National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for **Amherst Water Pollution Control Center (WPCC)**

Public Notice No.: 15-06-004
Public Notice Date: June 4, 2015
Comment Period Ends: July 4, 2015

Ohio EPA Permit No.: 3PD00001*LD
Application No.: OH0021628

Name and Address of Applicant:

City of Amherst
206 South Main Street
Amherst, OH 44001

Name and Address of Facility Where Discharge Occurs:

City of Amherst WPCC
931 North Lake Street
Amherst, OH 44001
Lorain County

Receiving Water: Beaver Creek

Subsequent Stream Network: Lake Erie

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.

Although the current wasteload allocation (WLA) would allow slightly higher limits for pollutants, anti-backsliding provisions in the Ohio Administrative Code (OAC) prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of Amherst WPCC, none of those conditions have been satisfied, so the existing limits are proposed to continue. (The anti-backsliding provisions of rule 3745-33-05 of the OAC requires that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.)

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 EPA (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations

for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based effluent limits (WQBELs) on a pollutant-by-pollutant basis. 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 WQBELs 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

The effluent concentration limits and monitoring requirements proposed for the following parameters are the same as in the current permit: flow, temperature, dissolved oxygen, 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids, total phosphorus, oil and grease, pH, cadmium, chromium, dissolved hexavalent chromium, copper, lead, nickel, and zinc.

New monitoring requirements for dissolved orthophosphate (as P) are proposed. Monitoring of this parameter is required by Ohio Senate Bill 1, which was signed by the Governor on April 2, 2015. Starting three months from the effective date of the permit, this parameter shall be monitored on a monthly basis without limits.

Though concentration limits for the effluent remain the same, loading limits for $CBOD_5$, total suspended solids, and total phosphorus have increased. This change reflects an average flow rate of 3.5 MGD instead of 2.25 MGD.

Monitoring requirements for total Kjeldahl nitrogen (TKN), nitrite+nitrate, and total filterable residue are proposed to increase. Based on best technical judgment (BTJ), TKN and nitrite+nitrate will be monitored on a monthly basis instead of quarterly; this change is being put in place in order to obtain a more representative data set and to have Amherst WPCC's monitoring schedule more consistent with those of other POTWs. Plant data shows that total filterable residue is being discharged at the effluent in amounts indicating a potential environmental risk. Based on BTJ, total filterable residue will increase its monitoring from a quarterly to monthly basis.
Lower WQBELs are needed for ammonia (winter) and ammonia (summer). Limits and monitoring frequencies for mercury and free cyanide are to remain the same due to potential risk to the environment.

Also note that free cyanide has new approved testing methods; due to lower quantification levels of these new methods, language in Part II of the permit for limits below quantification and the pollutant minimization program are being dropped.

Chronic toxicity testing is to be completed annually instead of on a quarterly basis. Acute and chronic toxicity are each required to conduct annual testing on both *Ceriodaphnia dubia* and *Pimephales promelas.* Limits on both toxicity testing are proposed to be removed.

In Part I.B., monitoring station 3PD00001581 will reduce its monitoring frequency of metals from a semi-annual basis to annual. This is due to the fact that the plant has fallen below 320 tons of annual sludge production over the past five years.

In Part I.B, a new sampling station, 3PD00001588, will be added to the permit. Monitoring is required when sewage sludge is removed from the permittee's facility for transfer to another NPDES permit holder. The total sludge weight or sludge volume transferred to another NPDES permit holder for the entire year shall be reported on the December Discharge Monitoring Report (DMR).

In Part I.B, station 3PD0001586 will be removed from the list of stations required for routine monitoring. Instead, sludge will only be discharged to a landfill as an emergency condition. Sludge data will only be recorded for this station if and when this occurs.

In Part I.B, the upstream (3PD00001801) and downstream monitoring stations (3PD00001901) will have the monitoring frequencies increase from quarterly to monthly for the following parameters: TKN, nitrite+nitrate, and phosphorus.

Part I.C includes requirements for a phosphorus discharge optimization evaluation plan; this will be in the permit renewal to identify phosphorus sources and decrease phosphorus being discharged by the facility.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding dissolved hexavalent chromium, a special condition is proposed in Part II of the permit that provides guidance on the analytical method detection limits (MDLs) the permittee should use in analyzing for these contaminants.

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; sludge requirements; whole effluent toxicity testing (WET); 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 Phoebe Low, (614) 644-2134, Phoebe.Low@epa.ohio.gov .

Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed 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 water quality based effluent limits after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and

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

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

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

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

Should the applicant determine that compliance with the proposed 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 Rule 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC Rule 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific 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

Amherst WPCC discharges to Beaver Creek at River Mile (RM) 3.85. Figure 1 shows the approximate location of the facility.

This segment of Beaver Creek is described by Ohio EPA River Code: 20-003, U.S. EPA River Reach #: 04110001-003, County: Lorain. Beaver Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-27): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Class B Primary Contact Recreation (PCR).

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

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

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

Facility Description

Amherst WPCC was constructed in 1927 with the most current upgrade completed in 2004. It serves the city of Amherst and a portion of Amherst Township, a total population of 12,288 served. The design flow is 3.5 million gallons per day (MGD) with a peak hydraulic capacity of 10.5 MGD. Currently the wet stream processes consist of bar screen, grit removal, scum removal, oxidation ditch, combined biological nitrification and biological oxygen demand, secondary clarification, tertiary filtration, alum addition, and ultra-violet disinfection. Solid stream processes are aerobic digestion, gravity thickening, dewatering by gravity belt thickening, and polymer addition. Sludge disposal is by land application at agronomic rates in accordance with an approved sludge management plan. See Figure 2 for a flow diagram of the treatment plant's processes.

