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 **Heath WWTP**

Public Notice No.: 11-05-043
Public Notice Date: May 13, 2011
Comment Period Ends: June 13, 2011

OEPA Permit No.: **4PC00007*KD**
Application No.: **OH0025763**

Name and Address of Applicant:

City of Heath
1287 Hebron Road
Heath, Ohio 43056

Name and Address of Facility Where Discharge Occurs:

Heath Wastewater Treatment Plant
719 Licking View Drive
Heath, Ohio 43056
Licking County

Receiving Water: **South Fork Licking River**

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

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

The limits proposed for dissolved oxygen, total suspended solids, ammonia-nitrogen and 5-day carbonaceous biochemical oxygen demand ($CBOD_5$) are all based on plant design criteria. These limits are protective of water quality standards.

Monitoring requirements for Silver and Lead will continue per the Wasteload Allocation.

Sampling parameter limits for Bis (2-ethylhexyl) Phthalate and Mercury are being proposed per the Wasteload Allocation.

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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 copy requests 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 Heath WWTP discharges to the South Fork of the Licking River at River Mile (RM) 2.20. The subsequent stream network is the Licking River, Muskingum River, and the Ohio River. The approximate location of the facility is shown in Figure 1.

The Licking River has the following designated uses under the Ohio Water Quality Standards (OAC 3745-1-24): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR), Class A. This section of the South Fork of Licking River is described by Ohio EPA River Code 17-200 and USEPA River Reach 05040006-015.

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 Heath WWTP was constructed in 1962 and the last major modification was in 2004. It serves the city of Heath and Union Township. It treats around 60% domestic wastewater, 32% commercial wastewater, and 8% industrial wastewater. It has an average design flow of 1.75 MGD with a peak hydraulic flow of 7.5 MGD. Treatment plant processes and/or equipment include: a bar screen, grit removal, activated sludge - extended aeration, secondary clarification, scum removal, sand filter, post aeration, chlorination and dechlorination.

The sludge produced by the WWTP is processed through gravity thickener then stabilized by aerobic digestion. A belt process is used to dewater the digested sludge prior to land application at agronomic rates. Ohio EPA approved Heath's sludge management plan on November 3, 1995. They land apply sludge to the following counties: Delaware, Fairfield, Franklin, Knox, Licking and Pickaway counties.

The Heath WWTP collection system is 100 separate sanitary sewers. Approximately 99 percent of the service area has sanitary sewers. They have about 580,000 GPD of infiltration/inflow.

The Heath WWTP has an approved pretreatment program. There are 3 non-categorical significant major users, and 2 categorical industrial users.

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 summarizes the chemical specific data for outfall 4PC00007001 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 Licking River (excluding Dillon Lake) as mostly in attainment. Nutrients and ammonia (total) are listed as causes of impairment with dam or impoundments as the source of impairment. Considering this information and the fact that municipal wastewater treatment plants discharge a nutrient load to the river, monthly monitoring for phosphorus, nitrate + nitrite and total Kjeldahl nitrogen is proposed based on best engineering judgment. Monitoring for phosphorus and nitrate + nitrite at the upstream and downstream stations also is proposed. The purpose of the monitoring is to maintain a nutrient data set for use in the future TMDL (total maximum daily loads) study.

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

http://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.

Two dischargers to the South Fork Licking River were included in an interactive model for the wasteload allocation (WLA). Approximately 3.7 miles of the South Fork Licking and Licking Rivers were modeled using the CONSWLA model for conservative (non-decaying) parameters. Dischargers receiving allocations were the Newark and Heath WWTPs.

Parameter Selection Effluent data for the Heath WWTP 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 (DMRs)	January 2006 through December 2010
Pretreatment Data	2007 through 2008

The effluent data were checked for outliers and the following values were removed from the data set: one value for chromium^{+6} of 65. µg/l, one value for chlorine, tot. res. of 180. µg/l and one value for phosphorus of 1900. mg/l. The average and maximum projected effluent quality (PEQ) values are presented in Table 1. For a summary of the screening results, refer to the parameter groupings at the end of this section.

