

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 **Southwest Licking Community WSD – Environmental Control Facility**

Public Notice No.: 12-04-032
Public Notice Date: April 16, 2012
Comment Period Ends: May 16, 2012

OEPA Permit No.: **4PD00101*DD**
Application No.: **OH0113964**

Name and Address of Applicant:

**Southwest Licking Community WSD
8720 Gale Road
Hebron, Ohio 43025**

Name and Address of Facility Where
Discharge Occurs:

**Southwest Licking Community WSD
Environmental Control Facility
Gale Road South of Refugee Road
Harrison Township, Ohio 43025
Licking County**

Receiving Water: **South Fork Licking River**

Subsequent
Stream Network: **Licking River
Muskingum River
Ohio River**

Introduction

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations, 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 (ORC 6111). Decisions to award variances to Water Quality Standards 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 limits proposed for dissolved oxygen, total suspended solids, ammonia-nitrogen and 5-day carbonaceous biochemical oxygen demand (CBOD₅) are all based on plant design criteria. These limits are protective of water quality standards.

Limits proposed for oil and grease, pH, and E.coli are based on Water Quality Standards (OAC 3745-1-07).

Limits for barium, nickel, zinc, strontium, cadmium, lead, chromium, copper, and hexavalent chromium are proposed to continue from the current permit. The wasteload allocation showed these parameters have a reasonable potential to contribute to exceedances of water quality standards.

Limits are being proposed for Bis (2-ethylhexyl) Phthalate and Total Dissolved Solids as there is reasonable potential to contribute to exceedances of water quality standards.

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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 OEPA 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 Daniel A. Kopec, (614) 644-1987, daniel.kopec@epa.state.oh.us.

Location of Discharge/Receiving Water Use Classification

The Southwest Licking Community WSD Environmental Control Facility discharges into the South Fork of the Licking River at River Mile (RM) 21.5. The approximate location of the facility is shown in Figure 1.

This segment of the South Fork of the Licking River is described by Ohio EPA River Code: 17-220, County: Licking, Ecoregion: Eastern Corn Belt. The South Fork of the Licking River is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-07): 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 (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 Southwest Licking Water and Sewer District WWTP (or SW Licking WWTP) is currently designed to treat an average daily flow of 4.3 million gallons per day (MGD). The most recent upgrade occurred in 2004. Treatment plant processes and/or equipment include:

- influent pumping
- mechanical screening
- extended aeration (new plant)
- oxidation ditch (old plant)
- secondary clarification
- post aeration
- Ultraviolet disinfection

The facility currently operates two treatment trains: an oxidation ditch (designated as the “old plant”) which was constructed in 1994; and an extended aeration reactor (the “new plant”) which was a part of the upgrade in 2004. Figure 2 shows a flow diagram of the existing facility and the two treatment trains. As shown in Figure 2, the old plant is designed for 1.0 MGD while the new plant is designed for 1.65 MGD.

Sludge is processed by aerobic digestion, and dewatered with a filter press. A covered storage pad is also provided. Sludge is ultimately applied to farm fields.

Description of Existing Discharge

Table 1 presents chemical specific data compiled from the NPDES renewal application, data reported in annual pretreatment reports, and data collected by Ohio EPA.

Table 2 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfall 4PD00101. Data are presented for the period December 2006 through November 2011, 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 (PEQ) values.

Assessment of Impact on Receiving Waters

The *2010 Ohio Integrated Water Quality Monitoring and Assessment Report* (Ohio EPA) lists the watershed assessment unit for South Fork of the Licking River in full attainment.

For a complete look at the 2010 Ohio Integrated Water Quality Monitoring and Assessment Report:

<http://www.epa.ohio.gov/dsw/tmdl/2010IntReport/2010OhioIntegratedReport.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 Southwest Licking Community WSD were used to determine what parameters should undergo wasteload allocation. 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)	December 2006 through November 2011
OEPA compliance sampling data	Sept. 2010, Mar. 2011

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 wasteload allocation is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a wasteload allocation is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 7 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 Village of Kirkersville WWTP is interactive with Southwest Licking Community WSD.

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 5, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

The data used in the WLA are listed in Tables 1 and 2. The wasteload allocation results to maintain all applicable criteria are presented in Table 5. The current ammonia limits have been evaluated using the wasteload allocation procedures and are protective of water quality standards.

