National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for **Alum Creek Water Reclamation Facility**

Public Notice No.: 14-09-004
Public Notice Date: September 3, 2014
Comment Period Ends: October 3, 2014

Ohio EPA Permit No.: **4PK00003*ED**
Application No.: **OH0121380**

Name and Address of Applicant:
Delaware County Board of Commissioners
50 Channing Street
Delaware, Ohio 43015

Name and Address of Facility Where Discharge Occurs:
Alum Creek Water Reclamation Facility (WRF)
7767 Walker Woods Blvd.
Lewis Center, Ohio 43035
Delaware County

Receiving Water: **Alum Creek**

Subsequent Stream Network: **Big Walnut Creek to Scioto River to Ohio River**

Introduction

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

This fact sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES permit effluent limitations. The technical basis for the fact sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This fact sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act and Ohio Water Pollution Control Law, Chapter 6111 of the Ohio Revised Code (ORC). Decisions to award variances to water quality standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the fact sheet where necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by 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.

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

The effluent limits and monitoring requirements proposed for the following parameters are the same as in the current permit, although some monitoring frequencies have changed: flow, temperature, dissolved oxygen, 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), ammonia-nitrogen, total phosphorus, nitrite plus nitrate-nitrogen, oil and grease, pH, cadmium, chromium, lead, mercury, nickel and zinc.

New or lower water-quality-based limits are needed for hexavalent chromium and copper because effluent data show there is reasonable potential for these parameters to violate WQS.

Based on best engineering judgment and the WLA, new monitoring is proposed for total dissolved solids (total filterable residue).

Final effluent limits are proposed for *Escherichia coli.* New WQS for *E. coli* became effective in March 2010.

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.

Annual chronic toxicity monitoring with the determination of acute endpoints using *Pimephales promelas* is proposed for the duration of the permit. This satisfies the minimum testing requirements of rule 3745-33-07(B)(11) of the Ohio Administrative Code (OAC) and will adequately characterize toxicity in the plant's effluent. Bimonthly chronic toxicity monitoring with acute endpoints with a trigger is proposed for the duration of one year using *Ceriodaphnia dubia*. If two or more chronic tests exceed 1.0 chronic toxicity units (TU_c), the WRF may be required to initiate a toxicity reduction evaluation and a final limit of 1.0 TU_c for *Ceriodaphnia dubia* may become effective. Otherwise, after one year of bimonthly testing, the monitoring frequency will return to annual testing.

Current permit limits for free cyanide are being removed because effluent data shows that they no longer have the reasonable potential to contribute to exceedances of WQS.

Two compliance schedules are included in the draft permit. The first one requires the tertiary filter bypass to be eliminated within 18 months from the effective date of the permit. The second schedule requires Alum Creek WRF to conduct a plant performance evaluation in order to achieve a whole effluent toxicity (WET) level of 1.0 TUc. The performance evaluation and final report are due to Ohio EPA, Central District Office within twenty-four months from the effective date of the permit.

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; 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 Ashley Ward by email, Ashley.ward@epa.ohio.gov or by phone, (614) 644-4852.

Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed water quality based effluent limitations 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 Section 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 NDPES 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 water quality based effluent limitations 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 water quality standard(s) 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 water quality standard(s) 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

The Alum Creek WRF discharges to Alum Creek at river mile 20.95. Figure 1 shows the approximate location of the facility.

This segment of Alum Creek is described by Ohio EPA River Code: 02-110, U.S. EPA River Reach #: 05060001-026, County: Delaware, Ecoregion: Eastern Corn Belt Plains. Alum Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Warmwater Habitat (WWH), 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 Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

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

Facility Description

The Alum Creek Water Reclamation Facility was originally constructed in 2001, and there have been no major modifications. The plant is designed to treat an average flow of 10 millions of gallons per day (MGD). Table 1 summarizes the WRF flow from March 2009 through February 2014. The mean for the past five years is 4.60 MGD.

Table 1. Summary of Alum Creek WRF Flow.

