National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for Eastern Regional Water Reclamation Facility (WRF)

Public Notice No.: 13-10-070
Public Notice Date: October 30, 2013
Comment Period Ends: November 29, 2013

Ohio EPA Permit No.: 1PL00001*ND
Application No.: OH0026590

Name and Address of Applicant:

Montgomery County Board of Commissioners
451 West Third Street
Dayton, Ohio 45422

Receiving Water: Little Beaver Creek

Name and Address of Facility Where Discharge Occurs:

Eastern Regional Water Reclamation Facility (WRF)
1802 Spaulding Road
Kettering, Ohio 45432

Subsequent
Stream Network: Beaver Creek to Little Miami River to 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, 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 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 current permit, although some monitoring frequencies have changed: flow, temperature, dissolved oxygen, 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), ammonia, *E. coli*, nitrate+nitrite, total Kjeldahl nitrogen (TKN), oil and grease, pH, free cyanide, cadmium, chromium, dissolved hexavalent chromium, copper, lead, mercury, nickel, zinc and silver.

Lower water-quality-based limits are proposed for total residual chlorine. Current chlorine limits are proposed to decrease from a monthly concentration of 0.021 mg/L to 0.02 mg/L in the summer to meet current WLAs. Past effluent data shows the facility is able to meet this new limit.

The proposed phosphorus limits for Eastern Regional WRF are consistent with the steps that have been taken in the upper Little Miami River basin to implement the findings of the Total Maximum Daily Load (TMDL) for the Upper Little Miami River - Final Report (Ohio EPA, April 2002).

Annual chronic toxicity monitoring with the determination of acute endpoints monitoring is proposed for the life of the permit. This satisfies the minimum testing requirements of rule 3745-33-07(B)(11) of the Ohio Administrative Code (OAC) for Whole Effluent Toxicity (WET) and will adequately characterize toxicity in the plant's effluent.

New monitoring requirements are proposed for dissolved hexavalent chromium and copper. The current method detection limits (MDLs), the minimum concentrations at which one can be confident that the effluent concentrations are greater than zero, for these parameters are too high to accurately evaluate concentrations of these parameters in the receiving water and new MDLs are proposed.

Current monitoring requirements for bis(2-ethylhexyl) phthalate are being removed from the permit because there were no detections of bis(2-ethylhexyl) phthalate over the past five years of data.

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; WET testing; storm water compliance; outfall signage; and pretreatment program requirements.

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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 Joe Reynolds (937)285-6097, Joe.Reynolds@epa.ohio.gov., or Andy Bachman, (614)644-3075, andrew.bachman@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 (NDPES) 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

Eastern Regional WRF discharges to Little Beaver Creek at river mile (RM) 4.58. Figure 1 shows the approximate location of the facility.

This segment of the Little Beaver Creek is described by Ohio EPA River Code: 11-036, U.S. EPA River Reach #: 05090202-037, County: Montgomery, Ecoregion: Eastern Corn Belt Plains. The Little Beaver Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-18): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Class A Primary Contact Recreation (PCR). Although Little Beaver Creek is a stream designated as "Class B," the Eastern Regional WRF discharge dominates the stream it discharges to and the Little Miami River, which is designated "Class A" is less than ten miles downstream. Without a Class A designation to Eastern Regional WRF, TMDL goals for impaired streams could not be met at the Little Miami River and thus a "Class A" designation has been proposed for the Eastern Regional WRF discharge.

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

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

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

Facility Description

The Eastern Regional WRF was originally constructed in 1945, and upgraded in 1988. The Eastern Regional WRF facility is an advanced treatment facility with an average design flow of 13.0 million gallons per day (MGD). The treatment plant includes the following equipment and/or wet processes:

- Influent pumping
- Bar screen
- Grit removal
- Scum removal
- Primary sedimentation
- Trickling filter-plastic media
- Ferric-chloride addition-secondary
- Post aeration
- Secondary clarification
- Dechlorination

- Chlorination

Sludge processing includes gravity thickening, dewatering by belt filter press, lime stabilization, and recycling of stabilized sludge by land application at agronomic rates. Table 1 shows the total tons of sludge removed from Eastern Regional WRF from 2008 through 2012, based upon discharge monitoring reports (DMR) data.

The plant serves parts of Kettering, Riverside, Dayton, Oakwood, and Centerville. The total population served is estimated to be 36,150. The collection system for Eastern Regional WRF, which is served by the City of Dayton, is 100 percent separate sanitary sewers. The inflow/infiltration rate for the collection system is estimated to be 1.0 MGD. The pretreatment program was approved on October 31, 1984. According to the permit renewal application, there are four significant industrial users responsible for 0.8 MGD of daily flow into the plant. Three of these facilities are categorical, accounting for 0.7 MGD of flow and 1 is non-categorical accounting for 0.1 MGD of flow.

Table 1: Sludge Removed from Eastern Regional WWTP 2008-2012

Year	Dry Tons Removed
2008	1510
2009	1665
2010	1452
2011	677
2012	1274

Description of Existing Discharge

Table 2 shows the annual effluent flow rates for the Eastern Regional WRF based upon DMR data. The flow rates have been very variable across this period. Heavy rains in 2008 and 2011 caused flow rates to increase in these years.

Table 2: Effluent Flow Rates for Outfall 001 2008-2012

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2008	8.49	17.21	29.77
2009	7.25	10.76	18.55
2010	7.21	12.09	22.70
2011	8.71	22.34	26.29
2012	7.42	12.71	25.30

Table 3 shows a summary of the aquatic life use attainment status of Little Miami River near where the Eastern Regional WRF discharges.

Table 4 presents the calculated phosphorus loadings from Eastern Regional WRF.

Table 5 presents chemical specific data compiled from data reported in annual pretreatment reports.

Table 6 presents a summary of unaltered DMR data for outfall 1PL00001001. Data are presented for the period from January, 2008 through December 2012, and current permit limits are provided for comparison.

Table 7 summarizes the chemical specific data for outfall 1PL00001001 by presenting the average and maximum PEQ values.

Table 8 summarizes the results of acute and chronic whole effluent toxicity tests of the final effluent.

Eastern Regional WRF reports SSO occurrences under station 300 in its NPDES permit. There was one overflow occurrence in 2009, four in 2010, three in 2011, and four in 2012.

Eastern Regional WRF reports plant bypass occurrences under station 602 in its NPDES permit. There was a single overflow bypass in 2010, 14 in 2011, and two in 2012. Large rain events in 2011, as can be seen by the flow data in 2011, contributed to these bypasses.

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 Ohio EPA.

Assessment of Impact on Receiving Waters

The most recent Ohio EPA survey of the upper Little Miami River basin was conducted during the summer of 1998. The results of that study are included in the report, *Biological and Water Quality Study of the Little Miami River Basin*, 1998. Clark, Greene, Montgomery, Warren, Clermont and Hamilton Counties (Ohio EPA; report MAS/1999-12-3). The report is available at the following Internet site:
http://www.epa.state.oh.us/portals/35/documents/LMR_Tsd.pdf

In July 2002, U.S. EPA approved the Ohio EPA report *Total Maximum Daily Loads for the Upper Little Miami River, Final Report*, which was based on data from 1998 and 1999 assessments. The complete report is available at the following internet site:
http://www.epa.state.oh.us/portals/35/tmdl/ULMR_finalreport.pdf.

