.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the water quality standards must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a water quality standard or do not require a wasteload allocation 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 wasteload allocations are selected from Table 8. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 3, 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. Tables 10, 11, and 12 present the final effluent limits and monitoring requirements proposed for Mill Creek outfalls 1PM00001604, 1PM00001002, and 1PM00001004, respectively, and the basis for their recommendation.

Station 1PM00001604 (Secondary Treatment Effluent Before Combining With Internal Secondary Treatment Bypass) – Table 10

The limits recommended for suspended solids and COD_5 (5-day biochemical oxygen demand) are technology-based treatment standards included in 40 CFR Part 133, Secondary Treatment Regulation. Secondary treatment is defined by the Best Practicable Waste Treatment Technology criteria, which are required of all publicly owned treatment works discharging to stream segments that are effluent limited with respect to conventional pollutants. Based on best engineering judgment, the proposed monitoring of ammonia-N and dissolved oxygen is appropriate for a facility required to meet secondary treatment standards. Consistent with the provisions of OAC 3745-33-05(C)(1)(c), the loading limits proposed for COD_5 and total suspended solids are based on a flow value of 170 MGD. All of these proposed limits and monitoring requirements are a continuation of existing permit conditions.

The limits proposed for oil and grease are based on Ohio water quality standards (OAC 2745-1-07) and are a continuation of the existing permit limits.

Based on best engineering judgment, monitoring is proposed for total phosphorus, total orthophosphate, total Kjeldahl nitrogen (TKN) and nitrate+nitrite-nitrogen. The purpose of the monitoring is to obtain data that can be used in evaluating nutrient impacts in the Ohio River.

The Ohio EPA risk assessment (Table 9) places selenium, alpha-BHC and gamma-BHC in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), we are proposing monitoring, rather than limits, for these pollutants because the calculated PEQ values may not be representative of their actual levels in the plant effluent.

Selenium was detected in three of ten samples collected over five years. There was a wide range in the three values, 2.8 – 127 ug/l, and five of the below-detection samples had an MDL (method detection limit) of 50 ug/l, which is too high for making water-quality related decisions. Alpha-BHC was detected in four of 56 samples collected over five years at levels that were slightly above the reported MDLs. Gamma-BHC was only detected once in 56 samples collected over five years. The purpose of the proposed monitoring is to obtain better data sets for characterizing the levels of these pollutants in the plant's effluent. .

Ohio EPA risk assessment (Table 9) places cadmium, zinc and silver in group 4. This placement as well as the data in Tables 1, 2 and 3 supports 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 Rule 3745-33-07(A)(2).

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

To ensure that the Sewer District reports data that allow Ohio EPA to make water quality-related decisions regarding cadmium, selenium, alpha-BHC and gamma-BHC, a special condition is proposed in Part II of the permit that provides guidance on the MDLs the permittee should use in analyzing for these contaminants. Other MDLs reported by the permittee are adequate for making water quality-related decisions.

Ohio EPA risk assessment (Table 9) places total chromium, dissolved hexavalent chromium, copper, free cyanide, lead, mercury, nickel and thallium in groups 2 and 3. This placement as well as the data in Tables 1, 2 and 3 supports 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.

Based on best engineering judgment, monitoring is proposed for total dissolved solids (total filterable residue), which is an emerging water quality issue for municipal wastewater treatment plants. The purpose of the monitoring is to obtain current data on the level and variability of total dissolved solids in the plant's effluent.

Alpha-BHC and gamma-BHC (lindane) are carcinogens, which requires the evaluation of the additive effect of these pollutants. Ohio Administrative Code 3745-33-07(A)(8) states that an additivity equation must be included in the permit and used to determine compliance unless certain conditions are met. As previously explained, the PEQ values for these pollutants may not be representative of their actual levels in the plant effluent, and the reasonable potential evaluation for additivity cannot be completed. Additional monitoring is proposed in the draft permit.

Station 1PM00001002 (Plant Effluent to Ohio River) – Table 11

The proposed limits for maximum pH, and fecal coliform are based on Ohio Water Quality Standards (OAC 3745-1-07 and 3745-1-32). The limit proposed for minimum pH is based on the results of a special water quality modeling study conducted by Ohio EPA in June 1999 that showed a minimum pH limit of 6.0 SU is protective of the minimum water quality standard, 6.5 SU. The Agency believes that the discharge flows, river flows and chemical characteristics that are inputs in the model have not significantly changed.

The limit proposed for total residual chlorine is based on the results of the "Mixing Zone Study for the Mill Creek WWTP Outfall Diffuser" (Final Report; March 1994) and is protective water quality standards. The discharge flows, river flows and diffuser characteristics have not significantly changed. A special condition in the permit requires MSD to conduct annual evaluations of the diffuser's structural integrity and to immediately make needed repairs.

Based on evaluating the whole effluent toxicity data presented in Table 5 and other pertinent data under the provisions of OAC 3745-33-07(B), the Mill Creek wastewater treatment plant is placed in Category 4 with respect to whole effluent toxicity – no toxicity problem. Considering the magnitude of the discharge and the variability observed in the toxicity data, a continuation of the current quarterly acute monitoring for *Ceriodaphnia dubia* and fathead minnows is proposed. Based on the 24.4 far field dilution factor provided by the diffuser, testing of chronic toxicity is not necessary.