Year	Percentile				Maximum	Mean
	25th	50th	75th	95th		
	Flows in MGD					
2009	3.92	4.105	4.4	5.37	6.75	4.25
2010	3.91	4.14	4.59	5.74	7.14	4.34
2011	4.23	4.57	5.33	7.10	8.94	4.94
2012	4.14	4.39	4.73	5.97	8.37	4.56
2013	4.27	4.56	5.1	6.48	10.07	4.82
2014	4.36	4.57	4.99	6.78	7.49	4.86
2009-2014	4.09	4.37	4.84	6.46	10.07	4.60

The WRF has an internal bypass that bypasses tertiary filters, before flow is blended with fully treated effluent and then discharged through Outfall 001. Table 2 summarizes the frequency the bypass is used. A compliance schedule for bypass elimination requiring submission of a complete and detailed Permit to Install application within six months and construction completion within 18 months is included in the draft permit.

Table 2. Number of Days per Month Alum Creek WRF Used Internal Bypass.

Month	Days/Month
March 2013	1
April 2013	16
May 2013	31
June 2013	8
July 2013	3
August 2013	1
November 2013	4
December 2013	3
January 2014	5
February 2014	15

The final discharge to Alum Creek is approximately 15 miles from the WRF. Outfall 001 samples WRF effluent at the WRF; Outfall 002 samples the effluent right before discharge to Alum Creek.

Wet stream processes include influent pumping and screening, activated sludge, bio nitrification and BOD removal, secondary clarification, mixed media filter, chemical phosphorus removal, polymer addition, post aeration and ultraviolet disinfection. Solid stream processes include aerobic digestion, belt filter press and gravity belt thickener. Sludge is land applied or sent to a landfill.

The WRF's collection system consists of separate sanitary and storm sewers. The facility receives flow from no industrial facilities and does not implement an Ohio EPA approved pretreatment program.

Description of Existing Discharge

Table 3 presents chemical specific data collected by Ohio EPA.

Table 4 presents a summary of unaltered discharge monitoring report (DMR) data for outfall4PK00003001. Data are presented for the period March 2009 through February 2014, and current permit limits are provided for comparison.

Table 5 summarizes the chemical specific data for outfall 4PK00003001 by presenting the average and maximum PEQ values.

Tables 6 and 7 summarize the results of acute and chronic WET tests of the final effluent.

Assessment of Impact on Receiving Waters

Comprehensive biological and water quality data were collected in 2000, which was before the Alum WRF was built. Based on this data, Alum Creek downstream of Alum Creek WRF was listed as impaired. Causes of impairment are siltation, organic enrichment, flow alteration, direct habitat alteration, ammonia, cadmium,

priority organics and pathogens. Sources of impairment are land development, urban runoff, impoundment, channelization and storm sewers. This information is included in the *Total Maximum Daily Loads for the Big Walnut Creek Watershed*, August 19, 2005 located at http://www.epa.state.oh.us/dsw/tmdl/SciotoRiver.aspx. The Big Walnut Creek watershed is next scheduled to be monitored in 2020.

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 Alum Creek WRF 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	March 2009 through February 2014
Ohio EPA compliance sampling data	2012

The data were examined, and the following value was removed from the evaluation to give a more reliable projection of effluent quality: zinc: 1100 µg/L reported on June 6, 2013.

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 5.

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 8 for a summary of the screening results.

WLA 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.

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

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 9, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

Ohio's water quality standard implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet WQS at the end-of-pipe, which are 12 ng/L (average) and 1700 ng/L (maximum) in the Ohio River basin, or 1.3 ng/L (average) and 1700 ng/L (maximum) in the Lake Erie basin.

The data used in the WLA are listed in Tables 9 and 10. The WLA results to maintain all applicable criteria are presented in Table 11. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

WET 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 Alum Creek WRF, the WLA values are 0.3 TU_a and 1.0 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the IC_{25}:

$$TU_c = 100/IC_{25}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (Ceriodaphnia dubia only):

TU_c = 100/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 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)	WLA (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 Alum Creek WRF is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.45 to 1.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a water quality standard 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 11. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 5, 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 8.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 12 presents the final effluent limits and monitoring requirements proposed for Alum Creek WRF outfalls 4PK00003001 and 4PK00003002 and the basis for their recommendation.

Dissolved oxygen, TSS and $CBOD_5$
The limits proposed for dissolved oxygen, TSS and $CBOD_5$ are proposed to continue from the existing permit and are based on plant design criteria. These limits are protective of WQS.

Ammonia-nitrogen
Ammonia-nitrogen limits are proposed to continue from the existing permit and are protective of WQS.

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 Primary Contact Recreation *E. coli* standards apply to Alum Creek.

