National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Revised December 20, 2011

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the Southerly Wastewater Treatment Center

Public Notice No.: 11-09-007
Public Notice Date: September 5, 2011
Comment Period Ends: October 5, 2011

OEPA Permit No.: 3PF00002*MD
Application No.: OH0024651

Name and Address of Applicant:

Northeast Ohio Regional Sewer District
3900 Euclid Avenue
Cleveland, Ohio 44115

Name and Address of Facility Where Discharge Occurs:

Southerly Wastewater Treatment Center
6000 Canal Road
Cuyahoga Heights, Ohio 44125

Receiving Water: Cuyahoga River

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, Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency, as well as the methods by which the public can participate in the process of finalizing those actions.

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

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by U.S. EPA in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent

dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

Summary of Permit Conditions

The 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, $CBOD_5$, total suspended solids, ammonia-nitrogen, nitrite+nitrate-nitrogen, oil and grease, maximum pH, total residual chlorine, cadmium, chromium, dissolved hexavalent chromium, lead, nickel, zinc, total dissolved solids and whole effluent toxicity.

Lower limits are proposed for total phosphorus to implement recommendations from the lower Cuyahoga River TMDL (total maximum daily loads study). Due to the role of nutrients in aquatic life impairment in the lower Cuyahoga, new monitoring is proposed for total Kjeldahl nitrogen.

New final effluent limits are proposed for *Escherichia coli.* New water quality standards for *E. coli* became effective in March 2010.

A new minimum pH limit is proposed based on the results of a July 2011 mixing study conducted by NEORSD and reviewed by Ohio EPA.

New final effluent limits are proposed for mercury. Effluent data show that it has the reasonable potential to cause or contribute to violations of water quality standards. The Agency is proposing to grant coverage under Ohio's general mercury variance.

Current effluent limits for free cyanide and copper are being removed because effluent data show that they no longer have the reasonable potential to contribute to exceedances of water quality standards. Monitoring will still be required.

In Part II of the permit, special conditions are included that address sanitary sewer overflow reporting; operator certification, minimum staffing and operator of record; tracking of effluent data for selenium and thallium; the future use of dissolved metal translators; whole effluent toxicity testing**;** outfall signage; and pretreatment program requirements.

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Procedures for Participation in the Formulation of Final Determinations

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

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

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

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

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

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

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

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

For additional information about this fact sheet or the draft permit, contact Erm Gomes (Northeast District Office), (330) 963-1196, Erm.Gomes@epa.ohio.gov , or Gary Stuhlfauth (Central Office), (614) 644-2026, Gary.Stuhlfauth@epa.ohio.gov .

Location of Discharge/Receiving Water Use Classification

The Southerly wastewater treatment plant discharges to the Cuyahoga River at River Mile (RM) 10.57. Figure 1 shows the approximate location of the facility.

This segment of the Cuyahoga River is described by Ohio EPA River Code: 19-001, U.S. EPA River Reach #: 04110002-001, County: Cuyahoga, Ecoregion: : Eastern Great Lakes and Hudson Lowlands. The Cuyahoga River is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-26):

Upstream of the Ship Channel (RM 5.6) - Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Class A Primary Contact Recreation (PCR);

Ship Channel (RM 5.6 – mouth) – Fish Passage (February – May when river flow equals or exceeds 703 cfs at USGS Independence gage, #04208000); Limited Resource Water (LRW, all other times); Industrial Water Supply (IWS) 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 water quality standards are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

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

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

Facility Description

The Southerly plant has an average dry weather design flow of 175 million gallons per day. The current peak capacity through secondary treatment is 400 MGD. Wet stream processes include influent pumping, screening and grit removal, primary settling, phosphorus removal, first stage activated sludge aeration, intermediate clarification, second stage activated sludge aeration, final clarification, tertiary filtration, chlorination, and dechlorination. Solid stream processes are cyclone degritting of primary sludge, sludge thickening, sludge storage, thermal conditioning, and dewatering using centrifugation. The primary means of sludge disposal is by incineration. Disposal at the PPG Lime Lakes site or at a mixed solid waste landfill are other options.

Southerly station 002 is a bypass of primary treatment effluent that discharges to the Cuyahoga River.

The Southerly collection system is mostly separate sanitary sewers, but there are combined sewer areas. The combined sewer overflows on the Southerly collection system are regulated under Ohio EPA permit number 3PA00002. A consent decree, civil action number 1:10CV2895-DCN, was filed on July 7, 2011. It addresses the long-term plan that will enable the District to control discharges of untreated sewage during wet weather and comply with Clean Water Act standards.

The decree includes the following control measures at the Southerly plant:

- Demonstrate and test chemical addition to primary clarifiers and high rate disinfection of primary effluent bypass, and if performance criteria are met, construct chemical addition and high rate disinfection of remaining primary effluent bypass up to 125 MGD peak flow; or

- If performance criteria are not met, construct ballasted flocculation system and high rate disinfection for remaining primary effluent bypass up to 125 MGD peak flow; and
- Increase secondary treatment capacity from 400 to 615 MGD during wet weather

Station 003
This station is being added to the permit. It is an existing emergency bypass structure that is not used. One of the CSO control measures that the District will be implementing at the Southerly plant is to increase secondary treatment capacity from 400 to 615 MGD during wet weather. This will be accomplished by adding an additional first stage settling tank, operating the first and second stage secondary systems in parallel, and using station 003 as a new effluent outfall off of the first stage system.

The typical-year performance criteria for this control measure is that the first and second stage outfalls achieve the NPDES permit limits. Because the discharge through station 003 will not be undergoing nitrification, the Agency will be conducting a plant-wide wasteload allocation for ammonia-nitrogen that will be protective of water quality standards when applied at the first and second stage outfalls.

The District anticipates submitting a permit-to-install application for this project during the third year of this NPDES permit cycle.

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The District implements an Ohio EPA-approved industrial pretreatment program. Based on information in the program's 2010 annual report, 64 categorical industrial users and 29 significant noncategorical industrial users discharge to the Southerly plant.

Description of Existing Discharge

Table 1 presents chemical specific data compiled from annual pretreatment reports.

Table 2 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfall 3PF00002001. Data are presented for the period April 2006 through March 2011, and current permit limits are provided for comparison.

Table 3 summarizes the chemical specific data for outfall 001 by presenting the average and maximum Projected Effluent Quality (PEQ) values.

Table 4 summarize the results of acute and chronic whole effluent toxicity tests of the final effluent.

Table 5 summarizes DMR data for bypass station 002 for the period April 2006 through March 2011.

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from effluent testing conducted by the Agency.

Assessment of Impact on Receiving Waters

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 Water Quality Standards 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 Water Quality Standards (WQS; Ohio Administrative Code 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 meet the biocriteria or one of the organism groups reflects poor or very poor performance. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Figure 2) 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.

Ohio EPA conducted an intensive biological and water quality survey of the Cuyahoga River during the summers of 1999 and 2000. To address water quality impairment identified during the survey, Ohio EPA conducted the study, *Total Maximum Daily Loads for the Lower Cuyahoga River* (September 2003, Ohio EPA Division of Surface Water), which was approved by U.S. EPA on September 26, 2003. The TMDL report is available at the following Ohio EPA internet site:
http://www.epa.ohio.gov/dsw/tmdl/CuyahogaRiverLowerTMDL.aspx .

The following excerpts from the TMDL report address chemical, recreational and biological water quality:

> Excepting D.O., the Cuyahoga River was in substantial compliance with chemical WQS and PCR criteria during dry weather. However, nitrate-nitrite, phosphorus, and zinc tended to increase in a step wise function below the Akron, NEORSD Southerly, and ISG (formerly LTV Steel) (zinc) discharges. Chronic enrichment and lack of nutrient assimilation between Akron and Cleveland suggests nutrient uptake by algae was either suppressed, or nutrients were present in concentrations saturating to algal uptake rates. Suppressed uptake rates may indicate chronic toxicity or light limitation. Saturated uptake rates demonstrate nutrients present in levels exceeding assimilative capacity.
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> Fecal coliform numbers continue to exceed the 1000/100 ml Primary Contact Recreation criterion between Akron and Cleveland when stream flow is elevated due to rain runoff. A similar finding was reported by the USGS in their extensive bacteriological survey of the lower Cuyahoga River (Francy et.al. 1993). The study concluded that the most significant source of fecal coliform bacteria was from bypasses of the secondary treatment process at the Akron WWTP. *(TMDL pages 18 – 19)*
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> Sampling downstream from Tinkers Creek at RM 15.6 found the first Full attainment of WWH ever recorded by Ohio EPA in the Cuyahoga River downstream from Akron. The improvement

continued the recovery trend that began 25 miles upstream in the Akron area. Positive changes are primarily attributed to a lessening of toxic impacts and continued reductions in loadings from the Akron sewer system. Full attainment is believed to extend downstream to the confluence with Mill Creek.

Between Mill Creek and the Southerly WWTP the fish communities declined to the poor range. Besides urban/industrial runoff, CSO, and SSO stressors, a large Mill Creek sewer line break in February of 2000 is suspected of contributing to the decline. Fish improved to Fair downstream from Southerly WWTP discharge, resulting in Partial attainment. This represents a significant improvement over the poor/very poor fish communities (and Non attainment) in previous surveys. The results fit the overall improving trend in the lower Cuyahoga River between Akron and Cleveland.