The following table is a summary of the designation status of Little Beaver Creek. Cause and sources for reasoning for non-attainment are also listed.

Table 3. Little Beaver Creek Use Designation Status and Causes and Sources.

Location	RM	Use Desig.	Status (1998)	Status (2011)	Causes (2011)	Sources (2011)
L. Beaver Creek upstream of Eastern Regional WRF	4.76	WWH	NON	B	Comment: Macroinvertebrates impacted by nutrient enrichment due to urban runoff.	
L. Beaver Creek upstream Grange Hall Rd; downstream of Eastern Regional WRF	3.54	WWH	NON	B	Comment: Macroinvertebrates impacted by nutrient enrichment and embedded substrates due to combined effect from WWTP and urban runoff.	
L. Beaver Creek at Valleywood	2.83	WWH	A	Partial	Nutrient enrichment biological indicators; Particle distribution (embeddedness); other flow regime alterations	Urban runoff/storm sewers; Municipal point source discharges; Municipal (urbanized high density area)
L. Beaver Creek at Factory Rd. near Alpha	0.05	WWH	NON	Partial	Nutrient enrichment biological indicators; Particle distribution (embeddedness); other flow regime alterations	Urban runoff/storm sewers; Municipal point source discharges; Municipal (urbanized high density area)

A. Location not sampled.
B. Only an Invertebrate Community Index qualitative sample was available here; no attainment status assessment was made.
* WWH=Warm Water Habitat, NON=Non-Attainment , RM = river mile, WRF = water reclamation facility, WWTP = wastewater treatment plant

The implementation recommendations from the TMDL report for point source dischargers such as the Eastern Regional WRF were incorporated into the existing permit for this facility, which became effective in May 2008. The compliance schedule in the existing permit required the plant to reduce its monthly average phosphorus discharge to 1.0 mg/L (May through October) not later than May 2007. To comply with the TMDL, the permit also required the County to implement additional steps to reduce the total phosphorus summer loading from the Eastern Regional WRF to 24.6 kg/day by March 2013.

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 Eastern Regional WRF was 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 2008 through December 2012
NPDES Application data / Pretreatment data	4/9/08, 4/1/09, 4/8/10, 4/11/11, 4/11/12

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. The average and maximum PEQ values are presented in Table 7.

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 12 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 following dischargers in the upper Little Miami River segment were considered interactive:

- Xenia-Ford Road WWTP
- Xenia-Glady Run WWTP
- Montgomery County Eastern Regional WRF
- Greene County Beavercreek Water Resource Reclamation Facility
- Greene County Sugarcreek Water Resource Reclamation Facility

The available assimilative capacity was distributed among them using the Conservative Substance Wasteload Allocation Program (CONSWLA) water quality model for conservative parameters.

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
Agricultural Water Supply		Harmonic mean flow

Human Health (nondrinking)	Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 10, and allocations cannot exceed the Inside Mixing Zone Maximum 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 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 9 and 10. The WLA results to maintain all applicable criteria are presented in Table 11. Current ammonia limits were not found to be protective of aquatic life.

Dissolved Metals Translators

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

For Eastern Regional WRF, there were 5 such paired samples available applicable to copper, lead, and zinc. These paired samples were used in the determination of background water quality from 1998 as can be seen in Table 10. To account for the limited quantity of data, the DMT for each of these metals was determined as the lower end of the 95 percent confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. Each DMT is metal-specific and is applied by multiplying the dissolved criteria by the DMT, resulting in total effective recoverable criteria which are used in the WLA procedures.

In some cases, it is possible that the use of a DMT may result in instream concentrations of metals that may increase the risk of non-attainment of the aquatic life use designation. This was evaluated for Eastern Regional WRF. The application of the dissolved metal translators resulted in effective total recoverable criteria for copper, lead, nickel and zinc that were lower than the total recoverable criteria listed in OAC 3745-1.

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

Whole Effluent Toxicity WLA

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 [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation (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 Eastern Regional WRF, the WLA values are 0.31 TU_a and 1.03 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the concentration of effluent which has an inhibitory effect on 25% of the test organisms for the monitored effect, as compared to the control (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):

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

Where NOEC is No Observable Effect Concentration and LOEC is Lowest Observable Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration of effluent that is lethal to 50 percent of the exposed organisms (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.

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

Dilution Ratio (downstream flow to discharger flow)	Wasteload Allocation (percent effects in 100% effluent)
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 Eastern Regional WRF is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.01 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 11. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 7, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 12.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 13 presents the final effluent limits and monitoring requirements proposed for Eastern Regional WRF outfall 1PL00001001 and the basis for their recommendation.

Oil and Grease, pH, E. coli, and Dissolved Oxygen

Limits proposed for oil and grease, pH, and dissolved oxygen are based on WQS (OAC 3745-1), and are a continuation of existing permit limits.

E. coli limits are proposed to continue because of antibacksliding rules. The facility had requested *E. coli* limits rather than fecal coliform limits before standards were put in place. These limits were calculated and applied to the previous permit. Although these limits are more stringent than current WQS rules, they are proposed to continue under the Antibacksliding rule [OAC 3745-33-05(F)].

TSS, Ammonia, and $CBOD_5$

The limits for TSS, ammonia, and $CBOD_5$ (5-day carbonaceous biochemical oxygen demand) that were approved for the treatment plant under the existing permit are proposed to continue. The concentration limits for these parameters are based upon the treatment technology associated with the plant design of Eastern Regional WRF. The loading limits are based upon the plant's average design flow of 13.0 MGD.

Total Phosphorus and TMDL Compliance

The existing permit for the Eastern Regional WRF included a compliance schedule to meet phosphorus reductions required by the *Total Maximum Daily Loads for the Upper Little Miami River, Final Report* (Ohio EPA; approved by U.S. EPA, July 2002). The Phase 1 reductions required the plant to meet average total phosphorus limits of 1.0 mg/L (monthly) and 1.5 mg/L (weekly) during the months of May through October no later than April 1, 2008.

Phase 2 reductions required Eastern Regional WRF to meet an allowable total phosphorus load of 24.6 kg/day during the summer months beginning in May 2013. As defined in the permit, the plant's summer phosphorus load is calculated using the median plant flow (May – October) for the previous five calendar years and the median phosphorus concentration (May – October).

Table 4 shows that over the past four years Eastern Regional WRF has produced phosphorus loads less than 24.6kg/day. The loading limit of 24.6 kg/day is proposed to continue for this permit for the summer months of May through October as it is in the current permit to help maintain river attainment levels. Weekly limits of 1.5mg/L and monthly limits of 1.0mg/L will also continue in the summer.