Monitoring flow is proposed based on best engineering judgment. This data is used to assist in the evaluation of effluent quality and treatment plant performance.

Station 1PM00001004 (Plant Effluent to Mill Creek) – Table 12

Based on best engineering judgment, the effluent limits proposed for pH, fecal coliform and total residual chlorine are the same as those proposed for station 1PM00001002. This decision is based on the fact that the auxiliary outfall to Mill Creek is used infrequently (2009, 2012, 2013 – 0 days; 2010 – 5 days; 2011 – 30 days), and that when it is used, high flow conditions exist both in Mill Creek and in the Ohio River.

Monitoring flow is proposed based on best engineering judgment. This data is used to assist in the evaluation of effluent quality and treatment plant performance.

Monitoring requirements proposed for the disposal of sewage sludge by incineration are based on 40 CFR Part 503, Subpart E.

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.

Other Requirements

Compliance Schedule

A six month compliance schedule is proposed for the Sewer District to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If revisions to local limits are required, the Sewer District must also submit a pretreatment program modification request.

A second compliance schedule is proposed for the Sewer District to review its wet weather operation procedures and revise and update its wet weather operating plan as needed. This must be completed by June 1, 2015.

Sanitary Sewer Overflow Reporting

The Sewer District reports sanitary sewer overflows under the provisions of the 2004 consent decree.

Operator Certification

Operator certification requirements have been included in Part II, Item A of the permit in accordance with rules adopted in December 2006. These rules require the Mill Creek treatment plant to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfalls 002 and 004.

In accordance with OAC 3745-7-04, Ohio EPA granted MSD of Greater Cincinnati a 30 hour reduction in the minimum staffing requirements for the Mill Creek treatment plant. Any change in the criteria under which the reduced staffing plan was approved (such as enforcement status, history of compliance, or provisions included in the plan) will require that the treatment works immediately return to the minimum staffing requirements included in paragraph (C)(1) of rule 3745-7-04 of the Ohio Administrative Code.

Operator of Record

In December 2006, rule revisions became effective that affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II, Item A of this NPDES permit is included to implement OAC 3745-7-02. It requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Storm Water Compliance

All storm water drains in process areas of the Mill Creek facility drain to the head of the plant.

Outfall Signage

Part II of the permit includes requirements for signs to be placed at each outfall to the Ohio River and to Mill Creek providing information about the discharge. Signage at outfalls is required pursuant to Ohio Administrative Code 3745-33-08(A).

Diffuser Inspection

Item Y in Part II of the permit is a special condition proposing that MSD conduct annual evaluations of the structural integrity of the outfall diffuser for station 002 and make any necessary repairs. The Agency is seeking comments on the necessity of annual evaluations, the costs and procedures for conducting an evaluation, and any extenuating circumstances that should be considered in determining an appropriate frequency for this work.