Amherst WPCC is 100% separate sanitary sewer system and 0% combined sewer system. The estimated current average inflow and infiltration flow rate for the sewerage system is 1.085 MGD. The City is currently implementing projects to minimize the inflow and infiltration rates. These projects mainly consist of relining or replacing sewer lines and manholes; the construction is expected to last until 2016.

The wastewater treatment facility has four bypass locations: influent screening, influent grit removal, oxidation ditch, and tertiary filtration. See Figure 2 for a diagram of bypass flows and Table 5 for details on bypass occurrences at the oxidation ditch.

Amherst WPCC does not have an approved pretreatment program. There is only one non-categorical significant industrial user discharging into the facility. The average daily flow discharging from all the industrial users to the plant is approximately 0.008 MGD.

Description of Existing Discharge

Table 1 presents a summary of unaltered DMR data for outfall 3PD00001001. Data are presented for the period August 2009 to September 2014, and current permit limits are provided for comparison.

Table 2 summarizes the chemical specific data for outfall 3PD00001001 by presenting the average and maximum PEQ values.

Tables 3 and 4 summarize the results of acute and chronic WET tests of the final effluent.

Table 5 summarizes the occurrences of flow bypass at the oxidation ditch.

Assessment of Impact on Receiving Waters

Beaver Creek has been identified as a priority impaired water on Ohio's 303(d) list.

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 (IBI) and modified Index of Well-Being (MIwb), which indicate the response of the fish community, and the Invertebrate Community Index (ICI), 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 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 (QHEI), and comments and observations for each sampling location.

Field monitoring in Beaver Creek is expected in 2015 and a Total Daily Maximum Load (TMDL) draft is scheduled for 2018. The full Integrated Report can be found at this website: http://www.epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx#156069519-report.

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 Amherst WPCC 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)	August 2009 through September 2014

Outliers
The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: copper (21 µg/L) on 4/12/2011 due to high value; winter ammonia (3.72 mg/L) on 1/22/2013 due to high value; summer ammonia (0.005 mg/L and 0.006 mg/L) on 9/2/2013 and 9/3/2013, respectively, both for values below the analytical laboratory detection level of 0.05 mg/L.

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

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 9 for a summary of the screening results.

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

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Wildlife		Annual 90Q10
AWS		Harmonic mean flow

Human Health (nondrinking)	Harmonic mean flow

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

The data used in the WLA are listed in Table 2. The WLA results to maintain all applicable criteria are presented in Table 8. The current ammonia limits have been evaluated using the WLA procedures and are not protective of WQS for ammonia toxicity.

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

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 Amherst WPCC, the WLA values are 0.3 TU_a and 1.01 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (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/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC_{50}) for the most sensitive test species:

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

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

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

Dilution Ratio (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 acute WLA for Amherst WPCC is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1 to 1.

$$\frac{Downstream\ Flow}{Discharger\ Flow} = \frac{Upstream\ flow + Discharge\ flow}{Discharge\ flow} = \frac{0.099\ cfs + 5.415\ cfs}{5.415\ cfs} = \frac{5.514\ cfs}{5.415\ cfs} = 1.018$$

Between August 2009 and September 2014, the facility has provided five biomonitoring results for acute toxicity and 13 biomonitoring results for chronic toxicity (Tables 3 and 4, respectively). None of the acute toxicity tests yielded a value higher than the detection limit. One test, however, showed chronic toxicity exceeding its limit (1.41 TU_c) on test date August 17, 2011.

Whole Effluent Toxicity Reasonable Potential
Acute and chronic toxicity test results are presented in Tables 3 and 4. Annual acute toxicity tests show no value above the detection limit. Quarterly chronic toxicity tests yield one result above the detection limit – 1.41 TU_c reported on March 3, 2014. The test result of 1.41 TU_c is anomalous value among the large data set. Due to the lack of values above the detection limit, chronic toxicity monitoring frequencies will decrease from a quarterly basis to annual. In addition, the limits for both chronic and acute toxicity are proposed to be dropped.

To appropriately document the environmental impact of the facility's effluent discharge, Amherst WPCC is proposed to complete chronic toxicity tests on both *C. dubia* and *P. promelas* on an annual basis. In addition, Amherst WPCC is proposed to complete acute toxicity tests on *C. dubia* and *P. promelas* on an annual basis.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either Group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 8. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 2, 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 9.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for Amherst WPCC outfall 3PD00001001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Flow Rate and Water Temperature
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment plant.

Dissolved Oxygen, Total Suspended Solids, and $CBOD_5$
The limits proposed for dissolved oxygen, total suspended solids, ammonia and $CBOD_5$ are all based on plant design criteria. These limits are protective of WQS.

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

Ammonia (summer and winter), Free Cyanide, and Mercury
The Ohio EPA risk assessment (Table 9) places winter ammonia, summer ammonia, mercury, and free cyanide in Group 5. This placement as well as the data in Tables 1 and 2 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA and/or the PEQ is between 75 and 100 percent of the WLA and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The lowered thirty day average and weekly limits for winter and summer ammonia are based on the WLA assessment. Past records from Amherst WPCC suggest that the facility can meet the new limits with little to no violations; an ammonia compliance schedule is not necessary in the NPDES permit. The thirty day average and daily maximum limits for mercury and free cyanide are based on the WLA assessment and are to remain the same.

Total Filterable Residue (Dissolved Solids)
The Ohio EPA risk assessment (Table 9) places total filterable residue in Group 4. This placement, as well as the data in Tables 1 and 2, 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). Based on BTJ, monitoring for this parameter shall increase from a quarterly basis to a monthly basis in order to more accurately characterize total filterable residue levels in the plant effluent.