Nutrient levels were elevated throughout the reach with both point and nonpoint contributors. Chronic water quality standard exceedances were detected during high stream flow events for copper, lead, and zinc and elevated concentrations of cadmium, chromium, and nickel were found in numerous high flow samples between Tinkers Creek and Big Creek. *(TMDL pages 19 – 20)*

Figure 2 presents the aquatic life attainment status of the lower Cuyahoga River.

The TMDL study identified organic enrichment, toxicity, low dissolved oxygen, nutrients and flow alteration as major causes of impairment. It identified municipal discharges, combined sewer overflows, urban runoff and industrial discharges as major sources of impairment.

In regards to recommendations for the Southerly wastewater treatment plant, the TMDL stated, "The WWTP allocation includes a yearly allowable load for the Southerly WWTP of 81283 lbs/year total phosphorus and 1.09E14 cfu/year for fecal coliform. This represents a total phosphorus permit limit for Southerly of 0.7 mg/l and no change in their current fecal coliform limit." *(TMDL page 78)*

Ohio EPA conducted water quality survey work on the lower Cuyahoga River during 2008. Figure 3 presents a comparison of the attainment status in 2000 and 2008.

The Northeast Ohio Regional Sewer District has been collecting level 3 credible data in the Cuyahoga River since 2006. Level 3 credible data may be used by Ohio EPA in making regulatory and management decisions. The aquatic life attainment table in the appendix to this fact sheet includes the Ohio EPA survey data discussed above along with biological and habitat data collected by the Sewer District from 2006 through 2010. This table was submitted by the Sewer District as part of its comments on the draft NPDES permit.

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 Southerly wastewater plant were used to determine what parameters should undergo wasteload allocation. The parameters discharged are identified by the data available to Ohio EPA - Discharge Monitoring Report (DMR) data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	April 2006 through March 2011

Pretreatment data 2006 - 2010

The data were examined, and the following values were removed from the evaluation to give a more reliable projection of effluent quality: lead – one high value, 6.1 ug/l.

This data is evaluated statistically, and Projected Effluent Quality (PEQ) values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points. The average and maximum PEQ values are presented in Table 3.

The PEQ values are used according to Ohio rules to compare to applicable water quality standards (WQS) and allowable wasteload allocation (WLA) values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no wasteload allocation is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a wasteload allocation is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 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 Water Quality Standards (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. Wasteload allocations using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

The Southerly wastewater treatment plant is interactive with ISG-Cleveland Steel. The CONSWLA (Conservative Substance Wasteload Allocation) program was used to allocate the available assimilative capacity of the Cuyahoga River among the various discharges. Small discharges were fixed at the Inside Mixing Zone Maximum (IMZM) to allow for an equitable division of the assimilative capacity among the larger discharges. Additionally, the use designation of the Cuyahoga River changes to Fish Passage at river mile 5.6 which is the beginning of the shipping channel.

The Fish Passage designation requires that criteria for Warmwater Habitat be met during the months from February through May when the flow at USGS gage #04208000 equals or exceeds 703 cfs. Limited Resource Water conditions are applicable for any other time. The potential impact of the Fish Migratory flow (703 cfs) on Southerly's average preliminary effluent limitations (PELs) was evaluated. All PELs that are protective for the Warmwater Habitat use designation are also protective for the Fish Migratory use. Figure 3 shows the study area of this portion of the Cuyahoga River.

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
Wildlife		Annual 90Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 7, 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 water quality standards at the end-of-pipe, which is a monthly average of 1.3 ng/l in the Lake Erie basin.

The data used in the WLA are listed in Tables 6 and 7. The wasteload allocation results to maintain all applicable criteria are presented in Table 8. The current ammonia limits have been evaluated using the wasteload allocation procedures and are protective of water quality standards for ammonia toxicity.

Dissolved Metals Translators A dissolved metals translator (DMT) is the factor used to convert a dissolved metal aquatic life criterion to an effective total recoverable aquatic life criterion with which a total recoverable aquatic life allocation can be calculated as required in the NPDES permit process. Currently, a DMT is based on site- or area-specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement.

For the Cuyahoga River, there were 5 such paired samples available applicable to cadmium, chromium, copper, lead, nickel, and zinc. To account for the limited quantity of data, the DMT for each of these metals was determined as the lower end of the 95percent confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. Each DMT is metal-specific and is applied by multiplying the dissolved criteria by the DMT, resulting in total effective recoverable criteria which can be used in the wasteload allocation procedures. The DMTs for cadmium and zinc were less than one; therefore, total recoverable criteria were used.

In some cases, it is possible that the use of a DMT may result in instream concentrations of metals that may increase the risk of non-attainment of the use designation. This was evaluated for the Southerly wastewater treatment plant. The application of the dissolved metal translators resulted in effective total recoverable criteria that were higher than the total recoverable criteria listed in OAC 3745-1.

In addition, the plant has not requested any increase in permitted load. Therefore, the facility can receive permit limits up to their current limits without undergoing any further review to ensure that the limits for metals will protect the biological criteria.

Zinc Reallocation
In drafting the NPDES permits for the Southerly wastewater treatment plant and ArcelorMittal, Ohio EPA has reallocated zinc loading between the Southerly discharge and ArcelorMittal outfall 002. When allocating multiple sources in a stream segment, the director may distribute the loading among the discharges using any appropriate method, based on site-specific considerations [OAC 3745-2-05(A)(8)]. A summary of this zinc wasteload allocation is shown below (all values are ug/l):

Outfall	Zinc Wasteload (avg./max.)	PEQ Values (avg./max)	Zinc Reallocation (avg./max.)
Southerly 001	263 / 303	43.7 / 53.7	261 / 290
ArcelorMittal 002	383 / 303	325 / 574	450 / 765

The reallocation increases zinc concentrations at ArcelorMittal outfall 002 more than it decreases concentrations at Southerly because of the large difference in flow between the two outfalls (8 cfs for 002 vs. approx. 250 cfs for Southerly).

The reallocation does not increase requirements for Southerly because the assimilative capacity of the Cuyahoga River has increased since the last wasteload allocation was completed. Upstream zinc concentrations measured at the Independence Gage are significantly lower than they were 5-10 years ago; also, the latest flow analysis shows that critical low flows at Independence are slightly higher than they used to be (see Table 7).

As a result of this reallocation, ArcelorMittal outfall 002 no longer has the reasonable potential to contribute to exceedances of water quality standards, and the permit contains a monitoring requirement, rather than limits.

Note that this reallocation applies for this permit only. Ohio EPA may, in future permitting actions, return to the original wasteload allocation based on NEORSD's needs and requirements.

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

Water quality standards for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). Wasteload allocations can then be calculated using TUs as if they were water quality criteria.

The wasteload allocation calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For the Southerly plant, the wasteload allocation values are 0.32 TU_a and 1.1 TU_c.

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

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

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

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

The acute toxicity unit (TU_a) is defined as 100 divided by the LC_{50} for the most sensitive test species:

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

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

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

Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

The acute wasteload allocation for Southerly is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.4 to 1.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the water quality standards must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a water quality standard or do not require a wasteload allocation based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum wasteload allocations are selected from Table 8. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 3, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) 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 10 presents the final effluent limits and monitoring requirements proposed for Southerly outfall 3PF00002001 and the basis for their recommendation.

Based on best engineering judgment, it is proposed that the existing permit limits for dissolved oxygen, total suspended solids, ammonia-nitrogen and $CBOD_5$ (5-day carbonaceous biochemical oxygen demand) be continued. The ammonia-N limits were evaluated as part of the current water quality modeling and are protective of water quality standards for ammonia toxicity.

Limits proposed for oil and grease and *Escherichia coli* are based on Water Quality Standards (OAC 3745-1-07). Class A Primary Contact Recreation *E. coli* standards apply to the Cuyahoga River.

The maximum limit proposed for pH, 9.0 SU, is based on Ohio water quality standards (OAC 3745-1-07) and is a continuation of the existing limit. Based on best engineering judgment, the limit proposed for minimum pH, 6.0 SU, is based on the results of a July 2011 mixing study conducted by NEORSD and reviewed by Ohio EPA. That study showed the proposed limit is protective of the minimum water quality standard of 6.5 SU.

The proposed limit for total residual chlorine is a continuation of the existing permit limit and is protective of water quality standards. The proposed limit is less than the quantification level of 0.050 mg/l. However, a pollutant minimization program is not required because the dosing rate of dechlorination chemicals ensures that the water quality based effluent limit is being met.

The proposed phosphorus limit is based on a recommendation from the report, *Total Maximum Daily Loads for the Lower Cuyahoga River, Final Report* (Ohio EPA, September 2003).

A continuation of monitoring for nitrite+nitrate-nitrogen plus new monitoring for total Kjeldahl nitrogen are proposed based on best engineering judgment. In addition, monitoring for total phosphorus and nitrite+nitrate-nitrogen is proposed at the upstream and downstream stations, 801 and 901. The purpose of the monitoring is to maintain a data base on nutrient loadings and ambient concentrations in the Cuyahoga River basin. This data will be available for future studies addressing nutrient-related water quality impairment.

Mercury Reasonable Potential and Mercury Variance The Ohio EPA risk assessment (Table 9) places mercury in group 5. This placement as well as the data in Tables 2 and 3 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality.

To comply with mercury limits, the permittee has applied for coverage under the general mercury variance, Rule 3745-33-07(D)(10) of the Ohio Administrative Code. Based on the results of low-level mercury monitoring, the permittee has determined that its wastewater treatment plant cannot meet the 30-day average water quality-based effluent limit (WQBEL) of 1.3 nanograms per liter (ng/l). However, the permittee believes that the plant will be able to achieve an annual average mercury effluent concentration of 12 ng/l. The variance application also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the

WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based on these factors, the permittee is eligible for coverage under the general mercury variance.

