

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

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

Public Notice No.: 12-12-010
Public Notice Date: December 5, 2012
Comment Period Ends: January 5, 2013

Ohio EPA Permit No.: 1PC00007*LD
Application No.: OH0027472

Name and Address of Applicant:

City of Springboro
320 West Central Avenue
Springboro, Ohio 45066

Name and Address of Facility Where
Discharge Occurs:

Springboro Wastewater Treatment Plant
275 West Mill Street
Springboro, Ohio 45066

Receiving Water: Unnamed tributary of
Clear Creek

Subsequent
Stream Network: Clear Creek to Great Miami
River to Ohio River

Introduction

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

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act 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

Limits are proposed for total dissolved solids.

Monitoring is newly proposed for iron and total Kjeldahl nitrogen (TKN).

Limits for mercury have been removed. Monitoring will continue.

Cadmium, chromium, copper, dissolved hexavalent chromium, lead, nickel, nitrate+nitrite-nitrogen, phosphorous, and zinc will continue to be monitored as in the existing permit.

Barium monitoring has been removed from the permit, because it was moved to the risk assessment group 3 from group 5.

Final effluent limits are proposed for *Escherichia coli*. New water quality standards for *E. coli* became effective in March 2010. A compliance schedule is proposed for meeting these new final effluent limits within 12 months of the effective date of the permit. Based on best engineering judgment, it is proposed that the plant comply with its current fecal coliform limits during the interim period.

Quarterly chronic toxicity monitoring with the determination of acute endpoints is proposed for the first two years of the permit for outfall 001 and at downstream locations, and annually thereafter.

Limits for dissolved oxygen, CBOD₅ (5-day carbonaceous biochemical oxygen demand), ammonia-nitrogen and total suspended solids are proposed to continue from the current permit based on best engineering judgment. The current limits for pH and oil and grease, which are based on Ohio water quality standards, are proposed to continue.

In Part II of the permit, special conditions are included that address sanitary sewer overflow reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity testing; 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 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 Maureen Ware, (937) 285-6103, Maureen.Ware@epa.ohio.gov, or Megan Zale, (614) 644-2027, megan.zale@epa.ohio.gov.

Location of Discharge/Receiving Water Use Classification

Springboro WWTP discharges at River Mile (RM) 0.3 of an unnamed tributary of Clear Creek. Figure 1 shows the approximate location of the facility. The unnamed tributary is not listed in Ohio's water quality standards. Warmwater Habitat aquatic life criteria and the nondrinking human health criteria apply to this tributary. The unnamed tributary, which is located at RM 7.1 on Clear Creek, is designated by Ohio EPA River Code 14-094 and by USEPA River Reach number 05080002-NA.

Clear Creek, the next downstream segment, is described by Ohio EPA River Code: 14-024, U.S. EPA River Reach #: 05080002-NA, County: Warren, Ecoregion: Eastern Corn Belt Plains. Clear Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-21): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and 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 (Ohio Administrative Code [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 Springboro wastewater plant, which completed an expansion and upgrades in 2006 and 2009, has an average daily design flow of 4.0 MGD (million gallons per day). Wet stream processes are screening, influent pumping, grit removal, activated sludge aeration in oxidation ditches, secondary clarification, tertiary filtration and ultraviolet disinfection. Solid stream processes include aerobic digestion, dewatering using centrifugation, and disposal of stabilized sludge at a solid waste landfill or by land application.

The Springboro wastewater plant is served by a separate sanitary sewer system.

The City does not implement an Ohio EPA approved industrial pretreatment program.

Description of Existing Discharge

Table 1 presents a summary of unaltered monthly operating report data for Springboro outfall 1PC00007001. Data are presented for the period January 2007 through December 2011, and current permit limits are provided for comparison. Table 2 presents additional chemical specific data collected by Ohio EPA. Table 3 summarizes the chemical specific data for outfall 001 and presents the average and maximum Projected Effluent Quality (PEQ) values. Table 4 summarizes the results of acute screening whole effluent toxicity tests of outfall 001 effluent conducted by Ohio EPA and five definitive acute and chronic tests conducted by the City.