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 2 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
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 3), 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 4. The current permit limits for NH_3-N were evaluated and are adequate to maintain instream WQS. Therefore, NH_3-N will not be addressed further in this report.

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 Heath, the wasteload allocation values are 0.48 TU_a and 1.93 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):

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

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.

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

Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
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 WLA is 50% mortality in 100% effluent based on the dilution ratio of 2.9 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 2. The average PEL (PEL_{avg}) is compared to the average PEQ

(PEQ_{avg}) from Table _, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 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 7 presents the final effluent limits and monitoring requirements proposed for 4PC00007 outfall 001 and the basis for their recommendation.

The Ohio EPA risk assessment (Table 6) places Bis (2-EHP) , Chlorine, tot. res., Lead, Mercury, and Silver in group 5. The placement of these parameters along with the data in Tables 1 and 2 indicates 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).

The Ohio EPA risk assessment (Table 6) places Lead and Silver into group 5 which recommends limits to protect water quality. Due to the small dataset and using the discretion allowed the Director under OAC 3745-33-07(A)(5), we are proposing monitoring, rather than limits, for these pollutants

Ohio EPA risk assessment (Table 6) places Copper in group 4. The placement of this parameter along with the data in Tables 1 and 2 supports 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 6) places Free Cyanide, Zinc, and Total Dissolved Solids in group 3. The placement of these parameters along with the data in Tables 1 and 2 indicates that the reasonable potential to exceed WQS exists and limits are 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 The allowable effluent toxicity (AET) is a factor considered in evaluating whole effluent toxicity. The AET calculations are similar to those for aquatic life criteria (using the chronic toxicity unit (TU_c) and 7Q10 for average and the acute toxicity unit (TU_a) and 1Q10 for maximum). For the Heath WWTP, the AET values are 0.48 TU_a and 1.93 TU_c.

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 the Heath WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 4PC00007001.

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 Heath WWTP.

Storm Water Compliance Under the provisions of the NPDES Phase II Storm Water Program Final Rule, Publically Owned Treatment Works (POTWs) with a design flow greater than 1.0 mgd or those required to have a pretreatment program that discharge storm water directly to state surface waters (not to the POTW) were required to apply for an industrial storm water discharge permit by March 10, 2003. Since the Heath WWTP submitted a "No Exposure Certification" their draft permit will not need Parts IV, V, and VI of the storm water language.