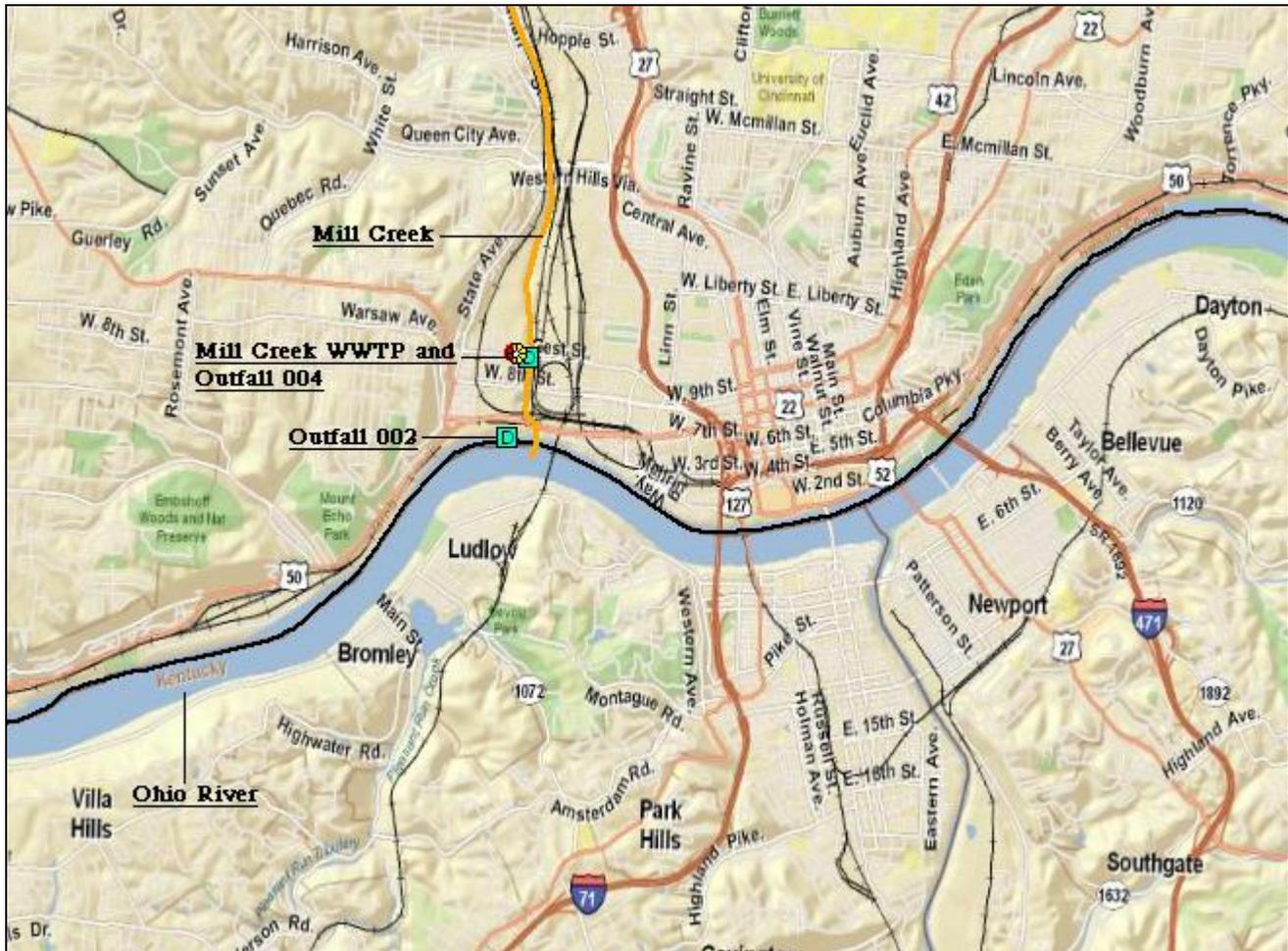
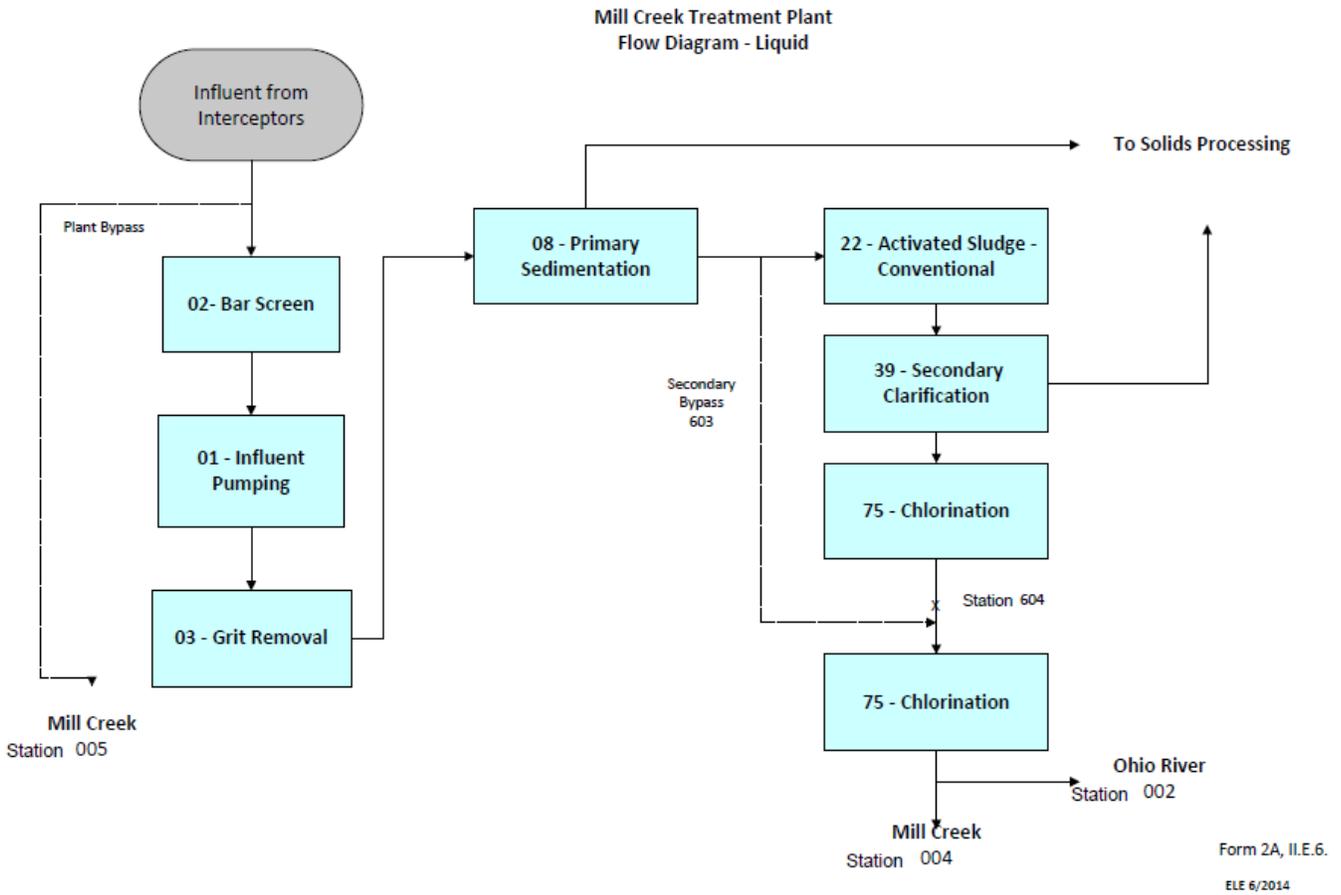


Figure 1. Location of Mill Creek wastewater treatment plant.