Ohio EPA has reviewed the mercury variance application and has determined that it meets the requirements of the Ohio Administrative Code. Items W, X and Y in Part II of the draft NPDES permit list the provisions of the mercury variance, and includes the following requirements:

- A variance-based monthly average effluent limit of 3.1 ng/l, which was developed from sampling data submitted by the permittee;
- A requirement that the permittee make reasonable progress to meet the water-quality-based effluent limit for mercury by implementing the plan of study, which has been developed as part of the Pollutant Minimization Program (PMP);
- Low-level mercury monitoring of the plant's influent and effluent;
- A requirement that the annual average mercury effluent concentration is less than or equal to 12 ng/l as specified in the plan of study;
- A summary of the elements of the plan of study;
- A requirement to submit an annual report on implementation of the PMP; and
- A requirement for submittal of a certification stating that all permit conditions related to implementing the plan of study and the PMP have been satisfied, but that compliance with the monthly average water quality-based effluent limit for mercury has not been achieved.

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Ohio EPA risk assessment (Table 9) places copper, total filterable residue (total dissolved solids), selenium and thallium in group 4. This placement as well as the data in Tables 1, 2 and 3 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 for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC Rule 3745-33-07(A)(2).

In addition, the selenium and thallium effluent quality falls within 75 percent of the wasteload allocation. Under OAC 3745-33-07(A)(2), parameters in this range must have a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II Item CC of the draft permit.

Ohio EPA risk assessment (Table 9) places free cyanide, cadmium, total chromium, dissolved hexavalent chromium, lead, nickel and zinc groups 2 and 3. This placement as well as the data in Tables 2 and 3 support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a low frequency is proposed to document that these pollutants continue to remain at low levels.

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. Monitoring requirements proposed for the disposal of sewage sludge by incineration are based on 40 CFR Part 503, Subpart E.

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

Whole Effluent Toxicity Reasonable Potential

Evaluating the acute and chronic toxicity results in Table 4 under the provisions of 40 CFR Part 132, Appendix F, Procedure 6, gives an acute PEQ value of 0.3 TU_a and a chronic PEQ of 1.1 TU_c. Reasonable potential for toxicity is not demonstrated, since these values do not exceed the wasteload allocation values of 0.3 TU_a and 1.1 TU_c.

In the case of split samples where the result from one lab was "below detection" and the result from the second lab was just above the detection limit, the Agency averaged the two results using one-half the detection limit for the result that was below detection. The average was used in the reasonable potential evaluation.

An October 5, 2010 test in which the labs reported results of 3.8 TUc for *Ceriodaphnia dubia* was not included in the reasonable potential evaluation. When *C. dubia* mortality was observed beginning on day 4 of the test, the District began an investigation that included screening tests of plant effluent and upstream and downstream ambient sites. In summary, the tests showed that a toxic "wave" passed through the plant and the upstream and downstream Cuyahoga River sites. The toxic impacts were observed for two days in the middle of the week-long chronic test period; then they were gone.

A wet weather event occurred during the time when the second set of effluent and ambient samples were being collected. During that time, plant flow increased from less than 100 MGD to a peak of 300 MGD. Based on the results of its investigation, the District believes the observed toxicity was associated with storm water runoff and not with normal treatment operations at the Southerly plant. The District conducted a phase I toxicity characterization analysis, which identified Pyrethroid pesticides as a potential cause of the toxicity. These pesticides are found in commercially available insect control products.

Considering the magnitude of the Southerly discharge and the number of industrial users that discharge to the plant, the Agency is proposing that the District conduct chronic toxicity tests with the determination of acute endpoints using both fathead minnows and *C. dubia* twice a year for the life of the permit.

Other Requirements

Compliance Schedule
A six month compliance schedule is proposed for the District to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If revisions to local limits are required, the District must also submit a pretreatment program modification request.

A six month compliance schedule is proposed for the District to submit a pretreatment program modification request for implementing changes required by Ohio's pretreatment rules and U.S. EPA's pretreatment streamlining rule.

Sanitary Sewer Overflow Reporting
Provisions for reporting sanitary sewer overflows (SSOs) are proposed in this permit. These provisions include: reporting the number of SSO occurrences from sewers owned or operated by the District 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 Southerly plant 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, Ohio Administrative Code 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 rule 3745-7-02 of the Ohio Administrative Code (OAC). It requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Storm Water Compliance
The Southerly wastewater treatment plant is covered under Ohio EPA's general permit for industrial storm water (permit # OHR000004). At the appropriate time, the District will submit a Notice of Intent to renew this coverage.

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

Figure 1. Location of NEORSD wastewater treatment plants.

Table 1. Effluent Characterization Using Ohio EPA and Pretreatment Data

Summary of analytical results for Southerly outfall 3PF00002001. Units ug/l unless otherwise noted; PT = data from pretreatment program reports; ND = not detected (detection limit); j = estimated value, greater than MDL but less than PQL; MDL = method detection limit; PQL = practical quantification level.

PARAMETER	PT 07/27/10	PT 08/03/09	PT 01/06/08	PT 01/08/08	PT 01/10/08	PT 08/28/07	PT 08/09/06	OEPA 05/03/11
Antimony	1.39	1.86	ND(10)	1.5(j)	0.6(j)	ND(10)	ND(10)	NA
Arsenic	2.44	3.01	ND(20)	1.4(j)	1.7(j)	ND(20)	ND(20)	3.0
Barium	NA	NA	NA	NA	NA	NA	NA	21
Cadmium	0.09	ND(0.15)	ND(1.0)	0.2(j)	ND(0.2)	ND(1.0)	ND(1.0)	ND(0.20)
Chromium	1.24	1.41	ND(10)	1.6(j)	1.7(j)	ND(10)	ND(10)	2.2
Copper	6.11	4.25	ND(10)	6.8	5.9	ND(10)	ND(10)	6.3
Dissolved solids, total (mg/l)	NA	NA	NA	NA	NA	NA	NA	588
Iron	NA	NA	NA	NA	NA	NA	NA	90
Nickel	8.59	9.98	9.97	20.7	11.3	21	29.6	7.6
Selenium	1.52	1.94	ND(10)	2.6(j)	2.8(j)	ND(10)	ND(10)	ND(2.0)
Strontium	NA	NA	NA	NA	NA	NA	NA	247
Thallium	ND(1.3)	ND(1.6)	ND(20)	8.2	7.9	ND(20)	ND(20)	NA
Zinc	25.98	28.24	28.4	40.6	37.6	30.2	47.9	22
Bromodichloromethane	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	1.41
Bromomethane	ND(5.0)	NF(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	1.52
Chloroform	5.56	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	2.18
Dibromochloromethane	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	0.53
Toluene	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	4.54

Table 2. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Southerly outfall 3PF00002001 (April 2006 – March 2011). 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	
Water Temperature	Annual	C	Monitor		1826	17.6	24.3	8-25.5
Dissolved Oxygen	Summer	mg/l		5.0	920	7.5	8.6	5.4-9.5
Dissolved Oxygen	Winter	mg/l		5.0	906	9.3	10.9	5.6-12.1
Residue, Total Dissolved	Annual	mg/l	Monitor		1804	705	1230	295-2070
Total Suspended Solids	Annual	mg/l	16	24[a]	1815	2	5	0-18
Oil and Grease, Hexane	Annual	mg/l		10	130	0	3.11	0-3.7
Nitrogen, Ammonia (NH3)	Summer	mg/l	1.7	2.6	913	0.16	0.5	0.03-1.28
Nitrogen, Ammonia (NH3)	Winter	mg/l	5.0/8.0[#]	7.5/12[a #]	874	0.1	0.603	0-3.28
Nitrite Plus Nitrate, Total	Annual	mg/l	Monitor		1788	15	19.8	4.5-23
Phosphorus, Total (P)	Annual	mg/l	1.0	1.5[a]	1787	0.53	0.94	0.06-1.36
Cyanide, Free	Annual	mg/l	0.0057	0.027	127	0.0015	0.00284	0-0.0045
Nickel, Total Recoverable	Annual	ug/l	Monitor		273	12.5	22	4.6-31.3
Zinc, Total Recoverable	Annual	ug/l	Monitor		273	36	49.8	13.1-66.3
Cadmium, Total Recoverable	Annual	ug/l	Monitor		273	0	0.2	0-0.7
Lead, Total Recoverable	Annual	ug/l	Monitor		273	0	0.64	0-6.1
Chromium, Total Recoverable	Annual	ug/l	Monitor		273	2	3.22	0-6.1
Copper, Total Recoverable	Annual	ug/l	23	43	273	11.8	18.6	3.7-30
Chromium, Dissolved Hexavalent	Annual	ug/l	Monitor		130	0	4.96	0-5.46
Fecal Coliform	Annual	#/100 ml	1000	2000[a]	915	32	746	0-21400
Flow Rate	Summer	MGD	Monitor		920	90.7	190	66.6-343
Flow Rate	Winter	MGD	Monitor		906	115	253	70.5-381
Flow Rate	Annual	MGD	Monitor		1826	101	233	66.6-381
Chlorine, Total Residual	Annual	mg/l		0.021	943	0	0	0-0.123
pH, Maximum	Annual	S.U.		9.0	1826	7	7.3	6.6-8.3
pH, Minimum	Annual	S.U.		6.5	1826	6.8	7.1	6.5-7.4
Mercury, Total Recoverable	Annual	ug/l	Monitor		60	0.002	0.005	0.001-0.0059
CBOD 5 day	Summer	mg/l	10	15[a]	913	0	3	0-13
CBOD 5 day	Winter	mg/l	16	24[a]	878	0	4	0-12.9

