

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

(Revised 10/31/14)

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the Lorain Philip Q. Maiorana Wastewater Treatment Plant

Public Notice No.: 14-08-001
Public Notice Date: August 20, 2014
Comment Period Ends: September 20, 2014

Ohio EPA Permit No.: 3PD00040*HD
Application No.: OH0089672

Name and Address of Applicant:

City of Lorain
200 West Erie Avenue
Lorain, Ohio 44052

Name and Address of Facility Where
Discharge Occurs:

Philip Q. Maiorana Wastewater Treatment Plant
6301 West Erie Avenue
Lorain, Ohio 44052

Receiving Water: Lake Erie

Introduction

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

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

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

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

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

Summary of Permit Conditions

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, 5-day carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS), ammonia-nitrogen, nitrite+nitrate-nitrogen, oil and grease, pH, total residual chlorine, free cyanide, cadmium, chromium, dissolved hexavalent chromium, copper, lead, nickel and zinc.

The current monthly and weekly limits are continued for total phosphorus. A new seasonal, April - October, limit is proposed based on best engineering judgment. A 27- month compliance schedule is proposed for achieving this limit.

We are proposing to renew the plant's mercury variance with a variance-based limit of 7.1 ng/l, which is lower than the limit in the current permit.

We are proposing a new weekly average limit for *Escherichia coli* to go along with the current monthly average limit.

Current permit limits for free cyanide are being removed because effluent data shows that they no longer have the reasonable potential to contribute to exceedances of water quality standards. This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. As soon as possible, the permittee must begin using either ASTM D7237-10 or OIA-1677-09 both of which are approved methods for free cyanide listed in 40 CFR 136.

Final limits for acute toxicity are proposed with monitoring and a trigger for a toxicity reduction evaluation as the interim conditions. Annual chronic toxicity testing is proposed for the life of the permit.

Based on evaluation of effluent data, a new monitoring requirement is proposed for silver. A new monitoring requirement is proposed for total filterable residue (total dissolved solids) based on best engineering judgment. We are also proposing to restore dissolved oxygen monitoring of the final effluent, which was inadvertently deleted from the current permit.

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; tracking of group 4 parameters; specifying method detection limits for certain parameters and outfall signage.

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Procedures for Participation in the Formulation of Final Determinations

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

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

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

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

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

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

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

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

For additional information about this fact sheet or the draft permit, contact Gary Stuhlfauth, (614) 644-2026, gary.stuhlfauth@epa.ohio.gov.

Information Regarding Certain Water Quality Based Effluent Limits

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

timely submitted National Pollutant Discharge Elimination System (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 Lorain Philip Q. Maiorana (PQM) wastewater treatment plant is located in Lorain County and discharges directly to Lake Erie through a submerged outfall pipe approximately 1000 feet offshore. The location of the facility is shown in Figure 1.

This segment of Lake Erie is described by Ohio EPA River Code: 24-500, USEPA River Reach #: 04110001, County: Lorain, Ecoregion: Eastern Great Lakes and Hudson Lowlands. Lake Erie is presently designated for the following uses under Ohio's water quality standards (OAC 3745-1-31): Exceptional Warmwater Habitat (EWH), Superior High Quality Water, Public Water Supply (PWS), Agricultural Water Supply (AWS), Industrial Water Supply (IWS) and Bathing Waters (BW).

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

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

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

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural and industrial water supply.

Facility Description

The Lorain PQM wastewater treatment plant was originally constructed and placed into operation in 1988 and most recently upgraded in 2012. The facility has an average daily design flow of 5.4 million gallons per day (MGD). The treatment processes include screening, grit removal, preaeration, primary settling, plastic media trickling filters, phosphorus removal using ferric chloride addition, secondary clarification, and disinfection (chlorination/dechlorination). Biosolids treatment consists of gravity thickening and anaerobic digestion. The biosolids are hauled to the Lorain Black River wastewater plant for further processing and disposal by land application at agronomic rates.

The plant has an internal secondary treatment bypass. It runs from the trickling filter wet well, bypasses the trickling filters and recombines with fully treated effluent before final effluent sampling at station 001. Bypass flow is disinfected during the recreation season. A monitoring and reporting table for this bypass, station 602, is proposed in the draft permit. The table includes a provision stating that bypassing is prohibited and subject to enforcement action unless certain conditions are met.

