

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio  
for Sugarcreek Water Resource Reclamation Facility

Public Notice No.: 13-10-068  
Public Notice Date: October 30, 2013  
Comment Period Ends: November 29, 2013

Ohio EPA Permit No.: 1PK00014\*OD  
Application No.: OH0040592

Name and Address of Applicant:

Greene County Sanitary Engineering  
Department  
667 Dayton-Xenia Road  
Xenia, Ohio 45385

Name and Address of Facility Where  
Discharge Occurs:

Sugarcreek Water Resource Reclamation  
Facility  
2365 State Route 725  
Spring Valley, Ohio 45370  
Greene County, Ohio

Receiving Water: Little Miami River

Subsequent  
Stream Network: Ohio River

Introduction

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

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

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 EPA (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 may have changed: flow, temperature, CBOD<sub>5</sub>, total suspended solids, total filterable residue, ammonia-nitrogen, nitrite+nitrate-nitrogen, total Kjeldahl nitrogen, oil and grease, pH, cadmium, chromium, copper, dieldrin, dissolved hexavalent chromium, lead, nickel, and zinc.

The proposed phosphorus limits 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 is proposed for the life of the permit. This satisfies the minimum testing requirements of OAC 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

New water-quality-based limits are proposed for mercury because mercury falls into group 5 of the Parameter Assessment (Table 13) in the Waste Load Allocation for Sugarcreek Water Resource Reclamation Facility (WRRF) and has the reasonable potential to contribute to exceedances of water quality standards.

New monitoring requirements are proposed for copper, cadmium, lead, and dissolved hexavalent chromium. The current method detection limit (MDL), the minimum concentration at which one can be confident that the effluent concentration is greater than zero, for these parameters are too high. New MDLs are proposed.

Final effluent limits are proposed for *Escherichia coli*. New water quality standards for *E. coli* became effective in March 2010. These limits will take the place of fecal coliform limits.

New monitoring requirements are proposed for barium and bis(2-ethylhexyl)phthalate because these parameters were placed in Groups 4 and 5 of the parameter assessment (explained in the Development of Water-Quality-Based Effluent Limits section). Monitoring for Group 4 pollutants is required by OAC Rule 3745-33-07(A)(2) and Group 5 pollutants may be monitored using the discretion allowed in paragraph A(5) of Rule 3745-33-07.

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity testing; 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 and Compliance Section  
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 Michelle Waller, (937)285-6454, [michelle.waller@epa.ohio.gov](mailto:michelle.waller@epa.ohio.gov), or Andy Bachman, (614)644-3075, [andrew.bachman@epa.ohio.gov](mailto: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](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

The Sugarcreek Water Resource Reclamation Facility discharges to the Little Miami River at River Mile (RM) 64.43 in Greene County. The approximate location of the facility is shown in Figure 1.

This segment of the Little Miami River is described by Ohio EPA River Code 11-001, and USEPA River Reach # 05090202-037 and is located in the Eastern Corn Belt Plains Region. The Little Miami River is presently designated for the following uses: Exceptional Warmwater Habitat (EWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Class A Primary Contact Recreation (PCR), and State Resource Water (SRW).

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 cannot meet the Clean Water Act 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 agricultural and industrial water supply.

### Facility Description

The Sugarcreek wastewater treatment plant was originally constructed in 1977, and last upgraded in 2009 which included an expansion of the plant. The following were updated in the expansion: the third aeration basin and clarifier, a new pretreatment building, the chemical feed/secondary pump building, the blower building, the equalization basin, new influent pump station and 2.3 miles of 42" discharge line, and other general equipment upgrades. The facility has an average design flow of 9.9 MGD. The treatment plant includes the following equipment and/or wet processes:

- Influent pumping (offsite)
- Bar screens
- Grit removal
- Activated sludge – extended aeration
- Secondary clarification
- Ultraviolet disinfection

Sludge processing includes aerobic digestion, sludge holding tanks, centrifuges for dewatering and the addition of lime prior to land application. Table 1 shows the total tons of sludge removed from the plant from 2008 through 2012, based upon discharge monitoring reports (DMR) data. The facility has a design capacity of 3900 dry tons of sludge per day.

<b>Year</b>	<b>Dry Tons Removed for Land Application</b>
2008	2652
2009	1862
2010	1849
2011	2464
2012	1682

Sugarcreek WRRF is also considering sending sludge to a third party company. Sludge will continue to be hauled to the landfill unless it is determined that a third party company has the ability to accept Sugarcreek WRRF sludge.

The wastewater plant serves the City of Bellbrook and Sugarcreek Township in Greene County, and a portion of Montgomery County. The total population served is estimated to be 61,400.

The inflow/infiltration rate for the collection system is estimated to be 1.7726 MGD. This treatment plan has an equalization basin in place for the bypassing of untreated wastewater when needed.

The County’s pretreatment program was approved on October 5, 1984. According to the permit renewal application, there are no significant industrial users and one categorical industrial user which discharge into the collection system. The total flow from industries was estimated to be 0.003 MGD, all contributed from the categorical industrial user.

Description of Existing Discharge

Table 2 shows the annual effluent flow rates for the Sugarcreek treatment plant from 2008 through 2012 based upon DMR data. The 50<sup>th</sup> percentile flow rates have remained relatively constant over this time period, while the 95<sup>th</sup> percentile flow rates and maximum flow rates have been somewhat more variable.

Year	Annual Flow in MGD		
	50 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile	Maximum
2008	6.475	13.6952	20.166
2009	4.918	7.0861	10.532
2010	4.746	8.5902	19.787
2011	5.263	14.3494	20.104
2012	4.149	7.7704	13.602

The collection system is 100 percent separate sanitary sewers. Over the life of the last permit there were 16 recorded overflows from the system wide sanitary sewer overflow monitoring station (the 300 station). However, all 16 of these occurrences took place in either 2008 or 2009. After the plant was upgraded to a larger capacity, there have been no overflows in 2010 through 2012.