Assessment of Impact on Receiving Waters

Biological sampling in the Lower Great Miami River basin and tributaries was conducted by Ohio EPA in 2010 as a part of the Lower Great Miami River Total Maximum Daily Load (TMDL) Study. Both the Clear Creek upstream as well downstream sampling results showed that Clear Creek is in full attainment of the designated aquatic use (warmwater habitat) in the vicinity of the Springboro WWTP. However, a longitudinal pattern of impact and recovery was evident in relation to the Springboro WWTP, and the macroinvertebrate community was rated as marginal downstream of the plant. The effluent results in elevated concentrations of total dissolved solids, total phosphorous, and inorganic nitrogen (total Kjeldahl nitrogen). The Biological and Water Quality Study of the Lower Great Miami River and Select Tributaries can be found at <http://www.epa.ohio.gov/portals/35/documents/GMR2012TSD.pdf>. The 2012 TMDL study report is still in preparation.

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 Springboro WWTP were used to determine what parameters should undergo 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 2007 through December 2011
Ohio EPA compliance sampling data	2011

The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: chromium, 170 ug/L on 4/29/11; nickel, 516 ug/L on 4/29/11; nitrate+nitrite-N, 0.56 mg/L on 3/7/2007, 0.73 mg/L on 12/3/2009, and 1.64 mg/L on 3/11/2010; total dissolved solids, 7.8 mg/L on 3/4/2008.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points. The average and maximum PEQ values are presented in Table 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 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 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
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 6, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

Ohio’s water quality standard implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet water quality standards at the end-of-pipe (12 ng/l in the Ohio River basin; 1.3 ng/l in the Lake Erie basin).

The data used in the WLA are listed in Tables 5 and 6. The WLA results to maintain all applicable criteria are presented in Table 7. 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 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). 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 Springboro WWTP, the wasteload allocation values are 0.3 TU_a and 1.01 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 (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):

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

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.

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

Dilution Ratio (<u>downstream flow to discharger flow</u>)	Allowable Effluent Toxicity (<u>percent effects in 100% effluent</u>)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

The acute WLA for the Springboro WWTP is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.0 to 1.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 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 Springboro WWTP outfall 1PC00007001 and the basis for their recommendation.

The Ohio EPA risk assessment (Table 8) places total dissolved solids in group 5. This placement as well as the data in Tables 1 and 3 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is between 75 and 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). The thirty day average limit is based on wasteload allocation. A review of effluent data for period 2008-2011 indicates the plant should be able to achieve the proposed limit.

The Ohio EPA risk assessment (Table 8) places iron in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), we are proposing monitoring, rather than limits, for this pollutant. The PEQ values calculated for iron (Table 3) may not be representative of actual levels in the plant effluent because they were based on 1 data point. 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.

Ohio EPA risk assessment (Table 8) places copper in group 4. This placement as well as the data in Tables 1 and 3 support that this parameter does 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).

Ohio EPA risk assessment (Table 8) places cadmium, chromium, dissolved hexavalent chromium, lead, mercury, nickel, and zinc-TR in groups 2 and 3. This placement as well as the data in Tables 1, 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 document that these pollutants continue to remain at low levels.

A continuation of monitoring for total phosphorus and nitrite+nitrate-nitrogen, plus new monitoring for total Kjeldahl nitrogen are proposed based on best engineering judgment. In addition, monitoring for total phosphorus and nitrite+nitrate-nitrogen is proposed at the upstream and downstream stations, 801 and 901. The Springboro wastewater plant discharges into Clear Creek, which is part of the Great Miami River basin. The purpose of the monitoring is to maintain a data base on nutrient loadings and ambient concentrations in the basin. This data will be available for future studies addressing nutrient-related water quality impairment.

Arsenic, barium, free cyanide, selenium, and strontium were placed in group 2 (Table 8), and based on reasonable potential for requiring monitoring in NPDES permits [OAC 3745-33-07(A)], no monitoring is proposed.