Metropolitan Sewer District of Greater Cincinnati
Mill Creek Treatment Plant
Flow Diagram - Solids

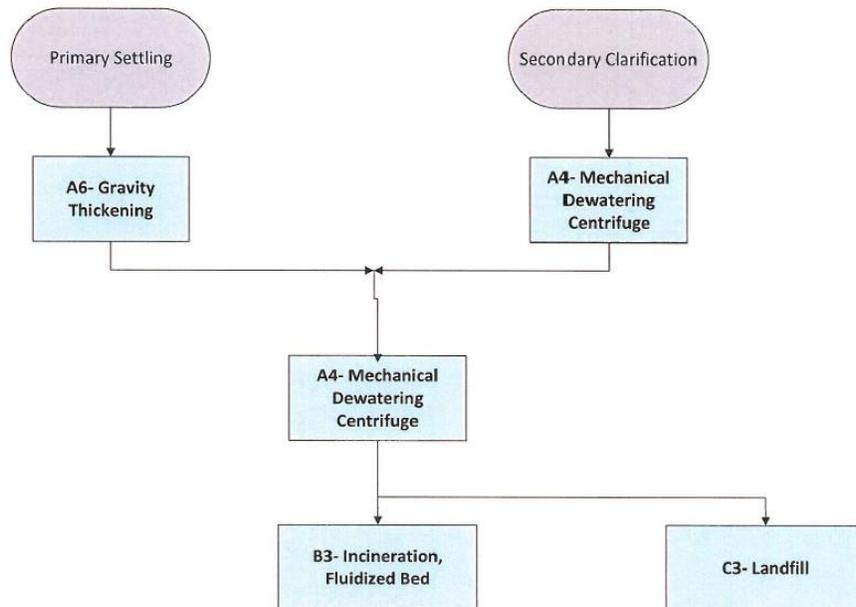


Figure 2. Mill Creek Treatment Plant Process Diagrams

Table 1. Effluent Characterization Using Ohio EPA and Pretreatment Data

Summary of analytical results for Mill Creek station 1PM00001604. Units ug/l unless otherwise noted; OEPA = data from analyses by Ohio EPA; PT = data from pretreatment program reports; NA = not analyzed; ND = not detected (detection limit).

PARAMETER 0	OEPA 3/09/10	OEPA 10/06/09	PT 08/17/12	PT 03/22/12	PT 08/26/11	PT 03/05/11	PT 08/20/10	PT 02/05/10	PT 08/28/09	PT 03/20/09
Arsenic	ND(2.0)	3.3	40.3	ND(12)	ND(5)	ND(5)	ND(5)	27.2	38.6	37.6
Barium	69	59	NA							
Chromium	4.4	ND(2.0)	ND(2)	ND(6)	7.08	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Copper	4.3	4.4	7.67	12.3	30.7	8.19	ND(2)	ND(2)	ND(2)	6.55
Dissolved solids, total (mg/l)	1040	690	NA							
Iron	292	189	NA							
Lead	ND(2.0)	ND(2.0)	26.0	ND(6)	ND(25)	ND(25)	ND(25)	ND(25)	ND(25)	ND(25)
Nickel	13.6	8.7	29.4	15.5	21.9	ND(10)	10.9	12.1	10.6	ND(10)
Nitrate+nitrite	0.24	0.42	NA							
Phosphorus, T	0.446	1.29	NA							
Selenium	ND(2.0)	2.8	127	ND(9)	ND(50)	ND(50)	ND(50)	ND(50)	83.7	ND(50)
Strontium	474	401	NA							
Thallium	NA	NA	23.0	ND(12)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)
Zinc	29	16	41.0	36.9	61	30.4	18.9	126	127	30.3
Bromomethane	ND(0.5)	0.57	ND(5)							
Chloroform	0.90	0.78	ND(5)							
Phenol	ND(2.1)	8.6	ND(5)							
Toluene	ND(0.5)	1.34	ND(5)							