Table 6 presents all the recorded data of the plant effluent from 2008 to 2012. Ohio EPA and Pretreatment data can be found in Table 7. Table 9 presents a summary of acute toxicity and chronic toxicity data and Table 10 contains a summary of projected effluent quality for the Sugarcreek plant.

Assessment of Impact on Receiving Waters

The upper Little Miami River and selected tributaries were evaluated for aquatic life and recreational use potential during the 2011 and 2012 field seasons. This assessment included the collection of water chemistry and biological sampling at numerous sites on the mainstem Little Miami River and tributaries, with locations upstream and downstream of the Sugarcreek WRRF. Table 3 (below) summarizes the use designation status and causes and sources of impairment found during the 2011 and 2012 sampling in the Little Miami River in the vicinity of the Sugarcreek WRRF.

In July 2002, U.S. EPA approved the Ohio EPA report *Total Maximum Daily Loads for the Upper Little Miami River, Final Report* (TMDL). The complete report is available at the following internet site:  
<http://www.epa.state.oh.us/dsw/tmdl/LittleMiamiRiver.aspx>

The implementation recommendations from the TMDL report for point source dischargers such as the Sugarcreek wastewater plant were incorporated into the existing permit for this facility which became effective in May 2003. 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 2006. To comply with the TMDL, the permit also required the County to implement additional steps to reduce the total phosphorus summer

loading from the Sugarcreek plant to 9.3 kg/day by 2013. These associated limits through the TMDL are proposed to continue through the life of this permit.

As Table 3 shows, the assessment showed the Little Miami River in full attainment of the EWH use designation both upstream, and for at least 6 miles downstream of Sugarcreek WRRF.

Table 3 Little Miami River Use Designation Status and Causes and Sources.

Location	RM	Use Desig.	Status (2011-12)	Causes	Sources
L. Miami R. upstream of Greene Co. Sugarcreek WRRF	64.44	EWH	FULL	--	--
L. Miami R. downstream of Greene Co. Sugarcreek WRRF	64.28	EWH	FULL	--	--
L. Miami R. at Spring Valley Roadside Park	63.28	EWH	FULL	--	--
L. Miami R. at Roxanna - N. Burlington Rd. at gage	60.84	EWH	FULL	--	--
L. Miami R. downstream of. Sandy Run, ¾ mi. SW Spring Valley Lake	58.30	EWH	FULL	--	--

#### 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 Sugarcreek WRRF were used to determine what parameters should undergo wasteload allocation (WLA). The parameters discharged are identified by the data available to Ohio EPA - Discharge Monitoring Report (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	Annual Reports from 2008 through 2012
Ohio EPA compliance sampling data	3/21/2011 and 5/23/2011

The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: chromium – TR, one value of 472 µg/L; iron, one value of 4430 µg/L; and nickel, one value of 528 µg/L.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ<sub>avg</sub>) values represent the 95<sup>th</sup> percentile of monthly average data, and maximum PEQ (PEQ<sub>max</sub>) values represent the 95<sup>th</sup> percentile of all data points. The average and maximum PEQ values are presented in Table 8.

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ<sub>avg</sub> or PEQ<sub>max</sub> is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 13 for a summary of the screening results.

#### *Wasteload Allocation*

For those parameters that require a wasteload allocation (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. 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 following dischargers in the upper Little Miami River segment were considered interactive:

- Xenia-Ford Road WWTP
- Xenia-Glady Run WWTP
- Montgomery County Eastern Regional WWTP
- Beaver Creek WWTP
- Sugarcreek WWTP

The available assimilative capacity was distributed among these facilities using the CONSWLA water quality model (Figure 2) 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 11, 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 in the Ohio River Basin requiring mercury limits in their NPDES permit must meet 12 ng/L at the end-of-pipe.

The data used in the waste load allocation analysis are listed in Tables 6, 7, and 8. The WLA results to maintain all applicable criteria are presented in Table 12. The current permit limits for ammonia-nitrogen were evaluated and are adequate to maintain water quality criteria in the Little Miami River.

### *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 Rule 3745-33-05(C)(2)]. Currently, a DMT is based on site- or area-specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement.

For the Little Miami River, 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 as can be seen in Table 11. 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 wasteload allocation 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 Sugarcreek WRRF. The application of the dissolved metal translators resulted in effective total recoverable criteria for copper, lead, and zinc that were lower than the total recoverable criteria listed in OAC 3745-1.

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

### *Whole Effluent Toxicity WLA*

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

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

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit ( $TU_c$ ) and 7Q10 flow for the average and the acute toxicity unit ( $TU_a$ ) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Sugarcreek WRRF, the wasteload allocation values are 1.0  $TU_a$  and 4.48  $TU_c$ .

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

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

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):

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

The acute toxicity unit ( $TU_a$ ) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life ( $LC_{50}$ ) 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 12. The average PEL ( $PEL_{avg}$ ) is compared to the average PEQ ( $PEQ_{avg}$ ) from Table 8, 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 13.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Federal and State laws/regulation require that dischargers meet both treatment-technology-based limits and any more stringent standards needed to comply with state WQS. Permit limits are based on the more restrictive of the two. Table 14 shows the draft NPDES permit limits for the Sugarcreek plant. The limits and monitoring requirements for outfall 001 are discussed in detail below.

#### ***Oil and Grease, pH, and Dissolved Oxygen***

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

#### ***Escherichia coli***

Effluent limits are being proposed for *Escherichia coli*. Water quality standards for *E. coli* became effective in March 2010 and take the place of fecal coliform testing. As the facility uses UV disinfection, Sugarcreek should not anticipate problems meeting the proposed monthly and weekly geometric mean concentrations of 126 and 284 per 100 ml respectively, these limits have been recommended in the permit for final effluent tables. Class A Primary Contact Recreation *E. coli* standards apply to the Little Miami River.