Winter ammonia limit months – March, April, Nov/Dec, Jan, Feb

Table 3. Projected Effluent Quality Values

Parameter	units	# samples	# >MDL	PEQ average	PEQ maximum
Self-monitoring (DMR) data:					
Ammonia (summer)	mg/L	607	607	0.248	0.518
Ammonia (winter)	mg/L	429	429	0.190	0.440
Cadmium, TR	µg/L	273	118	0.358	0.490
Chlorine, total residual	mg/L	943	7	0.00045	0.00062
Chromium, TR	µg/L	273	271	2.62	3.40
$Chromium^{6+}$, Dissolved	µg/L	130	64	3.189	4.368
Copper, TR	µg/L	273	273	15.2	19.4
Cyanide, free	mg/L	127	125	0.00259	0.00373
Dissolved Solids	mg/L	1804	1804	809	1141
Lead, TR	µg/L	272	33	0.430	0.684
Mercury, TR	ng/L	60	60	3.07	4.28
Nickel, TR	µg/L	273	273	17.55	23.41
Nitrate+Nitrite-N	mg/L	1788	1788	10.08	13.81
Suspended Solids	mg/L	1815	1789	2.91	5.18
Phosphorus, total	mg/L	1787	1787	0.596	0.816
Zinc, TR	µg/L	273	273	43.7	53.7
Ohio EPA, Pretreatment and NEORSD data:					
Antimony	µg/L	2	2	5.16	7.07
Arsenic, TR	µg/L	3	3	6.59	9.03
Barium, TR	µg/L	1	1	95	130
Bromodichloromethane [A]	µg/L	1	1	6.4	8.7
Bromomethane	µg/L	1	1	6.9	9.4
Chloroform [A]	µg/L	8	2	7.7	10.6
Dibromochloromethane [A]	µg/L	1	1	2.4	3.3
Iron, TR	µg/L	1	1	407	558
Selenium, TR*	µg/L	274	274	3.5	4.8
Strontium, TR	µg/L	1	1	1118	1531
Thallium, TR*	µg/L	252	252	7.0	9.6
Toluene	µg/L	8	1	6.9	9.5

[A] Carcinogen
TR=total recoverable
* = NEORSD data

Table 4. Summary of acute and chronic toxicity test results.

Test Date(a)	*Ceriodaphnia dubia 48 hours*	*Fathead Minnows 96 hours*	*Ceriodaphnia dubia 7 days*	*Fathead Minnows 7 days*
	TUa[b]	TUa[b]	TUc[b]	TUc[b]
04/10/06(E)	BD	BD	BD	BD
07/24/06(E)	BD	BD	BD	BD
07/25/06(E)*	BD	BD	BD	BD
10/03/06(E)	BD	BD	BD	BD
01/08/07(E)	BD	BD	1.1	BD
01/08/07(E)*	BD	BD	BD	BD
04/02/07(E)	BD	BD	BD	BD
04/02/07(E)*	BD	BD	1.1	BD
07/23/07(E)	BD	BD	BD	BD
07/24/07(E)*	BD	BD	BD	BD
10/01/07(E)	BD	BD	BD	BD
10/01/07(E)*	BD	BD	1.1	BD
01/07/08(E)	BD	BD	BD	BD
01/08/08(E)*	BD	BD	BD	BD
04/07/08(E)	BD	BD	BD	BD
04/08/08(E)*	0.4	BD	1.1	BD
07/18/08(E)	BD	BD	BD	BD
07/18/08(E)*	BD	BD	BD	BD
08/04/08(E)		BD		BD
08/05/08(E)*		BD		BD
01/12/09(E)	BD	BD	BD	BD
01/13/09(E)*	BD	BD	BD	BD
04/07/09(E)	BD	BD	BD	BD
04/07/09(E)*	BD	0.2	BD	BD
07/07/09(E)	BD	BD	BD	BD
07/07/09(E)*	BD	BD	BD	BD
10/06/09(E)	BD	BD	BD	BD
10/06/09(E)*	BD	BD	BD	BD
01/04/10(E)	BD	BD	BD	BD
01/05/10(E)*	BD	BD	BD	BD
04/13/10(E)	BD	BD	BD	BD
07/26/10(E)	BD	BD	BD	BD

Table 4. (Continued)

10/19/10(E)	BD		BD	
10/19/10(E)*	BD		BD	
01/04/11(E)	BD	BD	BD	BD
01/04/11(E)*	BD	0.2	BD	BD
04/04/11(E)	BD	BD	BD	BD
05/03/11 (O)[#]	BD	BD	--	--

[a] O = EPA test; E = entity test
[b] TUa = acute toxicity units, TUc = chronic toxicity units
Same-shaded rows are split samples, one done by NEORSD lab, one by a contract lab
* = Contract lab test
# = 48 hour acute screening test

Table 5. Summary of DMR Data for Bypass Station 002

Season	Year	# of Obs.	# Below Detection	Minimum	Percentiles 5th	25th	50th	75th	95th	99th	Maximum	Mean
Monitoring Station 002;		**Reporting Code:**		**00530;**		**Parameter Name:**		**Total Suspended Solids (mg/l)**				
Annual	2006	9	0	44	45.6	53	72	80	100.2	105.64	107	71.111
Annual	2007	12	0	33	42.35	52.25	81	140.25	202.9	238.98	248	102.08
Annual	2008	23	0	42	45.1	67	80	114.5	179.6	182.34	183	94.478
Annual	2009	13	0	27	34.2	54	61	76	142.4	178.88	188	74.154
Annual	2010	9	0	23	30.2	44	56	73	79.2	79.84	80	55.444
Annual	2011	9	0	22	27.6	45	57	73	131	151.8	157	66.889
Annual Overall	2006-2011	75	0	22	35.1	53	72	101	177.2	203.6	248	81.373
Monitoring Station 002;		**Reporting Code:**		**50050;**		**Parameter Name:**		**Flow Rate (MGD)**				
Annual	2006	9	0	0.43	0.85	2.01	3.91	20.89	68.474	92.743	98.81	17.602
Annual	2007	13	0	0.38	4.19	23.19	34.46	47.99	52.478	52.512	52.52	31.952
Annual	2008	23	0	1.3	1.643	9.505	31.1	54.655	176.53	249.25	268.52	55.296
Annual	2009	13	0	16	16.12	21.4	41.2	50.8	126.2	159.08	167.3	51.7
Annual	2010	9	0	7.5	9.06	24.9	35.4	53.3	64.78	69.516	70.7	37.1
Annual	2011	9	0	6.2	6.4	8.3	68.8	120.6	133.28	134.18	134.4	69.467
Annual Overall	2006-2011	76	0	0.38	1.5175	11.4	30.91	52.468	135.04	202.83	268.52	45.747
Monitoring Station 002;		**Reporting Code:**		**80082;**		**Parameter Name:**		**CBOD 5 day (mg/l)**				
Annual	2006	9	0	23	24.18	26	26	35	42	42	42	30.233
Annual	2007	12	0	8	10.2	14	19	31.5	55.45	55.89	56	24.75
Annual	2008	23	0	15	16.1	21.25	25.9	29.7	33.97	36.028	36.6	25.47
Annual	2009	13	0	11	11.6	22	23	27	35	35	35	24.077
Annual	2010	8	0	12	12.35	16	19.5	26.75	33.55	35.51	36	21.5
Annual	2011	9	0	20	20.8	22	23	25	27.8	28.76	29	23.667
Annual Overall	2006-2011	74	0	8	12	20	24.2	29	38.49	55.27	56	25.039
Monitoring Station 002;		**Reporting Code:**		**80999;**		**Parameter Name:**		**Bypass Duration, Hours per month (Hr/Month)**				
Annual	2006	9	0	0.92	1.152	2.5	3.08	6.92	14.968	16.994	17.5	5.6211
Annual	2007	13	0	0.17	0.908	6.25	8.3	9.5	13.352	15.07	15.5	7.4662
Annual	2008	23	0	0.26	0.553	2.235	5.42	8.91	19.43	22.998	23.75	6.8474
Annual	2009	13	0	2.25	2.682	3.82	7.41	10.25	12.316	13.799	14.17	7.26
Annual	2010	9	0	1.35	1.562	4.13	6.4	7.17	12.882	14.376	14.75	6.4544
Annual	2011	9	0	2.56	2.776	3.16	8.33	16.66	21.398	23.12	23.55	10.593
Annual Overall	2006-2011	76	0	0.17	1.0025	2.9925	7	9.7725	17.668	23.6	23.75	7.2757

Appendix D. Aquatic Life Use Attainment Status for Stations Sampled in the Cuyahoga River Basin July-September, 1999-2000

Attainment status for lotic habitats are based on biocriteria for the Erie/Ontario Lake Plain ecoregion of Ohio (OAC 3745-1-07, Table 7-17). Attainment status in lake influenced sections of the Cuyahoga River mainstem (*i.e.*, lacustuary and navigation channel; RMs 7.0-0.0) are evaluated using an interim set of criteria developed for Lake Erie river mouths (Ohio EPA 1999a,b Draft). All fish sites were sampled using boat methods unless otherwise indicated. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat to support a biotic community. DRAFT