Flow, temperature, nitrate plus nitrite and phosphorus
Based on best engineering judgment, monitoring is proposed to continue from the existing permit for flow, temperature, nitrate plus nitrite and phosphorus.

Dissolved hexavalent chromium and copper
The Ohio EPA risk assessment (Table 8) places dissolved hexavalent chromium and copper in group 5. This placement as well as the data in Tables 3, 4 and 5 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. Pollutants that meet this requirement must have permit limits under OAC Rule 3745-33-07(A)(1).

Total filterable residue
The Ohio EPA risk assessment (Table 8) places total filterable residue in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), we are proposing monitoring, rather than limits, for this pollutant. The PEQ values calculated for total filterable residue (Table 5) may not be representative of its actual levels in the plant effluent because they were based on only two data points. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

Free cyanide
Ohio EPA risk assessment (Table 8) places free cyanide in group 4. This placement as well as the data in Tables 4 and 5 supports that this parameter does not have the reasonable potential to contribute to WQS exceedances,

and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC Rule 3745-33-07(A)(2).

Cadmium, chromium, lead, mercury, nickel and zinc
Ohio EPA risk assessment (Table 8) places barium, cadmium, chromium, lead, mercury, nickel, strontium and zinc in groups 2 and 3. This placement as well as the data in Tables 3, 4 and 5 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 continue from the existing permit for cadmium, chromium, lead, mercury, nickel and zinc to document that these pollutants continue to remain at low levels.

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

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

WET Reasonable Potential
Based on evaluating the WET data presented in Tables 6 and 7 and other pertinent data under the provisions of OAC 3745-33-07(B), the Alum Creek WRF is placed in Category 2 with respect to chronic toxicity and Category 4 with respect to acute toxicity.

Bimonthly chronic toxicity monitoring with acute endpoints with a trigger is proposed for the duration of one year for *Ceriodaphnia dubia*. If two or more chronic tests exceed 1.0 TU_c, the WRF will be required to initiate a toxicity reduction evaluation and a final limit of 1.0 TU_c for *Ceriodaphnia dubia* will become effective. Otherwise, after one year of bimonthly testing, the monitoring frequency will return to annual testing.

Annual chronic toxicity monitoring with acute endpoints is proposed to continue from the existing permit for *Pimephales promelas*. While placement in Category 4 indicates that the plant's effluent does not currently pose a toxicity problem for *Pimephales promelas*, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Other Requirements

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

Operator Certification
Operator certification requirements have been included in Part II, Item A of the permit in accordance with rules adopted in December 2006. These rules require the Alum Creek WRF to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001 .

Operator of Record
In December 2006, rule revisions became effective that affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II, Item A of this NPDES permit is included to implement OAC 3745-7-02. It requires 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.

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, the Alum Creek WRF 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) the Alum Creek WRF 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 signs to be placed at each outfall to Alum Creek, providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