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 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 Southwest Licking Community WSD, the wasteload allocation values are 0.3 TU_a and 1.21 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.

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

<u>Dilution Ratio</u> <u>(downstream flow to discharger flow)</u>	<u>Allowable Effluent Toxicity (AET)</u> <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 AET is 30 percent effects in 100 percent effluent based on the dilution ratio of 1 to 1.

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 4. 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 $[(PEQ_{avg} \div PEL_{avg}) \times 100, \text{ or } (PEQ_{max} \div PEL_{max}) \times 100]$, the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 7.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 8 presents the final effluent limits and monitoring requirements proposed for 4PD00101 outfall 001 and the basis for their recommendation.

The limits proposed for dissolved oxygen, total suspended solids, ammonia-nitrogen and 5-day carbonaceous biochemical oxygen demand (CBOD₅) are all based on plant design criteria. These limits are protective of water quality standards.

Limits proposed for oil and grease, pH, and E.coli are based on Water Quality Standards (OAC 3745-1-07).

The Ohio EPA risk assessment (Table 7) places Bis (2-ethylhexyl) Phthalate, copper, and total dissolved solids in group 5. The placement of these parameters as well as the data presented in Tables 1 and 2 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters PEQ is greater than 100 percent of the wasteload allocation. Pollutants that meet this requirement must have permit limits under OAC Rule 3745-33-07(A)(1).

Ohio EPA risk assessment (Table 7) places barium, mercury, and oil & grease in group 4. The placement of these parameters as well as the data presented in Tables 1 and 2 supports 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).

Ohio EPA risk assessment (Table 7) places strontium and zinc in group 3. The placement of these parameters as well as the data presented in Tables 1 and 2 supports that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to document that these pollutants continue to remain at low levels.

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 Based on evaluating the whole effluent toxicity data under the provisions of OAC 3745-33-07(B), the Southwest Licking Community WSD wastewater treatment plant is placed in Category 4 with respect to whole effluent toxicity and further testing for toxicity is not recommended at this time.

Other Requirements

Sanitary Sewer Overflow Reporting Provisions for reporting sanitary sewer overflows (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 Southwest Licking Community WSD WWTP to have a Class III wastewater treatment plant operator in technical charge of the sewage treatment plant operations discharging through outfall 001.

Operator of Record In December 2006, Ohio Administrative Code rule revisions became effective which 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 represents language necessary to implement rule 3745-7-02 of the Ohio Administrative Code (OAC), and requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

To verify whether an operator of record is current on file with the Ohio EPA Division of Surface Water, please visit the following website:

<http://www.epa.ohio.gov/dsw/opcert/opcert.aspx>

Within 60 days of the effective date of this permit, the permittee shall notify the Director of Ohio EPA of the operators of record on a form acceptable to Ohio EPA. The form is located:

http://www.epa.ohio.gov/portals/28/Documents/opcert/Operator_of_Record_Notification_Form.pdf

Storm Water Compliance Parts IV, V, and VI have been included with the draft permit in order to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the Southwest Licking Community WSD may seek permit coverage under the general permit for industrial stormwater (permit # OHR000004) or submit a “No Exposure Certification.” Parts IV, V, and VI will be removed from the final permit if: 1) the Southwest Licking Community WSD submits a Notice of Intent (NOI) for coverage under the general permit for industrial stormwater or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