Table 2. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Mill Creek outfalls 1PM00002 and 604 (January 2009 - December 2013). All values are based on annual records unless otherwise indicated. * = For minimum pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; a = weekly average; b = summer/winter limits.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 th	95 th	
Outfall 002								
Fecal Coliform	Annual	#/100 ml	200/1000 ^b	400/2000 ^{a,b}	1785	55	1300	0-520000
Flow Rate	Annual	MGD	Monitor		1807	91.9	189	15.6-444
Chlorine, Total Residual	Annual	mg/l		0.33	1806	0.09	0.27	0-0.95
pH, Maximum	Annual	S.U.		9.0	1807	7.2	7.6	6.7-8.5
pH, Minimum	Annual	S.U.		6.0	1807	6.8*	7.3	0-7.6
Outfall 004								
Fecal Coliform	Annual	#/100 ml	Monitor		29	250	33400	5-55000
Flow Rate	Annual	MGD	Monitor		35	188	227	16.4-238
Chlorine, Total Residual	Annual	mg/l		0.33	29	0.32	0.33	0.24-0.33
pH, Maximum	Annual	S.U.		9.0	35	7.1	7.36	6.9-7.7
pH, Minimum	Annual	S.U.		6.0	35	6.9	7.1	6.6-7.1
Outfall 604								
Water Temperature	Annual	C	Monitor		1825	20	27	8-30
Dissolved Oxygen	Summer	mg/l	Monitor		920	5.1	2.6**	0-7
Dissolved Oxygen	Winter	mg/l	Monitor		906	5.6	3.1**	0.3-9.9
Residue, Total Dissolved	Annual	mg/l	--		210	715	1280	97-2630
Total Suspended Solids	Annual	mg/l	30	45 ^a	1820	20	46	0-317
Oil and Grease, Hexane	Annual	mg/l		10	449	0	5.7	0-48.9
Nitrogen, Ammonia (NH3)	Summer	mg/l	Monitor		919	7.74	21.1	0-32.2
Nitrogen, Ammonia (NH3)	Winter	mg/l	Monitor		901	7.64	18.5	0-30.2
Nitrogen Kjeldahl, Total	Annual	mg/l	Monitor		1596	15	28.3	0-43.5
Nitrite Plus Nitrate, Total	Annual	mg/l	Monitor		1596	1.4	5.12	0-20
Ortho Phosphate, Total	Annual	mg/l	Monitor		209	0.08	0.618	0-1.5
Phosphorus, Total (P)	Annual	mg/l	Monitor		1615	0.6	1.5	0-10.2
Cyanide, Free	Annual	mg/l	Monitor		225	0	0.016	0-0.029
Thallium, Total Recoverable	Annual	ug/l	Monitor		200	0	21.4	0-53.2
Nickel, Total Recoverable	Annual	ug/l	Monitor		228	8	25	0-122
Silver, Total Recoverable	Annual	ug/l	Monitor		228	0	2.1	0-31
Strontium, Total Recoverable	Annual	ug/l	--		28	407	888	221-964
Zinc, Total Recoverable	Annual	ug/l	Monitor		228	29	129	0-340
Cadmium, Total Recoverable	Annual	ug/l	Monitor		228	0	0	0-13.5
Lead, Total Recoverable	Annual	ug/l	Monitor		228	0	1.4	0-18.9
Chromium, Total Recoverable	Annual	ug/l	Monitor		228	0	5.26	0-14
Copper, Total Recoverable	Annual	ug/l	Monitor		228	6	15	0-41
Chromium, Dissolved Hexavalent	Annual	ug/l	Monitor		221	0	0	0-12
Alpha BHC	Annual	ug/l	Monitor		65	0	0.08	0-0.1
Gamma-BHC, Total	Annual	ug/l	Monitor		65	0	0	0-0.1
Heptachlor	Annual	ug/l	Monitor		65	0	0	0-0
Flow Rate	Annual	MGD	Monitor		1826	91.8	165	50.1-299
Mercury, Total (Low Level)	Annual	ng/l	Monitor		212	0	5.88	0-47.5
CBOD 5 day	Summer	mg/l	25	40 ^a	845	8	19	0-61
CBOD 5 day	Winter	mg/l	25	40 ^a	831	12	30	2-83

Table 3. Projected Effluent Quality Values

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Arsenic - TR	ug/l	10	5	50.0123	68.51
Barium – TR	ug/l	2	2	191.406	262.2
Cadmium – TR*	ug/l	34	8	3.504	4.8
Chlorine - TRes	mg/l	1806	1538	0.151	0.343
Chloroform	ug/l	2	2	2.4966	3.42
Chromium - TR	ug/l	228	22	7.154	9.8
Chromium VI - Diss	ug/l	221	3	6.132	8.4
Copper – TR	ug/l	228	142	12.25	18.2
Cyanide - free	mg/l	225	76	0.0112	0.0169
Dissolved solids (ave)	mg/l	210	210	879	1539
Heptachlor	ug/l	65	0	--	--
alpha-BHC (BCC)	ug/l	56	4	0.073	0.1
gamma-BHC (Lindane) (BCC)	ug/l	56	1	0.073	0.1
Iron – TR	ug/l	2	2	810.008	1109.6
Lead – TR	ug/l	238	44	2.11	2.9
Mercury - TR (BCC)	ng/l	212	103	5.25	7.91
Methyl bromide	ug/l	2	1	1.58118	2.166
Nickel – TR	ug/l	228	199	22.1	33.2
Nitrate-N + Nitrite-N	mg/l	1596	1214	2.65	5.99
Phenol	ug/l	10	1	10.6726	14.62
Phosphorus – T	mg/l	1615	1063	0.861	1.635
Ortho phosphate – T	mg/l	209	158	0.794	1.002
Selenium - TR	ug/l	10	3	157.607	215.9
Silver – TR	ug/l	227	79	2.555	3.5
Strontium – TR	ug/l	30	30	711	995
Thallium – TR	ug/l	200	43	20.8	28
Toluene	ug/l	2	1	3.71716	5.092
Zinc - TR	ug/l	228	223	89.1	133.6

BCC = bioaccumulative chemical of concern

* Cadmium – period of record 4/1/13 – 5/31/14, MDL = 0.5 ug/l

Table 4. Discharges Through Internal Bypass Station 603

Summary of monthly operating report data for 603 for the period January 2009 through December 2013.