Cadmium, Chromium, Hexavalent Chromium, Copper, Lead, Nickel, Nitrite+Nitrate, and Zinc
Ohio EPA risk assessment (Table 9) places the following parameters in Groups 2 and 3: cadmium, chromium, hexavalent chromium, copper, lead, nickel, nitrite+nitrate, and zinc. These placements as well as the data in Tables 1 and 2, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Except for total filterable residue, quarterly monitoring shall continue from the existing permit and is proposed to document that these pollutants continue to remain at low levels. The monitoring frequency for total filterable residue has been increased to monthly in order to obtain a more representative data set.

The monitoring frequencies for total filterable residue and nitrite+nitrate have been increased to monthly (refer to paragraph below). For all other parameters listed in this paragraph, quarterly monitoring shall continue from the existing permit and is proposed to document that these pollutants continue to remain at low levels.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding dissolved hexavalent chromium, a special condition is proposed in Part II of the permit that provides guidance on the MDLs the permittee must use in analyzing for these contaminants.

Phosphorus, Nitrite+Nitrate, and TKN
Based on BTJ, nitrite+nitrate and TKN will be monitored monthly instead of quarterly. The proposed monitoring frequencies are meant to bring Amherst WPCC's monitoring closer to what is required of other POTWs discharging to the Lake Erie Basin. In addition, monthly monitoring is what is recommended in *Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges*. The monitoring frequency for phosphorus at the effluent will continue on a weekly basis. The limits recommended for phosphorus are also to continue based on the Phosphorus Treatment Standards explained in OAC 3745-33-06(C).

Phosphorus, nitrate+nitrite, and TKN at the upstream and downstream stations will have their monitoring frequencies increased from quarterly to monthly. Based on BTJ, quarterly total phosphorus monitoring at these stations is not sufficient for a plant with a 3.5 MGD average design flow. Compared to a quarterly monitoring frequency, a monthly monitoring schedule will provide more data to better evaluate Amherst WPCC's contribution to nutrient conditions in Beaver Creek and Lake Erie. The increased monitoring frequency for nitrite+nitrate and TKN is meant to maintain consistency with the proposed effluent monitoring. The purpose of the monitoring is to maintain a nutrient data set for use in the future total maximum daily loads (TMDL) study.

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.

2002 Antidegredation
Based on additional review of the past permits, the loading limits proposed for total suspended solids, phosphorus, and $CBOD_5$ have been corrected to reflect the accurate average daily flow of 3.5 MGD. The WPCC completed the anti-degredation review process for additional loadings in 2002.

Antibacksliding
Although the current WLA would allow slightly higher limits for the daily maximum concentration for mercury, anti-backsliding provisions in the OAC prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of Amherst WPCC, none of those conditions have been satisfied, so the existing limits are proposed to continue. The anti-backsliding provisions of OAC 3745-33-05 require that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.

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

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

Other Requirements

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

Operator Certification
Operator certification requirements have been included in Part II, Item A of the permit in accordance with rules adopted in December 2006. These rules require Amherst WPCC to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 3PD00001001.

Operator of Record
In December 2006, OAC rule revisions became effective that affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II, Item A.2 of this

NPDES permit is included to implement rule 3745-7-02 of the OAC. It requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Plant Optimization for Phosphorus
Amherst WPCC discharge ultimately flows into the Lake Erie Basin which has very low water quality due in part to high phosphorus concentrations. Because phosphorus discharge from Amherst WPCC is a contributing factor to the Lake Erie Basin, an optimization approach is necessary to reduce phosphorus concentrations in the effluent. The requirement of a phosphorus discharge optimization evaluation plan has been included in the compliance schedule of the permit.

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.

Method Detection Limit
The reported data for hexavalent chromium shows that Amherst WPCC used an analytical method with a MDL that is not sensitive enough to properly evaluate the discharge with regard to the WLA for this parameter. As a result, Part II of the permit includes a condition requiring the City of Amherst to use an analytical method with an appropriate MDL.

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

Outfall Signage
Part II of the permit includes requirements for the permittee to place a sign at each outfall to Beaver Creek providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Figure 1. Location of Amherst WPCC

