

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for Pickaway Correctional Institute Wastewater Treatment Plant (PCI)

Public Notice No.: 16-07-022
Public Notice Date: July 7, 2016
Comment Period Ends: August 6, 2016

Ohio EPA Permit No.: 4PP00003*GD
Application No.: OH0054224

Name and Address of Applicant:

State of Ohio
Department of Rehabilitation and Correction
1050 Freeway Drive North
Columbus, Ohio 43229

Name and Address of Facility Where

Discharge Occurs:

Pickaway Correctional Institute
Wastewater Treatment Plant
11781 State Route 762
P.O. Box 209
Pickaway County

Receiving Water: Big Darby Creek

Subsequent Stream Network: Scioto River, Ohio River, Mississippi River, Gulf of Mexico, Atlantic Ocean

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 (CWA) 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.

No antidegradation review was necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (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

New monthly monitoring is proposed for dissolved orthophosphate in accordance with Ohio Revised Code (ORC) Section 6111.03(U).

New monthly monitoring is proposed for strontium because WLA analysis placed strontium as a Group 4 parameter.

New quarterly monitoring is proposed for heptachlor epoxide because WLA analysis placed heptachlor epoxide as a Group 5 parameter. A limit is not proposed at this time because of the limited dataset available.

New quarterly monitoring for chronic toxicity for *Ceriodaphnia dubia* with the determination of acute endpoints is proposed for the first year of the permit. This proposed increase in monitoring is based upon the 6/5/15 test where the chronic whole effluent toxicity test for *Ceriodaphnia dubia* was 16TU_c, significantly larger than the allowable WLA of 2.60 TU_c. After the first year of quarterly monitoring, annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the rest of the permit for *Ceriodaphnia dubia*.

Annual chronic toxicity monitoring with the determination of acute endpoints for *Pimephales promelas* is proposed for the life of the permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. As soon as possible, the permittee must begin using either ASTM D7237-10 or OIA-1677-09 both of which are approved methods for free cyanide listed in 40 CFR 136.

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; and outfall signage.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

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

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

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

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

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

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

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

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

For additional information about this fact sheet or the draft permit, contact Cole Miller at (614) 728-3846 or by e-mail at cole.miller@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants:

http://epa.ohio.gov/portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf.)

In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and information

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

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

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

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

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

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific WQS for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION

Pickaway Correctional Institute (PCI) discharges to Big Darby Creek at River Mile 22.92. Figure 1 shows the approximate location of the facility.

This segment of the Big Darby Creek is described by Ohio EPA River Code:02-200, Hydrologic Unit Code: 0506000122-03, County: Pickaway, Ecoregion: Eastern Corn Belt Plains. The Big Darby Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Exceptional Warmwater Habitat, General High Quality Water, Agricultural Water Supply, Industrial Water Supply, and Class A Primary Contact Recreation. Big Darby Creek discharges to the Scioto River. The Scioto River is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Class A Primary Contact Recreation.

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

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA 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 Recreation) and wading only (Secondary Contact which are 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 water supply and industrial water supply.

FACILITY DESCRIPTION

Pickaway Correctional Institute (PCI) was constructed in 1987 and last upgraded in 2007. The average design flow is 2.3 million gallons per day (MGD) with a maximum daily and peak hour flow of 6.3 MGD. PCI serves the unincorporated village of Orient, the Orient Correctional Complex, and an additional area of Pickaway County, serving a total population of 5,500 people. PCI has the following treatment processes which are shown on Figure 2:

- Mechanical bar screen
- Influent lift pumps
- Fine band screen
- Fine grit removal
- Grease removal
- Anoxic selector
- Oxidation ditch extended aeration
- Secondary clarification

- Tertiary disc filtration
- Ultraviolet disinfection
- Post aeration

Pickaway Correctional Institute (PCI) has no structural bypasses. The collection system has 100% separated sewers and 0% combined sewers.

PCI does not have an approved pretreatment program as there are no industrial users.

The potable water comes from various ground water wells depending on the service area.

PCI utilizes the following sewage sludge treatment processes (Figure 3):

- Gravity thickening prior to digestion
- Aerobic digestion - air
- Mechanical dewatering – filter press
- Cake storage – atmospheric drying
- Land application

Treated sludge is land applied. Table 1 shows the last five years of sludge removed from Pickaway Correctional Institute (PCI).

PCI has no additional NPDES permits but does carry no exposure certification under 4GRN00578*EG which expires on May 3, 2017. No exposure certification exempts a facility from storm water permitting requirements for a five-year period.

In 1999, PCI was issued a set of Director’s Final Findings and Orders in response to permit violations. The orders required the Ohio Department of Rehabilitation and Correction (ODRC) to submit an approvable PTI for long-term improvements. ODRC was issued two PTIs to upgrade the plant in 2001 and 2005. All of the Orders were met from the 1999 DFFO.

DESCRIPTION OF EXISTING DISCHARGE

Pickaway Correctional Institute (PCI) had 64 effluent violations for total phosphorus between December 2011 and January 2016 with the last violation occurring on August 2014. These violations were most likely caused by the lack of phosphorus treatment controls in place. These violations have been addressed by chemical precipitation of phosphorus using sodium aluminate. Table 2 displays the effluent violations by year since November 2011.

PCI has an estimated infiltration/inflow (I/I) rate of 0.169 MGD that does not cause known problems in the collection system. The median annual effluent flow rate for Pickaway Correctional Institute (PCI) for the previous five years is presented on Table 3. Pickaway Correctional Institute (PCI) has repaired and replaced some older sewers. The Pickaway County sewers which are tributary to the plant continue to repair and replace troubled sewers as needed.

Pickaway Correctional Institute (PCI) reports SSOs at station 300. In the last five years, there were two sanitary sewer overflows reported with both occurring in January 2016 as shown in Table 4.

Pickaway Correctional Institute (PCI) must maintain phosphorus loading limits as part of plant design. Compliance information is presented on Table 5.

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information from Ohio EPA effluent testing conducted.

Table 6 and Table 7 present chemical specific data compiled from data collected by the permittee and Ohio EPA, respectively.

Table 8 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period November 2011 through February 2016, and current permit limits are provided for comparison.

Table 9 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 10 summarizes the results of acute and chronic WET tests of the final effluent.

Table 11 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Greenbrier Creek-Big Darby Creek watershed assessment unit, which includes the Big Darby Creek in the vicinity of PCI, is not listed as impaired on Ohio's 303(d) list. The Big Darby Creek Study Area is shown in Figure 4.

A Total Daily Maximum Load (TMDL) report was approved for the Big Darby Creek in 2006. The March 24, 2015, Supreme Court of Ohio decision *Fairfield Cty. Bd. of Commrs. v. Nally, Slip Opinion No. 2015-Ohio-991* vacated all previously approved TMDLs. As of March 14, 2016, this TMDL is considered a technical guidance document pending final TMDL approval. Additional monitoring for a biological and water quality study was also conducted in 2014.

An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity and modified Index of Well-Being, which indicate the response of the fish community, and the Invertebrate Community Index, which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use

designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 12) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

The 2006 Big Darby Creek Watershed TMDL indicated that the segment of the Big Darby Creek where PCI discharges is in full attainment. The TMDL included a wasteload allocation for each point source discharging to the Big Darby Creek watershed for phosphorus and determined that a limit of 1 mg/L was necessary.

Follow-up sampling in 2014 to assess aquatic life use continued to show the stream in full attainment.

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 Pickaway Correctional Institute (PCI) were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA, DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	November 2011 through February 2016
Ohio EPA compliance sampling data	August 2014, May 2015, and October 2015

Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation as non-representative data:

Nitrogen, Ammonia, 12/2/2013 – 12/9/2013

The four (4) values, ranging from 4.9 – 22.2 mg/L, were the highest of the dataset. The next highest value was 0.9 mg/L. The operator indicated that poor nitrification was due to power flashes which caused equipment failures and ultimately ended with a plugged return line.