Based on best engineering judgment, it is proposed that the existing permit limits for dissolved oxygen, CBOD₅, total suspended solids, and ammonia-nitrogen be continued in the renewal permit. The existing ammonia-N limits were evaluated as part of the current water quality modeling, and they are protective of water quality standards.

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on Water Quality Standards (OAC 3745-1-07). Class B Primary Contact Recreation *E. coli* standards apply to the unnamed tributary to Clear Creek.

Water quality standards for *E. coli* became effective in March 2010, and a compliance schedule is proposed for meeting these new final effluent limits. The schedule provides time during the 2013 summer disinfection season for the plant to evaluate the ability of its existing disinfection system to achieve the new limits and to make operational changes or equipment upgrades if necessary. Based on best engineering judgment, it is proposed that the plant comply with its current fecal coliform limits during the interim period.

Whole Effluent Toxicity Reasonable Potential

Evaluation of the toxicity data presented in Table 4, the low critical flows of the receiving stream, and the absence of downstream toxicity data, and evaluation of other pertinent data under the provisions of OAC 3745-33-07(B), placed the Springboro wastewater plant in Hazard Category 2 with respect to whole effluent toxicity. For the initial two years of the permit, quarterly chronic toxicity testing with the determination of acute endpoints is proposed for the treatment plant effluent and at nearfield downstream and farfield downstream locations. Annual monitoring is proposed thereafter. Downstream monitoring will allow for comparison and allocation of toxicity. A compliance schedule is included in the permit for the permittee to submit an initial investigation Toxicity Reduction Evaluation (TRE) plan. Trigger levels are

included in the permit for acute and chronic toxicity. If these levels are reported to have been exceeded, Ohio EPA will notify the permittee that a TRE is required.

Sludge

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: land application, removal to sanitary landfill or transfer to another facility with an NPDES permit.

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

Other Requirements

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 Springboro WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 1PC00007001.

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 treatment works.

Storm Water Compliance

In order to comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on October 1, 2010. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than October 1, 2015, 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 the permittee to place a sign at each outfall to the unnamed tributary to Clear Creek providing information about the discharge. Signage at outfalls is required pursuant to Ohio Administrative Code 3745-33-08(A)