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



Figure 1. Approximate location of the Southwest Licking WSD WWTP

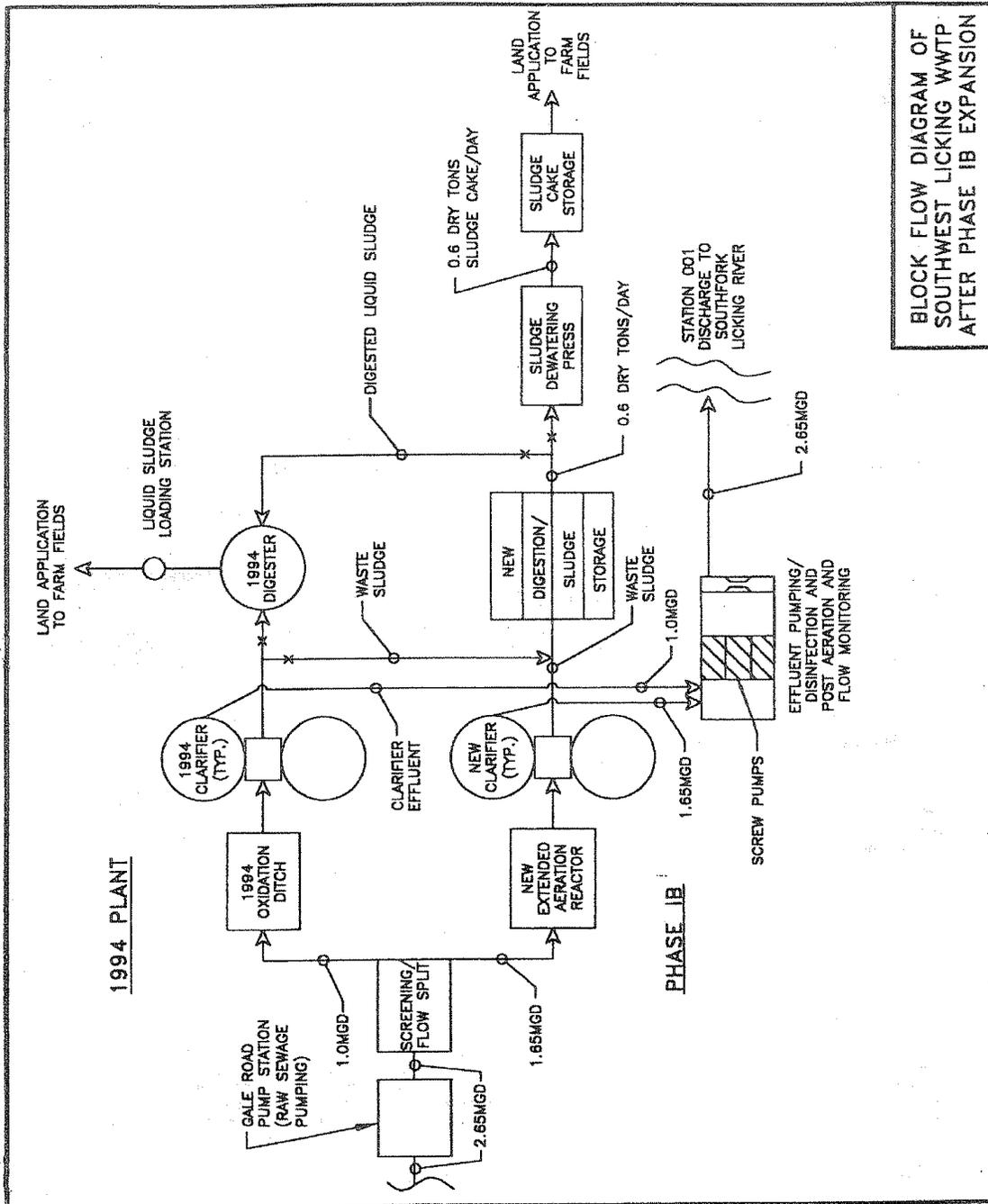


Figure 2. Wastewater Treatment System Schematic

Table 1. Effluent Characterization Using Ohio EPA & Pretreatment Data

Summary of analytical results for the Southwest Licking Community WSD WWTP outfall 4PD00101001. PT = data from, pretreatment program reports; OEPA = data from analyses by Ohio EPA; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

PARAMETER	Ohio EPA	Ohio EPA	DECISION CRITERIA	
	Bioassays – Sept. 2010	Bioassays – Mar. 2011	PEQ _{avg}	PEQ _{max}
Total Dissolved Solids (mg/l)	1480	1180	4105.5	5624
Arsenic (ug/l)	3.7	2.5	10.26	14.06
Copper (ug/l)	8.0	5.1	22.2	30.4
Nickel (ug/l)	2.9	2.1	8.04	11.02
Barium (ug/l)	71	84	233.0	319.2
Calcium (mg/l)	104	104	288.5	395.2
Hardness, Total (mg/l)	412	400	1142.9	1565.6
Magnesium (mg/l)	37	34	102.6	140.6
Potassium (mg/l)	13	10	36.1	49.4
Sodium (mg/l)	327	240	907.1	1242.6
Strontium (ug/l)	7660	4990	21248.8	29108
Zinc (ug/l)	33	43	1192.3	163.4
Alkalinity (mg/l)	214	230	638	874
COD (mg/l)	23	27	74.9	102.6
Chloride (mg/l)	497	375	1378.7	1888.6
Conductivity (umhos/cm)	2580	1990	7156.9	9804
Nitrate + Nitrite (mg/l)	25.9	14.5	71.84	98.42
TKN (mg/l)	1.57	1.48	4.35	5.9
Total Phosphorus (mg/l)	3.71	2.23	10.29	14.1
pH (S.U.)	8.18	7.51	--	--
Fecal Coliform (#/100ml)	10	--	--	--
E.coli (#/100ml)	--	840	--	--
Phenol (ug/l)	4.2	--	19	26.04

