

National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
For the **Waverly Wastewater Treatment Plant (WWTP)**

Public Notice No.: 14-03-049
Public Notice Date: March 26, 2014
Comment Period Ends: April 25, 2014

Ohio EPA Permit No.: **0PC00011*ID**
Application No.: **OH0023353**

Name and Address of Applicant:

**Mayor and Council
City of Waverly
211 West North Street, P.O. Box 228
Waverly, Ohio 45690**

Name and Address of Facility Where

Discharge Occurs:
**City of Waverly WWTP
9434 State Route 220
Waverly, Ohio 45690
Pike County**

Receiving Water: **Scioto 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 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. Environmental Protection Agency (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

Fact Sheet for NPDES Permit Renewal, Waverly Wastewater Treatment Plant, 2014

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

Summary of Permit Conditions

The effluent limits and monitoring requirements proposed for the following parameters are the same as in the current permit, although some monitoring frequencies have changed: temperature, dissolved oxygen, total suspended solids (TSS), oil and grease, ammonia, total kjeldahl nitrogen, nitrite plus nitrate, phosphorus, nickel, zinc, cadmium, chromium, copper, lead flow rate, pH and 5 day carbonaceous biochemical oxygen demand (CBOD₅).

Based on best engineering judgment, new monitoring is proposed for total dissolved solids (total filterable residue).

Final effluent limits are proposed for *Escherichia coli*, replacing existing fecal coliform limits. New WQS for *E. coli* became effective in March 2010.

Annual acute toxicity monitoring is proposed for the life of the permit. This satisfies the minimum testing requirements of rule 3745-33-07(B)(11) of the OAC and will adequately characterize toxicity in the plant's effluent.

Current permit limits for mercury are being removed because effluent data shows that it no longer has the reasonable potential to contribute to exceedances of WQS.

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; storm water compliance and outfall signage.

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Procedures for Participation in the Formulation of Final Determinations

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

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

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

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

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

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

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

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

For additional information about this fact sheet or the draft permit, contact Ashley Ward at (614) 644-4852 or Ashley.Ward@epa.ohio.gov or contact Jack Knapp at (740) 380-5268 or Jack.Knapp@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 ORC 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 NPDES permit renewal application, along with any and all pertinent information available to the Director.

This public notice allows the permittee to provide to the Director for consideration during this public comment period additional site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness for achieving compliance with the proposed final effluent limitations for these parameters. The permittee shall deliver or mail this information to:

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

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, written notification for any additional time shall be sent to the above address no later than 30 days after the Public Notice Date on Page 1.

Should the applicant determine that compliance with the proposed water quality based effluent limitations for parameters other than the priority pollutants is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQS used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in OAC 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 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

Waverly WWTP discharges to Scioto River at river mile 39.08. Figure 1 shows the approximate location of the facility.

This segment of the Scioto River is described by Ohio EPA River Code: 02-001-C, U.S. EPA River Reach #: 05060002-016, County: Pike, Ecoregion: Western Allegheny Plateau. The Scioto River is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Class A Primary Contact Recreation (PCR).

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

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal 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 (PCR) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

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

Facility Description

The Waverly WWTP is designed to treat an average daily flow of 1.8 million gallons per day (MGD). The treatment plant was originally constructed in 1954, with the most recent major upgrade occurring in 2004. Treatment plant processes and/or equipment include influent pumping, bar screen, grit removal, activated sludge, secondary clarification and ultraviolet disinfection.

Sludge is processed with aerobic digestion, lime stabilization, a filter press and is ultimately disposed by land application or by being hauled to a landfill.

The collection system consists of 100 percent separate sanitary sewers. There are no engineered or constructed bypasses or overflows in the collection system. The estimated inflow and infiltration rate is 0.106 MGD.

Waverly WWTP receives flow from one industrial user with an estimated flow of 0.038 MGD. The city does not have an Ohio EPA-approved pretreatment program.

The water supply source for the service area is wells.

Description of Existing Discharge

Table 1 shows the annual effluent flow rates for the Waverly WWTP from September 2008 through August 2013. The mean, 50th percentile and 95th percentile values are consistently below the average design flow of 1.8 MGD.

Table 1. Flow rates for Waverly WWTP, September 2008 through August 2013.