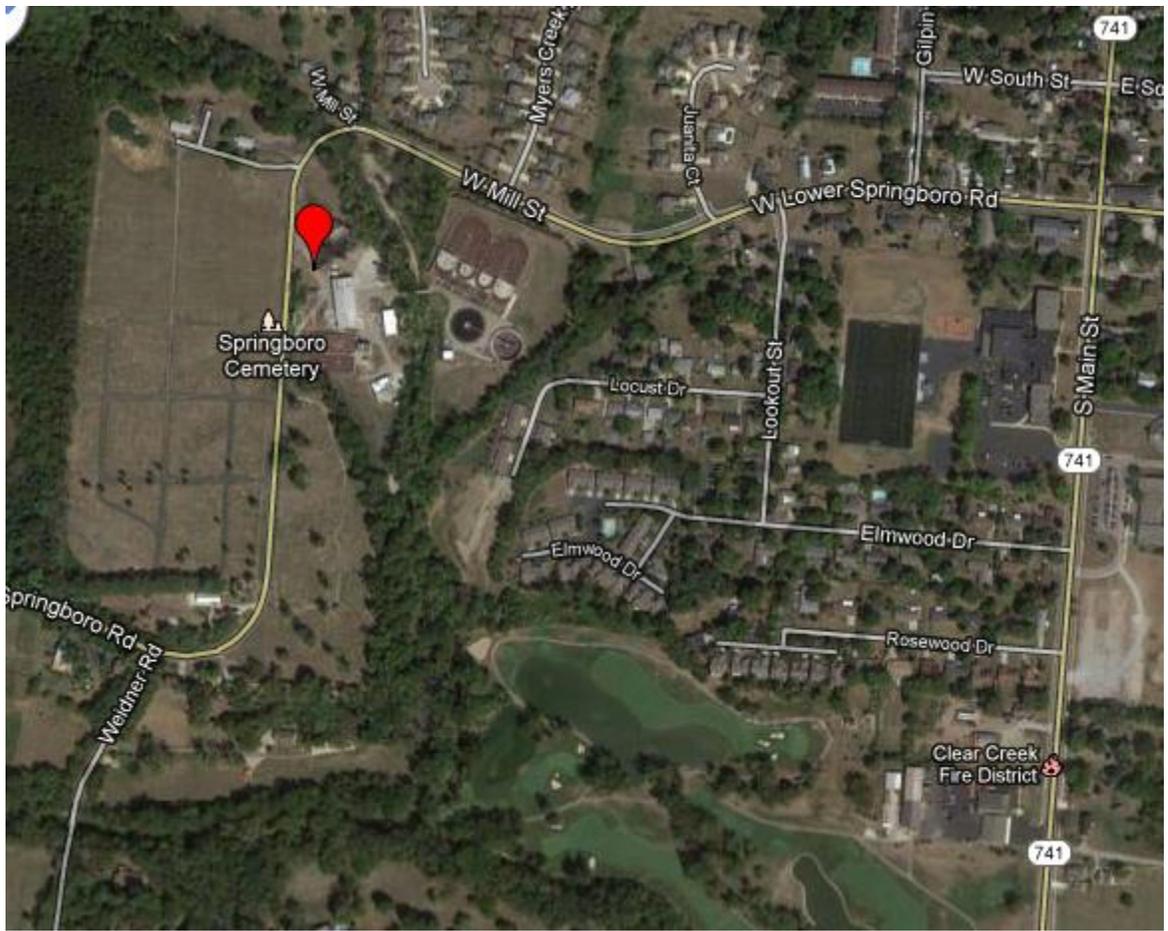


Figure 1. Approximate location of Springboro wastewater treatment plant

Table 1. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered monthly operating report data for the Springboro WWTP outfall 1PC00007001 (January 2007-December 2011). All values are based on annual records unless otherwise calculated. *=For minimum pH, 5th percentile shown in place of 50th percentile; **=For dissolved oxygen, 5th percentile shown in place of 95th percentile; a=7 day 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}
Water Temperature	Annual	C		Monitor	1826	17	23.7	8.5-37.8	1826	18.611	26.296
Dissolved Oxygen	Summer	mg/l		5.0 min.	641	8.6	9.4**	6.6-18.4	427	4.073	5.58
Dissolved Oxygen	Winter	mg/l		5.0 min.	629	9.9	10.8**	6.5-11.3	313	5.774	7.91
Residue, Total Dissolved	Annual	mg/l		Monitor	46	1020	1200	7.8-1290	46	1170.4	1351.7
Total Suspended Solids	Annual	mg/l			745	1	5.5	0-10	746	3.1861	6.353
Total Suspended Solids	Summer	mg/l	6.0	9.0 ^a	376	0	5.5	0-10			
Total Suspended Solids	Winter	mg/l	10.0	15.0 ^a	369	1	5.8	0-9			
Oil and Grease, Hexane Extr Method	Annual	mg/l		10	74	0	0	0-0	75	6.57	9
Nitrogen, Ammonia (NH3)	Summer	mg/l	0.7	1.1 ^a	376	0	0	0-3.7	249	1.891	2.59
Nitrogen, Ammonia (NH3)	Winter	mg/l	1.9	2.9 ^a	369	0	0	0-0.829	186	0.4841	0.6632
Nitrite Plus Nitrate, Total	Annual	mg/l		Monitor	20	7.47	11	0.56-11.3	18	10.643	13.436
Phosphorus, Total (P)	Annual	mg/l		Monitor	249	1.74	3.56	0-4.99	250	2.55	3.493
Barium, Total Recoverable	Annual	ug/l		Monitor	46	89.2	116	57.4-121	47	107.94	126.58
Nickel, Total Recoverable	Annual	ug/l		Monitor	20	0	0.066	0-1.32	21	489.7	670.8
Zinc, Total Recoverable	Annual	ug/l		Monitor	20	29.9	40	0-45.1	21	37.752	47.169
Cadmium, Total Recoverable	Annual	ug/l		Monitor	20	0	0	0-0	21	--	--
Lead, Total Recoverable	Annual	ug/l		Monitor	20	0	0	0-0	21	--	--
Chromium, Total Recoverable	Annual	ug/l		Monitor	20	0	0	0-0	21	161.3	221