River Mile Fish/Invert.	IBI	MIwb[a]	ICI[b]	QHEI	Attainment Status[b]	Comment DRAFT
Cuyahoga River (OEPA Stream Code = 19-001) *Warmwater Habitat (WWH) Use Designation (Existing)*						
97.7[H]/97.7	46	na	MG	70.5	FULL	Dst. Pioneer Lake
96.2[H]/96.2	32*	na	G	45.0	PARTIAL	Ust. East Branch Reservoir
90.6[w]/90.7	22*	na	28*	53.5	**NON**	Dst. East Branch Reservoir
87.3[w]/87.3	36[ns]	6.9*	38	41.5	PARTIAL	Dst. Tare Creek (wetland)
83.7[w]	30*	7.7[ns]	--	43.0	(PARTIAL)	Dst. West Branch Cuy. River
64.5[w]/64.2	47	8.8	56	89.0	FULL	Ust. Lake Rockwell
55.7[B]	28*	8.2[ns]	--	38.0	(PARTIAL)	Dst. Lake Rockwell
49.7[B]/48.7	30*	8.4[ns]	42	83.0	PARTIAL	Dst Munroe Falls Dam
– /46.0	--	--	32[ns]	NA	(FULL)	Dst. Cuyahoga Falls
42.6[w]/42.8	42	8.2	38	78.5	FULL	Ust. Little Cuyahoga River
39.7[B]/39.7	33*	8.3[ns]	34	76.5	PARTIAL	Old Portage, Dst. Little Cuy. R.
33.2[B]/33.3	23*	7.7*	42	81.0	**NON**	Bolanz Rd.- Dst. Akron WWTP
26.5[B]/29.2	30*	7.9*	32[ns]	78.0	PARTIAL	Boston Mills
15.6[B]/15.6	38[ns]	8.9	44	79.0	FULL	Hillside Rd., Dst. Tinkers Creek
11.0[B]/11.0	24*	6.7*	38 [#]	79.5	**NON**	Ust. Southerly WWTP, Dst Mill Cr.
8.0[B]/8.3	28*	8.0*	38	77.5	PARTIAL	Dst. Southerly WWTP
7.2[B]/7.1	26*	7.5*	42	63.0	PARTIAL	Dst. Big Creek
Lake Erie Lacustuary - WWH Use Designation[c] (Existing)						
6.2/ --	6*	4.1*	--	--	**NON**	Ust. Nav. Channel

Figure 2. Use attainment table from Total Maximum Daily Loads for the Lower Cuyahoga River, Final Report (Ohio EPA, September 2003)

Ecoregion Biocriteria: Erie/Ontario Lake Plain (EOLP) and Lake Erie Lacustuaries[c]

INDEX - Site Type	WWH	EWH	MWH[e]	Lake Erie Lacustuary[c] RMs 7.0-5.6 (WWH/EWH)	Navigation Channel RMs 5.6-0.0 (LRW)[d]
IBI - Headwaters	40	50	24	--	--
IBI - Wading	38	50	24	--	--
IBI - Boat	40	48	24	42/50	>17
Mod. Iwb - Wading	7.9	9.4	6.2	--	--
Mod. Iwb - Boat	8.7	9.6	5.8	8.5/9.5	>5.0
ICI	34	46	22	42/52	>10

* Indicates significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the Poor or Very Poor range.

ns Nonsignificant departure from biocriteria (≤4 IBI or ICI units, or ≤0.5 MIwb units).
\# 2000 or 2001 NEORSD ICI scores collected from the same location have been substituted where OEPA artificial substrate samplers were lost or macroinvertebrates were not sampled.
a The Modified Index of Well-being is not applicable (NA) to headwater site types (<20 sq. mi.).
b Use attainment status based on one organism group is parenthetically expressed.
c Lake Erie lacustuary communities are evaluated using an interim set of metric scoring criteria based on sampling from other flooded river mouths in the drainage (Ohio EPA 1999a,b Draft). The scores are not directly comparable to biocriteria for lotic streams and rivers.
d The use designation for the navigation channel is Limited Resource Water from June to January. The criteria listed exceed "Very Poor" conditions.
e Modified Warmwater Habitat criteria for channel modified habitats.
H Headwater site type
W Wading method

For narrative description in the ICI column the following definitions were used:

E	Exceptional	(ICI Score 48-60)
VG	Very Good	
MG	Moderately Good	(ICI Score 36-46)
G	Good	
F	Fair	(ICI Score 14-32)
P	Poor	(ICI Score 2-12)
VP	Very Poor	(ICI Score 0)

Figure 2. (Continued) Use attainment table from *Total Maximum Daily Loads for the Lower Cuyahoga River, Final Report* (Ohio EPA, September 2003)

Cuyahoga River (EOLP Ecoregion - WWH Use Designation)

RM	IBI	MIwb	ICI	QHEI	Attainment Status	Comment
2008						
15.6	48	9.7	42	85	Full	Hillside Road
14.2			50		(Full)	
11	44	8.5	46	83.5	Full	Dst. Mill Creek, ust. Southerly WWTP
10.56	NEORSD Southerly Discharge to Cuyahoga River					
8.8	40	9.1		83	(Full)	
8.2 / 8	32*	8.9	44	74.5	Partial	adj. Bradley Road
7.1	32*	9	38	80.5	Partial	Lower Harvard
2000						
15.6	38	8.9	44	79	Full	Hillside Road
11	24*	6.7*	MG	79.5	Non	Dst. Mill Creek, ust. Southerly WWTP
10.56	NEORSD Southerly Discharge to Cuyahoga River					
8 / 8.3	28*	8*	38	77.5	Non	adj. Bradley Road
7.1	26*	7.5*	42	63	Non	Lower Harvard

	WQS	Non Significant Deviation	* Significant Departure
IBI	40	≤4 units	>4 units
MIwb	8.7	≤0.5 units	>0.5 units
ICI	34	≤4 units	>4 units

Underlined Scores are in the Poor or Very Poor Range

Attainment Status in parentheses based on one organism group

Figure 3. Use attainment table – 2008 *vs* 2000 comparison.

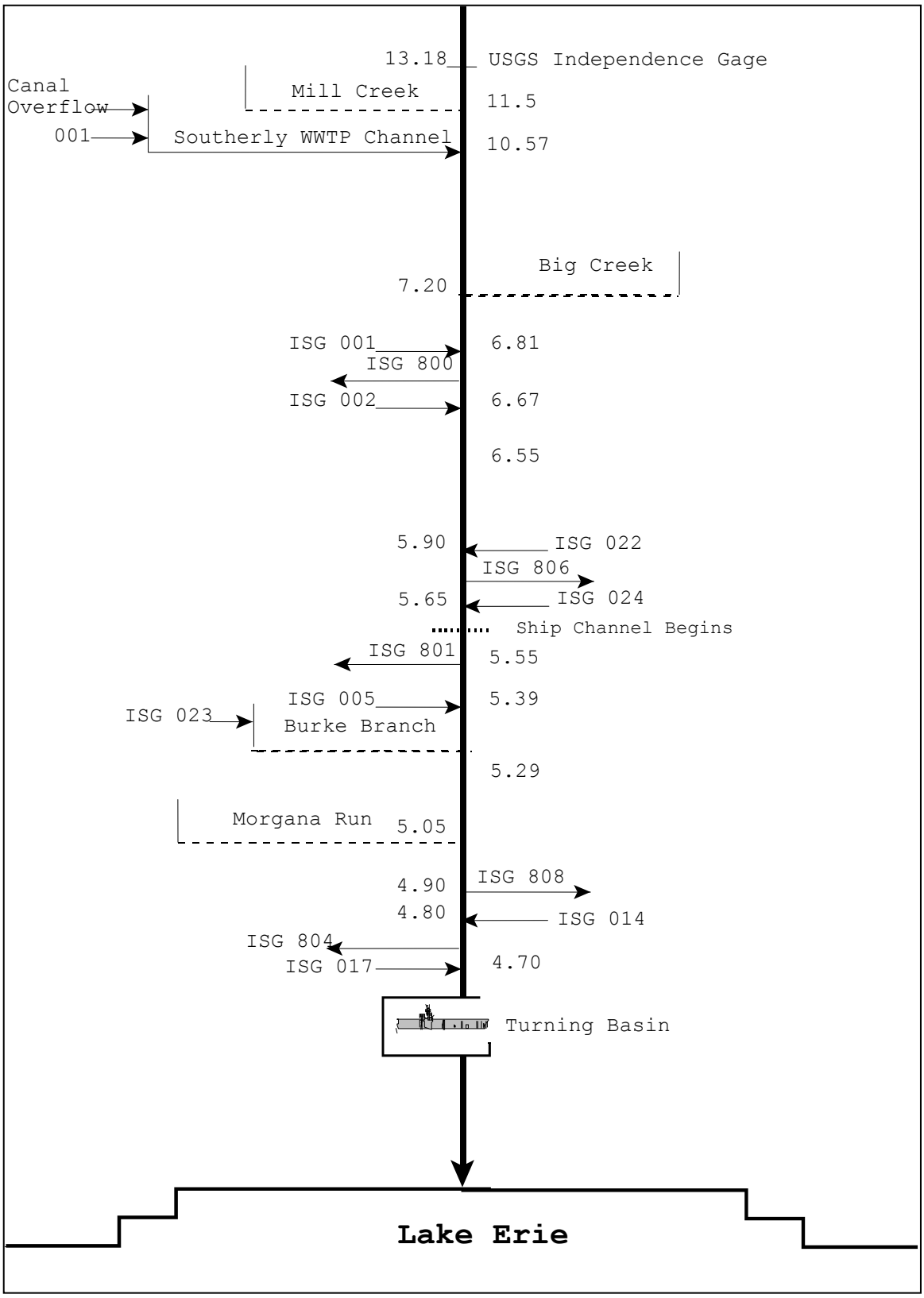

Figure 4. Cuyahoga River Study Area – Showing outfall and intake locations and tributaries

Table 6. Water Quality Criteria in the Study Area.