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

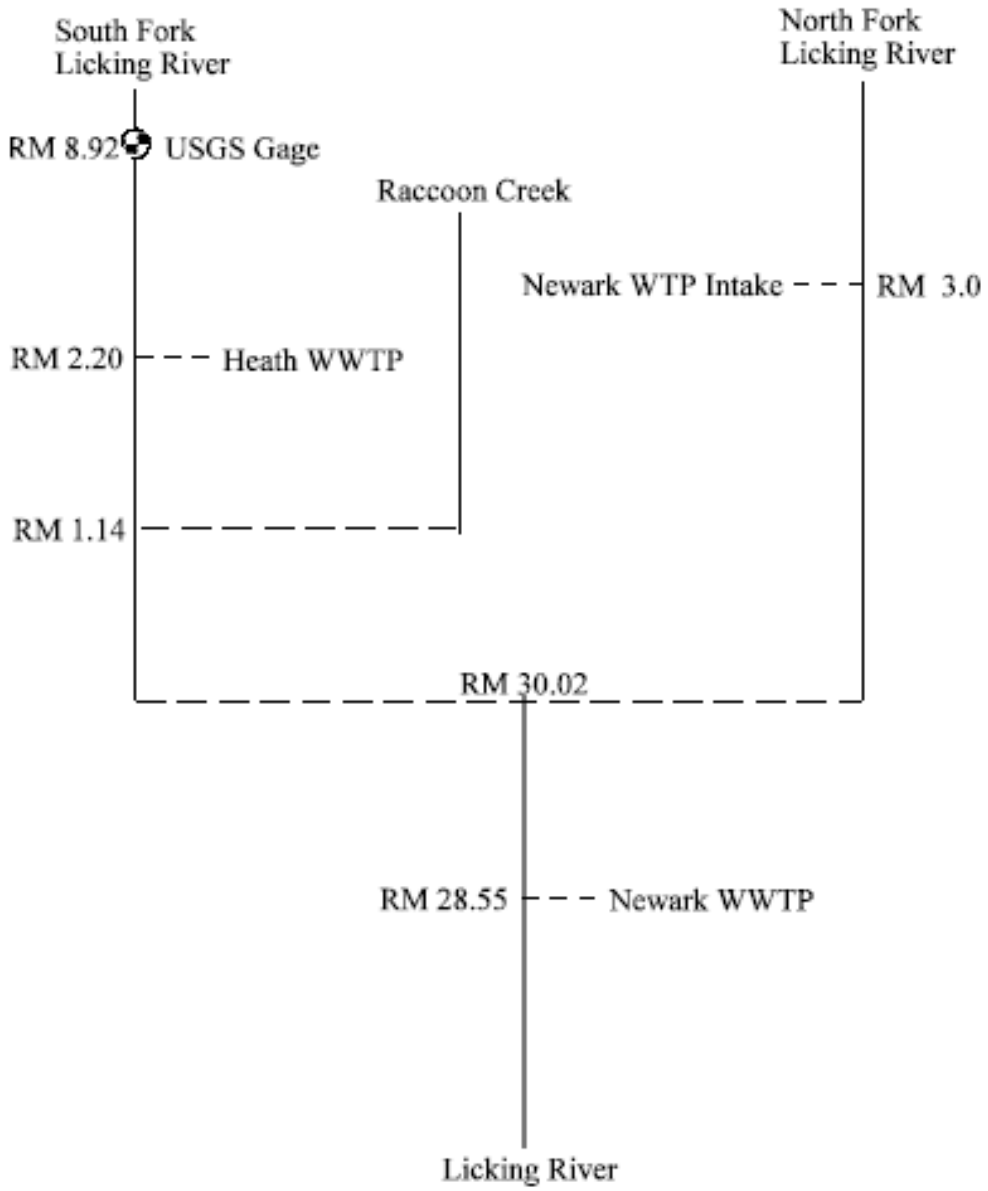

Figure 1. Approximate location of the Heath WWTP

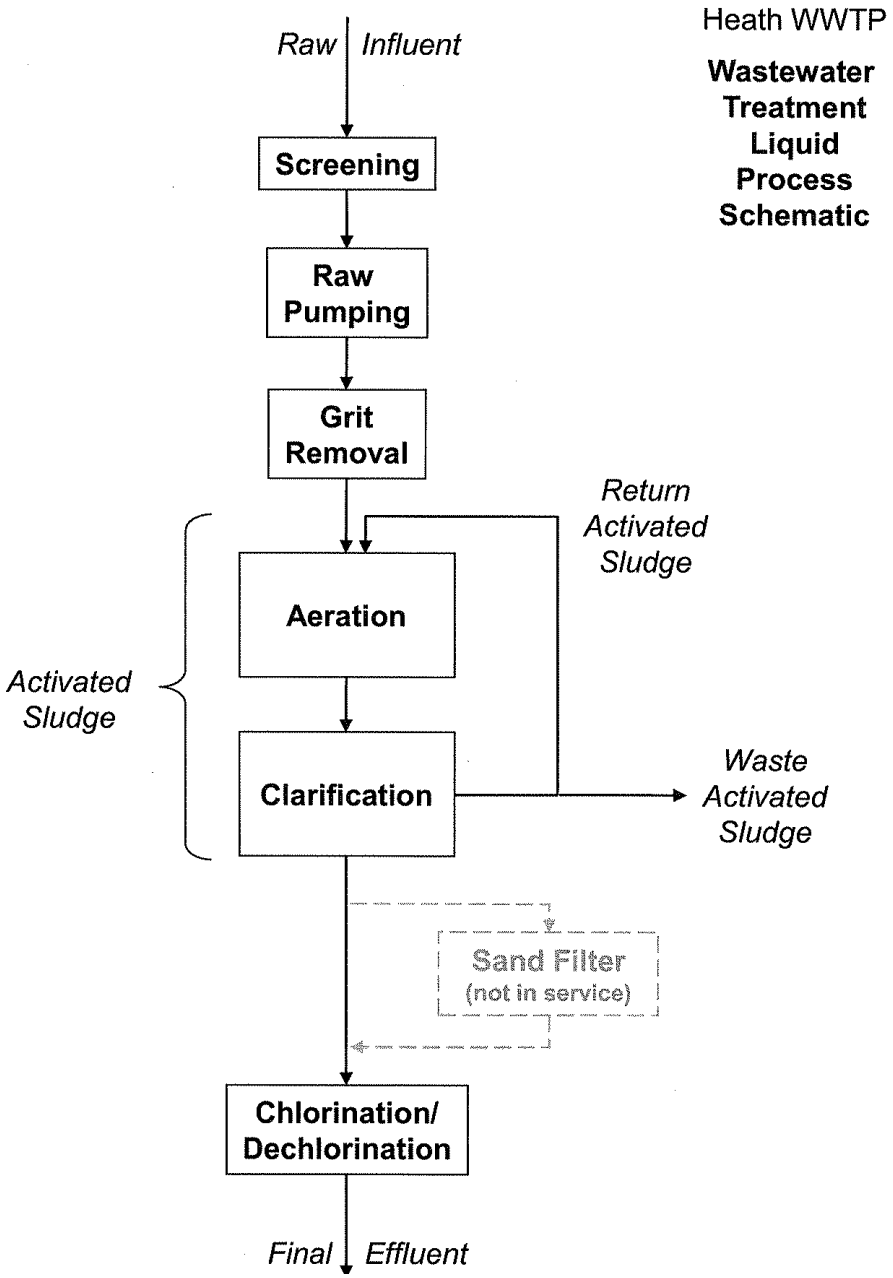

Figure 2. Diagram of Wastewater Treatment System

Table 1. Effluent Characterization Using Self Monitoring Data

Summary of analytical results for the Heath WWTP outfall 4PC00007001. All values are in ug/l unless otherwise indicated. OEPA = data from analyses by Ohio EPA; PT = data from, pretreatment program reports; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

PARAMETER	9/9/09	9/14/09	PT February 2007	PT August 2008	DECISION CRITERIA	
					PEQ_{avg}	PEQ_{max}
Zinc	NA	39	30	85	235.8	323
CBOD (mg/l)	2.2	2.5	ND	ND	6.9	9.5
Fecal Coliform	420	1200	ND	ND	3328.8	4560
Nitrate + Nitrite-N (mg/l)	NA	13.8	ND	ND	62.46	85.56
Ammonia (mg/l)	NA	0.23	ND	ND	1.04	1.426
COD (mg/l)	NA	27.5	ND	ND	124.46	170.5
Total Phosphorus (mg/l)	NA	3.53	ND	ND	15.97	21.88
TDS (mg/l)	NA	516	ND	ND	2335.4	3199.2
TSS (mg/l)	NA	5.6	ND	ND	25.34	34.72
Copper	NA	9	ND	ND	40.73	55.8
Bis (2-ethyhexyl) Phthalate	NA	19.4	ND	ND	87.8	120.3