Copper, Total Recoverable	Annual	ug/l		Monitor	30	8.86	18.8	0-22.2	31	16.036	23.394
Chromium, Dissolved Hexavalent	Annual	ug/l		Monitor	30	0	0	0-0	30	--	--
Fecal Coliform	Annual	#/100 ml	1000	2000 ^a	376	0	71	0-1490	376	7830.6	82.569
Flow Rate	Summer	MGD		Monitor	920	1.78	2.72	0.663-7.31			
Flow Rate	Winter	MGD		Monitor	906	2.22	4.36	1-9.19			
Flow Rate	Annual	MGD		Monitor	1826	1.99	3.37	0.663-9.19	1826	2.3569	3.3118
Mercury, Total (Low Level)	Annual	ng/l	12	1700	60	0.585	3.24	0-7.19	60	2.6171	4.1414
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa		Monitor	4	0	0	0-0	4	--	--
Chronic Toxicity, C. dubia	Annual	TUc		Monitor	4	0.73	5.03	0-5.66	4	10.74	14.72
Acute Toxicity, P. promelas	Annual	TUa		Monitor	4	0	0	0-0	4	--	--
Chronic Toxicity, P. promelas	Annual	TUc		Monitor	4	0	0	0-0	4	--	--
pH, Maximum	Annual	S.U.		9.0	1270	7.69	7.92	7.41-8.13	1270	7.7491	7.9102
pH, Minimum	Annual	S.U.		6.5	1270	7.61*	7.85	7.19-8	1270	7.6636	7.8397
CBOD 5 day	Summer	mg/l	5.0	7.5 ^a	376	0	2	0-9	249	1.224	2.4649
CBOD 5 day	Winter	mg/l	7.5	11.5 ^a	370	0	2.3	0-12	186	7.008	9.6

Table 2. Effluent Characterization Using Ohio EPA Data

Summary of analytical results for the Springboro wastewater treatment plant outfall 1PC00007001. OEPA=data from analyses by Ohio EPA; ND=not detected (detection limit)

	OEPA	
Parameter	4/11/2011	Units
Aluminum	ND(200)	ug/L
Arsenic	ND(2.0)	ug/L
Barium	93	ug/L
Cadmium	ND(0.2)	ug/L
Calcium	100	mg/L
CBOD5	ND(2.0)	mg/L
Chloride	310	mg/L
Chromium	170*	ug/L
Cyanide, Free	ND(5.0)	ug/L
Iron	3670	ug/L
Lead	ND(2.0)	ug/L
Magnesium	32	mg/L
Manganese	81	ug/L
Nickel	516*	ug/L
Nitrate+nitrite	5.72	mg/L
Oil and Grease	10	mg/L
Potassium	12	mg/L
Selenium	ND(2.0)	ug/L
Sodium	197	mg/L
Strontium	455	ug/L
TKN	0.64	mg/L
Total Dissolved Solids	896	mg/L
Total Phosphorus	1.52	mg/L
Total Suspended Solids	11	mg/L
Zinc	25	ug/L

*Not representative of plant effluent. Not included in PEQ calculation.