#### ***Total Suspended Solids, Ammonia, and CBOD<sub>5</sub>***

The limits for total suspended solids, ammonia-nitrogen, 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 the Sugarcreek plant. The loading limits are based upon the plant design flow of 9.9 MGD. Ammonia limits were evaluated and are protective of water quality standards for ammonia-nitrogen toxicity.

### ***Total Phosphorus and TMDL Compliance***

The existing permit for the Sugarcreek treatment plant 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 the Sugarcreek plant to meet an allowable total phosphorus load of 9.3 kg/day during the summer months beginning in March 2013. As defined in the permit, the plant's summer phosphorus load is calculated using the median plant flow (May – October) for the previous 5 calendar years and the median phosphorus concentration (May – October).

Year	Loading (kg/day)
2009	10.945
2010	7.93
2011	9.896
2012	8.24

Table 4 shows that over the past five years Sugarcreek has had some problems meeting the phosphorus loads of 9.3 kg/day according to the calculations referenced in Phase 2. The phosphorus is removed biologically and alum is stored on site in case secondary treatment is required. The loading limit of 9.3 kg/day is proposed to continue into this permit for the summer months of May through October to maintain river attainment levels after an additional three year compliance schedule allowing the facility to submit a nutrient trading plan. Weekly limits of 1.5mg/L and monthly limits of 1.0mg/L will also be proposed to continue in the summer.

### ***Nitrate+Nitrite-Nitrogen and Total Kjeldahl Nitrogen***

The continuation of monitoring for nitrate+nitrite-nitrogen and total Kjeldahl nitrogen is proposed based on best engineering judgment. Monitoring nitrate+nitrite-nitrogen and total Kjeldahl nitrogen 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.

### ***Dieldrin and Bis(2-ethylhexyl)phthalate***

Ohio EPA risk assessment (Table 13) places dieldrin and total bis(2-ethylhexyl)phthalate in Group 5. However, using the discretion allowed in paragraph A(5) of Rule 3745-33-07, monitoring, rather than effluent limits, is proposed for these pollutants. The PEQ values calculated for these pollutants (Table 8) may not be representative of their actual levels in the plant effluent because they were based on very limited data sets. There was only one data point out of 15 that detected dieldrin and that was at the method detection limit. There was also only one detection of Bis(2-ethylhexyl) phthalate out of 6 data points from pretreatment and EPA bioassay data (Table 7). The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

### ***Barium and Copper***

Ohio EPA risk assessment (Table 13) places barium and copper in group 4. This placement as well as the data in Tables 6 and 8 support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC Rule 3745-33-07(A)(2).

### ***Cadmium, Total Recoverable Chromium, Dissolved Hexavalent Chromium, Lead, Nickel, and Zinc***

Based on reasonable potential for requiring monitoring in NPDES permits [OAC 3745-33-07(A)], monitoring is proposed to continue for cadmium, total recoverable chromium, dissolved hexavalent chromium, lead, nickel and zinc. Because these contaminants were included in Group 2 under the risk assessment procedures (Table

13), monitoring at a reduced frequency of once per quarter is proposed. 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.

***Mercury***

The Ohio EPA risk assessment (Table 13) places mercury in group 5. This placement as well as the data in Tables 6 and 8 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For mercury, the PEQ is greater than 100 percent of the wasteload allocation and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC Rule 3745-33-07(A)(1).

***Whole Effluent Toxicity***

Annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the life of the permit. Evaluating the whole effluent toxicity data presented in Table 9 and other pertinent data under the provisions of OAC 3745-33-07(B) placed the Sugarcreek plant in Category 4 with respect to whole effluent toxicity. 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.

***MDLs for Cadmium, Dissolved Hexavalent Chromium, Copper, and Lead***

Table 5 shows a list of parameters and the accompanying method detection limits compared to the appropriate water quality criteria minimum values. The method detection limit should be approximately one third of the most stringent water quality criteria from Table 12. To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding cadmium, dissolved hexavalent chromium, copper, and lead; a special condition is proposed in Part II, Item L of the permit that provides guidance on the MDL the permittee should use in analyzing these contaminants.

Table 5. Sugarcreek WRRF Method Detection Limit Analysis			
Parameter (µg/L)	Current MDL	Water Quality Criteria Minimum	Proposed MDL
Cadmium	4.7	9.9	3.5
Chromium (Dissolved Hex.)	20	18	6
Copper	29	37	13
Lead	49	41	14

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

### *Sanitary Sewer Overflow Reporting*

Provisions for reporting sanitary sewer overflows (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 the Sugarcreek WRRF to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001.

### *Operator of Record*

In December 2006, Ohio Administrative Code 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 rule 3745-7-02 of the Ohio Administrative Code (OAC). It requires the permittee to designate one or more operator of record to oversee the technical operation of Sugarcreek WRRF.