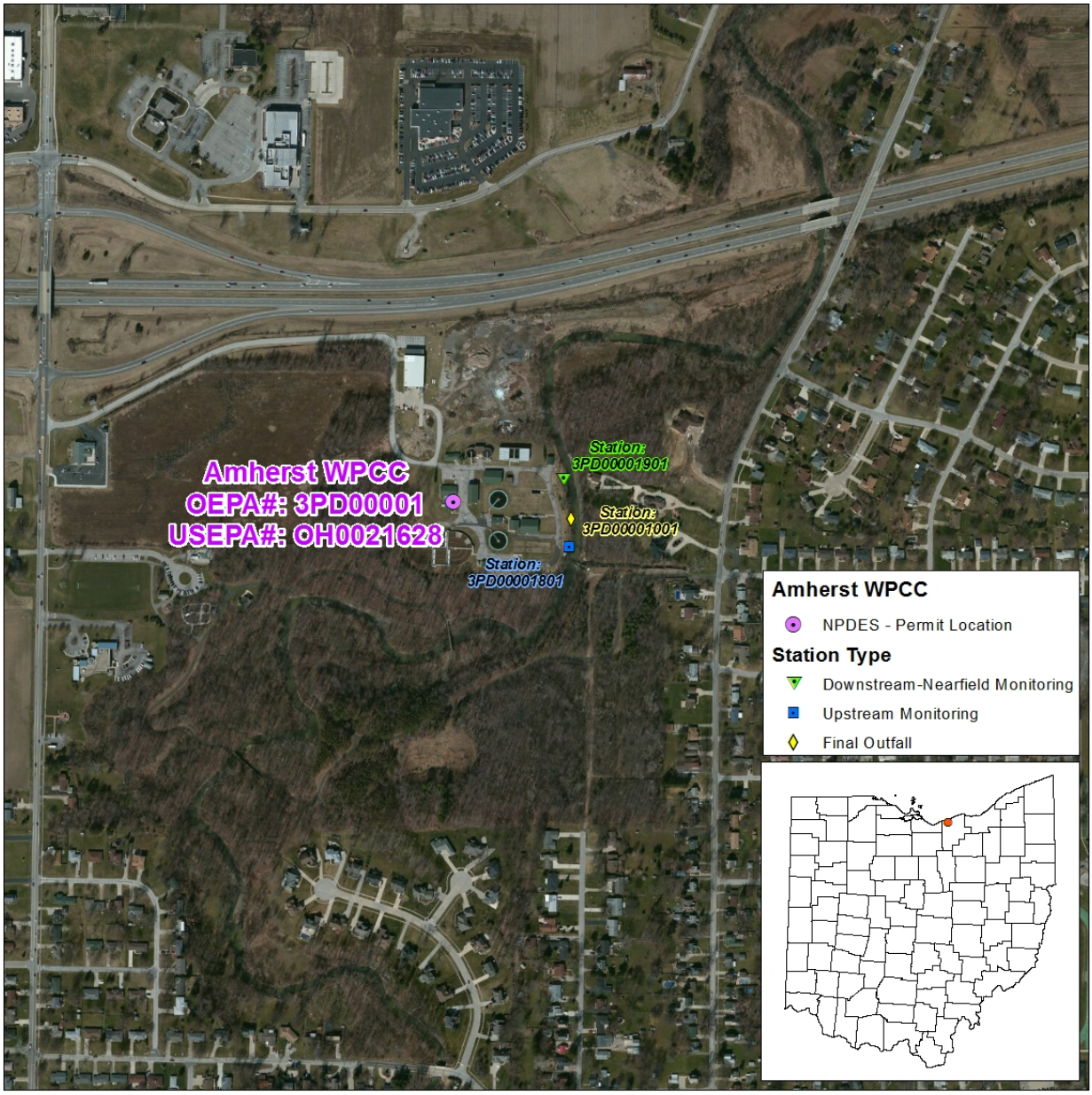

Figure 2. Flow Diagram

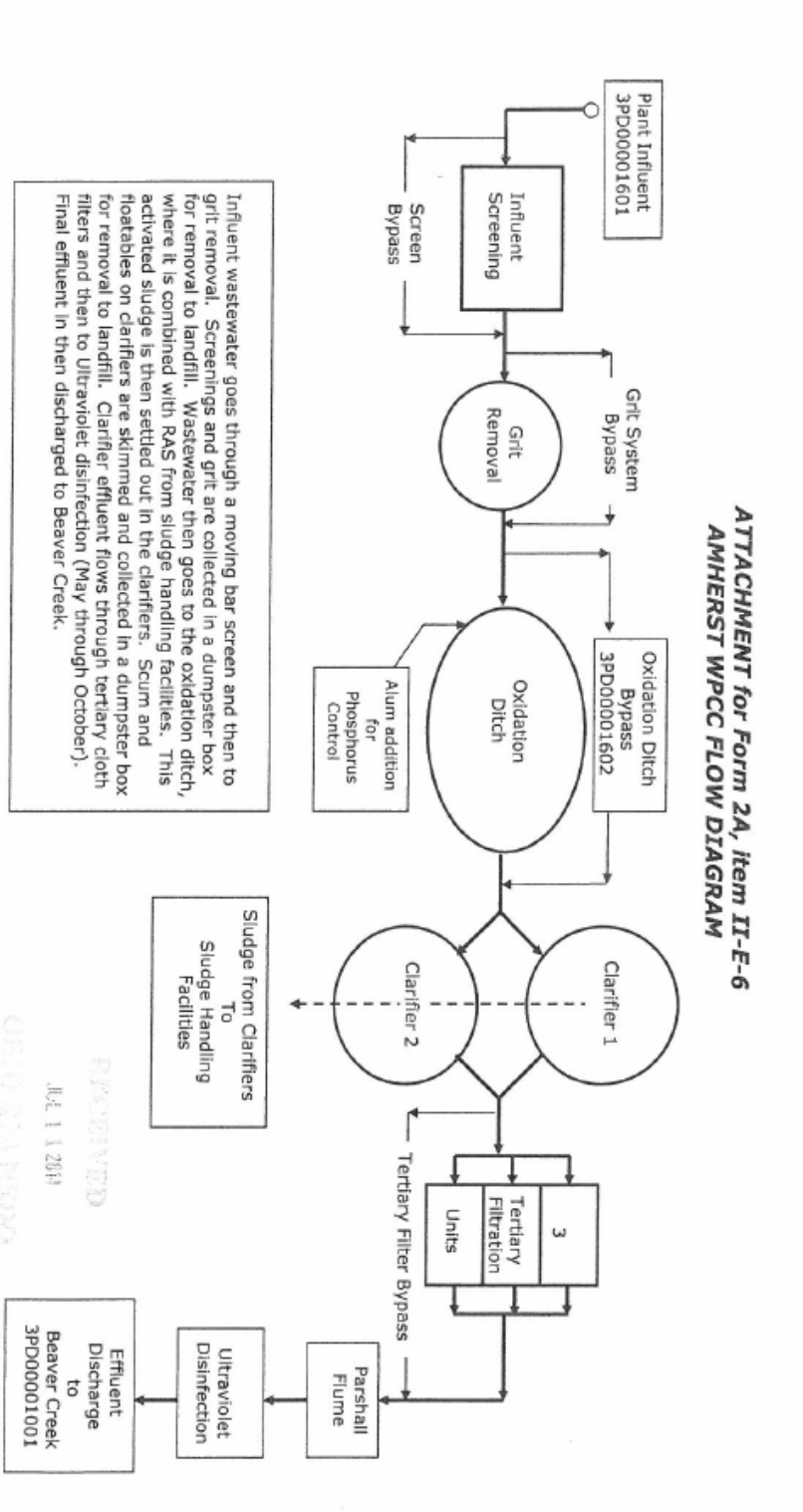

Table 1. Effluent Characterization Using Self-Monitoring Data
Summary of current permit limits and unaltered discharge monitoring report data for Amherst WPCC outfall 3PD00001001 (August 2009 – September 2014).