Lorain implements an Ohio EPA approved industrial pretreatment program. Two categorical industrial users and 1 significant noncategorical industrial user discharge approximately 0.204 MGD to the plant.

The City has a 100 percent separate sanitary sewer system that includes ten lift stations. The plant serves the west side of Lorain, and Amherst and Russia Townships with a total service population of approximately 16,700.

Description of Existing Discharge

Table 1 presents chemical specific data compiled from annual pretreatment reports.

Table 2 presents a summary of unaltered discharge monitoring report (DMR) data for outfall 3PD00040001. Data are presented for the period May 2009 through April 2014, and current permit limits are provided for comparison.

Table 3 summarizes the chemical specific data for outfall 001 by presenting the average and maximum Projected Effluent Quality values.

Table 4 summarizes the results of acute whole effluent toxicity tests of the final effluent.

The City reports sanitary sewer overflow (SSO) occurrences under station 300 in its NPDES permit. During the period May 2009 through April 2014, the City reported one SSO in 2010, one in 2012 and two in 2013.

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

Assessment of Impact on Receiving Waters

The draft *Ohio 2014 Integrated Water Quality Monitoring and Assessment Report* lists the Lake Erie Central Basin Shoreline as impaired for the aquatic life, recreation and fish consumption uses. Monitoring to develop a comprehensive Lake Erie nearshore monitoring program was funded by a Great Lakes Restoration Initiative grant conducted from 2011-2013. Fish community sampling results were used to update assessment unit status for the 2014 *Integrated Report*. Because data assessment and analyses were still underway for this project, causes and sources were retained from the previous report and include: siltation, nutrients, exotic species and direct habitat alterations (causes) and municipal point sources, urban runoff/storm sewers, habitat modifications other than hydromodification, combined sewer overflows, streambank modification/destabilization and non-irrigated crop production (sources).

The draft 2014 report is available at this Ohio EPA web site:

<http://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx> .

Development of Water-Quality-Based Effluent Limits

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

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

Self-monitoring data (DMR)	May 2009 through April 2014
Pretreatment data	2009 - 20013

The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: Nitrate+nitrite – 22 values less than 1 mg/l; total phosphorus – one value less than 1 mg/l; zinc – three values less than 2 ug/l.

This data is evaluated statistically, and Projected Effluent Quality (PEQ) values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points. The average and maximum PEQ values are presented in Table 3.

The PEQ values are used according to Ohio rules to compare to applicable water quality standards (WQS) and allowable wasteload allocation (WLA) values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a

WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 8 for a summary of the screening results.

Wasteload Allocation For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio water quality standards (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. Wasteload allocations for direct discharges to lakes are done using the following equation for average criteria: $WLA = (11 \times \text{Water Quality Criteria}) - (10 \times \text{Background Concentration})$. Allocations for maximum criteria are set equal to the Inside Mixing Zone Maximum values.

Ohio's water quality standard implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet water quality standards at the end-of-pipe, which are 1.3 ng/l (average) and 1700 ng/l (maximum) in the Lake Erie basin.

The data used in the WLA are listed in Tables 5 and 6. The wasteload allocation results to maintain all applicable criteria are presented in Table 7.

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

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

The wasteload allocation calculation for chronic WET is similar to the dilution calculation used for the aquatic life criteria. The acute WLA is set equal to 1.0 TU_a. These values are the levels of effluent toxicity that should not cause ambient toxicity. For the Lorain PQM plant, the wasteload allocation values are 1.0 TU_a and 11.0 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the IC₂₅:

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

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

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

The acute toxicity unit (TU_a) is defined as 100 divided by the LC₅₀ for the most sensitive test species:

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

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

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 7. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 3, and the PEL_{max} is compared to the PEQ_{max} . Based on the calculated percentage of the allocated value [$(PEQ_{avg} \div PEL_{avg}) \times 100$, or $(PEQ_{max} \div PEL_{max}) \times 100$], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 8.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 9 presents the final effluent limits and monitoring requirements proposed for Lorain PQM outfall 3PD00040001 and the basis for their recommendation.