### *Storm Water Compliance*

Parts IV, V, and VI have been included with the draft permit in order 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, Sugarcreek WRRF may seek permit coverage under the general permit for industrial stormwater (permit # OHR000004) or submit a “No Exposure Certification.” Parts IV, V, and VI will be removed from the final permit if: 1) the Sugarcreek WRRF submits a Notice of Intent (NOI) for coverage under the general permit for industrial stormwater or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

### *Outfall Signage*

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

Figure 1. Approximate location of the Sugarcreek Water Resource Reclamation Facility

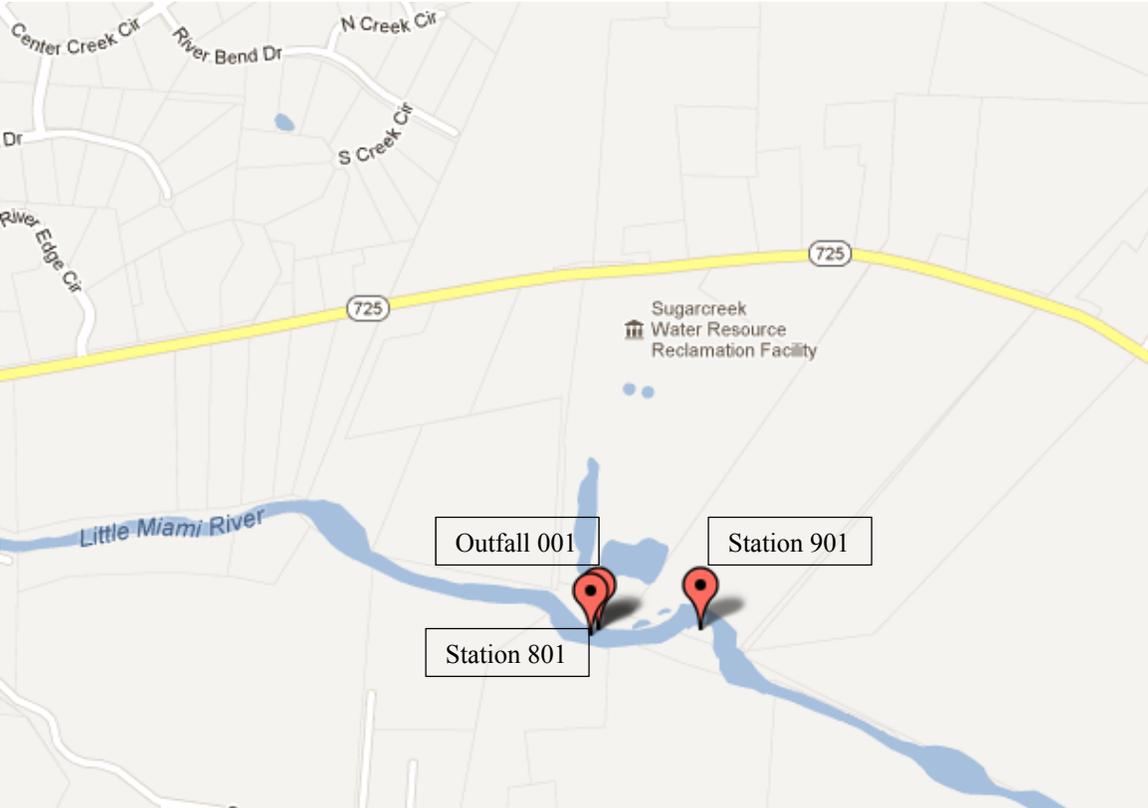
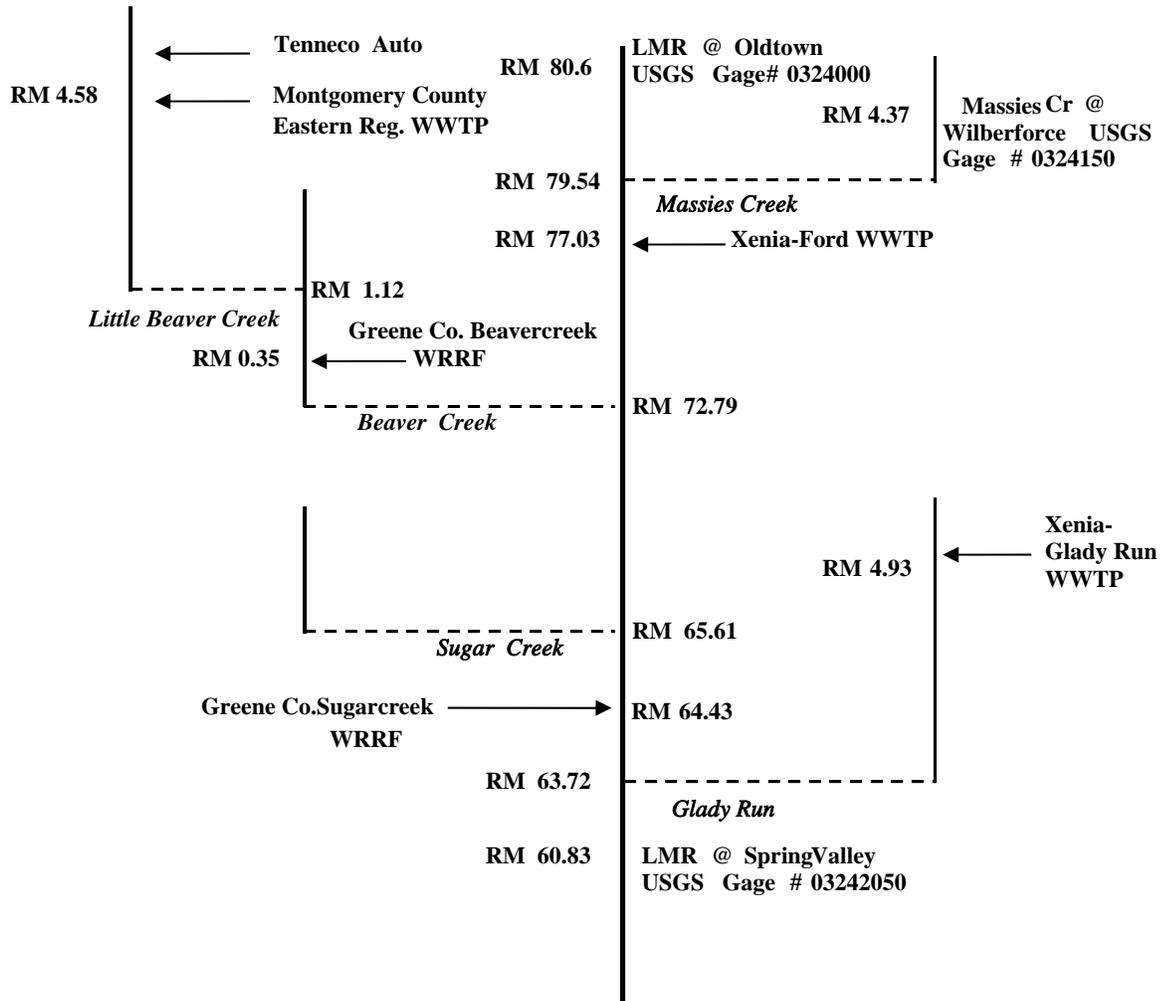