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001 – Effluent Monitoring								
Water Temperature	Annual	°C	- - - - Monitor - - - -		1887	16.5	24.2	7.6-25.6
Dissolved Oxygen	Summer	mg/L	--	6.0 Min	980	8.4	9.6	3.2-10.7
Dissolved Oxygen	Winter	mg/L	--	6.0 Min	905	10.1	11	4.6-11.6
Total Suspended Solids	Annual	mg/L	12	18a	1299	1	4	0-91
		kg/day	102.2	153.2a	-	-	-	-
Oil and Grease	Annual	mg/L	--	10 Max	82	0	0	0-8.6
Ammonia	Summer	mg/L	1.7	2.55a	419	0	0.242	0-1.8
		kg/day	22.5	33.8a	-	-	-	-
	Winter	mg/L	6.5	9.75a	379	0	0.2	0-3.72
		kg/day	86	129.2a	-	-	-	-
Total Kjeldahl Nitrogen	Annual	mg/L	- - - - Monitor - - - -		13	0	6.82	0-7.6
Nitrite + Nitrate	Annual	mg/L	- - - - Monitor - - - -		21	10.6	12.5	4.63-19.9
Phosphorus	Annual	mg/L	1.0	1.5a	279	0.5	0.77	0.12-1.41
		kg/day	8.5	12.7a	-	-	-	-
Cyanide, Free	Annual	mg/L	0.0052	0.022	63	0	0	0-0.007
		kg/day	0.0689	0.292	-	-	-	-
Nickel	Annual	µg/L	- - - - Monitor - - - -		21	0	0	0-0
Zinc	Annual	µg/L	- - - - Monitor - - - -		21	36	49	22-50
Cadmium	Annual	µg/L	- - - - Monitor - - - -		21	0	0	0-0
Lead	Annual	µg/L	- - - - Monitor - - - -		21	0	0	0-0
Chromium	Annual	µg/L	- - - - Monitor - - - -		21	0	0	0-0
Copper	Annual	µg/L	- - - - Monitor - - - -		38	5	8.15	0-21
Chromium, Dissolved Hexavalent	Annual	µg/L	- - - - Monitor - - - -		37	0	0	0-0
E. coli	Annual	#/100 mL	161	362a	263	7.4	89.9	1-2420
Flow Rate	Annual	MGD	- - - - Monitor - - - -		1887	1.97	4.54	0.98-12.6
Mercury	Annual	ng/L	1.3	1092	70	0.554	2.03	0-3.51
		kg/day	0.000017	0.015	-	-	-	-
		kg/day	85.1	127.6a	-	-	-	-

Table 1. Effluent Characterization Using Self-Monitoring Data (continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001 – Effluent Monitoring (continued)								
Acute Toxicity, *Ceriodaphnia dubia*	Annual	TUa	--	1.0	4	0	0	0-0
Chronic Toxicity, *Pimephales promelas*	Annual	TUc	1.01	--	13	0	0.564	0-1.41
pH, Maximum	Annual	S.U.	--	9.0	1887	7.3	7.7	6.7-7.8
pH, Minimum	Annual	S.U.	--	6.5	1887	7.2	7.6	6.5-7.8
Total Filterable Residue	Annual	mg/L	--	--	13	650	825	553-947
CBOD 5 day	Annual	mg/L	10	15a	795	0	2.83	0-32
		kg/day	85.1	127.6a	-	-	-	-
Outfall 300 – Sanitary Sewer Monitoring								
Overflow Occurrence	Annual	No./Month	- - - - Monitor - - - -		28	2	10.7	1-18
Outfall 581 – Sludge Monitoring (Land Application)								
Ammonia	Annual	mg/kg	- - - - Monitor - - - -		10	12400	31300	6600-43800
Total Kjeldahl Nitrogen	Annual	mg/kg	- - - - Monitor - - - -		10	49900	57600	22900-58900
Phosphorus	Annual	mg/kg	- - - - Monitor - - - -		10	31700	36700	23700-37900
Potassium	Annual	mg/kg	- - - - Monitor - - - -		6	3500	3690	3.5-3710
Arsenic	Annual	mg/kg	-	10	7.4	8.22	0-8.4	
Cadmium	Annual	mg/kg	-	10	1.3	4.27	1-4.66	
Copper	Annual	mg/kg	-	10	538	604	457-618	
Lead	Annual	mg/kg	-	10	43	57.6	23.1-64.5	
Nickel	Annual	mg/kg	-	10	24.8	26.8	19.5-27	
Zinc	Annual	mg/kg	-	10	763	865	556-868	
Selenium	Annual	mg/kg	-	10	8.05	10.6	0-10.8	
Sludge Fee Weight	Annual	Dry Tons	- - - - Monitor - - - -		6	0	0	0-0
Sludge Weight	Annual	Dry Tons	- - - - Monitor - - - -		43	15.4	154	1.34-186
Mercury	Annual	mg/kg	-	10	1.31	1.89	0.87-2.02	
Molybdenum	Annual	mg/kg	-	10	8.1	8.86	0-8.9	
Outfall 586 – Sludge Monitoring (Landfill)								
Sludge Fee Weight	Annual	Dry Tons	- - - - Monitor - - - -		1	0	0	0-0