Table 2. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered monthly operating report (MOR) data for Southwest Licking Community WSD WWTP outfall 4PD00101001. All values are based on annual records unless otherwise indicated. N = Number of Analyses. * = For pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; A = 7 day average. Decision Criteria: PEQ_{avg} = monthly average; PEQ_{max} = daily maximum analytical results.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily ¹		50 th	95 th		# Obs.	PEQ _{ave}	PEQ _{max}
Outfall 001											
Water Temperature	Annual	C			1228	16.2	22.9	4.8-28			
Dissolved Oxygen	Summer	mg/l	6.0 min		641	9.1	10.1	7.5-11	427	9.1369	9.7087
Dissolved Oxygen	Winter	mg/l	6.0 min		589	10.6	12.1	8.2-12.8	297	11.325	12.408
Residue, Total Dissolved	Annual	mg/l			51	1200	1580	810-1880	51	1494.6	1767.2
Total Suspended Solids	Annual	mg/l			768	0	5	0-25	768	2.34	4.7711
Oil and Grease, Hexane Extr Method	Annual	mg/l	10.0 max		129	0	5.6	0-14	129	5.4166	7.9659
Nitrogen, Ammonia (NH3)	Summer	mg/l	1.0	1.5	394	0.06	0.21	0-2.3	264	0.13186	0.28308
Nitrogen, Ammonia (NH3)	Winter	mg/l	3.0	4.5	374	0.06	0.184	0-3.24	192	0.10009	0.19131
Nitrite Plus Nitrate, Total	Annual	mg/l			59	16.7	23	10-30	59	21.304	25.952
Phosphorus, Total (P)	Annual	mg/l			51	2.86	3.8	1.4-7.5	51	3.8866	5.0197
Barium, Total Recoverable	Annual	ug/l			17	77.2	242	54.6-329	16	152.94	226.35
Nickel, Total Recoverable	Annual	ug/l			25	0	0	0-2.6	16	2.847	3.9
Strontium, Total Recoverable	Annual	ug/l			51	5040	8150	527-11100	50	9565.1	14786
Zinc, Total Recoverable	Annual	ug/l			25	35.9	98.4	5-115	24	75.406	117.27
Cadmium, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Lead, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Chromium, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Copper, Total Recoverable	Annual	ug/l	27	43 max	61	0	17.6	0-39	61	22.892	34.643
Chromium, Dissolved Hexavalent	Annual	ug/l			26	0	0	0-0	26	--	--
Fecal Coliform	Annual	#/100 ml			393	1	20	0-1500			
Bis(2-ethylhexyl) Phthalate	Annual	ug/l			17	0	5.2	0-6.8	17	7.379	13.039