Table 2. Effluent Data for Heath WWTP and Projected Effluent Quality Values

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia, summer	mg/l	244	224	0.527	1.125
Ammonia, winter	mg/l	192	143	0.455	1.016
NO_3+NO_2	mg/l	57	57	16.06	22
Phosphorus	mg/l	50	50	8.071	12.8
Cyanide, free	µg/l	17	1	4.568	6.258
Selenium	µg/l	3	0	--	--
Nickel	µg/l	20	0	--	--
Silver	mg/l	24	1	2.562	3.51
Zinc [B]	µg/l	26	26	79.52	104.7
Cadmium	µg/l	54	0	--	--
Lead	µg/l	20	1	26.57	36.4
Chromium, total	µg/l	21	1	11.39	15.6
Copper	µg/l	19	1	20.44	28
Chromium^{+6}, diss.	µg/l	19	0	--	--
Bis (2-EHP)[A]	µg/l	51	4	77.38	106
Chlorine, Tot. Res.	µg/l	644	394	22.32	45.68
Mercury	µg/l	23	22	0.0262	0.0443
Total Dissolved Solids	mg/l	106	106	606.6	680.8
Ammonia, winter	mg/l	192	143	0.455	1.016

[A] Carcinogen
[B] Combined DMR and Ohio EPA/Pretreatment Data

Table 3a. Water Quality Criteria in the Study Area

		Outside Mixing Zone Criteria				Inside
		Average		Maximum		Mixing
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Antimony	µg/l	4300.	--	190.	900.	1800.
Arsenic	µg/l	--	100.	150.	340.	680.
Benzene	µg/l	710.	--	160.	700.	1400.
Bis (2-EHP)	µg/l	59.	–	8.4	1100.	2100.
Chlorine, tot res.	µg/l	--	--	11.	19.	38.
Chlorodibromomethane	µg/l	340.	--	--	--	--
Chloroform	µg/l	4700.	--	140.	1300.	2600.
Chromium^{+6}, diss.	µg/l	--	--	11.	16.	31.
Cyanide, free	µg/l	220000.	--	12.	46.	92.
Dichlorobromomethane	µg/l	460.	--	--	--	--
Fluoranthene	µg/l	370.	--	0.8	3.7	7.4
Hexachloroethane	µg/l	89.	--	--	--	--
Iron	µg/l	--	5000.	--	--	--
Mercury	µg/l	0.012	10.	0.91	1.7	3.4
Molybdenum	µg/l	--	--	20000.	190000.	370000.
Naphthalene	µg/l	--	--	21.	170.	340.
NO_3+NO_2	mg/l	--	100.	--	--	--
Phenol	µg/l	4600000.	--	400.	4700.	9400.
Selenium	µg/l	11000.	50.	5.0	–	--
Strontium	µg/l	--	--	21000.	40000.	81000.
1,1,1,-Trichloroethane	µg/l	--	--	76.	690.	1400.
TDS	mg/l	--	--	1500.	--	--

Table 3b. Water Quality Criteria in the Study Area; Hardness-Based Metals.

		Outside Mixing Zone Criteria				Inside
		Average		Maximum		Mixing
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Licking River downstream of Newark WWTP; Hardness=263. mg/l						
Cadmium	µg/l	--	50.	5.3	13.	27.
Chromium, tot.	µg/l	--	100.	190.	4000.	8000.
Copper	µg/l	1300.	500.	21.	35.	70.
Lead	µg/l	--	100.	22.	420.	840.
Nickel	µg/l	4600.	200.	120.	1100.	2100.
Zinc	µg/l	69000.	25000.	270.	270.	540.
South Fork Licking River downstream of Heath WWTP; Hardness=242. mg/l						
Cadmium	µg/l	--	50.	4.9	12.	24.
Chromium, tot.	µg/l	--	100.	180.	3700.	7400.
Copper	µg/l	1300.	500.	20.	32.	64.
Lead	µg/l	--	100.	20.	380.	750.
Nickel	µg/l	4600.	200.	110.	990.	2000.
Silver	µg/l	--	--	1.3	7.3	15.
Zinc	µg/l	69000.	25000.	250.	250.	510.

Table 4. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Arsenic [B]	µg/l	--	426.	233.	479.	680.
Bis (2-EHP)	µg/l	255.	--	13.	1554.	2100.
Cadmium	µg/l	--	217.[A]	7.9	18.	24.
Chlorine, tot. res.	µg/l	--	--	21.	30.	38.
$Chromium^{+6}$, diss.	µg/l	--	--	17.	23.	31.
Chromium, tot.[B]	µg/l	--	435.	289.	5405.	7400.
Copper	µg/l	5646.[A]	2168.[A]	31.	46.	64.
Cyanide, free [B]	µg/l	956500.[A]	--	19.	65.	92.
Lead	µg/l	--	432.	32.	560.	750.
Mercury [C]	µg/l	0.012	10.[A]	0.91	1.7	3.4
Molybdenum [B]	µg/l	--	--	31240.	268400.	370000.
Nickel	µg/l	19990.[A]	862.	178.	1463.	2000.
Selenium	µg/l	47830.	217.	7.8	--	--
Silver	µg/l	--	--	2.5	12.	15.
TDS	mg/l	--	--	2108.	--	--
Zinc	µg/l	300000.[A]	108700.[A]	403.	364.	510.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.

[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested for use in pretreatment program.

[C] BCC: no mixing zone allowed unless the requirements for an exclusion are met as listed in 3745-2-08(L).

Table 5. Instream Conditions and Discharger Flow

Parameter	Units		Value	Basis
South Fork Licking River Flows:				
1Q10	cfs	annual	1.61	USGS gage #03145000, 1939-97 data
7Q10	cfs	annual	2.53	USGS gage #03145000, 1939-97 data
30Q10	cfs	summer	4.14	USGS gage #03145000, 1939-97 data
30Q10	cfs	winter	18.41	USGS gage #03145000, 1939-97 data
Harmonic Mean Flow	cfs	annual	22.89	USGS gage #03145000, 1939-97 data
Raccoon Creek Flows:				
1Q10	cfs	annual	2.58	USGS gage #03145500, 1939-48 data
7Q10	cfs	annual	2.83	USGS gage #03145500, 1939-48 data
30Q10	cfs	summer	3.20	USGS gage #03145500, 1939-48 data
30Q10	cfs	winter	6.14	USGS gage #03145500, 1939-48 data
Harmonic Mean Flow	cfs	annual	11.05	USGS gage #03146500, 1939-97 data
North Fork Licking Flows:				
1Q10	cfs	annual	2.04	USGS gage #03146250, 1944-77 data
7Q10	cfs	annual	3.12	USGS gage #03146250, 1944-77 data
30Q10	cfs	summer	5.27	USGS gage #03146250, 1944-77 data
30Q10	cfs	winter	17.1	USGS gage #03146250, 1944-77 data
Harmonic Mean Flow	cfs	annual	16.58	USGS gage #03146000, 1939-82 data
Mixing Assumption	%	average	100.	Stream-to-discharge ratio
	%	maximum	100.	Stream-to-discharge ratio
Instream Hardness:				
South Fork Licking River	mg/l	annual	242.	Heath 901; 23 values, 0<MDL,2006-10
Licking River	mg/l	annual	263.	Newark 901;60 values,0<MDL,2006-10
Background Water Quality for the South Fork Licking:				
Arsenic	µg/l	annual	3.9	STORET; 14 values, 4<MDL, 2008
Bis (2-EHP)	µg/l	annual	1.32	STORET; 1 value, 0<MDL, 2008
Cadmium	µg/l	annual	0.1	STORET; 14 values,13<MDL, 2008
Chlorine, tot res	mg/l	annual	0.	No representative data available.
Chloroform	µg/l	annual	0.	STORET; 1 value, 1<MDL, 2008
Chromium^{+6}, diss.	µg/l	annual	0.	No representative data available.
Chromium, tot.	µg/l	annual	0.	STORET; 14 values,14<MDL, 2008
Copper	µg/l	annual	3.4	STORET; 14 values, 3<MDL, 2008
Cyanide, free	µg/l	annual	0.	No representative data available.
Fluroanthene	µg/l	annual	0.	STORET; 1 value, 1<MDL, 2008
Lead	µg/l	annual	1.0	STORET; 14 values, 12<MDL, 2008
Mercury	µg/l	annual	0.	No representative data available.
Molybdenum	µg/l	annual	0.	No representative data available.
Nickel	µg/l	annual	3.1	STORET; 14 values, 3<MDL, 2008
Selenium	µg/l	annual	0.	STORET; 14 values,14<MDL, 2008
Silver	µg/l	annual	0.	No representative data available.
TDS	mg/l	annual	429.	STORET; 14 values, 0<MDL, 2008
Zinc	µg/l	annual	5.0	STORET; 14 values,10<MDL, 2008
Heath WWTP flow	cfs	design	2.71	DSW
Newark WWTP flow	cfs	design	12.38	DSW