Year	Flow in MGD			
	Mean	50 th percentile	95 th percentile	Maximum
2008	0.622	0.551	0.902	1.65
2009	0.763	0.746	1.14	1.62
2010	0.728	0.683	1.17	2.28
2011	0.874	0.799	1.61	2.29
2012	0.716	0.638	1.29	2.28
2013	0.756	0.728	1.18	2.11

Waverly reports SSO occurrences under station 300 in its NPDES permit. From 2009 through 2013, the city reported 4 SSOs in 2009, 2 in 2010, 0 in 2011 and 2012, and 3 in 2013.

Table 2 presents chemical specific data collected by Ohio EPA.

Table 3 presents a summary of unaltered discharge monitoring report (DMR) data for outfall OPC00011001. Data are presented for the period September 2008 through August 2013, and current permit limits are provided for comparison.

Tables 4 and 5 summarize the results of acute whole effluent toxicity (WET) tests of the final effluent.

Assessment of Impact on Receiving Waters

Extensive biological, physical habitat, and chemical water quality monitoring was conducted in 2011 and 2012. Based on this data, the Scioto River at Waverly was listed as in full attainment. This information is included in the 2012 Ohio Integrated Water Quality Monitoring and Assessment Report and is available on the Ohio EPA website at <http://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx>.

A Total Maximum Daily Load (TMDL) study is currently in progress for the Lower Scioto River. This study is scheduled to be completed sometime in 2015 and will be posted on the Ohio EPA website at http://www.epa.state.oh.us/dsw/tmdl/index.aspx#TMDL_Projects.

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 Waverly WWTP 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)	September 2008 through August 2013
Ohio EPA compliance sampling data	July 2011 and February 2012

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points. The average and maximum PEQ values are presented in Tables 2 and 3.

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 6 for a summary of the screening results.

Wasteload Allocation For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
AWS	Harmonic mean flow	
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 7, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

The data used in the WLA are listed in Tables 7 and 8. The wasteload allocation results to maintain all applicable criteria are presented in Table 9. The current ammonia limits have been evaluated using the wasteload allocation procedures and are protective of water quality standards for ammonia toxicity.

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

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). 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 Waverly WWTP, the WLA values are 1.0 TU_a and 79.6 TU_c .

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

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

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

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

The acute toxicity unit (TU_a) is defined as 100 divided by the LC_{50} for the most sensitive test species:

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

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

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Tables 2 and 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 6.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 10 presents the final effluent limits and monitoring requirements proposed for Waverly WWTP outfall OPC00011001 and the basis for their recommendation.

Dissolved oxygen, total suspended solids and CBOD₅

The limits proposed for dissolved oxygen, total suspended solids, and CBOD₅ are proposed to continue from the existing permit and are all based on plant design criteria. These limits are protective of WQS.

Ammonia

The limits proposed for ammonia are proposed to continue from the existing permit and are based on best engineering judgment.

Oil and grease, pH and Escherichia coli

Limits proposed for oil and grease, pH, and *E. coli* are based on WQS (OAC 3745-1-07). Class A PCR *E. coli* standards apply to the Scioto River.

Water temperature and flow rate

Monitoring of water temperature and flow rate is proposed to continue from the existing permit in order to assist in the evaluation of effluent quality and treatment plant performance. This is in accordance with Ohio EPA guidance.

Nitrate plus nitrite, phosphorus and total kjeldahl nitrogen

Monitoring for nitrate plus nitrite, phosphorus and total kjeldahl nitrogen is proposed to continue from the existing permit in order to provide supplemental data for the evaluation of Scioto River water quality.

Mercury

Ohio EPA risk assessment (Table 6) places mercury in group 4. This placement as well as the data in Table 3, support that this parameter 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).

Nickel, zinc and cadmium

Ohio EPA risk assessment (Table 6) places barium, cadmium, chromium, hexavalent chromium, copper, cyanide, dissolved solids (total filterable residue), iron, lead, nickel, strontium and zinc in groups 2 and 3. This placement as well as the data in Tables 2 and 3 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 continue for chromium, copper, lead nickel, zinc and cadmium document that these pollutants continue to remain at low levels.

Total filterable residue

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

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.

Whole Effluent Toxicity Reasonable Potential

Annual acute toxicity monitoring is proposed for the life of the permit. Evaluating the toxicity data presented in Tables 4 and 5 and other pertinent data under the provisions of OAC 3745-33-07(B) placed the Waverly WWTP in Category 4 with respect to WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Other Requirements

Sanitary Sewer Overflow Reporting

Provisions for reporting SSOs are also 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 Waverly WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall OPC00011001.

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

To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was issued on August 14, 2009. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than August 14, 2014, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations.