		Outside Mixing Zone Criteria					
		Average					
Parameter[E]	**Units**	**Human Health[A]**	**Wildlife**	**Agriculture**	**Aquatic Life[A]**	**Maximum Aquatic Life[A]**	**Inside Mixing Zone Maximum[A]**
1,4-Dichlorobenzene	µg/L	240	--	--	9.4 [B]	57 [B]	110 [B]
Aluminum, TR	µg/L	4,500	--	--	--	--	--
Antimony, TR	µg/L	780	--	--	190[B]	900[B]	1800[B]
Arsenic, TR	µg/L	580	--	100	150	340	680
Barium, TR	µg/L	160,000	--	--	220 [B]	2,000 [B]	4,000 [B]
Bromodichloromethane	µg/L	180	--	--	340 [C]	3,100 [C]	6,200 [C]
Bromomethane	µg/L	2,600	--	--	16 [B]	38 [B]	75 [B]
Cadmium, TR	µg/L	730	--	50	4.7	11	23
Chloride	mg/L	*ID*	--	--	--	--	--
Chlorine, total residual	µg/L	*ID*	--	--	11	19	38
Chloroform	µg/L	1,700	--	--	140 [B]	1,300 [B]	2,600 [B]
Chromium, TR	µg/L	14,000	--	100	170	3,500	7,100
Chromium^{6+}, dissolved	µg/L	14,000	--	--	11	16	31
Copper, TR	µg/L	64,000	--	500	22 [D]	35 [D]	71 [D]
Cyanide, free	mg/L	48	--	--	0.0052	0.022	0.044
Dibromochloromethane		150	--	--	320	2900	5800
Dissolved Solids	mg/L	*ID*	--	--	1,500	*ID*	*ID*
Iron, TR	µg/L	--	--	5,000	--	--	--
Lead, TR	µg/L	*ID*	--	100	58 [D]	1110 [D]	2,230 [D]
Manganese, TR	µg/L	61,000	--	--	--	--	--
Mercury[G], TR	ng/L	3.1	1.3	10000	910	1700	3400
Molybdenum, TR	mg/L	10,000	--	--	20,000 [B]	190,000 [B]	370,000 [B]
Nickel, TR	µg/L	43,000	--	200	110 [D]	990 [D]	2,000 [D]
Nitrate+Nitrite-N	mg/L	*ID*	--	100	--	--	--
Pentachlorophenol[F]	µg/L	1.6	--	--	10	13	16
Selenium, TR	µg/L	3,100	--	50	5.0	--	--
Silver, TR	µg/L	11,000	--	--	1.3	6.5	13
Strontium, TR	µg/L	1,400,000	--	--	21000 [B]	40,000	81000
Thallium, TR	µg/L	--	--	--	17[B]	79[B]	160[B]
Toluene	µg/L	51,000	--	--	62 [B]	560 [B]	1,100 [B]
Zinc, TR	µg/L	35,000	--	25,000	240	240	480

[A] Human Health and Aquatic Life criteria are Tier I unless otherwise indicated.
[B] Tier II criterion.
[C] Screening Value criterion.
[D] Effective total recoverable criterion; effective criterion = DMT*dissolved criterion .
[E] TR=total recoverable
[F] pH dependent criterion; for OMZ, applied value of 7.4 SU based on median 2001-2006 (SWIMS 901); for IMZ, applied value of 6.9 SU based on median 2001-2006 (SWIMS 001).
[G] Bioaccumulative chemical of concern (BCC).
ID = insufficient data.

Table 7. Instream Conditions and Discharger Flow.

Parameter	Units	Period	Value	Source
Upstream Design Flow				
*Cuyahoga River just UST Southerly WWTP (includes Cuyahoga R @ Independence, Mill Ck, West Ck, intervening drainage**, and canal overflow [7 cfs])***				
$_{1}Q_{10}$	cfs	annual	**98.3**	**USGS gauge #04208000; 1957-2006**
$_{7}Q_{10}$	cfs	annual	**117.3**	**USGS gauge #04208000; 1957-2006**
$_{7}Q_{10}$ (summer)	cfs	May-Nov	**117.3**	**USGS gauge #04208000; 1957-2006**
$_{7}Q_{10}$ (winter)	cfs	Dec-Feb	**204.5**	**USGS gauge #04208000; 1957-2006**
$_{30}Q_{10}$ (summer)	cfs	May-Nov	**144.6**	**USGS gauge #04208000; 1957-2006**
$_{30}Q_{10}$ (winter)	cfs	Dec-Feb	**268.6**	**USGS gauge #04208000; 1957-2006**
$_{90}Q_{10}$	cfs	annual	**185.6**	**USGS gauge #04208000; 1957-2006**
HMF	cfs	annual	**446.2**	**USGS gauge #04208000; 1957-2006**
FPC	cfs	Feb-May	**745.6**	**USGS gauge #04208000; 1957-2006**
Big Creek @ mouth (includes Big Ck @ Cleveland and intervening drainage)				
$_{1}Q_{10}$	cfs	annual	3.8	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$	cfs	annual	5.3	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (summer)	cfs	May-Nov	5.3	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (winter)	cfs	Dec-Feb	10.7	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (summer)	cfs	May-Nov	12.8	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (winter)	cfs	Dec-Feb	13.8	USGS gauge #04208502; 1972-86
$_{90}Q_{10}$	cfs	annual	21.3	USGS gauge #04208502; 1972-86
HMF	cfs	annual	22.7	USGS gauge #04208502; 1972-86
FPC	cfs	Feb-May	26.7	USGS gauge #04208502; 1972-86
Morgana Run @ mouth				
$_{1}Q_{10}$	cfs	annual	0.21	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$	cfs	annual	0.29	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (summer)	cfs	May-Nov	0.29	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (winter)	cfs	Dec-Feb	0.58	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (summer)	cfs	May-Nov	0.70	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (winter)	cfs	Dec-Feb	0.75	USGS gauge #04208502; 1972-86
$_{90}Q_{10}$	cfs	annual	1.16	USGS gauge #04208502; 1972-86
HMF	cfs	annual	1.24	USGS gauge #04208502; 1972-86
FPC	cfs	Feb-May	1.45	USGS gauge #04208502; 1972-86
Burke Branch @ mouth				
$_{1}Q_{10}$	cfs	annual	0.45	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$	cfs	annual	0.62	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (summer)	cfs	May-Nov	0.62	USGS gauge #04208502; 1972-86
$_{7}Q_{10}$ (winter)	cfs	Dec-Feb	1.25	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (summer)	cfs	May-Nov	1.50	USGS gauge #04208502; 1972-86
$_{30}Q_{10}$ (winter)	cfs	Dec-Feb	1.62	USGS gauge #04208502; 1972-86
$_{90}Q_{10}$	cfs	annual	2.50	USGS gauge #04208502; 1972-86
HMF	cfs	annual	2.66	USGS gauge #04208502; 1972-86
FPC	cfs	Feb-May	3.13	USGS gauge #04208502; 1972-86

HMF = harmonic mean flow
FPC = fish passage condition

Table 7. Instream Conditions and Discharger Flow (Continued).

Parameter	Units	Period	Value	Source
Mixing Assumption				
average	percent		25.0	Chronic default criterion (Lake Erie basin).
maximum	percent		100.0	Stream-to-discharge ratio.
NH_3 average	percent		100.0	Stream-to-discharge ratio.
Discharger (Facility) Flow				
Southerly WWTP	cfs	I	270.8	Design flow.
ISG 001	cfs	I	0.178	Form 2C application (max 30-d avg).
ISG 002	cfs	I	8.0	SWIMS, 48 values, 95th pct, Jun02-May06
ISG 005	cfs	I	67.8	SWIMS, 48 values, 95th pct, Jun02-May06
ISG 014	cfs	I	55.7	SWIMS, 48 values, 95th pct, Jun02-May06
ISG 017	cfs	I	0.902	SWIMS, 48 values, 95th pct, Jun02-May06
ISG 022	cfs	I	4.7	SWIMS, 25 values, 95th pct, May04-May06
ISG 023	cfs	I	0.324	SWIMS, 48 values, 95th pct, Jun02-May06
ISG 024	cfs	I	0.497	SWIMS, 367 values, 95th pct, Jun02-Jul06
ISG 800 (intake)	cfs	I	8.2	Equivalent to discharge sum (001 and 002).
ISG 801 (intake)	cfs	I	67.818	Equivalent to discharge (005).
ISG 804 (intake)	cfs	I	0.902	Equivalent to discharge (017).
ISG 806 (intake)	cfs	I	5.166	Equivalent to discharge sum (022 and 024).
ISG 808 (intake)	cfs	I	55.7	Equivalent to discharge (014).
Instream Hardness				
DST Southerly WWTP	mg/L	OMZ, IMZ	227.0	SWIMS (901), 139 values, 1<MDL, 2001-06
Cuyahoga R @ W 3rd St (RM 3.1)	mg/L	OMZ	223.0	STORET (#502140), 60 values, 0<MDL, 1999-04
Dissolved Metal Translators				
Chromium			1.13	Ohio EPA, 5 values, 0<MDL, 1996-97
Copper			1.22	Ohio EPA, 5 values, 0<MDL, 1996-97
Lead			4.05	Ohio EPA, 5 values, 0<MDL, 1996-97
Nickel			1.06	Ohio EPA, 5 values, 0<MDL, 1996-97

I: instantaneous flow measurement

OMZ = outside mixing zone
IMZ = inside mixing zone

Table 7. Instream Conditions and Discharger Flow (Continued).