Table 3. Projected Effluent Data for the Springboro Wastewater Treatment Plant

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Aluminum	ug/l	1	0	--	--
Ammonia-S	mg/l	249	5	1.8907	2.59
Ammonia-W	mg/l	186	8	0.484136	0.6632
Arsenic - TR	ug/l	1	0	--	--
Barium	ug/l	47	47	107.94	126.58
Cadmium - TR	ug/l	21	0	--	--
Chlorides	mg/l	1	1	1448.32	1984
Chromium - TR	ug/l	20	0	--	--
Chromium VI - Diss	ug/l	30	0	--	--
Copper - TR	ug/l	31	28	16.036	23.394
Cyanide - free (wwh,ewh,mwh)	mg/l	1	0	--	--
Dissolved solids (ave)	mg/l	46	46	1170.4	1351.7
Iron - TR	ug/l	1	1	16610.42	22754
Lead - TR	ug/l	21	0	--	--
Magnesium	mg/l	1	1	144.832	198.4
Manganese - TR	ug/l	1	1	366.606	502.2
Mercury - TR (BCC)	ng/l	60	39	2.617	4.14
Nickel - TR	ug/l	16	1	5.475	7.5
Nitrate-N + Nitrite-N	mg/l	18	18	10.643	13.436
Selenium - TR	ug/l	1	0	--	--
Strontium	ug/l	1	1	2059.33	2821
Zinc - TR	ug/l	21	19	37.752	47.169

Table 4. Summary of toxicity test results on the Springboro wastewater treatment plant effluent.

Test Date ^a	Ceriodaphnia dubia 48 hours		Fathead Minnows 96 hours		Ceriodaphnia dubia 7 days		Fathead Minnows 7 days	
	%M ^b	TUa ^c	%M ^b	TUa ^c	%M ^b	TUc ^d	%M ^b	TUc ^d
8/6/2008(E)	-	BD	-	BD	-	BD	-	BD
8/8/2009(E)	-	BD	-	BD	-	BD	-	BD
8/1/2010(E)	-	BD	-	BD	-	5.66	-	BD
4/11/2011(O)*	5	-	0	-	NT	NT	NT	NT
8/14/2011(E)	-	BD	-	BD	-	1.46	-	BD
8/19/2012(E)	-	BD	-	BD	-	1.41	-	BD

^a O=EPA test; E=entity test

^b %M=percent mortality in 100%

^c TUa = acute toxicity units

^d TUc = chronic toxicity units

NT = not tested

BD = below detection

*=48 hour screening test

Table 5. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average					
		Human Health	Agri-culture	Aquatic Life			
Aluminum	ug/l	--	--	--	--	--	
Ammonia-S	mg/l	--	--	1.2	--	--	
Ammonia-W	mg/l	--	--	2.5	--	--	
Arsenic - TR	ug/l	--	100	150	340	680	
Barium	ug/l	--	--	220	2000	4000	
Cadmium - TR	ug/l	--	50	5.9	16	32	
Chlorides	mg/l	--	--	--	--	--	
Chromium - TR	ug/l	--	100	210	4500	8900	
Chromium VI - Diss	ug/l	--	--	11	16	31	
Copper - TR	ug/l	1300	500	24	40	80	
Cyanide - free (wwh,ewh,mwh)	mg/l	220	--	0.012	0.046	0.092	
Dissolved solids (ave)	mg/l	--	--	1500	--	--	
Iron - TR	ug/l	--	5000	--	--	--	
Lead - TR	ug/l	--	100	26	500	1000	
Magnesium	mg/l	--	--	--	--	--	
Manganese - TR	ug/l	--	--	--	--	--	
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400	
Nickel - TR	ug/l	4600	200	130	1200	2400	
Nitrate-N + Nitrite-N	mg/l	--	100	--	--	--	
Selenium - TR	ug/l	11000	50	5	--	--	
Strontium	ug/l	--	--	21000	40000	81000	
Zinc - TR	ug/l	69000	25000	310	310	610	

Table 6.