Outfall Signage

Part II of the permit includes requirements for signs to be placed at each outfall to the Scioto River, providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

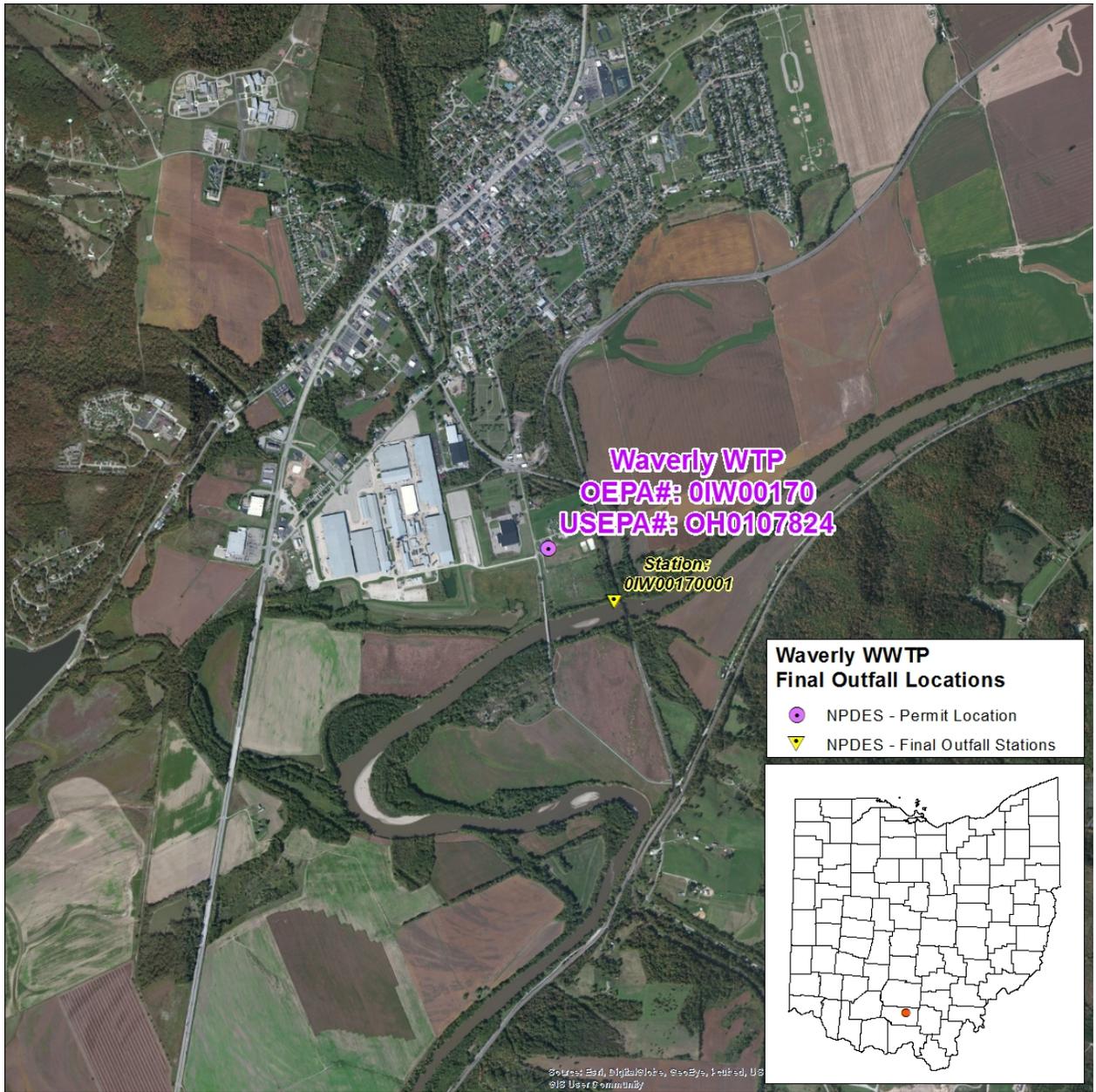


Figure 1. Location of Waverly wastewater treatment plant.

Table 2. Effluent Characterization Based on Ohio EPA Data.