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily ¹		50 th	95 th		# Obs.	PEQ _{ave}	PEQ _{max}
Flow Rate	Summer	MGD			920	1.83	2.73	1.09-5.26			
Flow Rate	Winter	MGD			876	2.08	3.55	1.11-5.98			
Flow Rate	Annual	MGD			1796	1.94	3.21	1.09-5.98			
Mercury, Total (Low Level)	Annual	ng/l			25	1.5	9.02	0-11	23	7.7419	12.61
pH, Maximum	Annual	S.U.	9.0		1230	8	8.3	7.5-8.6			
pH, Minimum	Annual	S.U.	6.5		1230	7.9	8.1	7.2-8.3			
CBOD 5 day	Summer	mg/l	10	15	393	2	7.4	0-25	263	5.2586	11.507
CBOD 5 day	Winter	mg/l	10	15	374	2	3	0-10	192	2.0338	3.4421
Outfall 801											
Water Temperature	Annual	C			59	13.7	23.1	0.09-24.8			
Dissolved Oxygen	Summer	mg/l			30	8.3	10.3	6-10.4	20	8.9541	10.409
Dissolved Oxygen	Winter	mg/l			29	11.8	14.4	8.8-14.5	15	13.815	15.194
pH	Annual	S.U.			59	8	8.5	7.4-8.5			
Nitrogen, Ammonia (NH3)	Summer	mg/l			30	0.05	0.208	0-0.24	20	0.19588	0.33922
Nitrogen, Ammonia (NH3)	Winter	mg/l			29	0.07	0.182	0-0.36	15	0.25436	0.45655
Phosphorus, Total (P)	Annual	mg/l			51	0.13	0.855	0-2.7	51	0.62959	1.0082
Nickel, Total Recoverable	Annual	ug/l			7	0	0	0-0	7	--	--
Zinc, Total Recoverable	Annual	ug/l			7	3	14	0-17	7	24.82	34
Cadmium, Total Recoverable	Annual	ug/l			7	0	0	0-0	7	--	--
Lead, Total Recoverable	Annual	ug/l			7	0	0	0-0	7	--	--
Chromium, Total Recoverable	Annual	ug/l			7	0	0	0-0	7	--	--
Copper, Total Recoverable	Annual	ug/l			7	0	6.6	0-9	7	13.14	18
Chromium, Dissolved Hexavalent	Annual	ug/l			7	0	0	0-0	7	--	--
Fecal Coliform	Annual	#/100 ml			30	315	2560	1-4300			
Mercury, Total (Hg)	Annual	ug/l			7	0	0	0-0	7	--	--

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily ¹		50 th	95 th		# Obs.	PEQ _{ave}	PEQ _{max}
Outfall 901											
Water Temperature	Annual	C			59	13.5	22.5	0.9-23.8			
Dissolved Oxygen	Summer	mg/l			30	8.4	9.98	6.5-10.2	20	8.7212	9.6723
Dissolved Oxygen	Winter	mg/l			29	12.3	13.9	8.7-14	15	13.592	14.748
pH	Annual	S.U.			59	8	8.41	7.5-8.7			
Nitrogen, Ammonia (NH ₃)	Summer	mg/l			30	0.06	0.261	0-0.66	20	0.19471	0.33459
Nitrogen, Ammonia (NH ₃)	Winter	mg/l			29	0.07	0.156	0-0.33	15	0.20592	0.35954
Hardness, Total (CaCO ₃)	Annual	mg/l			59	310	409	160-430	59	372.7	447.95
Nickel, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Zinc, Total Recoverable	Annual	ug/l			25	5	36.6	0-39	25	46.149	78.236
Cadmium, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Lead, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Chromium, Total Recoverable	Annual	ug/l			25	0	0	0-0	25	--	--
Copper, Total Recoverable	Annual	ug/l			59	0	12.3	0-21	59	11.902	18.899
Chromium, Dissolved Hexavalent	Annual	ug/l			25	0	0	0-0	25	--	--
Fecal Coliform	Annual	#/100 ml			30	220	1570	1-2500			
Mercury, Total (Hg)	Annual	ug/l			8	0	0	0-0	8	--	--

Table 3. Effluent Data for the Southwest Licking Community WSD WWTP					
Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Barium	ug/l	16	16	152.94	226.35
Bis(2-ethylhexyl)phthalate	ug/l	17	5	7.379	13.039
Dissolved oxygen	mg/l	427	427	9.14	9.71
Dissolved solids (ave)	mg/l	51	51	1494.6	1767.2
Nitrate-N + Nitrite-N	mg/l	59	59	21.3	25.95
Strontium	ug/l	50	50	9565.1	14786
Ammonia-S	mg/l	264	234	0.132	0.283
Ammonia-W	mg/l	192	168	0.1	0.19
Cadmium - TR	ug/l	25	0	--	--
Chromium - TR	ug/l	25	0	--	--
Chromium VI - Diss	ug/l	26	0	--	--
Copper - TR	ug/l	61	28	22.89	34.64
Lead - TR	ug/l	25	0	--	--
Mercury - TR (BCC)	ng/l	23	15	7.74	12.61
Nickel - TR	ug/l	16	1	2.847	3.9
Oil & grease	mg/l	129	58	5.42	7.96
Phosphorus	mg/l	51	51	3.88	5.02
Zinc - TR	ug/l	24	24	75.4	117.3

Bioaccumulative Chemical of Concern (BCC)