Figure 2. Schematic Depiction of the Upper Little Miami River Study Area



**Table 6. Effluent Characterization**

Summary of current permit limits and unaltered Discharged Monitoring Report (DMR) data for Sugarcreek outfall 1PK00014001: All values are based on annual records from January 2008 through December 2012. A = 7 day average.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50 <sup>th</sup>	95 <sup>th</sup>	
Water Temperature	Annual	C	----- Monitor-----		1826	15	21.8	5.3-22.8
Dissolved Oxygen	Summer	mg/L		6.0 (min)	919	7.6	9.7	6.2-11.1
Dissolved Oxygen	Winter	mg/L		6.0 (min)	907	8.6	10.5	6.3-13.4
Residue, Total Dissolved	Annual	mg/L	----- Monitor-----		44	713	807	552-1060
Total Suspended Solids	Summer	mg/L	16	24 <sup>A</sup>	727	2	5	0-61
Total Suspended Solids	Winter	mg/L	21	31.5 <sup>A</sup>	727	2	5	0-61
Oil and Grease, Freon Extr-Grav Meth	Annual	mg/L		10	32	0	0	0-0
Nitrogen, Ammonia (NH3)	Summer	mg/L	1.25	1.88 <sup>A</sup>	367	0.3	1.67	0-9.24
Nitrogen, Ammonia (NH3)	Winter	mg/L	7.5	11.25 <sup>A</sup>	363	0.42	5.6	0-11.1
Nitrogen Kjeldahl, Total	Annual	mg/L	----- Monitor-----		60	1.29	6.06	0.54-10.4
Nitrite Plus Nitrate, Total	Annual	mg/L	----- Monitor-----		60	2.22	12.5	0.15-16.1
Phosphorus, Total (P)	Annual	mg/L	1	1.5 <sup>A</sup>	274	0.54	2.07	0.08-3.86
Cyanide, Free	Annual	mg/L	----- Monitor-----		25	0	0	0-0
Barium, Total Recoverable	Annual	ug/L	----- Monitor-----		4	64.4	86.6	41-87.2
Nickel, Total Recoverable	Annual	ug/L	----- Monitor-----		47	0	0	0-0
Strontium, Total (Sr)	Annual	ug/L	----- Monitor-----		4	268	287	250-288
Zinc, Total Recoverable	Annual	ug/L	----- Monitor-----		47	28	55.5	0-63
Cadmium, Total Recoverable	Annual	ug/L	----- Monitor-----		47	0	0	0-5
Lead, Total Recoverable	Annual	ug/L	----- Monitor-----		47	0	0	0-0
Chromium, Total Recoverable	Annual	ug/L	----- Monitor-----		47	0	0	0-0
Copper, Total Recoverable	Annual	ug/L	----- Monitor-----		77	0	6.61	0-36
Chromium, Dissolved Hexavalent	Annual	ug/L	----- Monitor-----		29	0	0	0-0
Fecal Coliform	Annual	#/100 ml	1000	2000 <sup>A</sup>	388	0	60	0-2000
Aldrin	Annual	ug/L	----- Monitor-----		5	0	0	0-0
Dieldrin, Whole Sample	Annual	ug/L	----- Monitor-----		15	0	0.015	0-0.05
Mercury, Total (Low Level)	Annual	ng/L	----- Monitor-----		31	6.2	14.2	0-15.2
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	----- Monitor-----		4	0	0	0-0
Chronic Toxicity, Ceriodaphnia dubia	Annual	TUc	----- Monitor-----		4	0.705	2.61	0-2.82
Acute Toxicity, Pimephales promelas	Annual	TUa	----- Monitor-----		4	0	0	0-0
Chronic Toxicity, Pimephales promelas	Annual	TUc	----- Monitor-----		4	0	0	0-0
pH, Maximum	Annual	S.U.		9	1826	7.4	7.7	6.7-8.9
pH, Minimum	Annual	S.U.		6.5	1826	7.2	7.5	6.3-8.9
CBOD 5 day	Summer	mg/L	10	15 <sup>A</sup>	356	0	2.25	0-11
CBOD 5 day	Winter	mg/L	17.5	26.3 <sup>A</sup>	359	0	4	0-13

Table 7. Effluent Characterization Using Ohio EPA and Pretreatment Data

Summary of analytical results for Sugarcreek outfall 1PK00014001: Units ug/L unless otherwise noted; OEPA = data from analyses by Ohio EPA; PT = data from pretreatment program reports; NA = not analyzed; ND(x) = not detected (method detection limit).