Parameter	Ohio EPA Data		PEQ average	PEQ max
	7/18/2011	2/13/2012		
Total filterable residue (mg/L)	524	466	1454	1991
Copper (µg/L)	3.0	<2.0	3.066	4.2
Nickel (µg/L)	7.3	11.5	47.45	65
Barium (µg/L)	< 15	17	47.16	64.6
Iron (µg/L)	160	99	443.8	608
Strontium (µg/L)	183	170	507.6	695.4
Zinc (µg/L)	92	71	98.481	134.1

Definitions: PEQ = Projected Effluent Quality.

Table 3. Effluent Characterization Using Self-Monitoring Data.

Summary of current permit limits and unaltered discharge monitoring report data for Waverly WWTP outfall 0PC00011001 (September 2008 - August 2013). All values are based on annual records unless otherwise indicated. * = For minimum pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; a = weekly average.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50 th	95 th		# Obs.	PEQ _{ave}	PEQ _{max}
<u>Outfall 001</u>											
Water Temperature	Annual	°C	Monitor		1270	19.9	28	9.6-30.3			
Dissolved Oxygen	Summer	mg/L	6.0 min	--	657	7.3	8.8	6-9.6	427	7.6244	8.7118
Dissolved Oxygen	Winter	mg/L	6.0 min	--	613	8	9	6.3-89	302	8.8838	10.857
Total Suspended Solids	Annual	mg/L	21.0	31.5 ^a	735	7	17	1-29	723	10.927	20.625
Oil and Grease, Hexane Extr Method	Annual	mg/L	--	10 max	61	2	5.9	0.2-9	60	5.5966	8.8565
Nitrogen, Ammonia (NH3)	Summer	mg/L	34	51.1 ^a	375	0.134	1.46	0.013-6.78	240	0.54909	1.1857
Nitrogen, Ammonia (NH3)	Winter	mg/L	55.2	82.8 ^a	360	0.25	2.55	0.023-19.4	180	1.8468	3.8676
Nitrogen Kjeldahl, Total	Annual	mg/L	Monitor		61	1.86	3.7	0-4.3	60	6.0671	9.4359
Nitrite Plus Nitrate, Total	Annual	mg/L	Monitor		61	7.6	12.8	1.3-13.8	60	11.399	15.71
Phosphorus, Total (P)	Annual	mg/L	Monitor		244	2.43	9.7	0.07-20.6	240	7.2258	10.846
Cyanide, Free	Annual	mg/L	Monitor		3	0	0	0-0	3	--	--
Nickel, Total Recoverable	Annual	µg/L	Monitor		20	0	2.5	0-50	22	47.45	65
Zinc, Total Recoverable	Annual	µg/L	Monitor		20	63	111	0-120	22	98.481	134.1
Cadmium, Total Recoverable	Annual	µg/L	Monitor		20	0	0.25	0-5	19	5.11	7
Lead, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0	20	--	--
Chromium, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0	20	--	--
Copper, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0	19	3.066	4.2
Chromium, Dissolved Hexavalent	Annual	µg/L #/100	Monitor		3	0	0	0-0	3	--	--
Fecal Coliform	Annual	ml	1000	2000 ^a	376	29.5	173	1-1760			
Flow Rate	Annual	MGD	Monitor		1856	0.708	1.27	0.279-2.29			
Mercury, Total (Low Level)	Annual	ng/L	12	1700	20	2.05	6.33	0-18.5	20	7.165	12.439

Table 3. Effluent Characterization Using Self-Monitoring Data – Continued.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50 th	95 th		# Obs.	PEQ _{ave}	PEQ _{max}
Acute Toxicity, <i>Ceriodaphnia dubia</i>	Annual	TU _a	Monitor		5	0	0	0-0			
Acute Toxicity, <i>Pimephales promelas</i>	Annual	TU _a	Monitor	9.0	5	0	0	0-0			
pH, Maximum	Annual	S.U.	--	max	1272	7.2	7.9	6.5-8.3			
pH, Minimum	Annual	S.U.	6.5 min	--	1270	7	7.7	6.4-8			
CBOD 5 day	Summer	mg/L	17.5	26.3 ^a	375	3	5	1-9	240	3.5978	5.2186
CBOD 5 day	Winter	mg/L	17.5	26.3 ^a	360	4	8	1-16	180	5.4739	8.6595

Definitions: CBOD = Carbonaceous biochemical oxygen demand;
 PEQ = Projected Effluent Quality.

Table 4. Summary of acute toxicity results reported by Waverly WWTP.