Table 4: Calculated Phosphorus Loadings from Eastern Regional WWTP 2008-2012

Median Flows for May-October		Median Daily P Concentration		Calculated Loading	
Range	Flow (MGD)	Year	Phosphorus (mg/L)	Year	Loading (kg/day)
03-'07	7.386	2008	0.59	2008	16.50
04-'08	7.11	2009	0.54	2009	14.53
05-'09	7.069	2010	0.645	2010	17.26
06-'10	7.12	2011	0.7	2011	18.87
07-'11	7.205	2012	0.865	2012	23.59

Instruction on how to calculate phosphorus loadings is found in Part II, Item AA of the permit.

Nitrate+Nitrite and TKN

The continuation of monitoring for nitrate+nitrite and TKN is proposed based on best engineering judgment. Monitoring nitrate+nitrite and TKN at the upstream and downstream stations is also proposed. The purpose of the monitoring is to maintain a data set tracking nutrient levels in the upper Little Miami River basin.

Cadmium, Chromium, Nickel, Lead, Silver, Zinc, and Dissolved Hexavalent Chromium

Based on reasonable potential for requiring monitoring in NPDES permits [OAC 3745-33-07(A)], monitoring is proposed to continue for cadmium, chromium, nickel, lead silver, zinc, and dissolved hexavalent chromium because all these parameters were grouped into Group 2 and 3 of the Parameter Assessment (Table 12). The purpose of the monitoring is to maintain a current data base on the level of these contaminants in the plant effluent. This data will be used to assess reasonable potential at future permit renewals.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding dissolved hexavalent chromium; a special condition is proposed in Part II, Item X of the permit that provides guidance on the MDLs the permittee should use in analyzing this contaminant.

Copper, Free Cyanide, and Mercury

Copper, free cyanide, and mercury were placed in Group 4 of the Parameter Assessment (Table 12). Monitoring for Group 4 pollutants is required by OAC 3745-33-07(A)(2).

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding copper; a special condition is proposed in Part II, Item X of the permit that provides guidance on the MDLs the permittee should use in analyzing this contaminant.

Total Residual Chlorine

The Ohio EPA risk assessment (Table 12) places total residual chlorine in group 5. This placement as well as the data in Tables 6 and 7 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The daily maximum limit for total residual chlorine is proposed to decrease form 0.021mg/L to 0.02mg/L is based on WLA as limited by the inside mixing zone maximum (IMZM). The IMZM is a value calculated to avoid rapidly lethal conditions in the effluent mixing zone.

Bis(2-ethylhexyl) Phthalate

Current monitoring requirements for bis(2-ethylhexyl) phthalate are being removed from the permit because there were no detections of bis(2-ethylhexyl) phthalate over the past five years of data. However, annual monitoring for pretreatment reports will still include bis(2-ethylhexyl) phthalate. Increased monitoring or limits for bis(2-ethylhexyl) phthalate may be proposed if there are detections in the pretreatment data.

Whole Effluent Toxicity Reasonable Potential

Based on evaluating the WET data presented in Table 8 and other pertinent data under the provisions of OAC 3745-33-07(B), Eastern Regional WRF is placed in Category 4 with respect to WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

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, removal to sanitary landfill or transfer to another facility with an NPDES permit.

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 Eastern Regional WRF 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, Eastern Regional WRF must also submit a pretreatment program modification request.

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

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 Eastern Regional WRF to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 1PL00001001.

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.

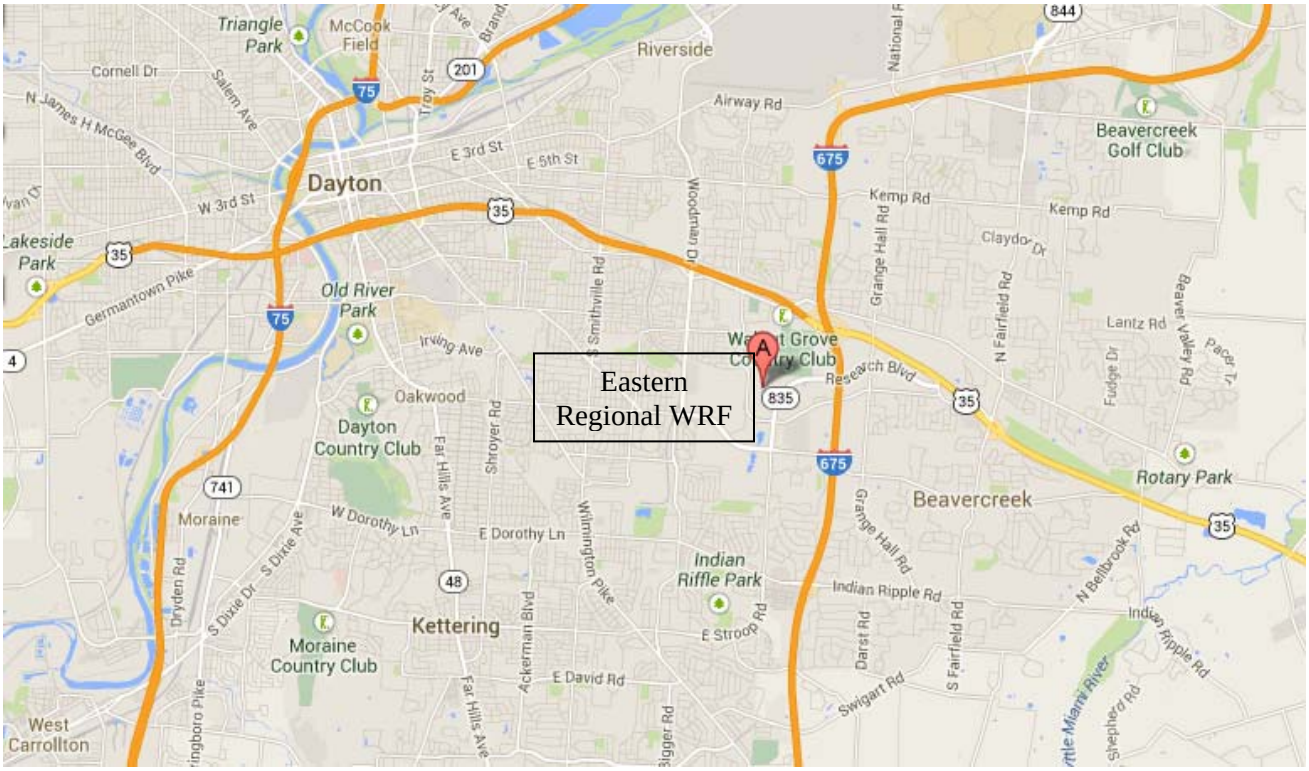
Storm Water Compliance

Parts IV, V, and VI have been included with the draft permit to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, Eastern Regional WRF may seek permit coverage under the general permit for industrial storm water (permit # OHR000005) or submit a "No Exposure Certification." Parts IV, V, and VI will be removed from the final permit if: 1) the Eastern Regional WRF submits a Notice of Intent (NOI) for coverage under the general permit for industrial storm water or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