Parameter	Units	Period	Value	Source
Background Water Quality				
Cuyahoga River DST Mill Creek				
Aluminum	µg/L	annual	1,220	STORET (#F01A25), 10 values, 1<MDL, 1987/00
Ammonia (summer)	mg/L	annual	0.07	SWIMS (801), 47 values, 0<MDL, 2001-06
Ammonia (winter)	mg/L	annual	0.15	SWIMS (801), 36 values, 0<MDL, 2001-06
Antimony	µg/L	annual	0	No representative data available.
Arsenic	µg/L	annual	3	STORET (#F01A25), 10 values, 10<MDL, 1996/00
Barium	µg/L	annual	81.4	STORET (#F01A25), 5 values, 0<MDL, 2000
Benzene	µg/L	annual	0	No representative data available.
Bis (2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Boron	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0.1	STORET (#F01A25), 10 values, 8<MDL, 1996/00
Chlorine, total residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	22.5	STORET (#F01A25), 10 values, 9<MDL, 1996/00
$Chromium^{6+}$	µg/L	annual	0	Ohio EPA (1988)[A], 5, 5<MDL, $\leq$ 1988
Copper	µg/L	annual	5	STORET (#F01A25), 10 values, 8<MDL, 1996/00
Cyanide, free	µg/L	annual	0	STORET (#F01A25), 11 values, 11<MDL, 1987-91
Fluoride	µg/L	annual	0	No representative data available.
Iron	µg/L	annual	2,310	STORET (#F01A25), 10 values, 0<MDL, 1987/00
Lead	µg/L	annual	3	STORET (#F01A25), 10 values, 3<MDL, 1996/00
Mercury	ng/L	annual	0	STORET (#F01A25), 10 values, 10<MDL, 1996/00
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	29	STORET (#F01A25), 5 values, 4<MDL, 2000
Pentachlorophenol	µg/L	annual	0	No representative data available.
Selenium	µg/L	annual	0	STORET (#F01A25), 5 values, 5<MDL, 2000
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	227.2	STORET (#F01A25), 5 values, 0<MDL, 2000
Thallium	µg/L	annual	0	No representative data available
Dissolved Solids	mg/L	annual	516.5	STORET (#F01A25), 10 values, 0<MDL, 1996/00
1,2,4-TMB	µg/L	annual	0	No representative data available.
Tetrachloroethylene	µg/L	annual	0	No representative data available.
Zinc	µg/L	annual	23.5	STORET (#F01A25), 10 values, 0<MDL, 1996/00

[A] Analysis of Unimpacted Stream Data for the State of Ohio (Paula S. Brown).

Table 7. Instream Conditions and Discharger Flow (Continued).

Parameter	Units	Period	Value	Source
Background Water Quality (continued)				
Big Creek NR mouth				
Aluminum	µg/L	annual	104	STORET (#502120), 6 values, 0<MDL, 1991
Ammonia (summer)	mg/L	annual	0.23	STORET (#502120), 18 values, 0<MDL, 1990-96
Ammonia (winter)	mg/L	annual	0.49	Estimated from ratios of summer/winter for other stations.
Antimony	µg/L	annual	0	No representative data available.
Arsenic	µg/L	annual	2	STORET (#502120), 14 values, 7<MDL, 1990-96
Barium	µg/L	annual	31.88	STORET (#502120), 6 values, 0<MDL, 1991
Benzene	µg/L	annual	0	No representative data available.
Bis (2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Boron	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0.1	STORET (#502120), 24 values, 21<MDL, 1990-96
Chlorine, total residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	15	STORET (#502120), 24 values, 23<MDL, 1990-96
$Chromium^{6+}$	µg/L	annual	0	Ohio EPA (1988)[A], 5, 5<MDL, $\leq$ 1988
Copper	µg/L	annual	5	STORET (#502120), 24 values, 20<MDL, 1990-96
Cyanide, free	µg/L	annual	0	STORET (#502120), 6 values, 6<MDL, 1990-96
Fluoride	µg/L	annual	0	No representative data available.
Iron	µg/L	annual	294	STORET (#502120), 7 values, 0<MDL, 1990-96
Lead	µg/L	annual	2.9	STORET (#502120), 24 values, 7<MDL, 1990-96
Mercury	ng/L	annual	0	STORET (#502120), 10 values, 10<MDL, 1990-96
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	20	STORET (#502120), 19 values, 17<MDL, 1990-96
Pentachlorophenol	µg/L	annual	0	No representative data available.
Selenium	µg/L	annual	0	STORET (#502120), 7 values, 7<MDL, 1990-96
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	0	STORET (#502120), 5 values, 0<MDL, 2000
Dissolved Solids	mg/L	annual	602	STORET (#502120), 18 values, 0<MDL, 1990-96
1,2,4-TMB	µg/L	annual	0	No representative data available.
Tetrachloroethylene	µg/L	annual	0	No representative data available.
Suspended Solids	mg/L	annual	41.5	STORET (#F01A25), 10 values, 0<MDL, 1996/00
Zinc	µg/L	annual	15	STORET (#502120), 24 values, 5<MDL, 1990-96

[A] Analysis of Unimpacted Stream Data for the State of Ohio (Paula S. Brown).

Table 7. Instream Conditions and Discharger Flow (Continued).

Parameter	Units	Period	Value	Source
Background Water Quality (continued)				
Morgana Run NR mouth				
Aluminum	µg/L	annual	1,113	STORET (#F01W44), 6 values, 0<MDL, 1991
Ammonia (summer)	mg/L	annual	2.83	STORET (#F01W44), 30 values, 0<MDL, 1990-96
Ammonia (winter)	mg/L	annual	3.51	STORET (#F01W44), 33 values, 0<MDL, 1990-96
Antimony	µg/L	annual	19.9	STORET (#F01W44), 6 values, 4<MDL, 1991
Arsenic	µg/L	annual	4	STORET (#F01W44), 22 values, 0<MDL, 1990-96
Barium	µg/L	annual	54.6	STORET (#F01W44), 6 values, 0<MDL, 1991
Benzene	µg/L	annual	0	No representative data available.
Bis (2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Boron	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0.6	STORET (#F01W44), 35 values, 9<MDL, 1990-96
Chlorine, total residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	15	STORET (#F01W44), 35 values, 20<MDL, 1990-96
$Chromium^{6+}$	µg/L	annual	0	Ohio EPA (1988)[A], 5, 5<MDL, ≤ 1988
Copper	µg/L	annual	5.5	STORET (#F01W44), 35 values, 20<MDL, 1990-96
Cyanide, free	µg/L	annual	0.326	STORET (#F01W44), 17 values, 1<MDL, 1990-91
Fluoride	µg/L	annual		No representative data available.
Iron	µg/L	annual	1160	STORET (#F01W44), 13 values, 0<MDL, 1990-96
Lead	µg/L	annual	7	STORET (#F01W44), 35 values, 4<MDL, 1990-96
Mercury	ng/L	annual	0	STORET (#F01W44), 11 values, 11<MDL, 1991-96
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	20	STORET (#F01W44), 31 values, 23<MDL, 1991-96
Pentachlorophenol	µg/L	annual	0	No representative data available.
Selenium	µg/L	annual	36.5	STORET (#F01W44), 6 values, 2<MDL, 1991
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	0	No representative data available.
Dissolved Solids	mg/L	annual	776	STORET (#F01W44), 31 values, 0<MDL, 1990-96
1,2,4-TMB	µg/L	annual	0	No representative data available.
Tetrachloroethylene	µg/L	annual	0	No representative data available.
Suspended Solids	mg/L	annual	41.5	STORET (#F01A25), 10 values, 0<MDL, 1996/00
Zinc	µg/L	annual	40.7	STORET (#F01W44), 35 values, 0<MDL, 1990-96

[A] *Analysis of Unimpacted Stream Data for the State of Ohio* (Paula S. Brown).

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

Parameter [D]	Units	Average				Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Wildlife	Agriculture	Aquatic Life		
Arsenic, TR [B]	µg/L	818 [A]	--	140	166	462	680
Barium, TR	µg/L	225,904	--	--	235	2696	4000
Bromomethane	µg/L	3671	--	--	17.7	51.8	75
Cadmium, TR	µg/L	1,031 [A]	--	71 [A]	5.2	15	23
Chlorine, total residual	µg/L	--	--	--	12	25	38
Chromium, TR [B]	µg/L	19,760 [A]	--	141	186	4,762	7,100
Chromium6+, dissolved [B]	µg/L	19,760 [A]	--	--	12	22	31
Copper, TR	µg/L	87,160 [A]	--	704 [A]	24 [C]	46 [C]	71 [C]
Cyanide, free	mg/L	67.76 [A]	--	--	0.0058	0.029	0.044
Dissolved Solids	mg/L	--	--	--	1,606	--	--
Lead, TR [B]	µg/L	--	--	140	64 [C]	1,512 [C]	2,230 [C]
Mercury [E], TR	ng/L	0.004	0.002	14 [A]	1	2.3	3.4
Nickel, TR [B]	µg/L	60,690 [A]	--	270	119 [C]	1,339 [C]	2,000 [C]
Selenium, TR [B]	µg/L	4,376	--	71	5.5	--	--
Silver, TR [B]	µg/L	15,530 [A]	--	--	1.4	8.9	13
Thallium, TR	µg/L	--	--	--	18.5	109	160
Zinc, TR	µg/L	46,620 [A]	--	35,280 [A]	263	303	480

[A] Allocation must not exceed that for Inside Mixing Zone Maximum.
[B] Parameter does not require a WLA based on reasonable potential, but an allocation is requested for a pretreatment program.
[C] WLA based on applicable dissolved metal translator.
[D] TR=total recoverable
[E] Bio-accumulative chemical of concern (BCC); no mixing zone allowed after 11/15/2018; WQS must be met at the end-of-pipe unless requirements for an exception are met as listed in OAC 3745-2-08(L).