Year	Number Occurrences	Average Volume (MG)	Range (MG)
2009	23	12.038	0.092 – 55.275
2010	54	18.392	0.148 – 113.689
2011	208	28.919	0.027 – 67.345
2012	107	18.696	0.229 – 75.783
2013	74	31.384	0.902 – 167.147

Table 5 . Summary of Acute Toxicity Test Results

Test Date(a)	<i>Ceriodaphnia dubia</i> 48 hours	<i>Fathead Minnows</i> 96 hours
	TUa ^b	TUa ^b
3/3/2009(E)	BD	BD
3/8,9/2009(O)*	100% mortality	60% mortality
6/2/2009(E)	BD	BD
8/4/2009(E)	BD	BD
10/7/2009(O)	1.3	100% mortality*
12/15/2009(E)	BD	2.5
3/4/2010(E)	BD	1
6/8/2010(E)	1.5	1.5
8/3/2010(E)	BD	1
12/7/2010(E)	0.8	BD
3/3/2011(E)	BD	0.2
6/7/2011(E)	BD	0.2
8/16/2011(E)	BD	2.2
12/6/2011(E)	BD	BD
3/6/2012(E)	BD	BD
6/5/2012(E)	1.1	1.4
8/7/2012(E)	BD	0.6
12/4/2012(E)	BD	1.2
3/5/2013(E)	BD	0.5
6/5/2013(E)	BD	BD
8/20/2013(E)	BD	0.8
12/3/2013(E)	BD	BD

^a O = EPA test; E = entity test

^b TUa = acute toxicity units

* = 48 hour screening test

BD = below detection

Table 6 . Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average				
		Human Health	Agri-culture	Aquatic Life		
Arsenic - TR	ug/l	50	100	150	340	680
Barium – TR	ug/l	--	--	220	2000	4000
Cadmium - TR	ug/l	--	50	3	6.1	12
Chlorine - TRes	mg/l	--	--	0.011	0.019	0.038
Chloroform	ug/l	57 ^c	--	140	1300	2600
Chromium - TR	ug/l	--	100	110	2200	4500
Chromium VI - Diss	ug/l	--	--	11	16	31
Copper – TR	ug/l	1300	500	12	18	36
Cyanide - free	mg/l	0.7	--	0.0052	0.022	0.044
Dissolved solids (ave)	mg/l	--	--	1500	--	--
Heptachlor	ug/l	0.0021 ^c	--	--	--	--
alpha-BHC (BCC)	ug/l	0.039 ^c	--	--	--	--
gamma-BHC (Lindane) (BCC)	ug/l	0.19 ^c	--	0.057	0.95	1.9
Iron – TR	ug/l	--	5000	--	--	--
Lead – TR	ug/l	--	100	9.1	170	350
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400
Methyl bromide	ug/l	48	--	16	38	75
Nickel – TR	ug/l	610	200	66	590	1200
Nitrate-N + Nitrite-N	mg/l	10	100	--	--	--
Phenol	ug/l	21000	--	400	4700	9400
Selenium - TR	ug/l	170	50	5	--	--
Silver - TR	ug/l	50	--	1.3	2.5	5.1
Strontium – TR	ug/l	--	--	21000	40000	81000
Thallium – TR	ug/l	1.7	--	17	79	160
Toluene	ug/l	6800	--	62	560	1100
Zinc - TR	ug/l	9100	25000	150	150	300