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 (see Table 9).

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 13).

Wasteload Allocation

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

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

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Wildlife		Annual 90Q10
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 14, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 13 and Table 14. The WLA results to maintain all applicable criteria are presented in Table 15.

Whole Effluent Toxicity Wasteload Allocation

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.

WQS 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 PCI, the WLA values are 0.7 TU_a and 2.60 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:

<u>Dilution Ratio</u> <u>(downstream flow to discharger flow)</u>	<u>Allowable Effluent Toxicity</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

$$\text{Stream Dilution Ratio} = \frac{1Q_{10} + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{4.6 \text{ cfs} + 3.6 \text{ cfs}}{3.6 \text{ cfs}} = 2.3$$

The acute WLA for Pickaway Correctional Institute (PCI) is 40 percent mortality in 100 percent effluent based on the dilution ratio of 2.3 to 1.

REASONABLE POTENTIAL/EFFLUENT LIMITS/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 15. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 9, 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 16.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 17 presents the final effluent limits and monitoring requirements proposed for Pickaway Correctional Institute (PCI) outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Dissolved Oxygen, Total Suspended Solids, Ammonia, and 5-Day Carbonaceous Biochemical Oxygen Demand

The limits proposed for dissolved oxygen, total suspended solids, ammonia and 5-day carbonaceous biochemical oxygen demand are all based on plant design criteria. These limits are protective of WQS.

The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

Phosphorus

Based on best technical judgment (BTJ), limits are recommended for phosphorus. Phosphorus limits are a continuation from the previous permit. As indicated in the effluent monitoring data, the facility discharges total phosphorus, contributing a nutrient load to the river. There is reasonable potential for nutrients to adversely affect the receiving stream. Therefore, a thirty day average concentration limit for phosphorus and a 7-day maximum concentration limit for phosphorus will continue.

Oil and Grease, pH, and *Escherichia coli*

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-07). Class A PCR *E. coli* standards apply to the Big Darby Creek. Phosphorus is limited based on provisions of OAC 3745-33-06(C).

Heptachlor Epoxide

The Ohio EPA risk assessment (Table 16) places heptachlor epoxide in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for this parameter. The PEQ values calculated for heptachlor epoxide in Table 9 may not be representative of its actual levels in the plant effluent since they were based on 2 data points. The purpose of the proposed monitoring is to collect additional data on the frequency and occurrence and variability of heptachlor epoxide in the plant's effluent.

Strontium

The Ohio EPA risk assessment (Table 16) places strontium in group 4. This placement, as well as the data in Table 8 and Table 9, 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 3745-33-07(A)(2). Strontium is proposed to be monitored monthly.

Cadmium, Chromium, Dissolved Hexavalent Chromium, Free Cyanide, Lead, Mercury, Nickel, Nitrate + Nitrite, Copper, Total Filterable Residue, and Zinc

The Ohio EPA risk assessment (Table 16) places cadmium, chromium, dissolved hexavalent chromium, free cyanide, lead, mercury, nickel, nitrite + nitrate, copper, total filterable residue, and zinc in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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 with the exception of mercury. Mercury will remain a monthly sampling parameter due to it being a Group 4 parameter during the previous permit renewal.

Barium

The Ohio EPA risk assessment (Table 16) places barium in group 3. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed.

Flow and Temperature

Monitoring for flow rate and temperature parameters are proposed to continue in order to evaluate the performance of the treatment plant.

Dissolved Orthophosphate

New monthly monitoring is proposed for dissolved orthophosphate (as P). This monitoring is required by Ohio Senate Bill 1, which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate is proposed to further develop nutrient datasets for dissolved reactive phosphorus and to assist stream and watershed assessments and studies. Ohio EPA monitoring, as well as other in-stream monitoring, is taken via grab sample, orthophosphate is proposed to be collected by grab sample to maintain consistent data to support watershed and stream surveys. Monitoring will be done by grab sample, which must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

Whole Effluent Toxicity Reasonable Potential

Based on evaluating the WET data presented in Table 10 and Table 11 and other pertinent data under the provisions of OAC 3745-33-07(B), the Pickaway Correctional Institute (PCI) is placed in Category 4 with respect to WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the life of the permit.

Due to a result of >16 TU_c for *Ceriodaphnia dubia*, the first year will include quarterly chronic testing with the determination of acute end points for *Ceriodaphnia dubia*. Based on previous results, the high result was removed from reasonable potential determination as it was believed to not be representative of plant performance.

The proposed monitoring will adequately characterize toxicity in the plant's effluent.

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.

OTHER REQUIREMENTS

Sanitary Sewer Overflow Reporting

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

Operator Certification and Operator of Record

Operator certification requirements have been included in Part II of the permit in accordance with rules adopted in December 2006 (OAC 3745-7-02). These rules require the Pickaway Correctional Institute (PCI) to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Low-Level Free Cyanide Testing

Currently there are two approved methods for free cyanide listed in 40 CFR 136.3 that have quantification levels lower than any water quality-based effluent limits:

- ASTM D7237-10 and OIA-1677-09 - Flow injection followed by gas diffusion amperometry

These methods will allow Ohio EPA make more reliable water quality-related decisions regarding free cyanide. Because the quantification levels are lower than any water quality-based effluent limits, it will also be possible to directly evaluate compliance with free cyanide limits.

New NPDES permits no longer authorize the use of method 4500 CN-I from Standard Methods for free cyanide testing. The new permits require permittees to begin using one of these approved methods as soon as possible. If a permittee must use method 4500 CN-I during the transition to an approved method, they are instructed to report the results on their DMR and enter "Method 4500 CN-I" in the remarks section.

Part III

Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

Storm Water Compliance

To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was issued on May 3, 2012. The certification number is 4GRN00578. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than May 3, 2017, 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 and maintain a sign at each outfall to the Big Darby Creek providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Figure 1. Location of Pickaway Correctional Institution WWTP.