PARAMETER	OEPA 5/17/2011	OEPA 3/15/2011	PT 10/23/2012	PT 5/17/2011	PT 12/8/2009	PT 11/18/2008
Arsenic	ND(2)	3.2	ND(5)	ND(5)	ND(5)	ND(3)
Barium	73	110	NA	NA	NA	NA
Chromium	472	11.9	ND(5)	ND(5)	ND(5)	ND(5)
Copper	12.8	5.3	7	ND(5)	6.35	8.03
Dissolved solids (mg/L)	730	942	NA	NA	NA	NA
Iron	4430	292	NA	NA	NA	NA
Nickel	528	43.2	ND(5)	ND(5)	ND(5)	ND(5)
Nitrate+nitrite (mg/L)	1.67	6.66	NA	NA	NA	NA
Phosphorus, T (mg/L)	0.439	0.388	NA	NA	NA	NA
Strontium	239	410	NA	NA	NA	NA
Zinc	23	25	48	17	41.4	34.9
Bis(2-ethylhexyl) phthalate	16.1	ND(10.4)	ND(6)	ND(5.0)	ND(6)	ND(10)

Table 8. Effluent Data for Greene County Sugarcreek WRRF

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
<u>Self-Monitoring (DMR) Data</u>					
Dissolved Solids, Total <sup>A</sup>	mg/L	46	46	795.5	875.2
Ammonia-S	mg/L	243	232	1.07	2.314
Ammonia-W	mg/L	179	161	3.492	6.143
Nitrate + Nitrite <sup>A</sup>	mg/L	62	62	11.76	16.11
Phosphorus <sup>A</sup>	mg/L	276	276	1.327	2.084
Free Cyanide	µg/L	25	0	--	--
Barium <sup>A</sup>	µg/L	6	6	168.6	231.0
Nickel <sup>A</sup>	µg/L	52	1	31.54	43.2
Strontium <sup>A</sup>	µg/L	4	4	546.6	748.8
Zinc <sup>A</sup>	µg/L	53	36	47.59	66.81
Cadmium	µg/L	47	1	4.015	5.5
Lead	µg/L	47	0	--	--
Chromium <sup>A</sup>	µg/L	53	1	17.37	23.8
Copper <sup>A</sup>	µg/L	83	12	23.65	32.4
Dissolved Hexavalent Chromium	µg/L	29	0	--	--
Aldrin	µg/L	5	0	--	--
Dieldrin	µg/L	3	1	0.11	0.15
Mercury	ng/L	31	30	13.32	18.24
<u>OEPA and Pretreatment Program Data</u>					
Arsenic	µg/L	6	1	7.01	9.6
Iron	µg/L	1	1	1322.	1810.
Bis(2-ethylhexyl)phthalate	µg/L	6	1	24.68	33.81

<sup>A</sup> OEPA and Pretreatment data were combined with the DMR data.

Table 9a. Acute/Chronic Toxicity Summary

Summary of acute and chronic toxicity test results for Sugarcreek WWTP effluent:

Test Date(a)	<i>Ceriodaphnia dubia</i> 48 hours	<i>Fathead Minnows</i> 96 hours	<i>Ceriodaphnia dubia</i> 7 days	<i>Fathead Minnows</i> 7 days
	TUa <sup>b</sup>	TUa <sup>b</sup>	TUc <sup>b</sup>	TUc <sup>b</sup>
9/1/09(E)	BD	BD	BD	BD
8/29/10(E)	BD	BD	2.82	BD
10/13/11(E)	BD	BD	1.41	BD
10/10/12(E)	BD	BD	BD	BD

<sup>a</sup> O = EPA test; E = entity test

<sup>b</sup> TUa = acute toxicity units, TUc = chronic toxicity units

\*BD = below detection

\*\* = 48 hour screening test

Table 9b. Summary of Acute Toxicity Test Results for Sugarcreek WWTP

Test Date	<i>Ceriodaphnia dubia</i> 48 hours						<i>Fathead Minnows</i> 96 hours					
	UP <sup>b</sup>	C <sup>c</sup>	LC <sub>50</sub> <sup>d</sup>	%M <sup>e</sup>	TUa <sup>f</sup>	NF <sup>g</sup>	UP <sup>b</sup>	C <sup>c</sup>	LC <sub>50</sub> <sup>d</sup>	%M <sup>e</sup>	TUa <sup>f</sup>	NF <sup>g</sup>
9/1/09	0	0	>100	0	BD	NT	0	0	>100	0	BD	NT
8/29/10	0	0	>100	0	BD	NT	2	5	>100	2	BD	NT
10/13/11	0	0	>100	0	BD	NT	2	5	>100	5	BD	NT
10/10/12	0	0	>100	0	BD	NT	0	5	>100	5	BD	NT