Outfall Signage

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

Figure 1. Location of Eastern Regional WRF



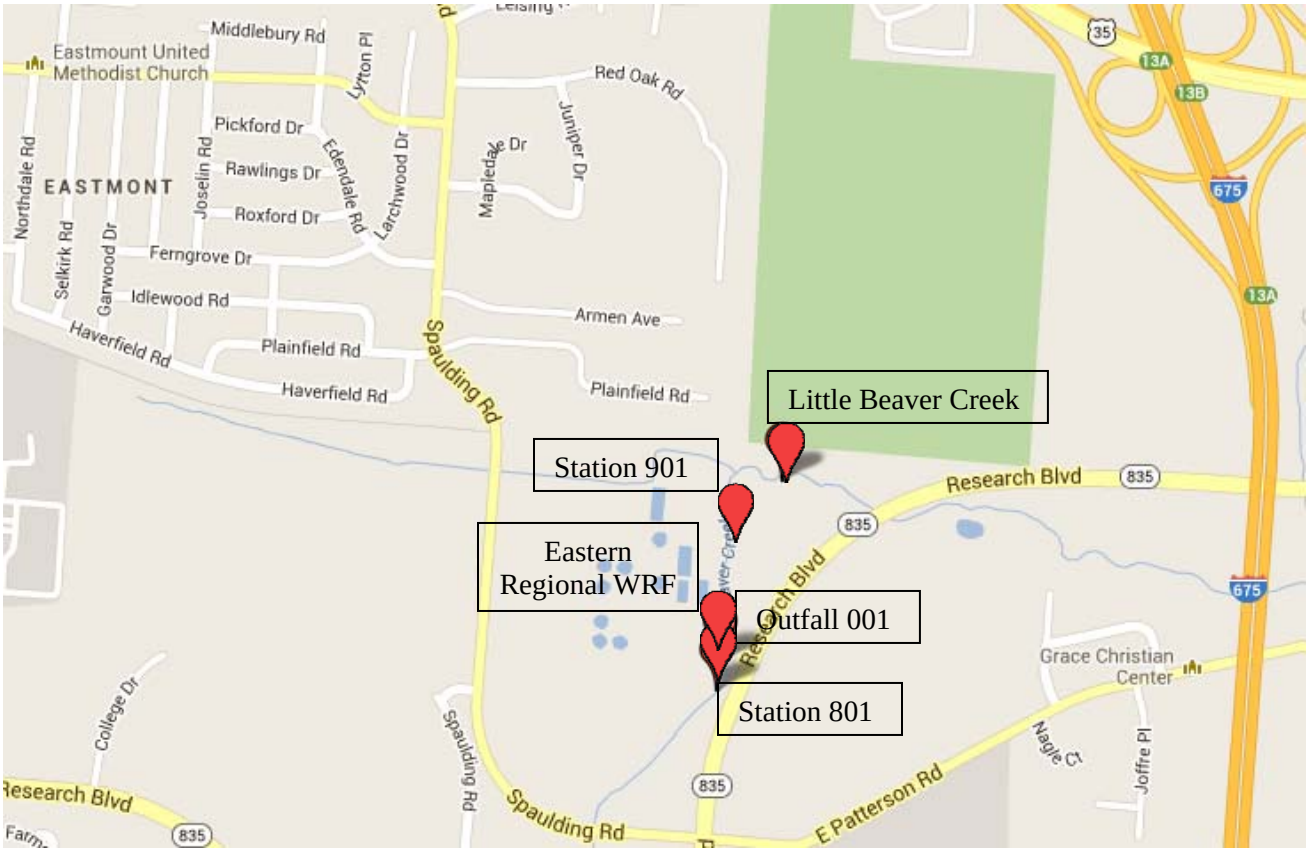


Figure 2. Little Miami River Study Area

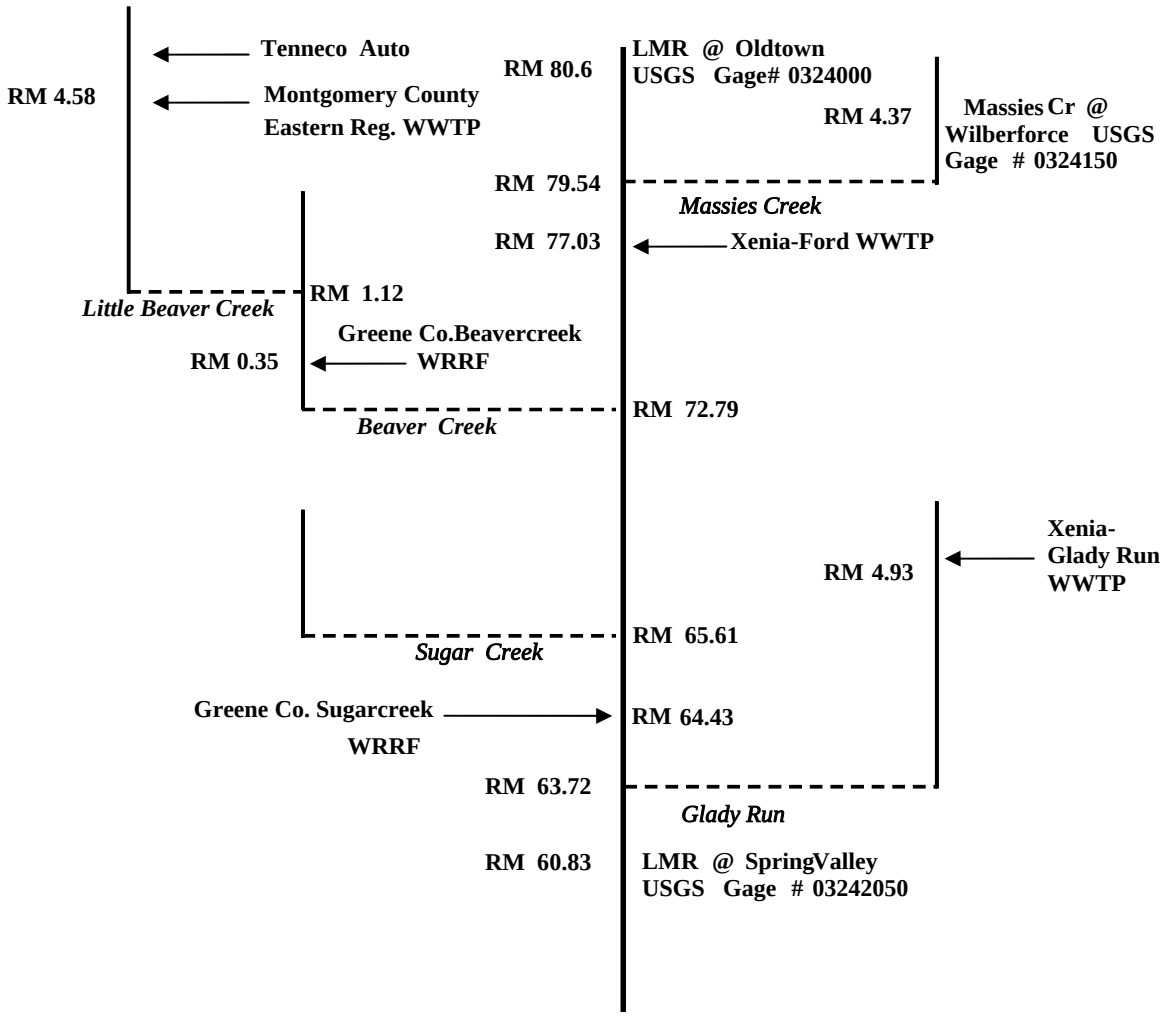

Tenneco Auto
RM 4.58
Montgomery County
Eastern Reg. WWTP
RM 80.6
LMR @ Oldtown
USGS Gage# 0324000
RM 4.37
Massies Cr @
Wilberforce USGS
Gage # 0324150
RM 79.54
Massies Creek
RM 77.03
Xenia-Ford WWTP
RM 1.12
Little Beaver Creek
Greene Co.Beavercreek
RM 0.35
WRRF
RM 72.79
Beaver Creek
Xenia-
Glady Run
WWTP
RM 4.93
RM 65.61
Sugar Creek
Greene Co. Sugarcreek
WRRF
RM 64.43
RM 63.72
Glady Run
RM 60.83
LMR @ SpringValley
USGS Gage # 03242050

Table 5. Effluent Characterization Using Ohio EPA and Pretreatment Data

Summary of analytical results for Eastern Regional outfall 1PL00001001. 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	OEPA 04/03/12	OEPA 03/16/12	PT 04/12/12	PT 04/12/11	PT 04/08/10	PT 04/02/09	PT 04/09/08
Barium	87	93	NA	NA	NA	NA	NA
Copper	5.9	5.6	ND(25)	ND(25)	ND(25)	ND(25)	ND(25)
Dissolved solids (mg/l)	650	656	NA	NA	NA	NA	NA
Iron	91	80	NA	NA	NA	NA	NA
Nickel	2.6	3.5	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
Nitrate+nitrite (mg/l)	9.44	10.0	NA	NA	NA	NA	NA
Phosphorus (mg/l)	1.50	1.32	NA	NA	NA	NA	NA
Strontium	339	327	NA	NA	NA	NA	NA
Zinc	12	18	ND(20)	23	22	ND(20)	29

Table 6. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Eastern Regional WRF outfall 1PL00001001 (January 2008 - December 2012). 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.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	C°	- - - - - - Monitor- - - - - -		1827	16.1	22.7	6.7-30
Dissolved Oxygen	Summer	mg/L	Not less than 7.0		920	8.9	9.7	7-11.2
Dissolved Oxygen	Winter	mg/L	Not less than 5.0		907	8.6	9.7	5.4-10.4
Total Dissolved Residue	Annual	mg/L	- - - - - - Monitor- - - - - -		17	644	741	540-760
Total Suspended Solids	Summer	mg/L	20	30[a]	428	0	6	0-18
Total Suspended Solids	Winter	mg/L	30	45[a]	281	0	8	0-42
Oil and Grease	Annual	mg/L	--	10	118	0	0	0-5.1
Ammonia	Summer	mg/L	1.5	2.3[a]	635	0.27	1.16	0-2.31
Ammonia	Winter	mg/L	3.5	5.3[a]	613	0.05	0.714	0-5.7
Total Kjeldahl Nitrogen	Annual	mg/L	- - - - - - Monitor- - - - - -		119	1.3	2.63	0-5.3
Nitrite Plus Nitrate	Annual	mg/L	- - - - - - Monitor- - - - - -		120	11.1	17.7	5.23-20.2
Phosphorus	Summer	mg/L	1.0	1.5[a]	162	0.655	1.129	0-1.53
Phosphorus	Winter	mg/L	- - - - - - Monitor- - - - - -		112	1.76	2.523	0.57-2.8
Free Cyanide	Annual	mg/L	- - - - - - Monitor- - - - - -		78	0	0.0066	0-0.02