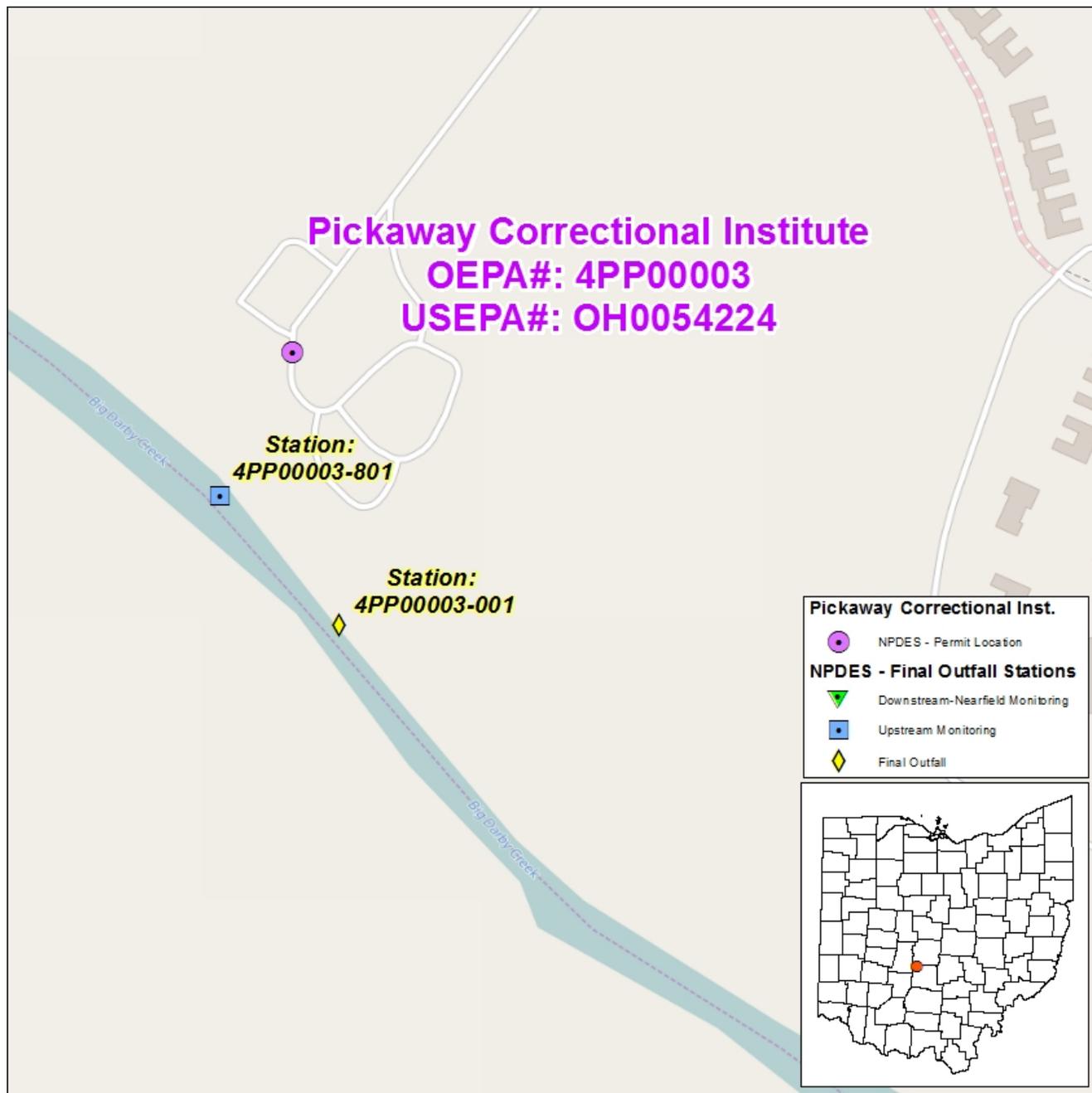
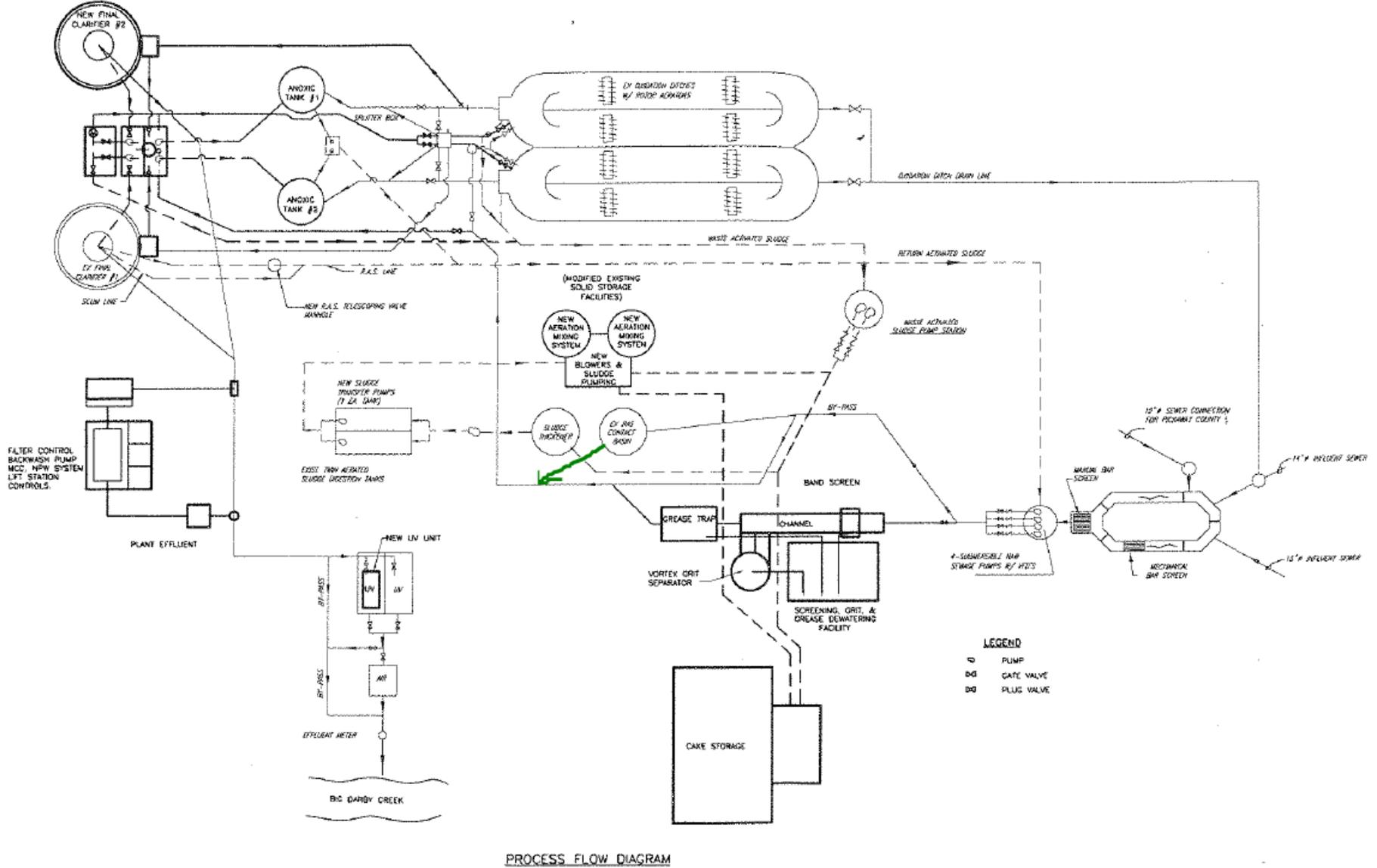


Figure 2. Diagram of Wastewater Treatment System



Note: Green line added after discussion with the operator.