Date	<i>Ceriodaphnia dubia</i> (TU _a)	<i>Pimephales promelas</i> (TU _a)
8/20/2009	AA	AA
8/12/2010	AA	AA
8/11/2011	AA	AA
8/6/2012	AA	AA
8/6/2013	AA	AA

TU_a = acute toxicity units;

AA = below detection limit (0.2 TU_a).

Table 5. Summary of toxicity results reported by Ohio EPA.

Collection Date	<i>Ceriodaphnia dubia</i>								<i>Pimephales promelas</i>							
	24 Hours				48 Hours				24 Hours				48 Hours			
	UP	C	%M	MMZ	UP	C	%M	MMZ	UP	C	%M	MMZ	UP	C	%M	MMZ
7/18/2011	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
7/19/2011	0	0	5	ND	0	0	0	ND	0	0	0	ND	0	0	0	ND
7/18/11-7/19/11 ^a	0	0	0	ND	0	0	0	ND	0	0	0	ND	0	0	0	ND
2/13/2012	0	0	0	0	0	0	0	0	0	0	0	ND	0	0	0	ND
2/14/2012	0	0	0	ND	0	0	0	ND	0	0	0	ND	0	0	0	ND
2/13/12-2/14/12 ^a	0	0	0	ND	0	0	0	ND	0	0	0	ND	0	0	0	ND

^a = 24-hour composite sample;

C = laboratory control water;

%M = percent mortality in 100% effluent;

MMZ = percent mortality in manual mixing zone;

ND = not determined;

TU_a = acute toxicity units;

UP = percent mortality in upstream control water.

Table 6. Parameter Assessment for Outfall OPC00011001.

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

There are no Group 1 parameters.

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

Barium	Chromium	Chromium ⁺⁶
Copper	Cyanide	Iron
Lead	Strontium	

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

Cadmium	Dissolved solids	Nickel
Zinc		

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

Mercury

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.

There are no Group 5 parameters.

Definitions: PEL = Projected effluent limitation;
PEQ = Projected effluent quality;
WLA = Wasteload allocation;
WQS = Water quality standards.

Table 7. Instream Conditions and Discharger Flow for Outfall 0PC00011001.

<u>Parameter</u>	<u>Units</u>	<u>Season</u>	<u>Value</u>	<u>Basis</u>
<i>Stream Flows</i>				
1Q10	cfs	annual	313.15	USGS 03234500 and 0323600
7Q10	cfs	annual	329.21	USGS 03234500 and 0323600
30Q10	cfs	summer	368.36	USGS 03234500 and 0323600
		winter	617.53	USGS 03234500 and 0323600
Harmonic Mean	cfs	annual	1406.3	USGS 03234500 and 0323600
Mixing Assumption	%	average	66.38953237	
		maximum	66.38953237	
<i>Hardness</i>	mg/L	annual	232	Ohio EPA Station 601000
<i>pH</i>	S.U.	summer	8.55	WWTP Station 901
		winter	8.08	WWTP Station 901
<i>Temperature</i>	°C	summer	26.05	WWTP Station 901
		winter	9.3	WWTP Station 901
<i>Waverly WWTP flow</i>	cfs	annual	2.78	NPDES application
<i>Background Water Quality</i>				
Ammonia, summer	mg/L		0.212	Waverly; 2011; n=21; 0<MDL; Waverly Station 801
Ammonia, winter	mg/L		0.715	Waverly; 2011; n=15; 0<MDL; Waverly Station 801
Barium	µg/L		71	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Cadmium	µg/L		0.12	Ohio EPA; 2011; n=6; 1<MDL; Station V15P11, RM 45
Chromium	µg/L		0	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Chromium ⁺⁶	µg/L		0	No representative data available.
Copper	µg/L		3.52	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Cyanide	mg/L		0	No representative data available.
Dissolved solids	mg/L		364	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Iron	µg/L		1580.3	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Lead	µg/L		1.72	Ohio EPA; 2011; n=6; 3<MDL; Station V15P11, RM 45
Mercury	ng/L		0	No representative data available.
Nickel	µg/L		4.67	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45

Table 7. Instream Conditions and Discharger Flow for Outfall 0PC00011001 – Continued.

<u>Parameter</u>	<u>Units</u>	<u>Season</u>	<u>Value</u>	<u>Basis</u>
Phosphorus	mg/L		0.45	Waverly; 2011; n=61; 0<MDL; Waverly Station 801
Strontium	µg/L		1134.8	Ohio EPA; 2011; n=6; 0<MDL; Station V15P11, RM 45
Zinc	µg/L		12	Ohio EPA; 2011; n=6; 2<MDL; Station V15P11, RM 45

Definitions: EPA = Environmental Protection Agency;
MDL = method detection limit;
n = number of samples taken;
NPDES = National Pollutant Discharge Elimination System;
RM = River mile;
USGS = United States Geological Survey;
WWTP = Waverly wastewater treatment plant.