Table 4. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Barium	ug/l	--	--	220	2000	4000
Bis(2-ethylhexyl)phthalate	ug/l	59c	--	8.4	1100	2100
Dissolved oxygen	mg/l	--	--	--	--	--
Dissolved solids (ave)	mg/l	--	--	1500	--	--
Nitrate-N + Nitrite-N	mg/l	--	100	--	--	--
Strontium	ug/l	--	--	21000	40000	81000
Ammonia-S	mg/l	--	--	0.9	--	--
Ammonia-W	mg/l	--	--	1.9	--	--
Cadmium - TR	ug/l	--	50	6	16	32
Chromium - TR	ug/l	--	100	220	4600	9100
Chromium VI - Diss	ug/l	--	--	11	16	31
Copper - TR	ug/l	1300	500	25	41	81
Lead - TR	ug/l	--	100	27	520	1000
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400
Nickel - TR	ug/l	4600	200	140	1200	2400
Oil & grease	mg/l	--	--	--	10	--
Phosphorus	mg/l	--	--	--	--	--
Zinc - TR	ug/l	69000	25000	310	310	620

Bioaccumulative Chemical of Concern (BCC)
c carcinogen

Table 5. Summary of Effluent Limits to Maintain Applicable WQ Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Barium	ug/l	--	--	244	2258	4000
Bis(2-ethylhexyl)phthalate	ug/l	170	--	9.8	1250	2100
Dissolved oxygen	mg/l	--	--	--	--	--
Dissolved solids (ave)	mg/l	--	--	1736	--	--
Nitrate-N + Nitrite-N	mg/l	--	291	--	--	--
Strontium	ug/l	--	--	24738	44974	81000
Ammonia-S	mg/l	--	--	--	--	--
Ammonia-W	mg/l	--	--	--	--	--
Cadmium - TR	ug/l	--	145	7.1	18	32
Chromium - TR	ug/l	--	293	267	5228	9100
Chromium VI - Diss	ug/l	--	--	11	17	31
Copper - TR	ug/l	3808	1460	30	46	81
Lead - TR	ug/l	--	287	32	591	1000
Mercury - TR (BCC)	ng/l	12	10000	910	1700	3400
Nickel - TR	ug/l	13492	579	169	1363	2400
Oil & grease	mg/l	--	--	--	11	--
Phosphorus	mg/l	--	--	--	--	--
Zinc - TR	ug/l	202464	73340	374	351	620

Bioaccumulative Chemical of Concern (BCC)

Table 6. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
<i>Stream Flows</i>				
1Q10	cfs	annual	0.56	USGS Gage #03145000
7Q10	cfs	annual	0.88	USGS Gage #03145000
30Q10	cfs	summer	1.44	USGS Gage #03145000
		winter	6.38	USGS Gage #03145000
Harmonic Mean	cfs	annual	7.93	USGS Gage #03145000
Mixing Assumption	%	average	100	
	%	maximum	100	
<i>Hardness</i>	mg/l	annual	310	50th Percentile, 901 Station (2006-2011)
<i>pH</i>	S.U.	summer	8.1	75th Percentile, eDMR 2006-2011; 901
		winter	8.3	75th Percentile, eDMR 2006-2011; 901
<i>Temperature</i>	C	summer	22.25	75th Percentile, eDMR 2006-2011; 901
		winter	6.8	75th Percentile, eDMR 2006-2011; 901
<i>SW Licking WSD WWTP flow</i>	cfs	annual	4.099	SW Licking NPDES Renewal
<i>Background Water Quality</i>				
Barium	ug/l		108	STORET; 2008; n=18; 0<MDL; Station 300360, 2008
Bis(2-ethylhexyl)phthalate	ug/l		1.74	STORET; 2008; n=4; 2<MDL; Station 300360, 2008
Dissolved oxygen	mg/l			No representative data available.
Dissolved solids (ave)	mg/l		402	BWQR; ; n=26403; 0<MDL; Statewide 50th percentile
Nitrate-N + Nitrite-N	mg/l		1.12	BWQR; ; n=26442; 3173<MDL; Statewide 50th percentile
Strontium	ug/l		3590	STORET; 2008; n=18; 0<MDL; Station 300360, 2008
Ammonia-S	mg/l		0.065	STORET; 2008; n=13; 11<MDL; Station 300360, 2008
Ammonia-W	mg/l		0.304	STORET; 2008; n=5; 3<MDL; Station 300360, 2008
Cadmium - TR	ug/l		0.98	STORET; 2008; n=18; 17<MDL; Station 300360, 2008
Chromium - TR	ug/l		0	STORET; 2008; n=18; 18<MDL; Station 300360, 2008
Chromium VI - Diss	ug/l		10	BWQR; ; n=44; 28<MDL; Statewide 50th percentile
Copper - TR	ug/l		3.7	STORET; 2008; n=18; 2<MDL; Station 300360, 2008