Table 1. Effluent Characterization Using Self-Monitoring Data (continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 601 – Influent Monitoring								
pH	Annual	S.U.	- - - - Monitor - - - -		1887	7.6	8.1	6.4-8.3
Total Suspended Solids	Annual	mg/L	- - - - Monitor - - - -		797	239	438	31-854
Mercury	Annual	ng/L	- - - - Monitor - - - -		62	44.9	254	15.8-468
$CBOD_5$	Annual	mg/L	- - - - Monitor - - - -		786	171	353	32-701
Outfall 602 – Bypass Monitoring								
Bypass Occurrence	Annual	No./Day	- - - - Monitor - - - -		77	1	1	1-7
Bypass Total Hours per Day	Annual	Hours/Day	- - - - Monitor - - - -		80	3.74	27.3	0.23-66.9
Total Suspended Solids	Annual	mg/L	- - - - Monitor - - - -		78	107	434	11-1380
Flow Rate	Annual	MGD	- - - - Monitor - - - -		32	1.12	8.92	0.002-11.1
$CBOD_5$	Annual	mg/L	- - - - Monitor - - - -		61	74	237	10-542
Outfall 801								
Water Temperature	Annual	°C	- - - - Monitor - - - -		62	10.7	23.5	1.2-24.3
Dissolved Oxygen	Annual	mg/L	- - - - Monitor - - - -		62	10.7	15	6.3-15.5
pH	Annual	S.U.	- - - - Monitor - - - -		62	8	8.3	6.8-8.7
Ammonia	Annual	mg/L	- - - - Monitor - - - -		62	0	0.129	0-0.73
Total Kjeldahl Nitrogen	Annual	mg/L	- - - - Monitor - - - -		13	0	3.6	0-4.5
Nitrite+Nitrate	Annual	mg/L	- - - - Monitor - - - -		13	0.96	11.2	0.37-12.9
Phosphorus	Annual	mg/L	- - - - Monitor - - - -		13	0.18	0.412	0.06-0.46
E. coli	Annual	#/100 mL	- - - - Monitor - - - -		12	538	2480	80-2700
48-Hour Acute Toxicity (Ceriodaphnia dubia)	Annual	% Affected	- - - - Monitor - - - -		21	308	1080	64-1550
7-Day Chronic Toxicity (Pimephales promelas)	Annual	% Affected	- - - - Monitor - - - -		4	0	0	0-0
Outfall 901 – Downstream-Nearfield Monitoring								
Water Temperature	Annual	°C	- - - - Monitor - - - -		62	12.3	22.8	2.4-23.7
Dissolved Oxygen	Annual	mg/L	- - - - Monitor - - - -		62	10.3	13	7.2-13.5
pH	Annual	S.U.	- - - - Monitor - - - -		62	7.8	8.1	7.2-8.3
Ammonia	Annual	mg/L	- - - - Monitor - - - -		62	0	0.09	0-0.17
Total Kjeldahl Nitrogen	Annual	mg/L	- - - - Monitor - - - -		13	0	2.4	0-4.2
Nitrite+Nitrate	Annual	mg/L	- - - - Monitor - - - -		13	6.24	9.7	2.61-10.1
Phosphorus	Annual	mg/L	- - - - Monitor - - - -		13	0.48	0.658	0.17-0.79

Table 1. Effluent Characterization Using Self-Monitoring Data (continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 901 – Downstream-Nearfield Monitoring								
Hardness ($CaCO_3$)	Annual	mg/L	- - - - Monitor - - - -		62	223	272	3.3-279
E. coli	Annual	#/100 mL	- - - - Monitor - - - -		12	261	1310	40-1450

a = 7 day average limit
$CBOD_5$ = 5-day Carbonaceous Biochemical Oxygen Demand

Table 2. Effluent Data for Amherst WPCC

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	272	143	0.12295	0.26825
Ammonia (Winter)	mg/L	186	76	0.11599	0.25147
Cadmium	µg/L	21	0	--	--
Chromium - Total	µg/L	21	0	--	--
Hexavalent Chromium (Dissolved)	µg/L	37	0	--	--
Copper	µg/L	37	29	6.4252	7.9975
Cyanide - Free	mg/L	52	3	0.00511	0.007
Lead	µg/L	21	0	--	--
Mercury	ng/L	68	38	1.5527	2.4379
Nickel	µg/L	21	0	--	--
Nitrate + Nitrite	mg/L	21	21	14.215	19.624
Phosphorus	mg/L	274	274	0.68906	0.88901
Zinc	µg/L	21	21	48.289	60.692
TKN	mg/L	13	3	8.8768	12.16
Total Filterable Residue (Dissolved Solids)	mg/L	13	13	790.19	931.6

MDL = Minimum Detection Level
PEQ = Projected Effluent Quality
TKN = Total Nitrogen Kjeldahl

Table 3. Summary of Acute Toxicity Test Results of Amherst WPCC Effluent

Date	Ceriodaphnia Dubia Acute Toxicity (TU_a)
9/12/2011	AA
9/4/2012	AA
9/10/2013	AA
9/15/2014	AA[a]

All tests were completed and reported by Amherst WPCC
TU_a = acute toxicity units
AA = below detection limit (0.2 TU_a)
[a] The detection limit for this sample was higher than what is appropriate (10 TU_a)

Table 4. Summary of Chronic Toxicity Test Results of Amherst WPCC Effluent

Date	Pimephales promelas Chronic Toxicity (TU_c)
9/13/2011	AA
11/22/2011	AA
3/10/2012	AA
5/31/2012	AA
9/5/2012	AA
10/2/2012	AA
11/28/2012	AA
3/5/2012	AA
5/18/2013	AA
9/4/2013	AA
9/30/2013	AA
12/1/2013	AA
3/3/2014	1.41
5/30/2014	AA
9/12/2014	AA
9/23/2014	AA