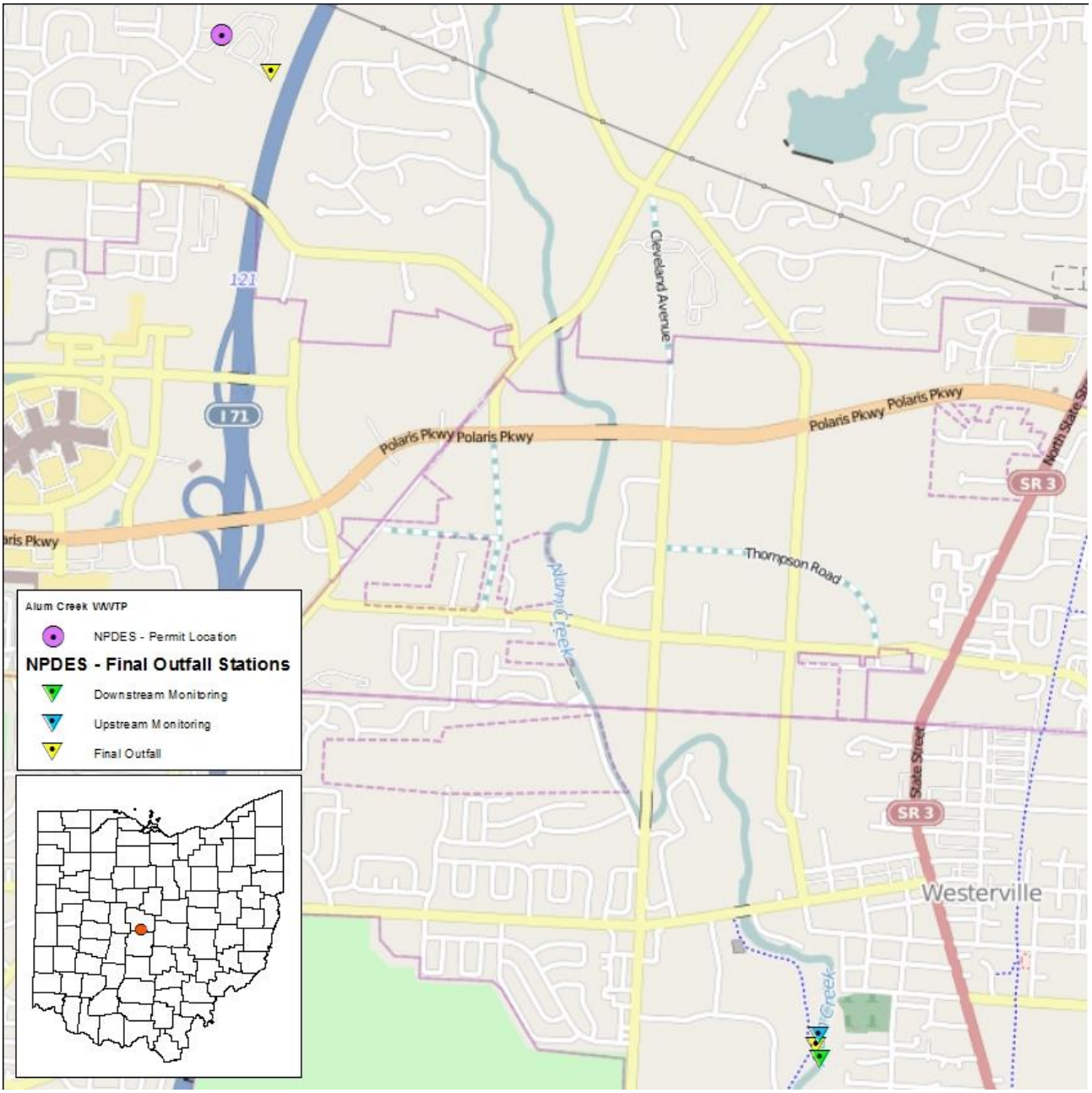

Figure 1. Location of Alum Creek Water Reclamation Facility.

Table 3. Summary of analytical results for Alum Creek Water Reclamation Facility outfall 4PK00003001.

	Ohio EPA Data	
Parameter	5/1/2012	11/27/2012
Total filterable residue (mg/L)	546	514
Copper (µg/L)	4.2	5.3
Nickel (µg/L)	3.3	3.1
Barium (µg/L)	30	22
Strontium (µg/L)	610	507
Zinc (µg/L)	74	94

Table 4. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Alum Creek Water Reclamation Facility outfall 4PK00003001 (March 2009 – February 2014). All values are based on annual records unless otherwise indicated. * = For minimum pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; a = weekly average.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	C	Monitor		1826	19.1	23.3	12-24.7
Dissolved Oxygen	Summer	mg/L	7.0 min		920	9.7	10.5	8-12.6
Dissolved Oxygen	Winter	mg/L	6.0 min		906	10.4	11.2	6.8-11.9
Total Suspended Solids	Annual	mg/L	12	18[a]	1825	2.2	8	0-209
Oil and Grease, Hexane Extr Method	Annual	mg/L	--	10 max	221	0	0	0-0
Oil and Grease, Freon Extr-Grav Meth	Annual	mg/L	--	10 max	21	0	0	0-0
Nitrogen, Ammonia (NH3)	Summer	mg/L	1	1.5[a]	907	0.19	1	0-3.16
Nitrogen, Ammonia (NH3)	Winter	mg/L	3	4.5[a]	906	0.23	1.58	0-6.42
Nitrite Plus Nitrate, Total	Annual	mg/L	Monitor		120	13.9	20.4	1.95-35.3
Phosphorus, Total (P)	Annual	mg/L	Monitor		480	2.84	4.24	0.13-7.07
Cyanide, Free	Annual	mg/L	0.012	0.046	20	0	0.00035	0-0.007
Nickel, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0
Zinc, Total Recoverable	Annual	µg/L	Monitor		23	75	99.7	45-1100
Cadmium, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0
Lead, Total Recoverable	Annual	µg/L	Monitor		20	0	0.175	0-3.5
Chromium, Total Recoverable	Annual	µg/L	Monitor		20	0	0	0-0
Copper, Total Recoverable	Annual	µg/L	20	33	67	0	16.4	0-50
Chromium, Dissolved Hexavalent	Annual	µg/L	Monitor		20	0	0.65	0-13
Fecal Coliform	Annual	#/100 ml	1000	2000[a]	920	10	66	1-540
Flow Rate	Annual	MGD	Monitor		1826	4.37	6.46	3-10.1
Mercury, Total (Low Level)	Annual	ng/L	Monitor		23	0.562	1.57	0-4.38