Table 9. Parameter Assessment.

Group 1

Due to a lack of criteria, the following parameter(s) could not be evaluated at this time. The facility may be required to generate toxicity data so that the parameter(s) can be reevaluated.

Phosphorus, total	Suspended Solids

Group 2 Either the PEQ <25% of WQS or all data below minimum detection limit; a WLA is not required. No limit is recommended and monitoring is optional.

Antimony	Arsenic	Bromodichloromethane
Cadmium	Chlorine, total residual	Chloroform
Chromium	Dibromochloromethane	Iron
Lead	Nickel	Nitrate+Nitrite-N
Strontium	Toluene	Zinc

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

Barium	Bromomethane	$Chromium^{6+}$
Cyanide, free	Thallium	

Group 4 PEQ_{max} >50% but <100% of the maximum PEL or PEQ_{avg} >50% but <100% of the average PEL. Monitoring is appropriate.

Copper	Dissolved Solids	Selenium

Group 5 PEQ_{max} >100% of the maximum PEL or PEQ_{avg} >100% of the average PEL, or either PEQ_{avg} or PEQ_{max} is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. A limit is recommended.

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits	
			Average	Maximum
Mercury	ng/L	annual	1.3	1700

Table 10. Final Effluent Limits and Monitoring Requirements

		Effluent Limitations				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Basis[b]
Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Dissolved Oxygen	mg/l	5.0 minimum		--	--	BEJ, EP
Suspended Solids	mg/l	16	24[c]	10598	15897	BEJ, EP
Oil and Grease	mg/l	--	10	--	--	WQS, EP
Ammonia-N	mg/l					
Summer (May-Oct)		1.7	2.6[c]	1126	1722[c]	BEJ, EP
March, Apr, Nov		5.0	7.5[c]	3312	4968[c]	BEJ, EP
Dec, Jan, Feb		8.0	12.0[c]	5299	7949[c]	BEJ, EP
Total Kjeldahl-N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Nitrite(N) + Nitrate(N)	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Phosphorus, Total	mg/l	0.70	1.1[c]	464	729[c]	TMDL
Cyanide, Free	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Selenium, T.R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Nickel, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Zinc, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Cadmium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Lead, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Chromium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Copper, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
Hex. Chromium (Dissolved)	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
E. coli						
Summer Only	#/100ml	126	284[c]	--	--	WQS
Flow	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M
Chlorine, Total Residual	mg/l	--	0.021	--	--	BEJ, EP
Mercury, T.	ng/l	3.1	1700	0.00205	1.13	VAR(avg), WLA(max)
Whole Effluent Toxicity						
Acute	TUa	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				WET
Chronic	TUc	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				WET
pH	S.U.	6.0 minimum 9.0 maximum				BEJ WQS, EP
Total Filterable Residue (Dissolved Solids)	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				RP
$CBOD_5$	mg/l					
Summer		10	15[c]	6620	9936[c]	BEJ, EP
Winter		16	24[c]	10598	15897[c]	BEJ, EP

Table 10 (Continued).

[a] Effluent loadings based on average design discharge flow of 175 MGD.

[b] Definitions: BEJ = Best Engineering Judgment; EP = Existing Permit; M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)]; TMDL = *Total Maximum Daily Loads for the Lower Cuyahoga River, Final Report* (Ohio EPA, September 2003); VAR = mercury variance-based limits, OAC 3745-33-07(D)(10); WET = Requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [40 CFR Part 132, Appendix F, Procedure 6 and 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.

Appendix

Aquatic Life Attainment Table for Cuyahoga River – Includes Ohio EPA Data and Level 3 Credible Data Collected by NEORSD

Cuyahoga River (ELOP Ecoregion - WWH Use Designation)
NEORSD and Ohio EPA Biological and Habitat Data

RM	IBI	MIwb	ICI	QHEI	Attainment Status	Comment
2010 NEORSD Level 3 Credible Data						
16.20	43	9.5	36	81.75	Full	3 pass avg/Dst. Tinkers Cr
12.10/11.95	39	9.0	40	70.50	Full	3 pass avg/Ust. Mill Cr
11.30	39	9.7	40	73.50	Full	3 pass avg/Dst. Mill Cr
10.75	33	9.7	36	70.50	Partial	3 pass avg/Ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
10.10	37	9.5	32	74.00	Full	3 pass avg/Dst. Southerly WWTC
8.60	41	9.2	44	79.00	Full	3 pass avg/Ust. Big Cr
7.00	31*	8.7	34	73.50	Partial	3 pass avg/Dst. Big Cr
2009 NEORSD Level 3 Credible Data						
16.20	45	9.9	36	78.00	Full	2 pass avg/Dst. Tinkers Cr
12.10/11.95	38	8.8	38	77.00	Full	2 pass avg/Ust. Mill Cr
11.30	44	9.5	36	72.50	Full	2 pass avg/Dst. Mill Cr
10.75	36	9.1	42	75.00	Full	3 pass avg/Ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
10.30			40			Dst. Southerly WWTC
10.10	31*	9.2	38	81.75	Partial	3 pass avg/Dst. Southerly WWTC
8.60	40	8.9	36	73.00	Full	2 pass avg/Ust. Big Cr
8.30/8.20	29*	8.9	34	58.25	Partial	3 pass avg/Ust. Big Cr
7.00	31*	8.5	42	76.00	Partial	3 pass avg/Dst. Big Cr
2008 NEORSD Level 3 Credible and Ohio EPA Data (Italics indicate EPA data)						
16.20	44	9.9	40	81.75	Full	2 pass avg/Dst. Tinkers Cr
15.61	*48*	*9.7*	*42*	*85.00*	*Full*	Hillside Rd.
14.20			*50*		*(Full)*	
12.10/11.95	34	8.2	40	67.50	Partial	2 pass avg/Ust. Mill Cr
11.30	38	9.1	40	77.75	Full	3 pass avg/Dst. Mill Cr
11.00/10.75	37	8.9	*46*/40	*83.50*/78.00	Full	3 pass avg/Ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
10.30			40		(Full)	Dst. Southerly WWTC
10.10	36	9.4	40	76.00	Full	3 pass avg/Dst. Southerly WWTC
8.80	*40*	*9.1*		*83.00*	*(Full)*	Ust. Big Cr
8.30/8.20/*8.00*	32*	8.5	38/*44*	79.00	Partial	3 pass avg/Ust. Big Cr
7.10/7.00	34	8.5	*38*/38	*80.50*/76.50	Partial	3 pass avg/Dst. Big Cr

2008 Data only, where applicable, EPA fish data results where averaged with NEORSD fish data results.
ICI and QHEI scores not averaged.

Cuyahoga River (ELOP Ecoregion - WWH Use Designation)
NEORSD and Ohio EPA Biological and Habitat Data

RM	IBI	MIwb	ICI	QHEI	Attainment Status	Comment
2007 NEORSD Level 3 Credible Data						
16.20	35	8.7	34	78.75	Partial	3 pass avg/Dst. Tinkers Cr
12.10/11.95	32*	7.9	36/34	75.00	Non	HD-replicate/Ust. Mill Cr
11.30	38	8.2	34	77.50	Full	2 pass avg/Dst. Mill Cr
10.75	34	9.4	32	75.75	Partial	3 pass avg/Ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
10.30			24*		(Non)	Dst. Southerly WWTC
10.10	35	9.7	36	71.00	Partial	3 pass avg/Dst. Southerly WWTC
7.90/7.55	24*	7.6*	36	51.00	(Non)	Ust. Big Cr
7.00	33	8.2	38	73.00	Partial	3 pass avg/Dst. Big Cr
2006 NEORSD Level 3 Credible Data						
16.20			30		(Full)	Dst. Tinkers Cr
11.50			28			Dst. Mill Cr
10.75	39	8.7	38	75.00	Full	3 pass avg/Ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
10.30			28		(Non)	Dst. Southerly WWTC
10.10	37	8.5	34	71.50	Full	3 pass avg/Dst. Southerly WWTC
7.55	27*	7.0*		59.50	(Non)	3 pass avg/Ust. Big Cr
7.00	32	7.7		66.50	(Non)	3 pass avg/Dst. Big Cr
2000 - Ohio EPA Data						
15.60	38	8.9	40	79.00	Full	Hillside Road
11.00	24*	6.7*	MG	79.50	Non	Dst. Mill Cr, ust. Southerly WWTC
10.56	NEORSD Southerly Discharge to Cuyahoga River					
8.00/8.30	28*	8.0*	38	77.50	Non	adj. Bradley Road
7.10	26*	7.5*	42	63.00	Non	Lower Harvard

	WQS	Non Significant Deviation	* Significant Departure
IBI	40	≤4 units	≥4 units
MIwb	8.7	≤0.5 units	≥0.5 units
ICI	34	≤4 units	≥4 units

Shaded cells indicate attainment
Underlined Scores are in the Poor of Very Poor Range
Attainment Status in paraentheses based on one organism group