Figure 3. Sewage Treatment Diagram

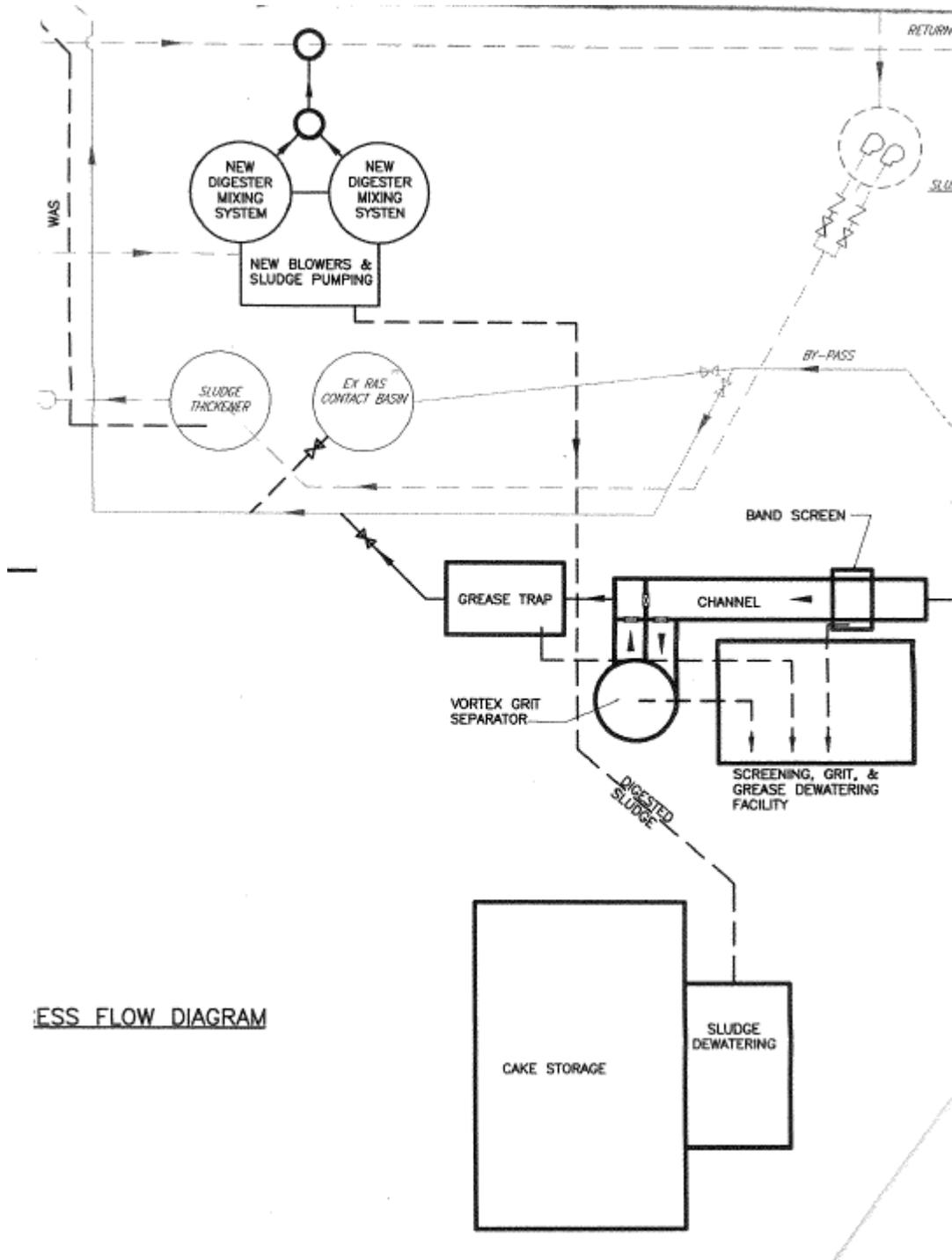


Figure 4. Big Darby Creek Study Area

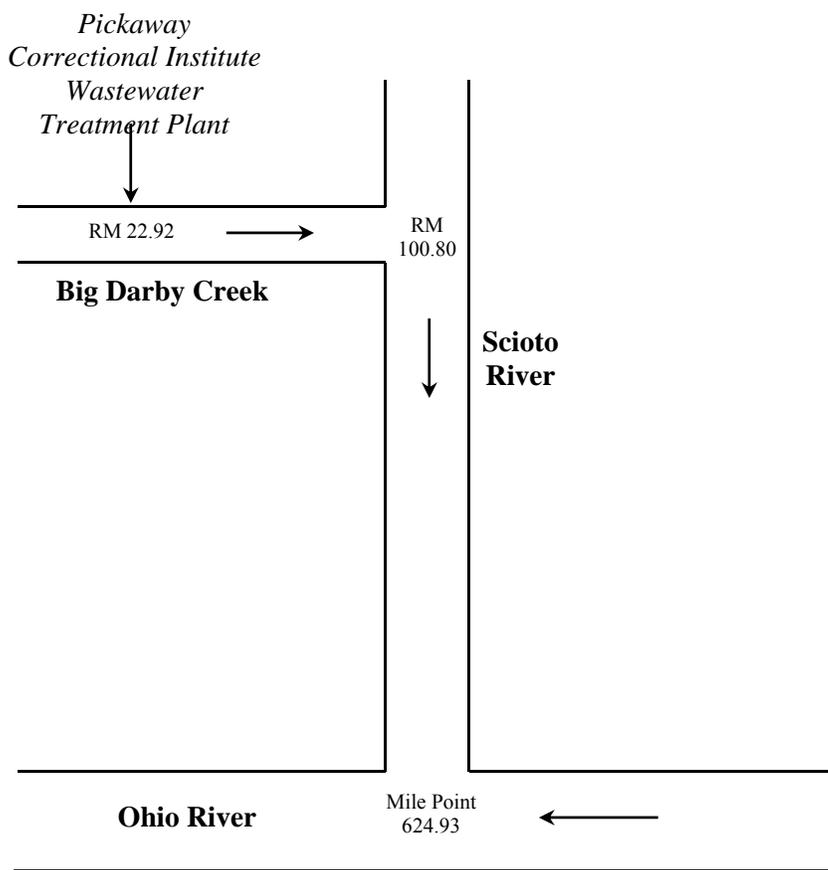


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2011	78.9
2012	102
2013	93.1
2014	120
2015	162

Table 2. Effluent Violations for Outfall 001

Parameter	2011	2012	2013	2014	2015	2016
Phosphorus, Total (P)	1	32	22	9	0	0

Table 3. Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2011	0.968	1.466	1.976
2012	0.849	1.063	2.07
2013	0.748	1.110	1.868
2014	0.647	0.894	1.62
2015	0.629	0.980	1.912
2016	0.627	0.703	0.771

MGD = million gallons per day.

Table 4. Sanitary Sewer Overflows Discharges

Year	Number
2011	0
2012	0
2013	0
2014	0
2015	0
2016	2

Table 5. Calculated Phosphorus Loadings from 2012 – 2015 Between May - October

Year	Median Flow (MGD)	Median Phosphorus (mg/L)	Median Phosphorus Loading (kg/day)
2012	0.891	1.25	3.87
2013	0.849	1.69	4.63
2014	0.669	0.75	1.7
2015	0.645	0.76	1.98

MGD = million gallons per day

Table 6. Effluent Characterization Using Permittee Data November 2011 through February 2016.

Name	Units	Median Concentration
Acute Toxicity, Ceriodaphnia dubia	TU _a	AA (.2)
Acute Toxicity, Pimephales promelas	TU _a	AA (.2)
Bis(2-ethylhexyl) Phthalate	µg/L	AA (5)
CBOD 5 day	mg/L	1
Cadmium, Total Recoverable	µg/L	AA (5)
Chromium, Dissolved Hexavalent	µg/L	AA (10)
Chromium, Total Recoverable	µg/L	AA (10)
Chronic Toxicity, Ceriodaphnia dubia	TU _c	.5
Chronic Toxicity, Pimephales promelas	TU _c	AA (1)
Copper, Total Recoverable	µg/L	5
Cyanide, Free	mg/L	AA (.01)
Dissolved Oxygen	mg/L	8.62
E. coli	#/100 mL	25
Fecal Coliform	#/100 mL	25
Flow Rate	MGD	.705
Lead, Total Recoverable	µg/L	AA (20)
Mercury, Total (Low Level)	ng/L	.9
Nickel, Total Recoverable	µg/L	AA (10)
Nitrite Plus Nitrate, Total	mg/L	5.4
Nitrogen, Ammonia (NH ₃)	mg/L	.05
Oil and Grease, Hexane Extr Method	mg/L	AA (5)
Phosphorus, Total (P)	mg/L	.62
Residue, Total Dissolved	mg/L	897
Residue, Total Filterable	mg/L	885
Strontium, Total Recoverable	µg/L	11200
Total Suspended Solids	mg/L	3
Water Temperature	°C	17.9
Zinc, Total Recoverable	µg/L	28
pH, Minimum - Maximum	S.U.	7.66 - 7.86

AA = not-detected (analytical method detection limit)

Table 7. Effluent Characterization Using Ohio EPA data for parameters above detection.