pH, Maximum	Annual	S.U.	--	9.0 max	1826	7.3	7.6	6.8-7.8
pH, Minimum	Annual	S.U.	6.5 min	--	1826	7.1	7.4	6.5-7.6
CBOD 5 day	Summer	mg/L	10	15[a]	918	0	3.57	0-8.73
CBOD 5 day	Winter	mg/L	10	15[a]	902	2.42	5.82	0-69.8

Table 5. Projected Effluent Quality Values.

Parameter	Units	PEQ average	PEQ maximum	Number of Observations
Winter Dissolved Oxygen	mg/L	10.588	12.001	451
Summer Dissolved Oxygen	mg/L	9.6794	10.202	610
Total Suspended Solids	mg/L	3.6895	7.578	1825
Oil and Grease, Hexane Extr Method	mg/L	--	--	221
Oil and Grease, Freon Extr-Grav Method	mg/L	--	--	21
Winter Nitrogen, Ammonia (NH3)	mg/L	0.63404	1.5871	451
Summer Nitrogen, Ammonia (NH3)	mg/L	0.41825	0.98003	597
Nitrite Plus Nitrate, Total	mg/L	19.851	26.32	120
Phosphorus, Total (P)	mg/L	4.8905	8.4595	480
Cyanide, Free	mg/L	0.007154	0.0098	20
Nickel, Total Recoverable	µg/L	3.614	4.95	14
Zinc, Total Recoverable	µg/L	95.477	116.34	24
Cadmium, Total Recoverable	µg/L	--	--	20
Lead, Total Recoverable	µg/L	3.577	4.9	20
Chromium, Total Recoverable	µg/L	--	--	20
Copper, Total Recoverable	µg/L	18.376	25.215	69
Chromium, Dissolved Hexavalent	µg/L	13.29	18.2	20
Mercury, Total (Low Level)	ng/L	2.0444	3.5413	23
Winter $CBOD_5$	mg/L	3.6998	7.3102	448
Summer $CBOD_5$	mg/L	2.1428	3.7489	608
Residue, Total Filterable	mg/L	1515	2075	2
Barium Total (Ba)	µg/L	83.22	114	2
Strontium, Total (Sr)	µg/L	1692	2318	2

Definitions: $CBOD_5$ 5-day carbonaceous biochemical oxygen demand;
PEQ Projected effluent quality.

Table 6. Summary of Acute and Chronic Toxicity Results Reported by Alum Creek Water Reclamation Facility.

Date	Acute Toxicity		Chronic Toxicity	
	Ceriodaphnia dubia (TU_a)	*Pimephales promelas* (TU_a)	*Ceriodaphnia dubia* (TU_c)	*Pimephales promelas* (TU_c)
9/11/2009	AA	AA	1.1	AA
9/21/2010	0.4	AA	2	AA
9/20/2011	AA	AA	AA	AA
9/18/2012	AA	AA	1.4	AA
9/10/2013	AA	AA	AA	AA

Definitions: AA Below detection (0.2 TU_a, 1.0 TU_c);
TU_a Acute toxicity units;
TU_c Chronic toxicity units.

Table 7. Summary of toxicity results reported by Ohio EPA.