Barium	Annual	µg/L	- - - - - - Monitor- - - - - -		16	57.8	91.4	24-92.5
Nickel	Annual	µg/L	- - - - - - Monitor- - - - - -		77	0	0	0-0
Silver	Annual	µg/L	- - - - - - Monitor- - - - - -		76	0	0	0-0
Strontium	Annual	µg/L	- - - - - - Monitor- - - - - -		16	331	359	287-363
Zinc	Annual	µg/L	- - - - - - Monitor- - - - - -		77	0	30.4	0-49
Cadmium	Annual	µg/L	- - - - - - Monitor- - - - - -		76	0	0	0-0
Lead	Annual	µg/L	- - - - - - Monitor- - - - - -		77	0	0	0-0
Chromium	Annual	µg/L	- - - - - - Monitor- - - - - -		77	0	0	0-5
Copper	Annual	µg/L	- - - - - - Monitor- - - - - -		77	0	0	0-0
Molybdenum	Annual	µg/L	- - - - - - Monitor- - - - - -		29	0	6.92	0-8
Dissolved Hexavalent Chromium	Annual	µg/L	- - - - - - Monitor- - - - - -		78	0	0	0-4
E. coli	Summer	#/100 ml	126	189[a]	404	6.3	435	0-12000
Bis(2-ethylhexyl) Phthalate	Annual	ug/L	- - - - - - Monitor- - - - - -		15	0	0	0-0
Flow Rate	Annual	MGD	- - - - - - Monitor- - - - - -		1827	7.68	15.6	4.35-29.8
Chlorine	Summer	mg/L	--	0.021	920	0.02	0.03	0-0.04
Mercury	Annual	ng/L	- - - - - - Monitor- - - - - -		62	1.9	6.19	0-14.5
Acute Toxicity, *C. dubia*	Annual	TUa	- - - - - - Monitor- - - - - -		4	0	0	0-0
Chronic Toxicity, *C. dubia*	Annual	TUc	- - - - - - Monitor- - - - - -		4	0	0.935	0-1.1
Acute Toxicity, *P. promelas*	Annual	TUa	- - - - - - Monitor- - - - - -		4	0	0	0-0
Chronic Toxicity, *P. promelas*	Annual	TUc	- - - - - - Monitor- - - - - -		4	0	0	0-0
pH, Maximum	Annual	S.U.	Not to exceed 9.0		1827	7.8	8.1	7.3-8.9
pH, Minimum	Annual	S.U.	Not less than 6.5		1827	7.6	7.9	6.6-8.1
$CBOD_5$	Summer	mg/L	10	15[a]	607	2	5	0-11
$CBOD_5$	Winter	mg/L	25	38[a]	575	2	5	0-12

Table 7. Effluent Data for the Eastern Regional WRF- Projected Effluent Quality Values

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Self-Monitoring (DMR) Data					
Dissolved Solids [A]	mg/L	19	19	704.8	777.2
Ammonia-Summer	mg/L	428	404	1.012	1.386
Ammonia-Winter	mg/L	300	233	0.245	0.533
Nitrate + Nitrite [A]	mg/L	122	122	11.80	16.16
Phosphorus [A]	mg/L	483	477	1.739	2.382
Free Cyanide	µg/L	78	9	8.233	11.05
Barium [A]	µg/L	18	18	95.05	130.2
Nickel [A]	µg/L	84	2	3.285	4.5
Silver	µg/L	76	0	--	--
Strontium [A]	µg/L	18	18	353.2	379.3
Zinc [A]	µg/L	84	35	32.19	44.10
Cadmium	µg/L	76	0	--	--
Lead	µg/L	77	0	--	--
Chromium	µg/L	77	1	3.285	4.50
Copper [A]	µg/L	84	2	16.37	22.42
Molybdenum	µg/L	29	12	6.35	8.26
Dissolved Hexavalent Chromium	µg/L	22	1	3.796	5.20
Bis(2-ethylhexyl)phthalate	µg/L	15	0	--	--
Chlorine	µg/L	920	917	17.52	24.0
Mercury	ng/L	62	42	6.112	9.682
OEPA Data					
Iron	µg/L	2	2	1026.	1406.