Parameter	Units	# Results	# Non-Detects	Mean
Alkalinity, Total (total hydroxide+carbonate+bicarbonate)	mg/L	2	0	126
Aluminum	µg/L	3	2	152
Ammonia	mg/L	3	1	0.74
Arsenic	µg/L	3	0	2.67
Barium	µg/L	3	1	18.5
BHC-gamma (Lindane)	µg/L	2	1	0.00238
Calcium	mg/L	3	0	47.8
CBOD 20-Day	mg/L	1	0	6.2
Chloride	mg/L	3	0	291
Copper	µg/L	3	0	3.8
Cyanide	µg/L	2	0	8.5
Dissolved Oxygen (DO)	mg/L	8	0	10.2
Escherichia coli	#/100mL	2	0	100
Hardness, Ca + Mg	mg/L	3	0	264
Heptachlor epoxide	µg/L	2	1	0.00358
Magnesium	mg/L	3	0	35.2
Manganese	µg/L	3	1	20.7
Methyl chloride	µg/L	2	1	2.77
Nitrate+Nitrite	mg/L	3	0	5.51
Nitrogen, Kjeldahl	mg/L	3	0	1.57
Nitrogen, Nitrite (NO2) as NO2	mg/L	1	0	0.501
pH	S.U.	8	0	7.96
Phosphate	mg/L	1	0	1.56
Phosphorus	mg/L	3	0	0.755
Potassium	mg/L	3	0	13.7
Sodium	mg/L	3	0	199
Specific conductance	µmhos/cm	8	0	1520
Strontium	µg/L	3	0	10400
Sulfur, sulfate (SO4) as SO4	mg/L	1	0	164
Temperature, water	°C	8	0	11.8
Total Dissolved Solids	mg/L	3	0	866
Zinc	µg/L	3	1	13.7

Effluent Characterization Using Ohio EPA data for parameters below detection:

Parameter	Units	#Results Below Detect	Parameter	Units	# Results Below Detect
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2	Chloroethane	µg/L	2
4-Chloro-3-methylphenol	µg/L	2	Chloroform	µg/L	2
Acenaphthene	µg/L	2	Chloronaphthalene-2	µg/L	2
Acenaphthylene	µg/L	2	Chlorophenol-2	µg/L	2
Aldrin	µg/L	2	Chlorophenyl-4 phenyl ether	µg/L	2
Anthracene	µg/L	2	Chlorotoluene, 2-	µg/L	2
Benzene	µg/L	2	Chlorotoluene, 4-	µg/L	2
Benzo[a]anthracene	µg/L	2	Chromium	µg/L	3
Benzo[a]pyrene	µg/L	2	Chrysene	µg/L	2
Benzo[b]fluoranthene	µg/L	2	Cumene	µg/L	2
Benzo[g,h,i]perylene	µg/L	2	Cymene	µg/L	2
Benzo[k]fluoranthene	µg/L	2	DDD	µg/L	2
BHC-alpha	µg/L	2	DDE	µg/L	2
BHC-beta	µg/L	2	DDT	µg/L	2
BHC-delta	µg/L	2	Dibenzo[a,h]anthracene	µg/L	2
bis(2-chloroethoxy) methane	µg/L	2	Dibromomethane	µg/L	2
bis(2-chloroethyl) ether	µg/L	2	Dibutyl phthalate	µg/L	2
bis(2-Chloroisopropyl) ether	µg/L	2	Dichlorobenzene, 1,2-	µg/L	4
bis(2-ethylhexyl) phthalate (DEHP)	µg/L	2	Dichlorobenzene, 1,3-	µg/L	4
bis(n-octyl) phthalate	µg/L	2	Dichlorobenzene, 1,4-	µg/L	4
Bromoform	µg/L	2	Dichlorobromomethane	µg/L	2
Bromophenyl-4 phenyl ether	µg/L	2	Dichlorodifluoromethane	µg/L	2
Butyl benzene	µg/L	2	Dichloroethane, 1,1-	µg/L	2
Butyl benzyl phthalate	µg/L	2	Dichloroethane, 1,2-	µg/L	2
Butylbenzene, sec-	µg/L	2	Dichloroethene, trans-1,2-	µg/L	2
Butylbenzene, tert-	µg/L	2	Dichloroethylene, 1,1-	µg/L	2
Cadmium	µg/L	3	Dichloroethylene, cis-1,2-	µg/L	2
Carbon tetrachloride	µg/L	2	Dichlorophenol, 2,4-	µg/L	2
CBOD 5-Day	mg/L	2	Dichloropropane, 1,2-	µg/L	2
Chemical Oxygen Demand (COD)	mg/L	2	Dichloropropane, 1,3-	µg/L	2
Chlorobenzene	µg/L	2	Dichloropropane, 2,2-	µg/L	2
Chlorobromomethane	µg/L	2	Dichloropropene, 1,1-	µg/L	2
Chlorodibromomethane	µg/L	2	Dichloropropene, 1,3 cis-	µg/L	2

Effluent Characterization Using Ohio EPA data for parameters below detection:

Parameter	Units	#Results Below Detect	Parameter	Units	# Results Below Detect
Dichloropropene, 1,3 trans-	µg/L	2	Nickel	µg/L	3
Dieldrin	µg/L	2	Nitro-benzene	µg/L	2
Diethyl phthalate	µg/L	2	Nitrophenol, 2-	µg/L	2
Dimethyl phthalate	µg/L	2	Nitrophenol, 4-	µg/L	2
Dimethylphenol, 2,4-	µg/L	2	Nitrosodiphenylamine, n-	µg/L	2
Dinitro-o-cresol	µg/L	2	Nitrosodipropylamine, n-	µg/L	2
Dinitrophenol, 2,4-	µg/L	2	Oil and Grease	mg/L	2
Dinitrotoluene, 2,4-	µg/L	2	PCB-Aroclor 1016	µg/L	2
Dinitrotoluene, 2,6-	µg/L	2	PCB-Aroclor 1221	µg/L	2
Endosulfan sulfate	µg/L	2	PCB-Aroclor 1232	µg/L	2
Endosulfan, alpha-	µg/L	2	PCB-Aroclor 1242	µg/L	2
Endosulfan, beta-	µg/L	2	PCB-Aroclor 1248	µg/L	2
Endrin	µg/L	2	PCB-Aroclor 1254	µg/L	2
Endrin aldehyde	µg/L	2	PCB-Aroclor 1260	µg/L	2
Ethyl benzene	µg/L	2	Pentachlorophenol (PCP)	µg/L	2
Ethylene dibromide (EDB)	µg/L	2	Phenanthrene	µg/L	2
Fluoranthene	µg/L	2	Phenol	µg/L	2
Fluorene	µg/L	2	Propylbenzene, n-	µg/L	2
Heptachlor	µg/L	2	Pyrene	µg/L	2
Hexachlorobenzene	µg/L	4	Selenium	µg/L	3
Hexachlorobutadiene	µg/L	4	Solids, Total Suspended (TSS)	mg/L	3
Hexachlorocyclopentadiene	µg/L	2	Styrene	µg/L	2
Hexachloroethane	µg/L	2	Tetrachloroethane, 1,1,1,2-	µg/L	2
Indeno[1,2,3-cd]pyrene	µg/L	2	Tetrachloroethane, 1,1,2,2-	µg/L	2
Iron	µg/L	3	Tetrachloroethylene	µg/L	2
Isophorone	µg/L	2	Toluene	µg/L	2
Lead	µg/L	3	Trichlorobenzene, 1,2,3-	µg/L	2
Methoxychlor	µg/L	2	Trichlorobenzene, 1,2,4-	µg/L	4
Methyl bromide	µg/L	2	Trichloroethane, 1,1,1-	µg/L	2
Methylene chloride	µg/L	2	Trichloroethane, 1,1,2-	µg/L	2
Mirex	µg/L	2	Trichloroethylene	µg/L	2
Monobromobenzene	µg/L	2	Trichlorofluoromethane	µg/L	2
Naphthalene	µg/L	4	Trichlorophenol, 2,4,6- (TCPh)	µg/L	2

Effluent Characterization Using Ohio EPA data for parameters below detection:

Parameter	Units	# Results Below Detect
Trichloropropane, 1,2,3-	µg/L	2
Trimethylbenzene, 1,2,4-	µg/L	2
Trimethylbenzene, 1,3,5-	µg/L	2
Vinyl chloride	µg/L	2
Xylene, o-	µg/L	2
Xylenes, m- & p- Mix	µg/L	2

Table 8. Effluent characterization using permittee submitted data.