<sup>a</sup> O = EPA test; E = entity test

<sup>b</sup> UP = upstr/eam control water

<sup>c</sup> C = laboratory water control

<sup>d</sup> LC<sub>50</sub> = median lethal concentration

NT = not tested

<sup>e</sup> %M = percent mortality in 100% effluent

<sup>f</sup> TUa = acute toxicity units

<sup>g</sup> NF = near field sample

BD = below detection

Table 10. Water Quality Criteria in the Little Miami River Study Area

Parameter	Units	Outside Mixing Zone Criteria			Inside	
		Human Health	Average		Maximum Aquatic Life	Mixing Zone Maximum
			Agri-culture	Aquatic Life		
Ammonia-S	mg/L	--	--	1.0	--	--
Ammonia-W	mg/L	--	--	1.9	--	--
Arsenic	µg/L	--	100.	150.	340.	680.
Barium	µg/L	--	--	220.	2000.	4000.
Bis (2-ethylhexyl) phthalate	µg/L	59. <sup>C</sup>	--	8.4	1100.	2100.
Cadmium	µg/L	--	50.	6.3	17.	35.
Chlorine	µg/L	--	--	11.	19.	38.
Chromium	µg/L	--	100.	230.	4800.	9600.
Dissolved Hexavalent Chromium	µg/L	--	--	11.	16.	31.
Copper	µg/L	1300.	500.	26.	43.	86.
Free Cyanide	µg/L	220000.	--	12.	46.	92.
Diieldrin	µg/L	0.0014 <sup>C</sup>	--	0.056	0.24	0.47
Total Dissolved Solids	mg/L	--	--	1500.	--	--
Iron	µg/L	--	5000.	--	--	--
Lead	µg/L	--	100.	29.	560.	1100.
gamma-BHC (Lindane) <sup>B</sup>	µg/L	0.63 <sup>C</sup>	--	0.057	0.95	1.9
Mercury <sup>B</sup>	ng/L	12.	10000.	910.	1700.	3400.
Molybdenum	µg/L	--	--	20000.	190000.	370000.
Nickel	µg/L	4600.	200.	140.	1300.	2600.
Nitrate + Nitrite	mg/L	--	100.	--	--	--
Phenol	µg/L	4600000.	--	400.	4700.	9400.
Selenium	µg/L	11000.	50.	5.	--	--
Silver	µg/L	--	--	1.3	13.	25.
Strontium	µg/L	--	--	21000.	40000.	81000.
Zinc	µg/L	69000.	25000.	330.	330.	660.

<sup>B</sup>. Bioaccumulative Chemical of Concern (BCC)

<sup>C</sup>. Based on a carcinogenic endpoint.

Table 11. Instream Conditions and Discharger Flow

Parameter	Season	Value	Basis
<b>Stream Flows (cfs)</b>			
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 Rd. 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 11. 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	DSW
Mont. Co. East. Regional WWTP		20.11	DSW
Greene Co. Beaver creek WRRF		13.15	DSW
Greene Co. Sugarcreek WRRF		15.32	DSW
Xenia- Glady Run WWTP		6.19	DSW
Mixing Assumption	% average	100	Stream-to-discharge ratio
	% maximum	100	Stream-to-discharge ratio
Instream Summer Temperature (°C)			
L. Miami River (RM 77.0)		22.	Xenia-Ford 901 Station; 19 values, 2008-12
L. Miami River (RM 64.0)		21.	Sugarcreek 901 Station; 20 values, 2008-12
Beaver Creek		21.	Beaver creek 901 Station; 20 values, 2008-12
L. Beaver Creek		22.	East.Reg. 901 Station; 20 values, 2008-12
Glady Run		19.	Xenia-Glady 901 Station; 19 values, 2008-12
Instream Winter Temperature (°C)			
L. Miami River (RM 77.0)		4.8	Xenia-Ford 901 Station; 9 values, 2008-12
L. Miami River (RM 64.0)		6.1	Sugarcreek 901 Station; 14 values, 2008-12
Beaver Creek		8.0	Beaver creek 901 Station; 14 values, 2008-12
L. Beaver Creek		8.9	East.Reg. 901 Station; 14 values, 2008-12
Glady Run		7.2	Xenia-Glady 901 Station; 9 values, 2008-12
Instream Summer pH (S.U.)			
L. Miami River (RM 77.0)		8.3	Xenia-Ford 901 Station; 19 values, 2008-12
L. Miami River (RM 64.0)		8.1	Sugarcreek 901 Station; 20 values, 2008-12
Beaver Creek		8.0	Beaver creek 901 Station; 20 values, 2008-12
L. Beaver Creek		7.9	East.Reg. 901 Station; 20 values, 2008-12
Glady Run		8.2	Xenia-Glady 901 Station; 19 values, 2008-12
Instream Winter pH (S.U.)			
L. Miami River (RM 77.0)		8.4	Xenia-Ford 901 Station; 9 values, 2008-12
L. Miami River (RM 64.0)		8.3	Sugarcreek 901 Station; 14 values, 2008-12
Beaver Creek		8.4	Beaver creek 901 Station; 14 values, 2008-12
L. Beaver Creek		7.9	East.Reg. 901 Station; 14 values, 2008-12
Glady Run		8.3	Xenia-Glady 901 Station; 9 values, 2008-12

Table 11. Instream Conditions and Discharger Flow (continued)

Parameter (Units)	Value	Basis
<b>Instream Hardness (mg/L)</b>		
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
<b>Background Water Quality (µg/L)</b>		
<b>Little Miami River</b>		
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 11. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
<b>Beaver Creek</b>		
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 11. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
<b>Little Beaver Creek</b>		
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 11. Instream Conditions and Discharger Flow (continued)

Parameter (µg/L)	Value	Basis
<b>Glady Run</b>		
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
<b>Dissolved Metal Translators (Little Beaver Creek)</b>		
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
<b>Dissolved Metal Translators (Little Miami River – apply to upper segment only)</b>		
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 12. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Average		Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Agri Supply			
Arsenic <sup>C</sup>	µg/L	--	459.	246.	522.	680.
Barium	µg/L	--	--	301.	3019.	4000.
Bis(2-ethylhexyl)phthalate	µg/L	392.	--	29.	3781. <sup>A</sup>	2100.
Cadmium	µg/L	--	230. <sup>A</sup>	9.9	24.	35.
Chromium <sup>C</sup>	µg/L	--	459.	355.	6911.	9600.
Dissolved-Hexavalent Chromium <sup>C</sup>	µg/L	--	--	18.	25.	31.
Copper	µg/L	5961. <sup>A</sup>	2289. <sup>A</sup>	37.	58.	86.
Free Cyanide <sup>C</sup>	µg/L	1010000. <sup>A</sup>	--	20.	71.	92.
Dieldrin	µg/L	0.13	--	0.3	1.0 <sup>A</sup>	0.47
Total Dissolved Solids	mg/L	--	--	2201.	--	--
Iron	µg/L	--	42110.	--	--	--
Lead <sup>C</sup>	µg/L	--	459.	41.	763.	1100.
Mercury <sup>B</sup>	ng/L	12.	10000. <sup>A</sup>	910.	1700.	3400.
Molybdenum <sup>C</sup>	µg/L	--	--	32850.	291500.	370000.
Nickel <sup>C</sup>	µg/L	21100. <sup>A</sup>	906.	205.	1963.	2600.
Selenium <sup>C</sup>	µg/L	50490.	230.	8.2	--	--
Silver <sup>C</sup>	µg/L	--	--	2.1	18.	25.
Zinc <sup>C</sup>	µg/L	316700. <sup>A</sup>	114700. <sup>A</sup>	477.	455.	660.