Collection Date	*Ceriodaphnia dubia*									
	24 Hours					48 Hours				
	UP	C	%M	CMZ	AMZ	UP	C	%M	CMZ	AMZ
5/1/2012	0	0	0	0	0	0	0	0	0	0
5/2/2012	ND	0	0	ND	ND	ND	0	0	ND	ND
5/1/12-5/2/12[a]	ND	ND	0	ND	ND	ND	ND	0	ND	ND
11/27/2012	0	0	0	0	0	0	0	0	0	0
11/28/2012	ND	0	0	ND	ND	ND	0	0	ND	ND
11/27/12-11/28/12[a]	ND	ND	0	ND	ND	ND	ND	0	ND	ND
Collection Date	*Pimephales promelas*									
	24 Hours					48 Hours				
	UP	C	%M	CMZ	AMZ	UP	C	%M	CMZ	AMZ
5/1/2012	0	0	0	0	0	0	0	0	0	0
5/2/2012	ND	0	0	ND	ND	ND	0	0	ND	ND
5/1/12-5/2/12[a]	ND	ND	0	ND	ND	ND	ND	0	ND	ND
11/27/2012	0	0	0	0	0	0	0	0	0	0
11/28/2012	ND	0	0	ND	ND	ND	0	0	ND	ND
11/27/12-11/28/12[a]	ND	ND	0	ND	ND	ND	ND	0	ND	ND

[a] = 24 hour composite sample

Definitions:

AMZ	Acute mixing zone;
C	Laboratory control water;
CMZ	Chronic mixing zone;
%M	Percent mortality in 100% effluent;
ND	Not determined;
UP	Percent mortality in upstream control.

Table 8. Parameter Assessment.

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.
No Group 1 parameters.

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

Lead	Mercury	Nickel
Strontium	Cadmium	Chromium

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

Barium 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.

Cyanide - free

Group 5:

Maximum PEQ >= 100 percent of the maximum PEL or average PEQ >= 100 percent of the average PEL. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits	
Parameter	Units	Average	Maximum
Chromium VI	µg/L	11	16
Copper	µg/L	19	30
Dissolved solids	mg/L	1500	--

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

Table 9. Instream Conditions and Discharger Flow.

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0	USGS gage 03228805
7Q10	cfs	annual	0	USGS gage 03228805
		summer	0	
		winter	0	
30Q10	cfs	summer	0	USGS gage 03228805
		winter	1.1	USGS gage 03228805
90Q10	cfs	annual	0	
Harmonic Mean	cfs	annual	8.58	USGS gage 03228805
Mixing Assumption	%	average	100	
	%	maximum	100	
Hardness	mg/L	annual	226	Station 901, N = 60, 2009-14
pH	S.U.	summer	7.4	Station 901, N = 20, 2009-14
		winter	7.8	Station 901, N = 15, 2009-14
Temperature	°C	summer	24.7	Station 901, N = 20, 2009-14
		winter	7.45	Station 901, N = 15, 2009-14
Alum Creek WRF flow	cfs	annual	15.47	Division of Surface Water
Background Water Quality				
Barium	µg/L		58.67	STORET; 2010; N=3; 0<MDL; Mean value
Chromium VI	µg/L		0	No representative data available.
Copper	µg/L		4.9	STORET; 2010; N=3; 0<MDL; Mean value
Cyanide - free	mg/L		0	No representative data available.
Dissolved solids	mg/L		422	STORET; 2010; N=3; 0<MDL; Mean value
Lead	µg/L		1.93	STORET; 2010; N=3; 1<MDL; Mean value
Mercury	ng/L		0	STORET; 2010; N=3; 3<MDL;
Nickel	µg/L		4.77	STORET; 2010; N=3; 3<MDL; Mean value
Strontium	µg/L		503.33	STORET; 2010; N=3; 3<MDL; Mean value
Ammonia, Summer	mg/L		0.1835	801; 2009-14; N=20; 3<MDL; Mean value
Ammonia, Winter	mg/L		0.1093	801; 2009-14; N=15; 10<MDL; Mean value
Cadmium	µg/L		0	STORET; 2010; N=3; 3<MDL; All data below MDL
Chromium	µg/L		1.93	STORET; 2011; N=3; 2<MDL; Mean value
Zinc	µg/L		12	STORET; 2012; N=3; 2<MDL; Mean value

Definitions:
- MDL — Minimum detection level;
- N — Number of samples;
- STORET — US EPA Storage and Retrieval Data Warehouse;
- USGS — United States Geological Survey.

Table 10. Water Quality Criteria in the Study Area.