c = carcinogen

BCC = bioaccumulative chemical of concern

Table 7 . Instream Conditions and Discharge Flow

Parameter	Units	Season	Value	Basis
<i>Stream Flows</i>				
1Q10	cfs	annual	10600	ORSANCO
7Q10	cfs	annual	10600	ORSANCO
Harmonic Mean	cfs	annual	42100	ORSANCO
Mixing Assumption	%	average	10	(WLA's for non-carcinogens are developed using 100 percent of the 7Q10.)
	%	maximum	1	
<i>Hardness</i>	mg/l	annual	131	ORSANCO
<i>MSD of GC Mill Creek WWTP flow</i>	cfs	annual	201.14	2A application
<i>Background Water Quality</i>				
Arsenic - TR	ug/l		0.79	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Barium – TR	ug/l		50.2	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Cadmium - TR	ug/l		0.05	ORSANCO; 2006-11; n=30; 26<MDL; Clean metals data
Chlorine - TRes	mg/l		0	No representative data available.
Chloroform	ug/l		0	No representative data available.
Chromium - TR	ug/l		1.5	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Chromium VI - Diss	ug/l		0	No representative data available.
Copper – TR	ug/l		2.3	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Cyanide - free	mg/l		0	No representative data available.
Dissolved solids (ave)	mg/l		382	BWQR; 1988; n=3755; 0<MDL; Statewide 50 %tile
Heptachlor	ug/l		0	No representative data available.
alpha-BHC	ug/l		0	No representative data available.
gamma-BHC (Lindane)	ug/l		0	No representative data available.
Iron - TR	ug/l		577	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Lead - TR	ug/l		0.74	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Mercury - TR	ng/l		2.2	ORSANCO; 2006-11; n=29; 8<MDL; Clean metals data
Methyl bromide	ug/l		0	No representative data available.
Nickel - TR	ug/l		2.7	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data
Nitrate-N + Nitrite-N	mg/l		0.896	ORSANCO; 2000-07;n=48;0,MDL; Bimonthly data
Phenol	ug/l		0	No representative data available.
Selenium - TR	ug/l		0.7	ORSANCO; 2006-11; n=30; 4<MDL; Clean metals data
Silver - TR	ug/l		0.05	ORSANCO; 2006-11; n=30; 30<MDL; Clean metals data
Strontium – TR	ug/l		685	OEPA; 1999-2003; n=1730; 0<MDL; Statewide 50 %tile
Thallium - TR	ug/l		0.05	ORSANCO; 2006-11; n=30; 28<MDL; Clean metals data
Toluene	ug/l		0	No representative data available.
Zinc - TR	ug/l		4.8	ORSANCO; 2006-11; n=30; 0<MDL; Clean metals data

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

Parameter	Units	Outside Mixing Zone Criteria			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average				
		Human Health	Agri-culture	Aquatic Life		
Arsenic - TR	ug/l	2643	2177	936	519	680
Barium – TR	ug/l	--	--	1115	3028	4000
Cadmium - TR	ug/l	--	1095	19	9.3	12
Chlorine - TRes	mg/l	--	--	0.069	0.029*	0.038*
Chloroform	ug/l	1250	--	878	1985	2600
Chromium - TR	ug/l	--	2162	682	3359	4500
Chromium VI - Diss	ug/l	--	--	69	24	31
Copper – TR	ug/l	69688	10917	63	26*	36*
Cyanide - free	mg/l	38	--	0.033	0.034	0.044
Dissolved solids (ave)	mg/l	--	--	7392	--	--
Heptachlor	ug/l	0.046	--	--	--	--
alpha-BHC (BCC)	ug/l	0.039	--	--	--	--
gamma-BHC (Lindane) (BCC)	ug/l	0.19	--	0.057	0.95	1.9
Iron – TR	ug/l	--	97576	--	--	--
Lead – TR	ug/l	--	2178	53	259	350
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400
Methyl bromide	ug/l	2578	--	100	58	75
Nickel – TR	ug/l	32614	4330	400	900	1200
Nitrate-N + Nitrite-N	mg/l	490	2174	--	--	--
Phenol	ug/l	1127692	--	2508	7177	9400
Selenium - TR	ug/l	9092	1082	28	--	--
Silver - TR	ug/l	2682	--	7.9	3.8	5.1
Strontium – TR	ug/l	--	--	128059	60719	81000
Thallium - TR	ug/l	89	--	106	121	160
Toluene	ug/l	365157	--	389	855	1100
Zinc - TR	ug/l	488414	548167	915	227	300

* Ohio EPA’s review of the *Mixing Zone Study for the Mill Creek WWTP Diffuser* (Final Report, March 1994; MSD of Greater Cincinnati) determined values of 0.33 mg/l for total residual chlorine and 90 ug/l for copper are protective of the OMZM and IMZM water quality standards.

Table 9 . Parameter Assessment

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

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

Chloroform	Chromium - TR	Heptachlor
Iron - TR	Lead - TR	Methyl bromide)
Phenol	Strontium - TR	Toluene

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

Arsenic - TR	Barium - TR	Chromium VI - Diss
Copper - TR	Cyanide - free	Nitrate-N + Nitrite-N
Mercury - TR	Nickel - TR	Thallium – TR
Dissolved solids (ave)		

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.

Cadmium - TR	Silver - TR	Zinc - TR
--------------	-------------	-----------

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

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>
Chlorine - TRes	mg/l	Annual	--	0.029
alpha-BHC	ug/l	Annual	0.039	--
gamma-BHC (Lindane)	ug/l	Annual	0.057	0.95
Selenium - TR	ug/l	Annual	28	--

Table 10. Final Effluent Limits and Monitoring Requirements for station 604.