Based on best engineering judgment, the limits proposed for CBOD₅ and total suspended solids are a continuation of existing permit conditions. Monitoring of ammonia-nitrogen and nitrate+nitrite-nitrogen is also proposed to continue. Reinstating daily monitoring for dissolved oxygen is proposed. Dissolved oxygen monitoring was inadvertently deleted from the permit during the previous NPDES renewal.

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on water quality standards (OAC 3745-1-07). Bathing Water *E. coli* standards apply to Lake Erie. A new weekly average *E. coli* limit is proposed consistent with the NPDES permit rule that requires monthly and weekly averages at municipal wastewater plants [OAC 3745-33-05(C)(1)(a)].

The proposed limit for total residual chlorine is based on wasteload allocation 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. The effluent limit for chlorine at outfall 3PD00040001 is less than the quantification level of 0.050 mg/l. However, a pollutant minimization program is not required because the dosing rate of dechlorination chemicals ensures that the water quality based effluent limit is being met.

The monthly and weekly average limits proposed for total phosphorus are based on provisions of OAC 3745-33-06(C) and are a continuation of existing permit limits. As an initial step to address the nutrient-related impairment in Lake Erie, a new seasonal concentration limit is proposed for the period April 1 through October 31. Compliance with this limit will be based on the arithmetic mean of all the daily phosphorus data reported during this period. A 27-month compliance schedule is proposed for achieving the seasonal limit. The schedule includes provisions for optimizing the operation of the existing treatment facilities to reduce total phosphorus in the plant's effluent. A special condition in Part II of the permit is proposed that explains compliance with the seasonal limit.

Mercury Reasonable Potential and Renewal of Mercury Variance The Ohio EPA risk assessment (Table 8) places mercury in group 5. This placement as well as the supporting data indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality.

The Lorain PQM permit was modified in January 2013 to include a mercury variance, and variance-based limits for mercury. Based on the monitoring results from May 2009 through April 2014 and the new application information, the City has determined that the facility will not meet the 30-day average permit limit of 1.3 nanograms per liter (ng/l). However, the effluent data shows that the permittee can meet the mercury annual average value of 12 ng/l. The permittee's application has also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based upon these demonstrations, the Lorain PQM wastewater treatment

plant is eligible for the mercury variance under Rule 3745-33-07(D)(10)(a) of the Ohio Administrative Code (OAC).

The City of Lorain submitted information supporting the renewal of the variance. The permittee has implemented actions in its pollutant minimization program (PMP) to reduce the amount of mercury coming to the treatment plant. The change in the proposed monthly average variance-based limit from 9.9 ng/l to 7.1 ng/l indicates a reduction of mercury in the plant effluent. The PMP schedule developed from the original variance continues to be implemented, and further reductions in mercury may be possible.

Ohio EPA has reviewed the mercury variance application and has determined that the application meets the requirements of the OAC. As a result, the variance is proposed to be issued as a condition in Part II of the NPDES permit, and the following requirements have been incorporated into the draft permit:

- mercury effluent limits developed from sampling data submitted by city of 7.1 ng/l for the 30-day average limit;
- a requirement that the permittee make reasonable progress to meet the water-quality-based effluent limit for mercury by implementing the plan of study which has been developed as part of the pollutant minimization program;
- influent and effluent monitoring for mercury;
- a requirement that the average annual effluent concentration for mercury is less than or equal to 12 ng/l as specified in the plan of study;
- a requirement for to use the most sensitive analytical method approved by U.S. EPA; and
- a requirement that the City submit a certification to Ohio EPA stating that all required permit conditions for the plan of study have been satisfied.

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

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

Ohio EPA risk assessment (Table 8) places cadmium, total chromium, dissolved hexavalent chromium, lead, nickel and zinc in group 2. This placement as well as the supporting data support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a low frequency is proposed to document that these pollutants continue to remain at low levels.

Based on best engineering judgment, monitoring is proposed for total dissolved solids (total filterable residue), which is an emerging water quality issue for municipal wastewater treatment plants. No effluent data is available for this parameter, though conductivity measurements taken during toxicity testing indicate levels in the range of 600 – 700 mg/l. The purpose of the monitoring is to obtain data on the level and variability of total dissolved solids in the plant's effluent.

The following parameters are included in risk assessment group 2, and based on best engineering judgment, no monitoring is proposed: arsenic, molybdenum and selenium.