[A.] OEPA and Pretreatment data were combined with the DMR data.

Table 8. Summary of Acute and Chronic Toxicity Test Results for Eastern Regional WRF

Test Date	*Ceriodaphnia dubia 48 hours*	*Fathead Minnows 96*	*Ceriodaphnia dubia 7 days*	*Fathead Minnows 7 days*
	TUa[a]	TUa[a]	TUc[a]	TUc[a]
6/2/2009	BD	BD	BD	BD
6/18/2009	BD	BD	BD	BD
12/22/2009	BD	BD	BD	BD
3/5/2010	BD	BD	1.1	BD
6/1/2010	BD	BD	BD	BD

[a] TUa = acute toxicity units, TUc = chronic toxicity units
BD = Below Detection

Table 9. Water Quality Criteria in the Little Miami River Study Area

Parameter	Units	Outside Mixing Zone Criteria: Average: Human Health	Outside Mixing Zone Criteria: Average: Agri-culture	Outside Mixing Zone Criteria: Average: Aquatic Life	Outside Mixing Zone Criteria: Maximum Aquatic Life	Inside Mixing Zone Maximum
Ammonia-Summer	mg/L	--	--	1.4	--	--
Ammonia-Winter	mg/L	--	--	4.0	--	--
Arsenic	µg/L	--	100.	150.	340.	680.
Barium	µg/L	--	--	220.	2000.	4000.
Bis (2-ethylhexyl) phthalate	µg/L	59. [C]	--	8.4	1100.	2100.
Cadmium	µg/L	--	50.	5.8	16.	31.
Chlorine	µg/L	--	--	11.	19.	38.
Chromium	µg/L	--	100.	210.	4400.	8900.
Dissolved Hexavalent Chromium	µg/L	--	--	11.	16.	31.
Copper	µg/L	1300.	500.	25. [D]	41. [D]	81. [D]
Free Cyanide	µg/L	220000.	--	12.	46.	92.
Dieldrin	µg/L	0.0014 [C]	--	0.056	0.24	0.47
Dissolved Solids	mg/L	--	--	1500.	--	--
Iron	µg/L	--	5000.	--	--	--
Lead	µg/L	--	100.	28. [D]	530. [D]	1100. [D]
gamma-BHC (Lindane) [B]	µg/L	0.63 [C]	--	0.057	0.95	1.9
Mercury [B]	ng/L	12.	10000.	910.	1700.	3400.
Molybdenum	µg/L	--	--	20000.	190000.	370000.
Nickel	µg/L	4600.	200.	130.	1200.	2400.
Nitrate + Nitrite	mg/L	--	100.	--	--	--
Phenol	µg/L	4600000.	--	400.	4700.	9400.
Selenium	µg/L	11000.	50.	5.	--	--
Silver	µg/L	--	--	1.3	18. [D]	37. [D]
Strontium	µg/L	--	--	21000.	40000.	81000.
Zinc	µg/L	69000.	25000.	300.	300.	610.

[B.] Bioaccumulative Chemical of Concern (BCC)
[C.] Based on a carcinogenic endpoint.
[D.] Criteria based on applicable dissolved metal translator.

Table 10. Instream Conditions and Discharger Flow

Note USGS= United States Geological Survey, RM=River Mile, cfs=cubic feet per second, STORET= EPA STOrage and RETrieval data management system, OEPA=Ohio Environmental Protection Agency, MDL=Method Detection Limit

Parameter	Season	Value	Basis
Stream Flows (cfs)			
Little Miami River (upstream of Xenia Ford Rd. WWTP)			
1Q10	annual	8.65	USGS gage #03240000 & 03241500,
7Q10	annual	10.63	1952 to 1997 data.
30Q10	summer	12.88	“
	winter	29.09	“
Harmonic Mean Flow	annual	56.61	“
Little Beaver Creek (upstream of Eastern Reg. WWTP and Tenneco)			
1Q10	annual	0.19	USGS gage #03241500, 1952-97 data
7Q10	annual	0.22	“
30Q10	summer	0.32	“
	winter	1.01	“
Harmonic Mean Flow	annual	1.84	“
Incremental flow for L. Beaver Creek between Eastern Reg. WWTP and mouth			
1Q10	annual	0.31	USGS gage #03241500, 1952-97 data
7Q10	annual	0.36	“
30Q10	summer	0.52	“
	winter	1.66	“
Harmonic Mean Flow	annual	3.01	“
Beaver Creek (upstream of L. Beaver Cr. confluence)			
1Q10	annual	0.66	USGS gage #03241500, 1952-97 data
7Q10	annual	0.73	“
30Q10	summer	0.93	“
	winter	2.45	“
Harmonic Mean Flow	annual	4.23	“
Incremental Flow for Little Miami River between Xenia Ford WWTP and Sugarcreek WRRF			
1Q10	annual	1.87	USGS gage #03241500, 1952-97 data
7Q10	annual	2.07	“
30Q10	summer	2.66	“
	winter	7.04	“
Harmonic Mean Flow	annual	12.2	“
Sugar Creek (@ mouth)			
1Q10	annual	0.64	USGS gage #03241500, 1952-97 data
7Q10	annual	0.75	“
30Q10	summer	1.07	“
	winter	3.42	“
Harmonic Mean Flow	annual	6.20	“

Table 10. Instream Conditions and Discharger Flow (continued)