All tests were completed and reported by Amherst WPCC
TU_c = chronic toxicity units
AA = below detection limit (1.0 TU_c)

Table 5. Bypass Occurrences at the Oxidation Ditch (Outfall 3PD00001602)

Date	Bypass Occurrences	Bypass Duration (hours)	Average Bypass Flow Rate [a] (MGD)	Average Total Suspended Solids (mg/L)	Average $CBOD_5$ [b] (mg/L)
Summer 2011	3	15.38	0.6	300.3	123.75
Winter 2011	9	83.61	2.5	94.6	54
Summer 2012	18	109.82	4.0	182	168.375
Winter 2012	10	61.91	--[a]	214.5	76.25
Summer 2013	11	34.77	0.2	254.6	152
Winter 2013	14	120.39	3.17	150.8	85.4
Summer 2014 [c]	9	62.69	1.735	199	55.375
Winter 2014 [d]	9	125.08	1.4	73.7	111.3
Annual 2011	12	17.7	1.55	197.45	88.875
Annual 2012	28	171.73	4.0	198.25	122.3
Annual 2013	25	155.16	1.685	202.7	100.625
Annual 2014 [c d]	18	93.885	1.5675	136.35	83.34

MGD = million gallons per day
$CBOD_5$ = 5-day carbonaceous biological oxygen demand

Winter = January 1 – April 30 and November 1 – December 31 of each calendar year
Summer = May 1 – October 31 of each calendar year

[a] Some data was omitted due to flow conditions too small for accurate measurements

[b] Some data was omitted due to errors in lab readings

[c] Summer 2014 data collection period ranges from May 1 – September 30

[d] Winter 2014 data collection period ranges from January 1 – April 30

Table 6. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average					
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	--	1.1	--	--
Ammonia (Winter)	mg/L	--	--	--	4.8	--	--
Cadmium	µg/L	--	730	50	4.6	11	22
Chromium	µg/L	--	14000	100	170	3500	7000
Hexavalent Chromium (Dissolved)	µg/L	--	14000	--	11	16	31
Copper	µg/L	--	64000	500	19	30	60
Cyanide - free	mg/L	--	48	--	0.0052	0.022	0.044
Lead	µg/L	--	--	100	18	340	680
Mercury	ng/L	1.3	3.1	10000	910	1700	3400
Nickel	µg/L	--	43000	200	100	920	1800
Nitrate + Nitrite	mg/L	--	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--	--
Zinc	µg/L	--	35000	25000	240	240	470
TKN	mg/L	--	--	--	--	--	--
Total Filterable Residue (Dissolved Solids)	mg/L	--	--	--	1500	--	--

TKN = Total Nitrogen Kjeldahl

Table 7. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.099	USGS #04199500(1950-81),#04200500(1944-97)
7Q10	cfs	annual	0.144	USGS #04199500(1950-81),#04200500(1944-97)
		summer	0.144	USGS #04199500(1950-81),#04200500(1944-97)
		winter	0.749	USGS #04199500(1950-81),#04200500(1944-97)
30Q10	cfs	summer	0.204	USGS #04199500(1950-81),#04200500(1944-97)
		winter	1.233	USGS #04199500(1950-81),#04200500(1944-97)
90Q10	cfs	annual	0.412	
Harmonic Mean	cfs	annual	1.33	USGS #04199500(1950-81),#04200500(1944-97)
Mixing Assumption	%	average	25	
	%	maximum	100	
Hardness	mg/L	annual	223	2009-14 DMR Stats median; 901; n=61
pH	S.U.	summer	8	2009-2014 DMR Stats; Station 901; n=21
		winter	7.8	2009-2014 DMR Stats; Station 901; n=15
Temperature	°C	summer	22.6	2009-2014 DMR Stats; Station 901; n=21
		winter	6.9	2009-2014 DMR Stats; Station 901; n=15
Amherst WPCC flow	cfs	annual	5.4145	Renewal application
Background Water Quality				
Ammonia (Summer)	mg/L		0.065	801 Station; 8/09-8/14; n=20; 13<MDL; Median; 801 Station PEQ
Ammonia (Winter)	mg/L		0.09	801 Stn; 8/09-8/14; n=15; 9<MDL; Median; 801 Station PEQ
Cadmium – TR	ug/L		0.125	STORET; 1992-97; n=8; 6<MDL; 1992-97 Ohio EPA Data
Chromium – TR	ug/L		0	STORET; 1992-97; n=8; 8<MDL; 1992-97 Ohio EPA Data
Hexavalent Chromium (Dissolved)	ug/L		0	No representative data available.

Copper – TR	ug/L		4.125	STORET; 1992-97; n=8; 4<MDL; 1992-97 Ohio EPA Data
Cyanide – free	mg/L		0	No representative data available.
Lead – TR	ug/L		0	STORET; 1992-97; n=7; 7<MDL; 1992-97 Ohio EPA Data
Mercury – TR (BCC)	ng/L		0	STORET; 1992-97; n=4; 4<MDL; 1992-97 Ohio EPA Data
Nickel – TR	ug/L		0	STORET; 1992-97; n=6; 6<MDL; 1992-97 Ohio EPA Data
Nitrate + Nitrite	mg/L		0.92	801 station; 8/09-8/14; n=11; 0<MDL; Median; 801 Station PEQ
Phosphorus	mg/L		0.18	801 station; 8/09-8/14; n=13; 0<MDL; Median; 801 Station PEQ
Zinc – TR	ug/L		14.5	STORET; 1992-97; n=8; 6<MDL; 1992-97 Ohio EPA Data
TKN	mg/L		1	801 station; 8/09-8/14; n=13; 9<MDL; Median; 801 Station PEQ
Total Filterable Residue (Dissolved Solids)	mg/L		--	No representative data available