Instream Conditions and Discharger Flow

<u>Parameter</u>	<u>Units</u>	<u>Season</u>	<u>Value</u>	<u>Basis</u>
<i>Stream Flows</i>				
1Q10	cfs	annual	0.039	USGS gage 03271700
7Q10	cfs	annual	0.039	USGS gage 03271700
30Q10	cfs	summer	0.058	USGS gage 03271700
		winter	0.242	USGS gage 03271700
Harmonic Mean	cfs	annual	0.295	prev FS (USGS gages 03271700 and 03271000)
Mixing Assumption	%	average	100	
	%	maximum	100	
<i>Hardness</i>	mg/l	annual	303	Station 901, median, 2007-2011, n=60
<i>pH</i>	S.U.	summer	7.9975	Station 901, 75th percentile, 2007-2011, n=20
		winter	8.1425	Station 901, 75th percentile, 2007-2011, n=14
<i>Temperature</i>	C	summer	22.075	Station 901, 75th percentile, 2007-2011, n=20
		winter	5.1	Station 901, 75th percentile, 2007-2011, n=14
<i>Springboro WWTP flow</i>	cfs	annual	6.19	Average daily design flow
<i>Background Water Quality</i>				
Aluminum	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Ammonia-S	mg/l		0.025	STORET; 2010; n=12; 8<MDL; H09W49, 50th percentile
Ammonia-W	mg/l		0	Station 801; 2007-2011; n=14; 13<MDL; 50th percentile
Arsenic - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Barium	ug/l		106.5	STORET; 2010; n=6; 0<MDL; H09W49, 50th percentile
Cadmium - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Chlorides	mg/l		95.4	STORET; 2010; n=12; 0<MDL; H09W49, 50th percentile
Chromium - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Chromium VI - Diss	ug/l		0	No representative data available.
Copper - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Cyanide - free	mg/l		0	No representative data available.
Dissolved solids (ave)	mg/l		499	STORET; 2010; n=12; 0<MDL; H09W49, 50th percentile
Iron - TR	ug/l		197.17	STORET; 2010; n=6; 0<MDL; H09W49, 50th percentile
Lead - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile

Table 6.**Instream Conditions and Discharger Flow**

Parameter	Units	Season	Value	Basis
Magnesium	mg/l		28.67	STORET; 2010; n=6; 0<MDL; H09W49, 50th percentile
Manganese - TR	ug/l		103.17	STORET; 2010; n=6; 0<MDL; H09W49, 50th percentile
Mercury - TR (BCC)	ng/l		0	No representative data available.
Nickel - TR	ug/l		1.57	STORET; 2010; n=6; 3<MDL; H09W49, 50th percentile
Nitrate-N + Nitrite-N	mg/l		0.44	STORET; 2010; n=12; 0<MDL; H09W49, 50th percentile
Selenium - TR	ug/l		0	STORET; 2010; n=6; 6<MDL; H09W49, 50th percentile
Strontium	ug/l		246.67	STORET; 2010; n=6; 0<MDL; H09W49, 50th percentile
Zinc - TR	ug/l		10.33	STORET; 2010; n=6; 4<MDL; H09W49, 50th percentile

**Summary of Effluent Limits to Maintain Applicable WQ
Criteria**

Table 7.

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri- culture	Aquatic Life	Aquatic Life	
Aluminum	ug/l	--	--	--	--	--
Ammonia-S	mg/l	--	--	--	--	--
Ammonia-W	mg/l	--	--	--	--	--
Arsenic - TR	ug/l	--	105	151	342	680
Barium	ug/l	--	--	221	2012	4000
Cadmium - TR	ug/l	--	52	5.9	16	32
Chlorides	mg/l	--	--	--	--	--
Chromium - TR	ug/l	--	105	211	4528	8900
Chromium VI - Diss	ug/l	--	--	11	16	31
Copper - TR	ug/l	1362	524	24	40	80
Cyanide - free	mg/l	230	--	0.012	0.046	0.092
Dissolved solids (ave)	mg/l	--	--	1506	--	--
Iron - TR	ug/l	--	5229	--	--	--
Lead - TR	ug/l	--	105	26	503	1000
Magnesium	mg/l	--	--	--	--	--
Manganese - TR	ug/l	--	--	--	--	--
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400
Nickel - TR	ug/l	4819	209	131	1208	2400
Nitrate-N + Nitrite-N	mg/l	--	105	--	--	--
Selenium - TR	ug/l	11524	52	5	--	--
Strontium	ug/l	--	--	21131	40250	81000
Zinc - TR	ug/l	72288	26191	312	312	610