Parameter	Units	Effluent Limitations				Basis ^b	
		Concentration		Loading (kg/day) ^a			
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum		
Temperature	°C	-----	Monitor	-----		M	
Dissolved Oxygen	mg/l	-----	Monitor	-----		BEJ, EP	
Suspended Solids	mg/l	30	45 ^c	19305	28958 ^c		BPT, EP
Oil and Grease	mg/l	--	10	--	--		WQS, EP
Ammonia-N	mg/l	-----	Monitor	-----			BEJ, EP
Total Kjeldahl-N	mg/l	-----	Monitor	-----			BEJ, EP
Nitrite(N) + Nitrate(N)	mg/l	-----	Monitor	-----			BEJ, EP
Orthophosphate, Total	mg/l	-----	Monitor	-----			BEJ, EP
Phosphorus, Total	mg/l	-----	Monitor	-----			BEJ, EP
Cyanide, Free	mg/l	-----	Monitor	-----			M
Selenium, T. R.	µg/l	-----	Monitor	-----			RP
Thallium, T. R.	µg/l	-----	Monitor	-----			M
Nickel, T. R.	µg/l	-----	Monitor	-----			M
Silver, T. R.	µg/l	-----	Monitor	-----			RP
Zinc, T. R.	µg/l	-----	Monitor	-----			RP
Cadmium, T. R.	µg/l	-----	Monitor	-----			RP
Lead, T. R.	µg/l	-----	Monitor	-----			M
Chromium, T. R.	µg/l	-----	Monitor	-----			M
Copper, T. R.	µg/l	-----	Monitor	-----			M
Hex. Chromium (Dissolved)	µg/l	-----	Monitor	-----			M
alpha-BHC	µg/l	-----	Monitor	-----			RP
gamma-BHC (Lindane)	µg/l	-----	Monitor	-----			RP
Flow	MGD	-----	Monitor	-----			M
Mercury, T.	ng/l	-----	Monitor	-----			M
Total Filterable Residue (Dissolved Solids)	mg/l	-----	Monitor	-----			M
CBOD ₅	mg/l	25	40 ^c	16088	25741 ^c		BPT, EP

^a Effluent loadings for total suspended solids and CBOD₅ are based on a wet weather flow of 170 MGD [OAC 3745-33-05(C)(1)(c)]. The average daily design flow of the treatment plant is 130 MGD. Any increase in the average design flow is subject to the provisions of the antidegradation rule (OAC 3745-1-05).

^b **Definitions:** BEJ = Best Engineering Judgment; BPO/APO = Before/After mixing zone phase out, mixing zones for mercury are not allowed after November 15, 2010 [OAC 3745-2-05(A)(2)(iv) and 3745-2-08(L)]; BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation; EP = Existing Permit; M = BEJ of 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 [OAC 3745-33-07(A)]; WLA = Wasteload Allocation procedures (OAC 3745-2); WQS = Ohio Water Quality Standards (OAC 3745-1-07).

^c Weekly average limit.

Table 11. Final Effluent Limits and Monitoring Requirements for Outfall 002.

Parameter	Units	Effluent Limitations				Basis ^b
		Concentration		Loading (kg/day) ^a		
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow	MGD	----- Monitor -----				M
pH	S.U.	----- 6.0 to 9.0 -----				WQM (min.), EP WQS (max.), EP
Fecal Coliform						
Summer	#/100ml	200	400 ^c	--	--	WQS-OR, EP
Winter	#/100ml	1000	2000 ^c	--	--	WQS-OR, EP
Chlorine Residual	mg/l	--	0.33	--	--	MIXING STUDY, EP
Whole Effluent Toxicity						
Acute	TUa	----- Monitor (w/o trigger) -----				WET, EP

^a Effluent loadings based on average design discharge flow of 130 MGD.

^b **Definitions:** BEJ = best engineering judgment; EP = Existing Permit M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges; MIXING STUDY = “Mixing Zone Study for the Mill Creek WWTP Outfall Diffuser” (Final Report; March 1994); WET = Reasonable potential for requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [OAC 3745-33-07(B)]; WQM = special water quality modeling study, Ohio EPA, June 1999; WQS = Ohio Water Quality Standards (OAC 3745-1-07); WQS-OR = Ohio Water Quality Standards for the Ohio River (OAC 3745-1-32).

^c Weekly average limit.

Table 12. Final Effluent Limits and Monitoring Requirements for Outfall 004.

Parameter	Units	Effluent Limitations				Basis ^b
		Concentration		Loading (kg/day) ^a		
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow	MGD	----- Monitor -----			M	
pH	S.U.	----- 6.0 to 9.0 -----			WQM (min.), BEJ, EP WQS (max.), BEJ, EP	
Fecal Coliform*						
Summer	#/100ml	----- Monitor -----			M	
Winter	#/100ml	----- Monitor -----			M	
Chlorine Residual	mg/l	--	0.33	--	--	MIXING STUDY, BEJ, EP

^a Effluent loadings based on average design discharge flow of 130 MGD.

^b Definitions: BEJ = best engineering judgment; M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges; MIXING STUDY = “Mixing Zone Study for the Mill Creek WWTP Outfall Diffuser” (Final Report; March 1994); WQM = special water quality modeling study, Ohio EPA, June 1999; WQS = Ohio Water Quality Standards (OAC 3745-1-07); WQS-OR = Ohio Water Quality Standards for the Ohio River (OAC 3745-1-32).

^c Weekly average limit.

* Compliance with fecal coliform limits determined at outfall 002.