Parameter	Units	Outside Mixing Zone Criteria: Average: Human Health	Outside Mixing Zone Criteria: Average: Agri-culture	Outside Mixing Zone Criteria: Aquatic Life	Outside Mixing Zone Criteria: Maximum Aquatic Life	Inside Mixing Zone Maximum
Barium	µg/L	--	--	220	2000	4000
Chromium VI	µg/L	--	--	11	16	31
Copper	µg/L	1300	500	19	30	60
Cyanide - free	mg/L	220	--	0.012	0.046	0.092
Dissolved solids	mg/L	--	--	1500	--	--
Lead	µg/L	--	100	18	350	690
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	4600	200	100	940	1900
Strontium	µg/L	--	--	21000	40000	81000
Ammonia, Summer	mg/L	--	--	1.6	--	--
Ammonia, Winter	mg/L	--	--	4.8	--	--
Cadmium	µg/L	--	50	4.7	11	23
Chromium	µg/L	--	100	170	3500	7000
Zinc	µg/L	69000	25000	240	240	480

Table 11. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria.

		Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Barium	µg/L	--	--	220	2000	4000
Chromium VI	µg/L	--	--	11	16	31
Copper	µg/L	2018	775	19	30	60
Cyanide - free	mg/L	342	--	0.012	0.046	0.092
Dissolved solids	mg/L	--	--	1500	--	--
Lead	µg/L	--	154	18	350	690
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	7149	308	100	940	1900
Strontium	µg/L	--	--	21000	40000	81000
Ammonia, Summer	mg/L	--	--	1.6	--	--
Ammonia, Winter	mg/L	--	--	5.13	--	--
Cadmium	µg/L	--	78	4.7	11	23
Chromium	µg/L	--	154	170	3500	7000
Zinc	µg/L	107262	38859	240	240	480

Table 12. Final Effluent Limits and Monitoring Requirements for Outfalls 4PK00003001 and 4PK00003002

Parameter	Units	Effluent Limits				Basis
		Concentration		Loading (kg/day)		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 4PK00003001						
Temperature	°C	Monitor		--	--	M
Dissolved Oxygen, Summer	mg/L	7.0 min	--	--	--	EP/PD
Dissolved Oxygen, Winter	mg/L	6.0 min	--	--	--	EP/PD
Total Suspended Solids	mg/L	12	18[c]	454	681[c]	EP/PD
Oil and Grease	mg/L	--	10	--	--	WQS
Nitrogen, Ammonia, Summer	mg/L	1.0	1.5[c]	38	57[c]	EP
Nitrogen, Ammonia, Winter	mg/L	3.0	4.5[c]	114	170[c]	EP
Nitrite Plus Nitrate	mg/L	Monitor		--	--	M
Phosphorus	mg/L	Monitor		--	--	M
Cyanide, Free	mg/L	Monitor		--	--	M
Nickel, Total Recoverable	µg/L	Monitor		--	--	M
Zinc, Total Recoverable	µg/L	Monitor		--	--	M
Cadmium, Total Recoverable	µg/L	Monitor		--	--	M
Lead, Total Recoverable	µg/L	Monitor		--	--	M
Chromium, Total Recoverable	µg/L	Monitor		--	--	M
Copper, Total Recoverable	µg/L	19	30	0.72	1.14	RP/WLA
Chromium, Dissolved Hexavalent	µg/L	11	16	0.417	0.606	RP/WLA
E. coli	#/100 mL	126	284[c]	--	--	WQS
Flow Rate	MGD	Monitor		--	--	M
Mercury, Total (Low Level)	ng/L	Monitor		--	--	M
pH	S.U.	6.5 min	9.0 max	--	--	WQS
Total Filterable Residue	mg/L	Monitor		--	--	WLA/BEJ
Biochemical Oxygen Demand, 5 day	mg/L	10	15[c]	379	568[c]	EP/PD
Outfall 4PK00003002						
Acute, *Ceriodaphnia dubia*	Tu_a	Monitor		--	--	WET
Chronic, *Ceriodaphnia dubia*	Tu_c	Monitor		--	--	WET
Acute, *Pimephales promelas*	Tu_a	Monitor		--	--	WET
Chronic, *Pimephales promelas*	Tu_c	Monitor		--	--	WET

[a] Effluent loadings based on average design discharge flow of 10 MGD.

[b] Definitions: BEJ = Best engineering judgment;
EP = Existing Permit;
M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges;
PD = Plant Design Criteria;
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)];
WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)] or Reasonable potential for requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [OAC 3745-33-07(B)]

WLA = Wasteload Allocation procedures (OAC 3745-2);
WQS = Ohio Water Quality Standards (OAC 3745-1-07).

[c] Weekly average limit.