Table 8. Water Quality Criteria in the Study Area.

Parameter	Units	Outside Mixing Zone Criteria			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average		Aquatic Life		
		Human Health	Agri-culture			
Barium	µg/L	--	--	220	2000	4000
Cadmium	µg/L	--	50	4.8	12	23
Chromium	µg/L	--	100	170	3600	7200
Chromium ⁺⁶	µg/L	--	--	11	16	31
Copper	µg/L	1300	500	19	31	62
Cyanide	mg/L	220	--	0.012	0.046	0.092
Dissolved solids	mg/L	--	--	1500	--	--
Iron	µg/L	--	5000	--	--	--
Lead	µg/L	--	100	19	360	710
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	4600	200	110	960	1900
Strontium	µg/L	--	--	21000	40000	81000
Zinc	µg/L	69000	25000	240	240	490

Table 9. Summary of Effluent Limits to Maintain Applicable Water Quality Standards.

	Outside Mixing Zone Criteria		Inside Mixing
	Average	Maximum	

Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Barium	µg/L	--	--	11934	146258	4000
Cadmium	µg/L	--	16802	373	900	23
Chromium	µg/L	--	33684	13535	272821	7200
Chromium ⁺⁶	µg/L	--	--	876	1213	31
Copper	µg/L	436710	167238	1236	2086	62
Cyanide	mg/L	74105	--	0.96	3.5	0.092
Dissolved solids	mg/L	--	--	90811	--	--
Iron	µg/L	--	1153473	--	--	--
Lead	µg/L	--	33106	1378	27154	710
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	1547897	65800	8391	72403	1900
Strontium	µg/L	--	--	1582783	2946485	81000
Zinc	µg/L	23237950	8416977	18165	17291	490

Table 10. Final Effluent Limits and Monitoring Requirements.

Parameter	Units	Effluent Limits				Basis
		Concentration		Loading (kg/day)		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow	MGD	Monitor		--	--	M

Temperature	°C	Monitor		--	--	M
Dissolved Oxygen	mg/L	--	6.0 min	--	--	EP/PD
Total Suspended Solids	mg/L	21	31.5 ^c	143	215 ^c	EP/PD
Oil and Grease	mg/L	--	10.0 max	--	--	WQS
Total Filterable Residue	mg/L	Monitor		--	--	BEJ
Ammonia-N						
Summer	mg/L	5.0	7.5 ^c	34	51.1 ^c	EP/BEJ
Winter	mg/L	8.1	12.2 ^c	55.2	82.8 ^c	EP/BEJ
Nitrogen, Kjeldahl	mg/L	Monitor		--	--	EP/BEJ
Nitrite plus Nitrate	mg/L	Monitor		--	--	EP/BEJ
Phosphorus	mg/L	Monitor		--	--	EP/BEJ
Nickel	µg/L	Monitor		--	--	EP/BEJ
Zinc	µg/L	Monitor		--	--	EP/BEJ
Cadmium	µg/L	Monitor		--	--	EP/BEJ
Lead	µg/L	Monitor		--	--	EP/BEJ
Chromium	µg/L	Monitor		--	--	EP/BEJ
Copper	µg/L	Monitor		--	--	EP/BEJ
Bacteria						
<i>E. coli</i>	#/100mL	126	284 ^c	--	--	WQS
Mercury	µg/L	Monitor		--	--	EP/BEJ
Whole Effluent Toxicity						
Acute, Ceriodaphnia dubia	TU _a	Monitor		--	--	WET
Acute, Pimephales promelas	TU _a	Monitor		--	--	WET
pH	S.U.	6.5 min	9.0 max	--	--	WQS
CBOD ₅	mg/L	17.5	26.3 ^c	119	179 ^c	EP/PD

Effluent loadings based on average design discharge flow of 1.8 MGD.

Definitions: BEJ = Best Engineering Judgment;
CBOD₅ = 5 day carbonaceous biochemical oxygen demand;
EP = Existing Permit;
M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges;
PD = Plant Design Criteria;
WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)]
WQS = Ohio Water Quality Standards (OAC 3745-1-07).

^c Weekly average limit.