Parameter (Units)	Season	Value	Basis
Glady Run (upstream of Glady Run WWTP)			
1Q10	annual	0.09	USGS gage #03241500, 1952-97 data
7Q10	annual	0.10	"
30Q10	summer	0.15	"
	winter	0.47	"
Harmonic Mean Flow	annual	0.84	"
Discharger Flows (cfs)			
Xenia- Ford Rd. WWTP		5.57	Ohio Division of Surface Water
Mont. Co. East. Regional WWTP		20.11	Ohio Division of Surface Water
Greene Co. Beaver creek WRRF		13.15	Ohio Division of Surface Water
Greene Co. Sugarcreek WRRF		15.32	Ohio Division of Surface Water
Xenia- Glady Run WWTP		6.19	Ohio Division of Surface Water
Mixing Assumption	% average	100	Stream-to-discharge ratio
	% maximum	100	Stream-to-discharge ratio
Instream Summer Temperature (^oC)			
L. Miami River (RM 77.0)		22.	Xenia-Ford 901Station; 19 values, 2008-12
L. Miami River (RM 64.0)		21.	Sugarcreek 901 Station; 20 values, 2008-12
Beaver Creek		21.	Beavercreek 901Station; 20 values, 2008-12
L. Beaver Creek		22.	East.Reg. 901Station; 20 values, 2008-12
Glady Run		19.	Xenia-Glady 901Station; 19 values, 2008-12
Instream Winter Temperature (^oC)			
L. Miami River (RM 77.0)		4.8	Xenia-Ford 901Station; 9 values, 2008-12
L. Miami River (RM 64.0)		6.1	Sugarcreek 901 Station; 14 values, 2008-12
Beaver Creek		8.0	Beavercreek 901Station; 14 values, 2008-12
L. Beaver Creek		8.9	East.Reg. 901Station; 14 values, 2008-12
Glady Run		7.2	Xenia-Glady 901Station; 9 values, 2008-12
Instream Summer pH (S.U.)			
L. Miami River (RM 77.0)		8.3	Xenia-Ford 901Station; 19 values, 2008-12
L. Miami River (RM 64.0)		8.1	Sugarcreek 901 Station; 20 values, 2008-12
Beaver Creek		8.0	Beavercreek 901Station; 20 values, 2008-12
L. Beaver Creek		7.9	East.Reg. 901Station; 20 values, 2008-12
Glady Run		8.2	Xenia-Glady 901Station; 19 values, 2008-12
Instream Winter pH (S.U.)			
L. Miami River (RM 77.0)		8.4	Xenia-Ford 901Station; 9 values, 2008-12
L. Miami River (RM 64.0)		8.3	Sugarcreek 901 Station; 14 values, 2008-12
Beaver Creek		8.4	Beavercreek 901Station; 14 values, 2008-12
L. Beaver Creek		7.9	East.Reg. 901Station; 14 values, 2008-12
Glady Run		8.3	Xenia-Glady 901Station; 9 values, 2008-12

Table 10. Instream Conditions and Discharger Flow (continued)

Parameter (Units)	Value	Basis
Instream Hardness (mg/L)		
L. Miami River dst Xenia Ford WWTP 336.		Xenia-Ford 901; 18 values, 2008-12
L. Miami River dst Sugarcreek WWTP 331.		Sugarcreek 901; 60 values, 2008-12
Beaver Creek	347.	Beavercreek 901; 60 values, 2008-12
L. Beaver Creek	301.	East.Reg. 901; 61 values, 2008-12
Glady Run	367.	Xenia-Glady Run 901; 52 values, 2008-12
Background Water Quality (µg/L)		
Little Miami River		
Ammonia-Summer (mg/L)	0.025	DMRs; 19 values, 18<MDL, 2008-12 data
Ammonia-Winter (mg/L)	0.0	DMRs; 9 values, 9<MDL, 2008-12 data
Arsenic	0.	STORET; 3 values, 3<MDL, 2011 data
Barium	93.7	STORET; 3 values, 0<MDL, 2011 data
Bis (2-ethylhexyl) phthalate	0.	No representative data available
Cadmium	0.	STORET; 3 values, 3<MDL, 2011 data
Chlorine	0.	No representative data available
Chromium	0.	STORET; 3 values, 3<MDL, 2011 data
Dissolved Hexavalent Chromium	0.	No representative data available
Copper	1.8	STORET; 3 values, 1<MDL, 2011 data
Free Cyanide	0.	No representative data available
Dieldrin	0.	No representative data available
Gamma – BHC	0.	No representative data available
Iron	370.	STORET; 3 values, 0<MDL, 2011 data
Lead	0.	STORET; 3 values, 3<MDL, 2011 data
Mercury (ng/L)	0.	No representative data available
Molybdenum	0.	No representative data available
Nickel	3.4	STORET; 3 values, 0<MDL, 2011 data
Selenium	0.	STORET; 3 values, 3<MDL, 2011 data
Silver	0.	No representative data available
Total Dissolved Solids (mg/L)	408.	STORET; 6 values, 0<MDL, 2011 data
Zinc	16.3	STORET; 3 values, 1<MDL, 2011 data

Table 10. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
Beaver Creek		
Ammonia-Summer (mg/L)	0.08	DMRs; 20 values, 5<MDL, 2008 -12 data
Ammonia-Winter (mg/L)	0.08	DMRs; 14 values, 5<MDL, 2008 -12 data
Arsenic	0.	STORET; 11 values, 11<MDL, 2011-12
Barium	100.	STORET; 11 values, 0<MDL, 2011-12
Bis (2-ethylhexyl) phthalate	0.	No representative data available
Cadmium	0.	STORET; 11 values, 11<MDL, 2011-12
Chlorine	0.	No representative data available
Chromium	0.	STORET; 11 values, 11<MDL, 2011-12
Dissolved Hexavalent Chromium	0.	No representative data available
Copper	1.0	STORET; 11 values, 10<MDL, 2011-12
Free Cyanide	0.	No representative data available
Dieldrin	0.	No representative data available
Gamma – BHC	0.	No representative data available
Iron	438.	STORET; 11 values, 0<MDL, 2011-12
Lead	0.	STORET; 11 values, 11<MDL, 2011-12
Mercury (ng/L)	0.	No representative data available
Molybdenum	0.	No representative data available
Nickel	2.5	STORET; 11 values, 0<MDL, 2011-12
Selenium	0.	STORET; 11 values, 11<MDL, 2011-12
Silver	0.	No representative data available
Total Dissolved Solids (mg/L)	455.	STORET; 14 values, 0<MDL, 2011-12
Zinc	0.	STORET; 11 values, 11<MDL, 2011-12

Table 10. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
Little Beaver Creek		
Ammonia-Summer (mg/L)	0.07	DMRs; 20 values, 1<MDL, 2008-12 data
Ammonia,-Winter (mg/L)	0.05	DMRs; 15 values, 2<MDL, 2008-12 data
Arsenic	0.	STORET; 5 values, 5<MDL, 2011 data
Barium	93.	STORET; 5 values, 0<MDL, 2011 data
Bis (2-ethylhexyl) phthalate	0.	No representative data available
Cadmium	0.	STORET; 5 values, 5<MDL, 2011 data
Chlorine	0.	No representative data available
Chromium	0.	STORET; 5 values, 5<MDL, 2011 data
Dissolved Hexavalent Chromium	0.	No representative data available
Copper	1.6	STORET; 5 values; 2<MDL, 2011 data
Free Cyanide	0.	No representative data available
Dieldrin	0.	No representative data available
Gamma – BHC	0.	No representative data available
Iron	140.	STORET; 5 values, 0<MDL, 2011 data
Lead	0.	STORET; 5 values, 5<MDL, 2011 data
Mercury (ng/L)	0.	No representative data available
Molybdenum	0.	No representative data available
Nickel	1.8	STORET; 5 values, 2<MDL, 2011 data
Selenium	0.	STORET; 5 values, 5<MDL, 2011 data
Silver	0.	No representative data available
Total Dissolved Solids (mg/L)	443.	STORET; 10 values, 0<MDL,2011 data
Zinc	6.6	STORET; 5 values, 4<MDL, 2011 data