Lead - TR	ug/l		3.1	STORET; 2008; n=18; 16<MDL; Station 300360, 2008
Mercury - TR (BCC)	ng/l			No representative data available.
Nickel - TR	ug/l		3.9	STORET; 2008; n=18; 2<MDL; Station 300360, 2008
Oil & grease	mg/l		2	BWQR; ; n=219; 138<MDL; Statewide 50th percentile
Phosphorus	mg/l		0.07	BWQR; ; n=494; 0<MDL; Statewide 50th percentile
Zinc - TR	ug/l		13	STORET; 2008; n=18; 15<MDL; Station 300360, 2008

Table 7. Parameter Assessment

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

Dissolved oxygen *Phosphorus*

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

Nitrate-N + Nitrite-N *Cadmium - TR* *Chromium - TR*
Chromium VI - Diss *Lead - TR* *Nickel - TR*

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

Strontium *Zinc - TR*

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.

Barium *Mercury - TR (BCC)* *Oil & grease*

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>
<i>Bis(2-ethylhexyl)phthalate</i>	<i>ug/l</i>		<i>9.8</i>	<i>1250</i>
<i>Dissolved solids (ave)</i>	<i>mg/l</i>		<i>1736</i>	<i>--</i>
<i>Copper - TR</i>	<i>ug/l</i>		<i>30</i>	<i>46</i>

Bis(2-ethylhexyl)phthalate becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].

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

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

Table 8. Final effluent limits and monitoring requirements for Southwest Licking Community WSD WWTP outfall 4PD00101 001 and the basis for their recommendation.

Parameter	Units	Effluent Limits				Basis ^b
		Concentration		Loading (kg/day) ^a		
		30 Day Average	Daily ¹ Maximum	30 Day Average	Daily ¹ Maximum	
Flow	MGD	-----Monitor-----				M ^c
Water Temperature	°C	-----Monitor-----				M ^c
Dissolved Oxygen	mg/L	6.0 min		--	--	PD, EP
Total Dissolved Solids	mg/l	1736	--	28,300	--	WLA
Total Suspended Solids	mg/l	12	18	196	293	PD,EP
Oil & Grease, Hexane Extr Method	mg/l	10 max		--	--	WQS
Nitrogen, Ammonia (NH ₃)	mg/l					
Winter		3.0	4.5	48.9	73.3	PD,EP
Summer		1.0	1.5	16.3	24.5	PD,EP
Nitrate-N + Nitrite-N	mg/l	-----Monitor-----				M ^c
Total Phosphorus	mg/l	-----Monitor-----				M ^c
Barium – TR	ug/l	-----Monitor-----				M ^c
Nickel – TR	ug/l	-----Monitor-----				M ^c
Strontium – TR	ug/l	-----Monitor-----				M ^c
Zinc – TR	ug/l	-----Monitor-----				M ^c
Cadmium – TR	ug/l	-----Monitor-----				M ^c
Lead – TR	ug/l	-----Monitor-----				M ^c
Chromium - TR	ug/l	-----Monitor-----				M ^c
Hexavalent Chromium	ug/l	-----Monitor-----				M ^c
Copper – TR	ug/l	27	43	0.44	0.7	EP/WLA
E.coli	#/100ml	161	362	--	--	WQS
Bis (2-ethylhexyl) Phthalate	ug/l	9.8	1250	0.16	20.4	WLA
Mercury, (Low Level)	ng/l	-----Monitor-----				EP/WLA
pH	S.U.	-----6.5-9.0-----				EP
CBOD ₅	mg/l	10	15	163	245	PD,EP

^a Effluent loadings based on average design discharge flow of 4.3 MGD.

^b Definitions: EP = Existing Permit; M = Monitoring; PD = Plant Design Criteria; WLA = Wasteload Allocation procedures (OAC 3745-2); 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.