Table 8.**Parameter Assessment**

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

Aluminum	Chlorides	Magnesium
Manganese - TR		

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

Arsenic-TR	Cadmium - TR	Chromium VI -Diss
Cyanide - free (wwh,ewh,mwh)	Lead - TR	Mercury - TR (BCC)
Nitrate-N + Nitrite-N	Selenium - TR	Strontium
Zinc - TR	Nickel - TR	Chromium-TR

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

Barium

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

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>
Dissolved solids (ave)	mg/l	Annual	1506	--
Iron - TR	ug/l	Annual	5229	--

Dissolved solids (ave) becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].

Table 9. Final Effluent Limits and Monitoring Requirements for Springboro Outfall 001

Parameter	Units	Effluent Limits				Basis ^b
		Concentration		Loading (kg/day) ^a		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow	MGD	----- Monitor -----				M ^c
Temperature	°C	----- Monitor -----				M ^c
Dissolved Oxygen	mg/L	----- Not less than 5.0 -----				BEJ, EP
Carbonaceous biochemical oxygen demand (5-day)	mg/L					
Summer		5.0	7.5 ^d	75.7	114 ^d	BEJ, EP
Winter		7.5	11.5 ^d	114	175 ^d	BEJ, EP
Total Suspended Solids	mg/L					
Summer		6.0	9.0 ^d	90.9	137 ^d	BEJ, EP
Winter		10	15 ^d	152	228 ^d	BEJ, EP
Total Filterable Residue (Dissolved Solids)	mg/L	1506	--	22900	--	WLA
Ammonia						
Summer	mg/L	0.7	1.1 ^d	10.6	16.7 ^d	BEJ/EP
Winter	mg/L	1.9	2.9 ^d	28.8	44 ^d	BEJ/EP
Total Kjeldahl nitrogen	mg/L	----- Monitor -----				M ^c
Nitrite + Nitrate	mg/L	----- Monitor -----				M ^c
Phosphorus	mg/L	----- Monitor -----				M ^c
Oil and Grease	mg/L	----- Not greater than 10.0 -----				WQS
pH	S.U.	6.5 - 9.0				WQS
<i>E. coli</i> (Summer)						
Interim (until 5/1/14)		----- Monitor -----				BEJ
Final		161	362 ^d	--	--	WQS
Fecal Coliform (Summer-until 5/1/14)						
		----- Monitor -----				BEJ
Cadmium	µg/L	----- Monitor -----				M ^c
Chromium	µg/L	----- Monitor -----				M ^c
Chromium+6 (dissolved)	µg/L	----- Monitor -----				M ^c
Copper	µg/L	----- Monitor -----				RP
Lead	µg/L	----- Monitor -----				M ^c
Iron	µg/L	----- Monitor -----				RP
Mercury	µg/L	----- Monitor -----				M ^c
Nickel	µg/L	----- Monitor -----				M ^c
Zinc	µg/L	----- Monitor -----				M ^c
Whole Effluent Toxicity						
Acute, <i>C. dubia</i>	TU _a	---- Monitor with 1.0 TRE Trigger ----				WET

Chronic, <i>C. dubia</i>	TU _c	---- Monitor with 1.0 TRE Trigger ----	WET
Acute, <i>P. promelas</i>	TU _a	---- Monitor with 1.0 TRE Trigger ----	WET
Chronic, <i>P. promelas</i>	TU _c	---- Monitor with 1.0 TRE Trigger ----	WET

^a Effluent loadings based on average design discharge flow of 4.0 MGD.

- ^b Definitions:
- BADCT** = Best Available Demonstrated Control Technology
 - BEJ** = Best Engineering Judgment
 - BPT** = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation
 - EP** = Existing Permit
 - M** = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges;
 - RP** = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A))
 - PD** = Plant Design
 - TMDL** = Total Maximum Daily Load
 - 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)

^c Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

^d 7 day average limit.