TKN = Total Kjeldahl Nitrogen
USGS = U.S. Geographical Survey
DMR = Discharge Monitoring Report
WPCC = Water Pollution Control Center
MDL = Minimum Detection Level
n = # of observations
PEQ = Projected Effluent Quality
STORET = STOrage and RETreival Data Warehouse
Ohio EPA = Ohio Environmental Protection Agency

Table 8. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average					
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	--	1.1	--	--
Ammonia (Winter)	mg/L	--	--	--	5.9	--	--
Cadmium	µg/L	--	775	53	4.6	11	22
Chromium	µg/L	--	14860	106	171	3564	7000
Hexavalent Chromium (Dissolved)	µg/L	--	14860	--	11	16	31
Copper	µg/L	--	67930	530	19	30	60
Cyanide – free	mg/L	--	51	--	0.0052	0.022	0.044
Lead	µg/L	--	--	106	18	346	680
Mercury	ng/L	1.3	3.1	10000	910	1700	3400
Nickel	µg/L	--	45641	212	101	937	1800
Nitrate + Nitrite	mg/L	--	--	106	--	--	--
Phosphorus	mg/L	--	--	--	--	--	--
Zinc	µg/L	--	37148	26534	241	244	470
TKN	mg/L	--	--	--	--	--	--
Total Filterable Residue (Dissolved Solids)	mg/L	--	--	--	1510	--	--

TKN = Total Kjeldahl Nitrogen

Table 9. Parameter Assessment

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

Phosphorus Total Kjeldahl Nitrogen

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

Cadmium	Chromium	Hexavalent Chromium (Dissolved)
Lead	Nickel	Nitrate + Nitrite

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

Copper 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.

Total Filterable Residue (Dissolved Solids)

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	Average	Maximum
Ammonia (Summer)	mg/L	1.1	--
Ammonia (Winter)	mg/L	5.9	--
*Cyanide - free	mg/L	0.0052	0.022
Mercury	ng/L	1.3	1700

* Free cyanide is placed in Group 5 based upon the loading test in accordance with OAC 3745-2-06(B)(1)(b).
PEQ = Projected Effluent Quality
PEL = Preliminary Effluent Limit
WLA = Wasteload Allocation
WQS = Water Quality Standard

Table 10. Loading Test

Application of the Loading Test [OAC 3745-2-06(B)(1)(b)]

Parameter name: Cyanide - free - PEQaverage = 98.3 % of PELaverage

Loading capacity	=	WQS * (100% of upstream flow + effluent flow)
	=	.0052 ug/l * (.144 cfs + 5.4145 cfs) * 0.0024467 (conversion factor)
	=	.00007071990614 kg/day
Background load	=	(background concentration * 100% of upstream flow)
	=	0 ug/l * .144 cfs * 0.0024467 (conversion factor)
	=	0 kg/day
Effluent Load	=	WLA * effluent flow
	=	.0052 ug/l * 5.4145 cfs * 0.0024467 (conversion factor)
	=	.00006888781718 kg/day
Total Load	=	Background Load + Effluent Load
	=	0 kg/day & .00006888781718 kg/day
	=	.00006888781718 kg/day
Total Load / Loading Capacity	=	97.41%

*** Therefore, Free Cyanide becomes a Group 5 parameter.

PEQaverage = Average Projected Effluent Quality
PELaverage = Average Preliminary Effluent Limit
WQS = Water Quality Standard
WLA = Wasteload Allocation
OAC = Ohio Administrative Code

Table 11. Final Effluent Limits and Monitoring Requirements for Amherst WPCC Outfall 001

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Flow	MGD	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Temperature	°C	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/L	- - - - - - - - - - - - 6.0 Minimum - - - - - - - - - - -				EP, PD
$CBOD_5$	mg/L	10	15[d]	133	199[d]	EP, PD
Total Suspended Solids	mg/L	12	18[d]	159	239[d]	EP, PD
Total Filterable Residue (Dissolved Solids)	mg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c], WLA
Ammonia						
Summer	mg/L	1.1	1.65[d]	14.6	21.9[d]	WLA
Winter	mg/L	5.9	8.85[d]	78.2	118[d]	WLA
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ, M[c]
Nitrate + Nitrite	mg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ, M[c]
Phosphorus	mg/L	1.0	1.5[d]	13.3	19.9[d]	PTS, BTJ, M
Orthophosphate, Dissolved (as P)	mg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				SB1
Oil and Grease	mg/L	- - - - - - - - - - - - 10 Maximum - - - - - - - - - - -				WQS
pH	S.U.	- - - - - - - - - - - - - 6.5 - 9.0 - - - - - - - - - - - -				WQS
E. coli	#/100mL					
Summer		161	362[d]	--	--	WQS
Cadmium	mg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Cyanide, Free	µg/L	22	5.2	0.292	0.0689	WLA
Chromium	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Chromium, Dissolved Hexavalent	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Copper	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Lead	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Mercury	ng/L	1.3	1092	0.000017	0.015	WQS, ABS
Nickel	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Zinc	µg/L	- - - - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Whole Effluent Toxicity						
Acute, *Ceriodaphnia dubia*	TU_a	--	--	--	--	BTJ, WET
Chronic, *Pimephales promelas*	TU_c	--	--	--	--	BTJ, WET

$CBOD_5$ = 5-day carbonaceous biochemical oxygen demand

[a] Effluent loadings based on average design discharge flow of 3.5 MGD.

[b] Definitions:

ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l))
BTJ = Best Technical Judgment

EP = Existing Permit
M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges
PD = Plant Design
PTS = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
SB1 = Implementation of Senate Bill 1 [ORC 6111.03]
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