Parameter	Season	Units	Day Max	Day Min	7 Day Max	30 Day Max	Obs.	50 th	95 th	Data Range
Water Temperature	All	°C					1553	17.9	25.6	7.1-28.1
Dissolved Oxygen	Summer	mg/L		5.4			736	8.42	7.42**	6.48-10.3
Dissolved Oxygen	Winter	mg/L		3.6			817	9.18	5.54**	4.54-12.1
Total Suspended Solids	Summer	kg/day			160	107	360	7.05	16.9	1.05-34.5
Total Suspended Solids	Winter	kg/day			238	160	400	9.04	21.6	1.3-166
Total Suspended Solids	Summer	mg/L			18.3	12.2	360	2.7	5.61	.5-11.5
Total Suspended Solids	Winter	mg/L			27.3	18.3	400	3.2	7.11	.5-30.5
Oil and Grease, Hexane Extr Method	All	mg/L	10.0				103	2.5	2.5	2.5-2.5
Nitrogen, Ammonia (NH3)	Summer	kg/day			15.7	10.5	319	0.173	3.35	.0432-12.4
Nitrogen, Ammonia (NH3)	Winter	kg/day			143	94.9	351	0.147	4.88	.0829-49.2
Nitrogen, Ammonia (NH3)	Summer	mg/L			1.80	1.20	319	0.05	1.21	.05-3
Nitrogen, Ammonia (NH3)	Winter	mg/L			16.4	10.9	351	0.05	1.35	.05-22.2
Nitrite Plus Nitrate, Total	All	mg/L					52	5.4	14.8	.47-19.4
Phosphorus, Total (P)	All	kg/day			13.1	8.71	321	1.74	11.2	.0735-18.7
Phosphorus, Total (P)	All	mg/L			1.50	1.00	321	0.62	3.24	.025-5.13
Cyanide, Free	Quarterly	mg/L					18	0.005	0.005	.005-.005
Nickel, Total Recoverable	Quarterly	µg/L					17	0	0	0-0
Zinc, Total Recoverable	Quarterly	µg/L					17	28	54	0-62
Cadmium, Total Recoverable	Quarterly	µg/L					17	0	0	0-0
Lead, Total Recoverable	Quarterly	µg/L					17	0	0	0-0
Chromium, Total Recoverable	Quarterly	µg/L					17	0	0	0-0
Copper, Total Recoverable	Quarterly	µg/L					17	0	20.4	0-22
Chromium, Dissolved Hexavalent	Quarterly	µg/L					17	0	0	0-0
E. coli	Summer	#/100 mL			284	126	296	25	50	25-2700
Flow Rate	All	MGD					1553	0.705	1.06	.228-2.07

Mercury, Total (Low Level)	All	ng/L					46	0.9	2.35	.25-4.56
Acute Toxicity, Ceriodaphnia dubia	June	TU _a					8	0.1	0.1	.1-.1
Chronic Toxicity, Ceriodaphnia dubia	June	TU _c					4	0.5	13.7	.5-16
Acute Toxicity, Pimephales promelas	June	TU _a					8	0.1	0.1	.1-.1
Chronic Toxicity, Pimephales promelas	June	TU _c					4	0.5	0.5	.1-.5
pH, Maximum	All	S.U.	9.0				1553	7.86	8.16	7.19-8.82
pH, Minimum	All	S.U.		6.5			1553	7.66	7.26*	7.04-8.2
Residue, Total Filterable	All	mg/L					160	885	1060	569-1510
CBOD 5 day	Summer	kg/day			122	79.3	360	2.64	8.31	.979-13.2
CBOD 5 day	Winter	kg/day			213	133	400	2.95	11	.118-22
CBOD 5 day	Summer	mg/L			14.0	9.10	360	1	2.81	.5-4.4
CBOD 5 day	Winter	mg/L			24.4	15.2	400	1	3.71	.05-9.6

* = For minimum pH, 5th percentile shown in place of 50th percentile.

** = For dissolved oxygen, 5th percentile shown in place of 95th percentile and the dataset is from Dec., Jan., Feb., and June – Sept for winter and summer, respectively.

Outfall 300 (Sanitary Sewer Overflow Outfall)

Parameter	Season	Units	Obs.	50 th	95 th	Data Range
Overflow Occurrence	All	No./Month	44	0	0	0-2

Outfall 581 – Land Application of Biosolids Outfall

Parameter	Season	Units	Day Max	Obs.	50 th	95 th	Data Range
Ammonia (NH3) In Sludge	December	mg/kg		7	8650	10600	3530-10700
Nitrogen Kjeldahl, Total In Sludge	December	mg/kg		7	51500	73400	23800-77200
Phosphorus, Total In Sludge	December	mg/kg		7	12600	26200	4830-29900
Potassium In Sludge	December	mg/kg		5	5270	8020	4170-8090
Arsenic, Total In Sludge	December	mg/kg	75	7	4.35	7.05	1.4-7.5
Cadmium, Total In Sludge	December	mg/kg	85	7	1	2.18	.416-2.25
Copper, Total In Sludge	December	mg/kg	4300	7	384	474	5-484
Lead, Total In Sludge	December	mg/kg	840	7	24.4	35.3	.25-35.6
Nickel, Total In Sludge	December	mg/kg	420	7	17.1	21.4	7.41-22
Zinc, Total In Sludge	December	mg/kg	7500	7	451	728	410-832
Selenium, Total In Sludge	December	mg/kg	100	7	5.64	24.8	1.31-29
Sludge Fee Weight	December	dry tons		5	102	154	78.9-162
Fecal Coliform in Sludge	December	CFU/gram	2000000	5	4090	8210	2000-8780
Sludge Weight	December	Dry Tons		5	102	154	78.9-162
Mercury, Total In Sludge	December	mg/kg	57	7	0.332	0.768	.02-.787
Molybdenum In Sludge	December	mg/kg	75	7	16.7	29.4	13.2-30

Outfall 586 and 588 – Disposal of sludge at landfill and transfer of sludge to another NPDES holder outfalls.

Parameter	Season	Units	Obs.	50 th	95 th	Data Range
Sludge Fee Weight	All	dry tons	0			-

Outfall 601 – Influent monitoring station

Parameter	Season	Units	Obs.	50 th	95 th	Data Range
Total Suspended Solids	All	mg/L	760	190	387	43-837
pH, Maximum	All	S.U.	1553	7.98	8.51	7.1-9.32
pH, Minimum	All	S.U.	1553	7.39	7.86	6.37-8.62
CBOD 5 day	All	mg/L	759	218	483	20-871

Outfall 801 – Upstream monitoring station

Parameter	Season	Units	Obs.	50 th	95 th	Data Range
Water Temperature	All	C	51	14	23.6	2.6-24.6
Dissolved Oxygen	All	mg/L	51	9.02	13.7	5.12-14.1
pH	All	S.U.	51	7.99	8.32	7.38-8.41
Nitrogen, Ammonia (NH3)	All	mg/L	51	0	0.1	0-.2
Nitrite Plus Nitrate, Total	All	mg/L	51	2.6	5.7	.05-6.6
Phosphorus, Total (P)	All	mg/L	51	0.08	0.27	.025-.66
E. coli	Summer	#/100 ml	23	100	4120	25-6400