Table 6. Parameter Assessment

Group 1:	Due to a lack of criteria, the following parameters could not be evaluated at this time.		
	Phosphorus		
Group 2:	PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.		
	Arsenic	*Cadmium*	*Selenium*
	Chromium, tot.	*Molybdenum*	*Chromium^{+6}, diss.*
	NO_3+NO_2	*Nickel*	
Group 3:	PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL. WLA not required. No limit recommended; monitoring optional.		
	Cyanide, free	*TDS*	*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.		
	Copper		
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							
						Recommended Effluent Limits		
	Parameter		Units		Period	Average		Maximum
	Bis (2-EHP)		*µg/l*		*annual*	*13.*		*1554*
	Chlorine, tot. res.		*µg/l*		*summer*	*21*		*30*
	Lead		*µg/l*		*annual*	*32*		*560*
	Mercury		*µg/l*		*annual*	*0.012*		*1.7*
	Silver		*µg/l*		*annual*	*2.5*		*12*

Table 7. Final effluent limits and monitoring requirements for Heath WWTP 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----------				PD
CBOD						
Summer	mg/l	10	15_d	66	99_d	PD
Winter	mg/l	25	40_d	166	265_d	BPT
Total Suspended Solids						
Summer	mg/l	20	30_d	133	199_d	PD
Winter	mg/l	30	45_d	199	298_d	BPT
Ammonia						
Summer	mg/l	1.7	2.55_d	11.3	16.9	EP
Winter	mg/l	12	18_d	80	119_d	EP
Total Phosphorus	mg/l	----------Monitor----------				M[c]
Oil & Grease	mg/l	----------Not to exceed 10----------				WQS
pH	S.U.	----------6.5-9.0----------				WQS
E. coli	#/100ml	126	284	--	--	WQS
Chromium, T. R.	ug/L	----------Monitor----------				M[c] /RP
Cyanide, Free	mg/l	----------Monitor----------				M[c] /RP
Nitrate-N + Nitrite-N	mg/l	----------Monitor----------				M[c] /RP
Nickel	ug/L	----------Monitor----------				M[c] /RP
Hexavalent Chromium	ug/L	----------Monitor----------				M[c] /RP
Copper	ug/L	----------Monitor----------				M[c]/EP
Lead	ug/L	----------Monitor----------				WLA/EP
Mercury	ug/L	12	1700			WLA/EP
Zinc,T.R.	ug/L	----------Monitor----------				M[c] /RP
Silver	ug/L	----------Monitor----------				M[c] /RP/WLA
Bis (2-EHP)	ug/L	13	1554	0.0826	10.3	WLA/RP
Cadmium	ug/L	----------Monitor----------				EP/RP
Chlorine, Residual	mg/l	0.021	0.03	--	--	WLA
Whole Effluent Toxicity						
Acute	TUa	----------Monitor----------				WET
Chronic	TUc	----------Monitor----------				WET

[a] Effluent loadings based on average design discharge flow of 1.75 MGD.

[b] Definitions: BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation; EP = Existing Permit; M = Monitoring; PD = Plant Design Criteria; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ; 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.