Table 10. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
Glady Run		
Ammonia-Summer (mg/L)	0.025	DMRs; 19 values,18<MDL, 2008-12 data
Ammonia-Winter (mg/L)	0.025	DMRs; 9 values, 8<MDL, 2008-12 data
Arsenic	0.	STORET; 11 values, 11<MDL, 2011-12
Barium	100.	STORET; 11 values, 0<MDL, 2011-12
Bis (2-ethylhexyl) phthalate	0.	No representative data available
Cadmium	0.	STORET; 11 values, 11<MDL, 2011-12
Chlorine	0.	No representative data available
Chromium	0.	STORET; 11 values, 11<MDL, 2011-12
Dissolved Hexavalent Chromium	0.	No representative data available
Copper	1.0	STORET; 11 values, 10<MDL, 2011-12
Free Cyanide	0.	No representative data available
Dieldrin	0.	No representative data available
Gamma – BHC	0.	No representative data available
Iron	438.	STORET; 11 values, 0<MDL, 2011-12
Lead	0.	STORET; 11 values, 11<MDL, 2011-12
Mercury (ng/L)	0.	No representative data available
Molybdenum	0.	No representative data available
Nickel	2.5	STORET; 11 values, 0<MDL, 2011-12
Selenium	0.	STORET; 11 values, 11<MDL, 2011-12
Silver	0.	No representative data available
Total Dissolved Solids (mg/L)	455.	STORET; 14 values, 0<MDL, 2011-12
Zinc	0.	STORET; 11 values, 11<MDL, 2011-12
Dissolved Metal Translators (Little Beaver Creek)		
Copper	1.072	OEPA; 5 samples, 0 < MDL, 1998
Lead	1.335	OEPA; 5 samples, 0 < MDL, 1998
Nickel	1.010	OEPA; 5 samples, 0 < MDL, 1998
Silver	2.034	OEPA; 5 samples, 0 < MDL, 1998
Dissolved Metal Translators (Little Miami River – apply to upper segment only)		
Copper	1.125	OEPA; 5 samples, 0 < MDL, 1998
Lead	3.456	OEPA; 5 samples, 0 < MDL, 1998
Zinc	1.059	OEPA; 5 samples, 0 < MDL, 1998

Table 11. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Arsenic [C]	µg/L	--	111.	155.	350.	680.
Barium	µg/L	--	--	226.	2059.	4000.
Cadmium [C]	µg/L	--	56. [A]	6.0	16.	31.
Chlorine	µg/L	--	--	11.	20.	38.
Chromium [C]	µg/L	--	111.	217.	4531.	8900.
Dissolved Hexavalent Chromium	µg/L	--	--	11.	16.	31.
Copper	µg/L	1445.[A]	556. [A]	26.[D]	42. [D]	81.
Free Cyanide	µg/L	244600.[A]	--	12.	47.	92.
Dissolved Solids	mg/L	--	--	1533.	--	--
Lead [C]	µg/L	--	111.	29. [D]	546.[D]	1100.
Mercury [B]	ng/L	12.	10000. [A]	910.	1700.	3400.
Molybdenum [C]	µg/L	--	--	20630.	195700.	370000.
Nickel [C]	µg/L	5115. [A]	222.	134.	1236.	2400.
Selenium [C]	µg/L	12230.	56.	5.2	--	--
Silver [C]	µg/L	--	--	1.3	15.[D]	37.
Zinc [C]	µg/L	76720. [A]	27800. [A]	309.	308.	610.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.
[B] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless the requirements for an exception are met as listed in 3745-2-08(L).
[C] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested for use in pretreatment program.
[D] WLA based on applicable dissolved metal translator.

Table 12. Parameter Assessment

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

Phosphorus

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

Arsenic	Bis (2-ethylhexyl) phthalate	Cadmium
Chromium	Iron	Lead
Molybdenum	Nickel	Nitrate + Nitrite
Selenium	Silver	Strontium
Zinc		

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

Barium	Dissolved Solids	Dissolved Hexavalent Chromium

Group 4: $PEQ_{max} \geq$ 50% but <100% of the maximum PEL or $PEQ_{avg} \geq$ 50% but < 100% of the average PEL. Monitoring is appropriate.

Copper	Free Cyanide	Mercury

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

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits Average	Recommended Effluent Limits Maximum
Chlorine	µg/L	summer only	11.	20.

Table 13. Final Effluent Limits and Monitoring Requirements

		Effluent Limitations				
		Concentration		Loading (kg/day)[a]		
Parameter	**Units**	**Monthly Average**	**Daily Maximum**	**Monthly Average**	**Daily Maximum**	**Basis[b]**
Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Dissolved Oxygen	mg/L					
Summer		- - - - - - - - - - Not less than 7.0 - - - - - - - - -				WQS, EP
Winter		- - - - - - - - - - Not less than 5.0 - - - - - - - - -				WQS, EP
Total Suspended Solids	mg/L					
Summer		30	45[c]	1478	2218[c]	PD, EP
Winter		20	30[c]	986	1478[c]	PD, EP
Oil and Grease	mg/L	--	10	--	--	WQS, EP
Ammonia	mg/L					
Summer		1.5	2.3[c]	74	113[c]	PD, EP
Winter		3.5	5.3[c]	172	261[c]	PD, EP
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Nitrate + Nitrite	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Phosphorus	mg/L					
Winter		- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Summer		1.0	1.5[c]	49	74[c]	TMDL, EP
Summer Loading	kg/day	- - - - - - Not more than 24.6 kg/day- - - - - - -				TMDL
Free Cyanide	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				RP
Nickel	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Silver	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Zinc	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Cadmium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Lead	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Chromium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				RP
Dissolved Hexavalent Chromium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
E. coli						
Summer Only	#/100ml	126	189[c]	--	--	ABS, EP
Flow	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M, EP
Chlorine	mg/L	--	0.020	--	--	WLA
Mercury	ng/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				RP
Whole Effluent Toxicity – *C. dubia* and *P. promelas*						
Acute	TUa	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				WET
Chronic	TUc	- - - - - - - - - - - - Monitor - - - - - - - - - - - - -				WET
pH	S.U.	- - - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - -				WQS, EP
$CBOD_5$[d]	mg/L					
Summer		10	15[c]	492	738[c]	PD, EP
Winter		25	38[c]	1232	1873[c]	PD, EP

[a] Effluent loadings based on average design discharge flow of 13.0 MGD.

[b] Definitions: ABS = Antibacksliding Rule [OAC 3745-33-05(F) and 40 CFR Part 122.44(l)];
BEJ = Best Engineering Judgment;
EP = Existing Permit;
M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges;
PD = Plant Design Criteria;

RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)];
TMDL= Phosphorus treatment required by the Total Maximum Daily Load for the receiving water;
WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)]
WQS = Ohio Water Quality Standards (OAC 3745-1-07).

[c] Weekly average limit.

[d] $CBOD_5$ = 5-day carbonaceous biochemical oxygen demand