Outfall 901 – Downstream Monitoring Station

Parameter	Season	Units	Obs.	50 th	95 th	Data Range
Water Temperature	All	C	51	13.7	23.5	2.7-24.4
Dissolved Oxygen	All	mg/L	51	9.57	13.6	5.67-14.1
pH	All	S.U.	51	8.1	8.36	7.58-8.42
Nitrogen, Ammonia (NH3)	All	mg/L	51	0	0.1	0-5.6
Hardness, Total (CaCO3)	All	mg/L	51	314	447	3.84-610
E. coli	Summer	#/100 ml	23	200	2050	25-5900

Table 9. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia-Summer	mg/L	208	106	0.725	1.50
Ammonia-Winter	mg/L	176	28	0.243	0.428
Arsenic - TR	µg/L	3	3	5.91	8.1
Barium	µg/L	2	2	69.4	95
Cadmium - TR	µg/L	17	0	--	--
Chlorides	mg/L	3	3	683	936
Chromium - TR	µg/L	17	0	--	--
Dissolved Hexavalent Chromium	µg/L	17	0	--	--
Copper - TR	µg/L	17	4	22.4	30.8
Free Cyanide	mg/L	18	0	--	--
Total Filterable Residue	mg/L	160	160	1003	1126
Lead - TR	µg/L	17	0	--	--
Mercury - TR (BCC)	ng/L	46	34	2.07	3.25
Nickel - TR	µg/L	17	0	--	--
Nitrate-N + Nitrite-N	mg/L	52	52	14.2	19.4
Phosphorus	mg/L	321	320	2.25	3.65
Strontium	µg/L	17	7	23000	31500
TKN	mg/L	3	3	6.02	8.25
Zinc - TR	µg/L	17	15	55.8	90.3
Heptachlor epoxide	µg/L	2	1	0.169	0.0232
Lindane	µg/L	2	1	0.0102	0.141

MDL = analytical method detection limit

PEQ = projected effluent quality

Table 10. Summary of Acute and Chronic Toxicity Results

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales promelas</i>	
	TU _a	TU _c	TU _a	TU _c
6/22/2012	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
6/24/2013	AE ()	AE ()	AE ()	AE ()
6/26/2013	AE ()	AE ()	AE ()	AE ()
6/30/2013	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
6/16/2014	AA (0.2)		AA (0.2)	
6/18/2014	AA (0.2)		AA (0.2)	
6/20/2014	AA (0.2)	AA (1.0)	AA (0.2)	AA (0.2)
6/1/2015	AA (0.2)		AA (0.2)	
6/3/2015	AA (0.2)		AA (0.2)	
6/5/2015	AA (0.2)	>16 ^B	AA (0.2)	AA (1.0)

AA = non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c

AE = Invalid test and analytical data not valid.

TU_a = acute toxicity unit

TU_c = chronic toxicity unit

^B = *C. dubia* result not representative; deleted from reasonable potential.

Table 11. Ohio EPA Toxicity Screening Results for Outfall 001

Date	<i>Pimephales promelas</i>		<i>Ceriodaphnia dubia</i>	
	%M		%M	
	24 hours	48 hours	24 hours	48 hours
5/5/2015	0	0	0	0
5/6/2015	0	0	0	0
5/5/2015-5/6/2015	0	0	0	0
10/13/2015	0	0	0	0
10/14/2015	0	0	0	0
10/13/15-10/14/2015	0	0	0	0

^a = 24-hour composite sample

%M = percent mortality in 100% effluent

Table 12. Use Attainment Table

Location	River Mile	Use	Status	QHEI
Big Darby Creek Dst. PCI WWTP, Upst. Snake Island (V07W56)	22.25	EWH	Full	90.3
Big Darby Creek near Gravel Pit @ end of lane (V07P42)	21.35	EWH	Full	88.5

EWH = Exceptional warmwater habitat

Reference: PCI Discharges at River Mile 22.92 and these are the two nearest downstream assessment sites.

Table 13. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia-Summer	mg/L	--	--	0.8	--	--
Ammonia-Winter	mg/L	--	--	1.7	--	--
Arsenic - TR	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Cadmium - TR	µg/L	--	50	6	16	33
Chlorides	mg/L	--	--	--	--	--
Chromium - TR	µg/L	--	100	220	4600	9200
Dissolved Hexavalent Chromium	µg/L	--	--	11	16	31
Copper - TR	µg/L	1300	500	25	41	82
Free Cyanide	mg/L	220	--	0.012	0.046	0.092
Total Filterable Residue	mg/L	--	--	1500	--	--
Lead - TR	µg/L	--	100	28	530	1100
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Nickel - TR	µg/L	4600	200	140	1200	2500
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Strontium	µg/L	--	--	21000	40000	81000
TKN	mg/L	--	--	--	--	--
Zinc - TR	µg/L	69000	25000	320	320	630
Heptachlor epoxide	µg/L	0.0011 ^c	--	--	--	--
Lindane	µg/L	0.63 ^c	--	0.057	0.95	1.9

^c This criterion is based on a carcinogenic endpoint.

Table 14. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
<i>Stream Flows</i>				
1Q10	cfs	annual	4.6	USGS 03230500
7Q10	cfs	annual	5.7	USGS 03230500
		summer	0	
		winter	0	
30Q10	cfs	summer	8.8	USGS 03230500
		winter	32.4	USGS 03230500
90Q10	cfs	annual	0	
Harmonic Mean	cfs	annual	56.8	USGS 03230500
Mixing Assumption	%	average	100	
	%	maximum	100	
<i>Hardness</i>	mg/L	annual	314	Station 901; 2011-2016; n=51; 0<MDL
<i>pH</i>	S.U.	summer	8.1	Station 901; 2011-2016; n=16
		winter	8.345	Station 901; 2011-2016; n=14
<i>Temperature</i>	C	summer	23.325	Station 901; 2011-2016; n=16
		winter	9.125	Station 901; 2011-2016; n=14
<i>Pickaway Correctional Institute flow</i>	cfs	annual	3.5581	2015 Permit Application

Table 14 Continued:

Parameter	Units	Value	Basis
<i>Background Water Quality</i>			
Ammonia-Summer	mg/L	0	801; 2011-2016; n=16; 15<MDL; 50th Percentile
Ammonia-Winter	mg/L	0	801; 2011-2016; n=14; 14<MDL; 50th Percentile
Arsenic - TR	µg/L	1.28	STORET: V07G78; 2014; n=5; 4<MDL; Average
Barium	µg/L	92.6	STORET: V07G78; 2014; n=5; 0<MDL; Average
Cadmium - TR	µg/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Chlorides	mg/L	55.56	STORET: V07G78; 2014; n=5; 0<MDL; Average
Chromium - TR	µg/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Dissolved Hexavalent Chromium	µg/L		No representative data available.
Copper - TR	µg/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Free Cyanide	mg/L		No representative data available.
Total Filterable Residue	mg/L	445.2	STORET: V07G78; 2014; n=5; 0<MDL; Average
Lead - TR	µg/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Mercury - TR (BCC)	ng/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Nickel - TR	µg/L	2.74	STORET: V07G78; 2014; n=5; 0<MDL; Average
Nitrate-N + Nitrite-N	mg/L	2.6	; 2011-2016; n=51; 4<MDL; 50th Percentile
Phosphorus	mg/L	0.08	; 2011-2016; n=51; 16<MDL; 50th Percentile
Strontium	µg/L	4596	STORET: V07G78; 2014; n=5; 0<MDL; Average
TKN	mg/L	0.286	STORET: V07G78; 2014; n=5; 1<MDL; Average
Zinc - TR	µg/L	0	STORET: V07G78; 2014; n=5; 5<MDL; Average
Heptachlor epoxide	µg/L		No representative data available.
Lindane	µg/L		No representative data available.