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

<sup>B.</sup> Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless the requirements for an exception are met as listed in 3745-2-08(L).

<sup>C.</sup> Parameter would not require a WLA based on reasonable potential procedures, but allocation requested for use in pretreatment program.

Table 13. 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.

Aldrin	Arsenic	Dissolved Hexavalent Chromium
Chromium	Free Cyanide	Lead
Molybdenum	Nickel	Nitrate + Nitrite
Selenium	Silver	Strontium
Zinc		

Group 3: PEQ<sub>max</sub> < 50% of maximum PEL and PEQ<sub>avg</sub> < 50% of average PEL. No limit recommended, monitoring optional.

Cadmium	Total Dissolved Solids	Iron
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Group 4: PEQ<sub>max</sub> ≥ 50% but <100% of the maximum PEL or PEQ<sub>avg</sub> ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

Barium	Copper
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Group 5: Maximum PEQ ≥ 100% of the maximum PEL or average PEQ ≥ 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	Maximum
Bis(2-ethylhexyl) phthalate	µg/L	annual	29.	2100.
Dieldrin	µg/L	annual	0.13	0.47
Mercury	ng/L	annual	12.	1700.

Table 14. Final Effluent Limits and Monitoring Requirements for Sugarcreek WRRF Outfall 001

Parameter	Units	Effluent Limits				Basis <sup>b</sup>
		Concentration		Loading (kg/day) <sup>a</sup>		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow	MGD	----- Monitor -----				M
Temperature	°C	----- Monitor -----				M
Dissolved Oxygen	mg/L	----- Not less than 6.0 -----				PD/EP
Carbonaceous biochemical oxygen demand (5-day)						
Summer	mg/L	10	15 <sup>c</sup>	375	563 <sup>c</sup>	PD/EP
Winter	mg/L	17.5	26.3 <sup>c</sup>	656	984 <sup>c</sup>	PD/EP
Total Suspended Solids						
Summer	mg/L	16	24 <sup>c</sup>	599	899 <sup>c</sup>	PD/EP
Winter	mg/L	21	31.5 <sup>c</sup>	787	1180 <sup>c</sup>	PD/EP
Total Dissolved Solids	mg/L	----- Monitor -----				RP
Ammonia						
Summer	mg/L	7.5	11.25 <sup>c</sup>	281	422 <sup>c</sup>	PD/EP
Winter	mg/L	1.25	1.88 <sup>c</sup>	46.8	70.3 <sup>c</sup>	PD/EP
Total Kjeldahl nitrogen	mg/L	----- Monitor -----				BEJ
Nitrate + Nitrite	mg/L	----- Monitor -----				BEJ
Phosphorus						
Summer	mg/L	1.0	1.5 <sup>c</sup>	37.5	56.2	TMDL/EP
Winter	mg/L	----- Monitor -----				BEJ/EP
May-Oct (Initial)	mg/L	----- Monitor -----				BEJ
May-Oct (Final)		----- 9.3 kg/day seasonal limit -----				TMDL
Oil and Grease	mg/L	----- Not greater than 10.0 -----				WQS
pH	S.U.	6.5 - 9.0				WQS
<i>E. coli</i> - Summer	#/100mL	126	284 <sup>c</sup>	--	--	WQS
Free Cyanide	mg/L	----- Monitor -----				M/EP
Barium	mg/L	----- Monitor -----				RP
Cadmium	µg/L	----- Monitor -----				M/EP
Chromium	µg/L	----- Monitor -----				M/EP
Dissolved Hex. Chromium	µg/L	----- Monitor -----				M/EP
Copper	µg/L	----- Monitor -----				WLA
Lead	µg/L	----- Monitor -----				M
Mercury	ng/L	12	1700	0.000450	0.0638	WLA
Nickel	µg/L	----- Monitor -----				M/EP
Zinc	µg/L	----- Monitor -----				M/EP
Whole Effluent Toxicity						
Acute, <i>Ceriodaphnia dubia</i>	TU <sub>a</sub>	----- Monitor w/o Trigger -----				WET
Chronic, <i>Ceriodaphnia dubia</i>	TU <sub>c</sub>	----- Monitor w/o Trigger -----				WET
Acute, <i>Pimephales promelas</i>	TU <sub>a</sub>	----- Monitor w/o Trigger -----				WET
Chronic, <i>Pimephales promelas</i>	TU <sub>c</sub>	----- Monitor w/o Trigger -----				WET

<sup>a</sup> Effluent loadings based on average design discharge flow of 9.9 MGD.

<sup>b</sup> Definitions:

- ABS** = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l))
- BADCT** = Best Available Demonstrated Control Technology
- BEJ** = Best Engineering Judgment
- BPJ** = Best Professional Judgment
- BPT** = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation
- EP** = Existing Permit
- M** = Best Engineering Judgement of *Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges*
- RP** = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A))
- PD** = Plant Design
- PTS** = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
- TMDL** = Total Maximum Daily Load
- VAR** = Mercury variance (OAC 3745-33-07(D)(10)(a))
- WET** = Whole Effluent Toxicity (OAC 3745-33-07(B))
- WLA** = Wasteload Allocation procedures (OAC 3745-2)
- WLA/IMZM** = Wasteload Allocation limited by Inside Mixing Zone Maximum
- WQS** = Ohio Water Quality Standards (OAC 3745-1)

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