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 and influent 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.

Whole Effluent Toxicity Reasonable Potential

Evaluating the acute toxicity results in Table 4 under the provisions of 40 CFR Part 132, Appendix F, Procedure 6, gives an acute PEQ value of 3.2 TU_a for *C. dubia* and 4.8 TU_a for fathead minnows. Reasonable potential for acute toxicity is demonstrated, since these values exceed the wasteload allocation value of 1.0 TU_a.

Consistent with Procedure 6 and OAC 3745-33-07(B), a daily maximum limit of 1.0 TU_a is proposed for both test species that would become effective 50 months from the effective date of the permit. To obtain a larger data set that includes seasonal results, quarterly acute testing for the first two years of the permit with a trigger to conduct a toxicity reduction evaluation (TRE) is proposed as the interim condition. Twice per year acute testing is proposed for the remainder of the permit.

A compliance schedule is proposed that includes a requirement for an initial TRE investigation if toxicity is detected, outlines requirements for the TRE if one is necessary and requires compliance with the final limits for acute toxicity.

Annual chronic toxicity tests using both test species is proposed for the life of the permit. Chronic toxicity data is not available for the PQM plant. The purpose of the annual testing is to obtain base line chronic data during the time the plant is addressing the observed acute toxicity. The annual chronic testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11).

Several observations regarding the effluent and acute toxicity at the Lorain PQM wastewater treatment plant:

- The plant discharges high levels of ammonia-Nitrogen. On the days when the 2009 – 2013 tests were conducted, 14 of the 16 daily ammonia-N values reported on the plant's DMRs were between 21 and 28 mg/l. At these levels, ammonia can be toxic to fathead minnows
- Ammonia-N is lower during the winter months than during the summer: average PEQs = 22.0 and 12.5 mg/l (summer, winter); maximum PEQs = 31.5 and 17.1 mg/l. Ammonia might not be at toxic levels during the winter months. Quarterly testing may demonstrate this.
- The pattern of acute toxicity – 80, 95 and 100 percent mortality in 100 percent effluent during the first 24 hours in three of the tests – suggests multiple toxicants may be present.
- The presence of *C. dubia* toxicity in several of the tests suggests multiple toxicants may be present.
- The maximum PEQ value for copper, 31 ug/l, is 91 percent of the inside mixing zone maximum criteria (IMZM), 34 ug/l. The IMZM is a value calculated to avoid acutely toxic conditions in the effluent mixing zone.
- Effluent conductivity during the toxicity tests indicates total dissolved solids in the range of 600 – 700 mg/l, which by itself should not contribute to *C. dubia* toxicity.

The draft permit includes a reopener clause that would allow the City to request a permit modification to remove the final toxicity limits and TRE requirements if the results of at least eight tests conducted over two years show there is no reasonable potential for whole effluent toxicity.

Other Requirements

Sanitary Sewer Overflow Reporting

Provisions for reporting SSOs are again proposed in this permit. These provisions include: the reporting of the system-wide number of SSO occurrences on monthly operating reports; telephone notification of Ohio EPA and the local health department, and 5-day follow up written reports for certain high risk SSOs; and preparation of an annual report that is submitted to Ohio EPA and made available to the public. Many of these provisions were already required under the “Noncompliance Notification”, “Records Retention”, and “Facility Operation and Quality Control” general conditions in Part III of Ohio NPDES permits.

Operator Certification

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 Lorain PQM wastewater treatment plant 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, 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

The Philip Q. Maiorana plant is covered under Ohio EPA’s general permit for storm water associated with industrial activities, OHR00005, which expires on December 31, 2016. The facility permit number is 3GR01371*EG.

Outfall Signage

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

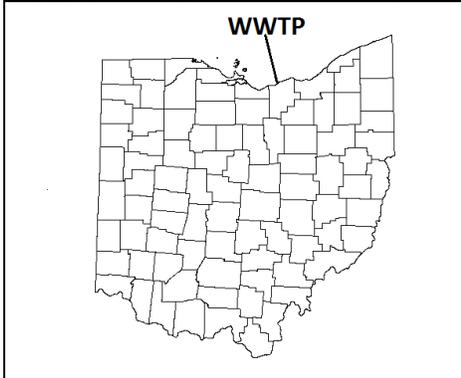
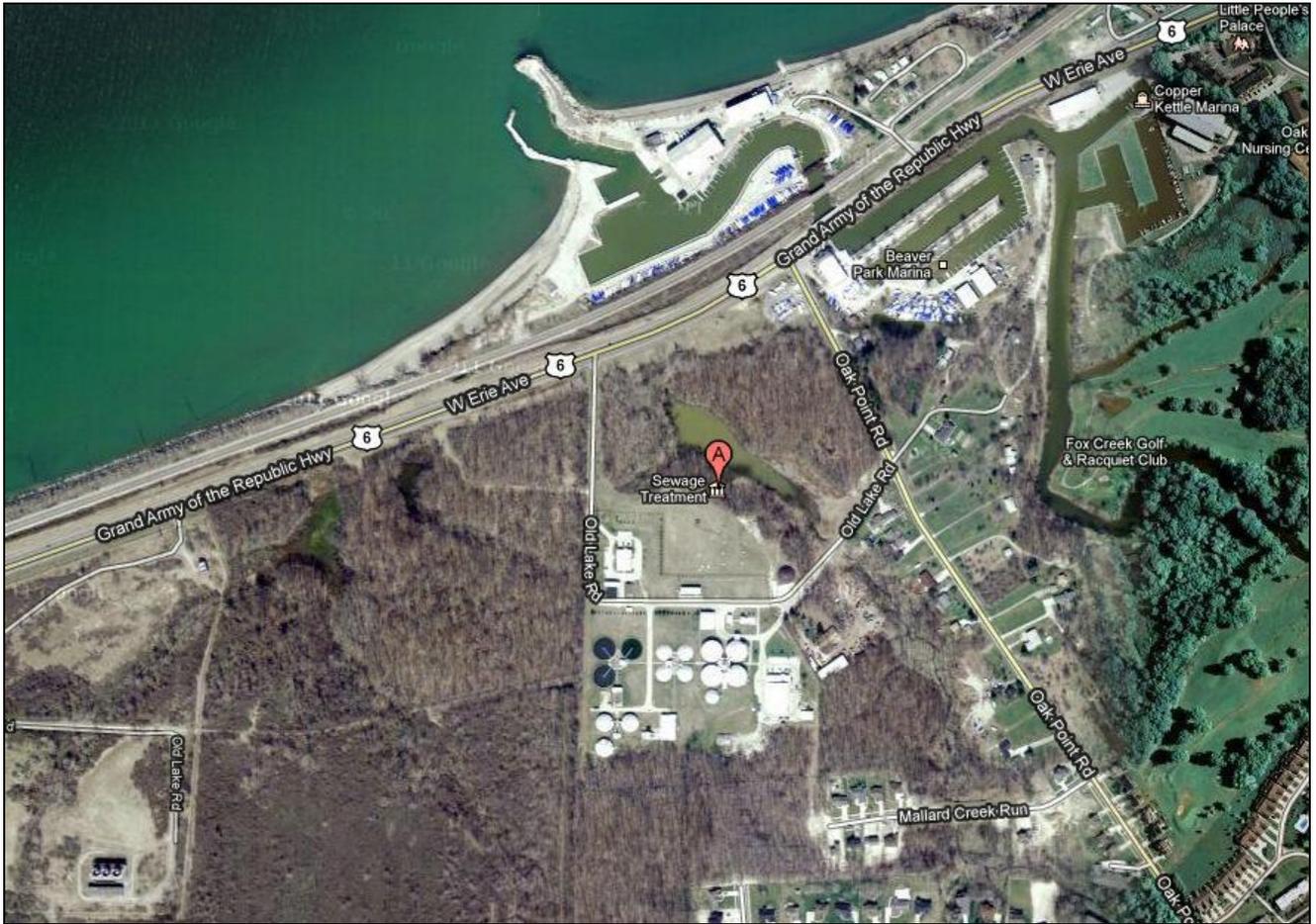


Figure 1. Location of Lorain PQM wastewater treatment plant.

Table 1. Effluent Characterization Using Ohio EPA and Pretreatment Data

Summary of analytical results for Lorain PQM outfall 3PD00040001. 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	PT 7/18/13	PT 06/26/12	PT 08/10/11	PT 08/24/09
Copper	19.4	17.2	17.9	16.4
Silver	ND(10)	ND(10)	0.69	ND(0.5)
Zinc	15.7	11.4	11.3	11

Table 2. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Lorain PQM outfall 3PD00040001 (May 2009 – April 2014). 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		50 th	95 th	
Water Temperature	Annual	C	Monitor		1826	17	23	9-25
Dissolved Oxygen	Summer	mg/l	--		368	3.5	0.9**	0.5-6.4
Dissolved Oxygen	Winter	mg/l	--		181	4.6	3.9**	2.8-6.5
Total Suspended Solids	Annual	mg/l	20	30 ^a	1248	9.3	15.4	3.1-79
Oil and Grease, Total	Annual	mg/l		10	60	2.15	3.8	0.6-3.8
Nitrogen, Ammonia (NH3)	Summer	mg/l	Monitor		642	18.8	26.9	0.74-30.4
Nitrogen, Ammonia (NH3)	Winter	mg/l	Monitor		603	14.2	22.8	1.94-25.5
Nitrite Plus Nitrate, Total	Annual	mg/l	Monitor		60	0.04	4.28	0-5.18
Phosphorus, Total (P)	Annual	mg/l	1.0	1.5 ^a	733	0.82	0.96	0.072-1.24
Cyanide, Free	Annual	mg/l		0.044	20	0	0.0107	0-0.0213
Nickel, Total Recoverable	Annual	ug/l	Monitor		20	2.51	4.75	0-4.91
Zinc, Total Recoverable	Annual	ug/l	Monitor		20	12.8	21.4	0-25.5
Cadmium, Total Recoverable	Annual	ug/l	Monitor		20	0	0.0015	0-0.03
Lead, Total Recoverable	Annual	ug/l	Monitor		20	0.125	0.812	0-1.6
Chromium, Total Recoverable	Annual	ug/l	Monitor		20	1.82	3.84	0-4.64
Copper, Total Recoverable	Annual	ug/l	Monitor		22	13.3	25.4	6.62-32.3
Chromium, Dissolved Hexavalent	Annual	ug/l	Monitor		20	0	0	0-0
Fecal Coliform	Summer	#/100 ml	--		159	3	54.5	1-29500
E. coli	Summer	#/100 ml		126	363	4	39	0-8000
Flow Rate	Summer	MGD	Monitor		920	2.21	4.17	1.32-12.6
Flow Rate	Winter	MGD	Monitor		906	2.56	5.93	1.71-20.9
Flow Rate	Annual	MGD	Monitor		1826	2.37	5.25	1.32-20.9
Chlorine, Total Residual	Summer	mg/l		0.038	920	0	0	0-0
Mercury, Total (Low Level)	Annual	ng/l	9.9	1700	31	2.8	7.79	1.46-10.5
pH, Maximum	Annual	S.U.		9.0	1826	7.2	7.4	6.6-7.6
pH, Minimum	Annual	S.U.		6.5	1826	6.8*	7.2	6.6-7.4
CBOD 5 day	Summer	mg/l	15	22.5 ^a	615	10.3	14	1.6-28.6
CBOD 5 day	Winter	mg/l	20	30 ^a	554	8.65	12.4	4.4-27

Table 3. Projected Effluent Quality Values

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Cadmium - TR	ug/l	13	1	0.0584	0.08
Chlorine - TRes	mg/l	920	0	--	--
Chromium - TR	ug/l	20	13	3.5	5.48
Chromium VI - Diss	ug/l	20	0	--	--
Copper - TR	ug/l	26	26	22.2	31
Cyanide - free	mg/l	20	3	0.0217	0.0298
Lead - TR	ug/l	20	10	1.03	1.81
Mercury - TR (BCC)	ng/l	31	31	7.1	11.1
Nickel - TR	ug/l	14	13	5.475	7.5
Nitrate-N + Nitrite-N	mg/l	38	22	4.04	6.07
Phosphorus - T	mg/l	732	732	0.86	0.99
Silver - TR	ug/l	2	1	1.914	2.622
Zinc - TR	ug/l	21	21	20.4	29.1

Table 4. Summary of Acute Toxicity Test Results.

Test Date(a)	<i>Ceriodaphnia dubia</i> 48 hours	<i>Fathead Minnows</i> 96
	TUa ^b	TUa ^b
09/1/09(E)	BD	0.8
09/13/10(E)	1.3	2.1
09/13/11(E)	BD	BD
09/04/12(E)	0.2	1.41
09/08/13(E)	1.41	1.87

^a O = EPA test; E = entity test

^b TUa = acute toxicity units

* = 48 hour screening test

Table 5. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Wildlife	Average			Maximum	
			Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Arsenic - TR	ug/l	--	580	100	150	340	680
Cadmium - TR	ug/l	--	730	50	2.9	5.7	11
Chlorine - TRes	mg/l	--	--	--	0.011	0.019	0.038
Chromium - TR	ug/l	--	14000	100	100	2100	4200
Chromium VI - Diss	ug/l	--	14000	--	11	16	31
Copper - TR	ug/l	--	64000	500	11	17	34
Cyanide - free	mg/l	--	48	--	0.0052	0.022	0.044
Lead - TR	ug/l	--	--	100	8.3	160	320
Mercury - TR (BCC)	ng/l	1.3	3.1	10000	910	1700	3400
Molybdenum - TR	ug/l	--	10000	--	20000	190000	370000
Nickel - TR	ug/l	--	43000	200	62	560	1100
Nitrate-N + Nitrite-N	mg/l	--	--	100	--	--	--
Phosphorus - T	mg/l	--	--	--	--	--	--
Selenium - TR	ug/l	--	3100	50	5	--	--
Silver - TR	ug/l	--	11000	--	1.3	2.2	4.5
Zinc - TR	ug/l	--	35000	25000	140	140	280

Table 6. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
<i>Hardness</i>	mg/l	annual	122	Lake Erie ambient station, n=17,2010-12
<i>Lorain PQM WWTP flow</i>	cfs	annual	8.355	NPDES renewal application; file
<i>Background Water Quality</i>				
Arsenic - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 17<MDL; Lake Erie stations 300896, 301257
Cadmium - TR	ug/l		0.2	Ohio EPA; 2010-12; n=17; 17<MDL; Lake Erie stations 300896, 301257
Chlorine - TRes	mg/l		0	No representative data available.
Chromium - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 17<MDL; Lake Erie stations 300896, 301257
Chromium VI - Diss	ug/l		0	No representative data available.
Copper - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 13<MDL; Lake Erie stations 300896, 301257
Cyanide - free	mg/l		0	No representative data available.
Lead - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 17<MDL; Lake Erie stations 300896, 301257
Mercury - TR (BCC)	ng/l		0	No representative data available.
Molybdenum - TR	ug/l		0	No representative data available.
Nickel - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 16<MDL; Lake Erie stations 300896, 301257
Nitrate-N + Nitrite-N	mg/l		0.71	Ohio EPA; 2010-12; n=19; 0<MDL; Lake Erie stations 300896, 301257
Phosphorus -	mg/l		0.01	Ohio EPA; 2010-12; n=19; 10<MDL; Lake Erie stations 300896, 301257
Selenium - TR	ug/l		2	Ohio EPA; 2010-12; n=17; 17<MDL; Lake Erie stations 300896, 301257
Silver - TR	ug/l		0	No representative data available.
Zinc - TR	ug/l		10	Ohio EPA; 2010-12; n=17; 15<MDL; Lake Erie stations 300896, 301257

Table 7. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Wildlife	Average			Maximum Aquatic Life	
			Human Health	Agri-culture	Aquatic Life		
Arsenic - TR	ug/l	--	6360	1080	1630	--	680
Cadmium - TR	ug/l	--	8028	548	30	--	11
Chlorine - TRes	mg/l	--	--	--	0.12	--	0.038
Chromium - TR	ug/l	--	153980	1080	1080	--	4200
Chromium VI - Diss	ug/l	--	154000	--	121	--	31
Copper - TR	ug/l	--	703980	5480	101	--	34
Cyanide - free	mg/l	--	528	--	0.057	--	0.044
Lead - TR	ug/l	--	--	1080	71	--	320
Mercury - TR (BCC)	ng/l	1.3	3.1	10000	910	--	3400
Molybdenum - TR	ug/l	--	110000	--	220000	--	370000
Nickel - TR	ug/l	--	472980	2180	662	--	1100
Nitrate-N + Nitrite-N	mg/l	--	--	1093	--	--	--
Phosphorus - T	mg/l	--	--	--	--	--	--
Selenium - TR	ug/l	--	34080	530	35	--	--
Silver - TR	ug/l	--	121000	--	14	--	4.5
Zinc - TR	ug/l	--	384900	274900	1440	--	280

Table 8. Parameter Assessment

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

Phosphorus - T

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

Arsenic - TR
Chromium - TR
Molybdenum - TR
Selenium - TR

Cadmium - TR
Chromium VI - Diss
Nickel - TR
Zinc - TR

Chlorine - TRes
Lead - TR
Nitrate-N + Nitrite-N

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

No parameters meet these criteria.

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

Copper - TR

Cyanide - free

Silver - TR

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

Limits to Protect Numeric Water Quality Criteria

<u>Parameter</u>	<u>Units</u>	<u>Period</u>	<u>Recommended Effluent Limits</u>	
			<u>Average</u>	<u>Maximum</u>
Mercury - TR (BCC)	ng/l	annual	1.3	1700

Table 9. Final Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations				Basis ^b
		Concentration		Loading (kg/day) ^a		
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Temperature	°C	----- Monitor -----		-----		M
Dissolved Oxygen	mg/l	----- Monitor -----		-----		M
Suspended Solids	mg/l	20	30 ^c	409	614 ^c	BEJ, EP
Oil and Grease	mg/l	--	10	--	--	WQS, EP
Ammonia-N	mg/l	----- Monitor -----		-----		M
Nitrite(N) + Nitrate(N)	mg/l	----- Monitor -----		-----		M
Phosphorus, Total	mg/l	1.0	1.5 ^c	20.5	30.7 ^c	PT, EP
Phosphorus, Total April - October	mg/l		0.7*	--	--	BEJ
Nickel, T. R.	ug/l	----- Monitor -----		-----		M
Silver, T. R.	ug/l	----- Monitor -----		-----		RP
Zinc, T. R.	ug/l	----- Monitor -----		-----		M
Cadmium, T. R.	ug/l	----- Monitor -----		-----		M
Lead, T. R.	ug/l	----- Monitor -----		-----		M
Chromium, T. R.	ug/l	----- Monitor -----		-----		M
Copper, T. R.	ug/l	----- Monitor -----		-----		RP
Hex. Chromium (Dissolved)	ug/l	----- Monitor -----		-----		M
<i>E. coli</i>						
Summer Only (Final)	#/100ml	126	284	--	--	WQS
Flow	MGD	----- Monitor -----		-----		M
Chlorine, Total Residual						
Summer	mg/l	--	0.038	--	--	WLA/IMZM
Mercury, T.	ng/l	7.1	1700	0.000146	0.0348	VAR(avg), WLA(max)
Cyanide, Free	mg/l	----- Monitor -----		-----		RP
Whole Effluent Toxicity – <i>C. dubia</i> and <i>P. promelas</i>						
Acute (both species)	TUa	Interim monitoring with TRE trigger				WET
Acute (both species)	TUa	--	1.0	--	--	WET
Chronic (both species)	TUc	----- Monitor -----		-----		WET
pH	S.U.	----- 6.5 to 9.0 -----		-----		WQS, EP
Total Filterable Residue (Dissolved Solids)	mg/l	----- Monitor -----		-----		BEJ
CBOD ₅	mg/l					
Summer		15	22.5 ^c	307	460 ^c	BEJ, EP
Winter		20	30 ^c	409	614 ^c	BEJ, EP

^a Effluent loadings based on average design discharge flow of 5.4 MGD.

^b **Definitions:** BEJ = Best Engineering Judgment; EP = Existing Permit; M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges; PT = Phosphorus treatment required under OAC 3745-33-06(C); RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)]; VAR = mercury variance-based limits, OAC 3745-33-07(D)(10); WET = Requiring water quality-based effluent limits and monitoring

requirements for whole effluent toxicity in NPDES permits [40 CFR Part 132, Appendix F, Procedure 6 and OAC 3745-33-07(B)]; WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum; WQS = Ohio Water Quality Standards (OAC 3745-1-07).

^c Weekly average limit.

* April 1 – October 31 seasonal average limit.