MDL = analytical method detection limit

n = number of samples

NPDES = National Pollutant Discharge Elimination System

Ohio EPA = Ohio Environmental Protection Agency

WWTP = wastewater treatment plant

Table 15. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average		Aquatic Life	Maximum Aquatic Life	
		Human Health	Agri-culture			
Ammonia-Summer	mg/L	--	--	--	--	--
Ammonia-Winter	mg/L	--	--	--	--	--
Arsenic - TR	µg/L	--	1676	388	778	680
Barium	µg/L	--	--	424	4466	4000
Cadmium - TR	µg/L	--	848	16	37	33
Chlorides	mg/L	--	--	--	--	--
Chromium - TR	µg/L	--	1696	572	10547	9200
Dissolved Hexavalent Chromium	µg/L	--	--	29	37	31
Copper - TR	µg/L	22053	8482	65	94	82
Free Cyanide	mg/L	3732	--	0.031	0.11	0.092
Total Filterable Residue	mg/L	--	--	3190	--	--
Lead - TR	µg/L	--	1696	73	1215	1100
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Nickel - TR	µg/L	77989	3349	360	2748	2500
Nitrate-N + Nitrite-N	mg/L	--	1655	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Strontium	µg/L	--	--	47279	85771	81000
TKN	mg/L	--	--	--	--	--
Zinc - TR	µg/L	1170487	424089	833	734	630
Heptachlor epoxide	µg/L	0.019	--	--	--	--
Lindane	µg/L	11	--	0.15	2.2	1.9

Table 16. Parameter Assessment

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

Chlorides Phosphorus TKN

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 - TR
Dissolved
Hexavalent
Chromium Lead - TR Mercury - TR (BCC)
Nickel - TR Nitrate-N + Nitrite-N Lindane

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

Barium Copper - TR Free Cyanide
Total Filterable
Residue 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.

Strontium

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>
Heptachlor epoxide	µg/L		0.019	--

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

- PEL = preliminary effluent limit
- PEQ = projected effluent quality
- WLA = wasteload allocation
- WQS = water quality standard
- TKN = Total Kjeldahl Nitrogen

Table 17. Final Effluent Limits for Outfall 001

Create the table so the parameters are in the same order as in the permit. Acronyms need to be spelled out in the table or defined in a footnote. Not all definitions listed below are applicable; list only the ones used in the table.

Parameter	Concentration Specified Units				Loading* kg/day		Monitoring Requirements			Basis
	Max Daily	Min Daily	Weekly	Monthly	Weekly	Monthly	Measuring Frequency	Sampling Type	Monitoring Months	
00010 - Water Temperature - °C							1/Day	Maximum Indicating Thermometer	All	Ohio EPA Policy
00300 - Dissolved Oxygen - mg/L		3.6					1/Day	Multiple Grab	Winter	EP / PD
00300 - Dissolved Oxygen - mg/L		5.4					1/Day	Multiple Grab	Summer	EP / PD
00530 - Total Suspended Solids - mg/L			18.3	12.2	160	107	3/Week	24hr Composite	Summer	EP / PD
00530 - Total Suspended Solids - mg/L			27.3	18.3	238	160	3/Week	24hr Composite	Winter	EP / PD
00552 - Oil and Grease, Hexane Extr Method - mg/L	10.0						1 / 2 Weeks	Grab	All	WQS
00610 - Nitrogen, Ammonia (NH3) - mg/L			1.80	1.20	15.7	10.5	3/Week	24hr Composite	Summer	EP / PD
00610 - Nitrogen, Ammonia (NH3) - mg/L			16.4	10.9	143	94.9	3/Week	24hr Composite	Winter	EP / PD
00630 - Nitrite Plus Nitrate, Total - mg/L							1/Month	24hr Composite	All	Ohio EPA Policy
00665 - Phosphorus, Total (P) - mg/L			1.50	1.00	13.1	8.71	1/Week	24hr Composite	All	BTJ / Ohio EPA Policy
00671 - Orthophosphate, Dissolved (as P) - mg/L							1/Month	Grab	All	ORC Section 6111.03(U)
51173 - Cyanide, Free (Low Level) - µg/L							1/Quarter	Grab	Quarterly	Ohio EPA Policy

Parameter	Concentration Specified Units				Loading* kg/day		Monitoring Requirements			Basis
	Max Daily	Min Daily	Weekly	Monthly	Weekly	Monthly	Measuring Frequency	Sampling Type	Monitoring Months	
01074 - Nickel, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01084 – Strontium, Total Recoverable – µg/L							1 / Month	24hr Composite	All	OAC 3754-33-07
01094 - Zinc, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01113 - Cadmium, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01114 - Lead, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01118 - Chromium, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01119 - Copper, Total Recoverable - µg/L							1/Quarter	24hr Composite	Quarterly	Ohio EPA Policy
01220 - Chromium, Dissolved Hexavalent - µg/L							1/Quarter	Grab	Quarterly	Ohio EPA Policy
31648 - E. coli - #/100 ml			284	126			3/Week	Grab	Summer	WQS
39420 – Heptachlor Epoxide – µg/L							1 / Quarter	Grab	Quarterly	OAC 3754-33-07(B)(11)
50050 - Flow Rate - MGD							1/Day	Continuous	All	Ohio EPA Policy
50092 - Mercury, Total (Low Level) - ng/L							1/Month	Grab	All	Ohio EPA Policy
61425 - Acute Toxicity, Ceriodaphnia dubia - TU _a							1/Year ^d	24hr Composite	June	OAC 3745-33-07
61426 - Chronic Toxicity, Ceriodaphnia dubia - TU _c							1/Year ^d	24hr Composite	June	OAC 3745-33-07
61427 - Acute Toxicity, Pimephales promelas - TU _a							1/Year	24hr Composite	June	OAC 3745-33-07

Parameter	Concentration Specified Units				Loading* kg/day		Monitoring Requirements			Basis
	Max Daily	Min Daily	Weekly	Monthly	Weekly	Monthly	Measuring Frequency	Sampling Type	Monitoring Months	
61428 - Chronic Toxicity, Pimephales promelas - TU _c							1/Year	24hr Composite	June	OAC 3745-33-07
61941 - pH, Maximum - S.U.	9.0						1/Day	Multiple Grab	All	WQS
61942 - pH, Minimum - S.U.		6.5					1/Day	Multiple G	All	WQS
70300 - Residue, Total Filterable - mg/L							1 / 2 Weeks	24hr Composite	All	BTJ Based on OEPA / DSW Guidance
80082 - CBOD 5 day - mg/L			24.4	15.2	213	133	3/Week	24hr Composite	Winter	EP / PD
80082 - CBOD 5 day - mg/L			14.0	9.10	122	79.3	3/Week	24hr Composite	Summer	EP / PD

^a Effluent loadings based on average design discharge flow of 2.3 MGD.

^b Definitions:

ABS = Antibracksliding Rule (OAC 3745-33-05(F) and 40 CFR Part 122.44(l))
 BADCT = Best Available Demonstrated Control Technology, 40 CFR Part 122.29, and OAC 3745-1-05
 BPJ = Best Professional Judgment
 BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation
 BTJ = Best Technical Judgment
 CFR = Code of Federal Regulations
 EP = Existing Permit
 M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges
 NPDES = National Pollutant Discharge Elimination System
 OAC = Ohio Administrative Code
 PD = Plant Design (OAC 3745-33-05(E))
 PTS = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
 RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
 TMDL = Total Maximum Daily Load
 VAR = Mercury variance (OAC 3745-33-07(D)(10)(a))
 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 The first year is quarterly monitoring for *C. dubia*.

Addendum 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CONSWLA	Conservative substance wasteload allocation
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
LTCP	Long-term Control Plan
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SSO	Sanitary sewer overflow
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WPCF	Water Pollution Control Facility
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant