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 the **Niles Wastewater Treatment Plant**

Public Notice No.: 12-03-046
Public Notice Date: March 26, 2012
Comment Period Ends: April 26, 2012

OEPA Permit No.: **3PD00036*QD**
Application No.: **OH0026743**

<u>Name and Address of Applicant:</u>
City of Niles
34 West State Street
Niles, Ohio 44446

Name and Address of Facility Where <u>Discharge Occurs:</u>
Niles WWTP
999 Summit Street Extension
Niles, Ohio 44446
Trumbull County

Receiving Water: **Mahoning River**

Subsequent Stream Network: **Beaver River to Ohio River**

Introduction

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

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

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

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

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

Summary of Permit Conditions

Limits for all plant operational parameters are proposed to continue from the current permit. These are based on federal Secondary Treatment Regulations (suspended solids and carbonaceous biochemical oxygen demand – CBOD) and Ohio Water Quality Standards (oil&grease, bacteria, chlorine, pH and mercury).

The bacteria limits are expressed as e. coliform, rather than fecal coliform because Ohio changed its water quality standard to e. coli. in 2010.

The draft permit contains three compliance schedules to allow time to:

Eliminate sanitary sewer overflows by December 31, 2012;
Eliminate the plant headworks bypass by December 31, 2017; and
Update local limits for the City pretreatment program

This permit renewal is proposed for a term of approximately **5 years**, expiring on **January 31, 2017**. This schedule will allow the Niles WWTP permit to be on a similar schedule with the other facilities within the same watershed basin.

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<u>Procedures for Participation in the Formulation of Final Determinations</u>

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 draft permit, contact Tomas Parry by phone at (330) 963-1120 (tomas.parry@epa.state.oh.us) or Eric Nygaard at (614) 644-2024 (eric.nygaard@epa.state.oh.us).

Location of Discharge/Receiving Water Use Classification

The Niles WWTP discharges to the Mahoning River at River Mile (RM) 28.86. The approximate location of the facility is shown in Figure 1.

This segment of the Mahoning River is described by Ohio EPA River Code: 18-001, U.S. EPA River Reach #: 05030103-070, County: Trumbull, Ecoregion: Erie-Ontario Lake Plain. The Mahoning River is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-25): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR) – Class A.

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 Niles WWTP has an average design flow of 6.2 million gallons per day (MGD). The plant was built in 1955, with the most recent major modification occurring in 1988. The next major upgrade is scheduled for 2013. Treatment processes and/or equipment include:

- Influent pumping;
- Bar screen;
- Grit removal;
- Oxygen ditch with integral clarifier;
- Polymer addition;
- Chlorination;
- De-chlorination; and
- Scum removal.

Sludge processing includes polymer addition, gravity thickening, anaerobic digestion, and a mechanical dewatering filter press. Sludge is ultimately disposed of in a municipal solid waste landfill. The process design capacity of the sewage sludge treatment system is 624 dry tons per year. In the most recent year, the facility has generated 275 dry tons of sewage sludge. The last major modification to the sewage sludge treatment system occurred in 1988.

The City of Niles' collection system only contains separate sanitary sewers. The facility serves the City of Niles, McDonald Village, Weathersfield Township, and Howland Township, a total population of approximately 27,180 people. The city estimates the inflow and infiltration to be 2.0 MGD, according to the NPDES permit application. There is one internal bypass (Station Number 602) at the influent building that has been used twice in the past year. The bypassed flow is screened, and then is returned to the process at the disinfection step. The bypassed flow does not go through grit removal or the oxidation ditch. Because of significant effluent quality issues during wet weather events, the facility plans to improve this system beginning in 2013.

Local industries contribute approximately 0.15 MGD to the flow received at the Niles WWTP. There are two categorical industrial users and one non-categorical significant industrial user.

The WWTP has an approved pretreatment plan.

Description of Existing Discharge

Table 3 presents chemical specific data compiled from the NPDES renewal application, data reported in annual pretreatment reports, and data collected by the Ohio EPA.

Table 4 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfall 001. Data are presented for the period January 2006-December 2011, and current permit limits are provided for comparison.

Table 5 summarize the results of acute whole effluent toxicity tests of the final effluent.

Table 6 summarizes the chemical specific data for outfall 001 by presenting the average and maximum Projected Effluent Quality (PEQ) values.

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

The assessment of the Little Squaw Creek to the Mahoning River watershed, Hydrologic Unit Code (HUC) 05090101 01 03, comes from the 2010 Integrated Water Quality Monitoring and Assessment Report. Monitoring is scheduled for this watershed in 2013. The watershed use assessment evaluated four categories: aquatic life use assessment, recreational use assessment, public drinking water supply assessment, and fish tissue assessment.

Aquatic Life Use Assessment
Aquatic life use was placed into reporting category 5hx (impaired with historical data from a past Integrated Report). The sampling year for the aquatic life use assessment was 1994. The watershed was given a score of 0.0. The causes of impairment were direct habitat alterations, metals, nutrients, organic enrichment, dissolved oxygen, suspended solids, and unionized ammonia. The impairment was caused by dam construction and major municipal point sources.

Recreational Use Assessment
Recreational use was placed into reporting category 3 (use attainment unknown). No other information about recreational use was given.

Public Drinking Water Supply Assessment
The reporting category for drinking water supply assessment is not applicable to this location in the watershed. There are no known causes of impairment toward public drinking water supply. This watershed is not on the nitrate watch list or the pesticide watch list.

Fish Tissue Assessment
The reporting category for fish tissue is 5 (impaired, TMDL needed). The cause of impairment was PCBs (polychlorinated biphenyls). The PCB concentration in this watershed was 620 parts per billion.

A TMDL is scheduled for 2016.

The complete Ohio Integrated Report can be found at the following website:
http://www.epa.ohio.gov/dsw/tmdl/2010IntReport/2010OhioIntegratedReport.aspx

Development of Water-Quality-Based Effluent Limits

Determining appropriate effluent concentrations is a multiple step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits. In addition, antidegradation and whole effluent toxicity issues must be addressed.

As in past modeling studies, all facilities discharging to the Mahoning River mainstem between the Leavittsburg dam and the Ohio-Pennsylvania boundary are considered interactive and are included in the wasteload allocation (WLA). The WLA contains a total of 23 outfalls from 6 municipal WWTPs and 7 industrial facilities, as follows:

Warren Steel Holdings (CSC Industries)	Thomas Steel Strip
RG Steel - Warren	ArcelorMittal-Warren
Warren WWTP	RMI-Niles
GenOn Niles Power	Niles WWTP
McDonald Steel	Campbell WWTP
Youngstown WWTP	Lowellville WWTP
Struthers WWTP	

Four dischargers located on tributaries are allocated separately from the mainstem discharges: Meander Creek WWTP (Meander Creek), Girard WWTP (Little Squaw Creek), Mosquito Creek WWTP (Mosquito Creek), and Boardman WWTP (Mill Creek). Travel time to and distance from the Mahoning River are considered large enough that, for modeling purposes, the effluents from the respective treatment plants are considered non-interactive with the direct dischargers to the Mahoning. Effluents from these four treatment plants were allocated to meet water quality standards for the conditions, habitat, and use designation for their particular receiving waters and separate Permit Support Documents were prepared for each facility. Monitoring was conducted downstream of these dischargers or at the mouths of these tributaries, however, for inputs into the Mahoning River mainstem model.

A schematic representation of the study area can be found in Figure 2.

Parameter Selection Effluent data for the Niles WWTP were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data (DMRs)	January 2006 through September 2011
Pretreatment program	2006 - 2010

The effluent data were checked for outliers and the following values were eliminated from the data set: for nitrate+nitrite, two values less than 0.1 mg/L and one value of 58.9 mg/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 PEQ_{avg} and PEQ_{max} values are presented in Table 6.

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 10 for a summary of the screening results.

Water Quality Standards
Ohio water quality standards (WQS) were used for all parameters except for chronic cadmium, chronic lead, chronic chromium^{+6} diss., chronic selenium and chronic iron. The Mahoning River enters Pennsylvania at about river mile (RM) 11.43, and Pennsylvania WQS must be met at that point. The Pennsylvania Aquatic Life criteria and Human Health criteria were met at the state line for all other parameters (metals and organics).

Flows in the Mahoning River
Flows in the Mahoning River are contributed by a series of reservoirs in the headwaters and on Mosquito Creek, controlled and mostly owned by the U.S. Army Corps of Engineers. Constructed several decades ago to provide adequate flow for the steel industry of the Mahoning River valley, the reservoirs are operated on a schedule to maintain specific seasonal flows at Leavittsburg and Youngstown. The operation of the reservoir system is discussed at length in earlier USEPA Mahoning River studies (Amendola et al., 1977; Schregardus and Amendola, 1984).

Modeling Approach and Wasteload Allocations
Appropriate effluent concentrations for dischargers to the Mahoning River were determined using two models: a Monte Carlo model for the six commonly allocated metals (cadmium, chromium (total), copper, lead, nickel, and zinc) and the conventional Ohio EPA conservative parameter model (CONSWLA) for all other parameters. The models and their applications are discussed in the sections that follow and model inputs are presented.

Allocations are developed using a percentage of stream design flow (as specified in Table 8), and allocations cannot exceed the Inside Mixing Zone Maximum criteria. The data used in the WLAs are listed in Tables 7 and 8. The wasteload allocation results to maintain all applicable criteria are presented in Table 9.

Beginning in November 2010, the use of mixing zones to determine the waste load allocation for bioaccumulative chemicals of concern (BCCs) is no longer allowed. This means that limits for BCCs after November 2010 must meet water quality standards with no allowances for dilution. Since mercury is considered a BCC, discharges must comply with water quality standards at the discharge point. In order to obtain mercury effluent data which can be compared to the water quality standards, the permittee must use a low level method for mercury sampling and analysis.

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 Mahoning River, there were 5 such paired samples available applicable to copper, lead, and silver. To account for the limited quantity of data, the DMT for each of these metals was determined as the lower end of the 95% confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. A DMT for zinc, cadmium,

chromium, and nickel could not be determined due to shortcomings in the data. 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 Monte Carlo Model
The application of the Monte Carlo method was limited to the six commonly allocated metals (cadmium, chromium (total), copper, lead, nickel, and zinc). Previous allocations, using the conventional Ohio EPA conservative parameter model, resulted in stringent limits for these parameters that have been difficult for dischargers to maintain. As a result, the Ohio EPA was asked to consider other methods for determining effluent limits that would adequately protect the river while allowing the dischargers some relief. The Monte Carlo method addresses these concerns but does not guarantee more favorable discharge limits. This is the third permit cycle where a Monte Carlo method was used to determine the wasteload allocations for the six metals listed above.

Conventional water quality modeling methods project the receiving water pollutant concentration which will occur under critical low-flow conditions. The Monte Carlo probabilistic method, as applied to water quality modeling, projects the year-round probability distribution for the pollutant. This allows a more accurate determination of the frequency at which water quality criteria are violated or maintained. Conventional modeling methods, when applied to systems with numerous dischargers, may be overly conservative because they model all dischargers at their maximum permitted concentration. The more dischargers modeled, the more unlikely it is that all will discharge at their maximum level at the same time and at critical low-flow conditions. The Monte Carlo method accounts for the independent variability of discharges as well as other model inputs.

The Monte Carlo model for the Mahoning River was originally developed by Limno-Tech, Inc., for their 1993 study to determine alternative copper limits for Thomas Strip Steel. The model combines the Monte Carlo statistical method with a multi-discharge mass-balance model and allows upstream flow to be input from a historical gaging station flow record, in order to to account for unusual flow fluctuations caused by the numerous upstream dams and reservoirs. Ohio EPA approved the alternative limits developed using this model and received permission to modify and apply the model in the future. The original model was written in 1992-1993 in Borland Pascal. For this permit cycle, the model has been modified by the Ohio EPA and re-written in the ‘C’ programming language.

River Hardness and Water Quality Criteria
Water quality criteria for the six metals depends on instream hardness. Thus, hardness is a key element in determining effluent limits. A detailed analysis of the available hardness and flow data was conducted. This analysis revises and updates the Ohio EPA analysis previously performed in 2002. Stream hardness data was taken from the two main STORET stations on the Mahoning River main stem, at Leavittsburg, Ohio (RM 45.51) and at Lowellville, Ohio (RM 12.42). The hardness data for the two stations was analyzed for the period January 1997 to October 2006.

A linear correlation between the Leavittsburg USGS gaging station flow and instream hardness was determined for both STORET stations. These correlations were then used to calculate hardness as a function of river mile at 129 cfs (Leavittsburg 1Q10 low flow) and 136 cfs (7Q10 low flow).

Acute Criteria, at 1Q10

river hardness (mg/L) = (-0.575)(river mile) + 184.534

Chronic Criteria, at 7Q10

river hardness (mg/L) = (-0.575)(river mile) + 184.291

Discharger hardness was calculated with these equations. This relationship established local river hardness for calculating outside-mixing-zone, hardness-dependent criteria in the Monte Carlo model. Inside-mixing-zone, maximum criteria were determined with effluent hardness data when available, or outside-mixing-zone hardness when effluent data was unavailable.

Table 1 contains the water quality criteria for the six metals in the vicinity of the Niles WWTP.

This Monte Carlo method uses a thirty-day averaging period with a ten-year return period for meeting chronic (average) water quality criteria. A one-day averaging period with a ten-year return period is used for meeting the acute (maximum) water quality criteria. Since the chronic aquatic life criteria are less than or approximate to both the agriculture and human health criteria and since the return periods for both agriculture and human health criteria would be longer than ten years, the allocations that meet the average aquatic life criteria will be protective of the agriculture and human health criteria as well.

Federal rules require that a downstream state's water quality criteria be considered when calculating effluent limits. The Pennsylvania state line is at RM 11.43. Pennsylvania's standards are the same as Ohio's for copper, total chromium, nickel, and zinc. However, Pennsylvania's standards for cadmium and lead are more stringent than Ohio's and had to be considered. Since Pennsylvania uses, in effect, a one hundred-day return period, Ohio's acute criteria for those two metals, in combination with a ten-year return period, still meet Pennsylvania's water quality criteria. However, the same is not true for the chronic criteria.

Table 1. Water Quality Criteria for Monte Carlo Model Parameters (Niles WWTP)

	Outside Mixing Zone Criteria				Inside
	Average		Maximum	Mixing	
Parameter (µg/L)	Human Health	Agri-culture[A]	Aquatic Life[B]	Aquatic Life[B]	Zone Maximum[C]
Cadmium	-	50.	0.39 [E]	8.0	17.
Chromium, total	-	100.	130.	2700.	5800.
Copper	1300.	500.	15.[D]	24.[D]	48.
Lead	-	100.	5.7 [D,E]	240.[D]	510.
Nickel	610.[E]	200.	80.	720.	1500.
Zinc	69000.	25000.	180.	180.	390.

[A] There is some uncertainty regarding the return period used to develop the Agricultural Water Supply (AWS) criteria. Therefore, the AWS criteria for the Monte Carlo model are presented for information purposes only.
[B] Based on river hardness of 166 mg/L.
[C] Based on effluent hardness of 177 mg/L.
[D] Effective Criteria Based on Application of Dissolved Metal Translator.
[E] Pennsylvania WQC at the state line.

Data Analysis for the Monte Carlo Model

The Monte Carlo method accounts for individual system component variability by generating probability distributions that predict a range of possible input conditions. These distributions are derived from the mean and the coefficient of variation input by the user and based on field data for each of these components. Table 2 lists the calculated mean and coefficient of variation for such system characteristics as background/ambient concentrations and discharger and tributary flows.

Table 2. Monte Carlo Model Inputs

Parameter	Mean	Coefficient of Variation Acute	Coefficient of Variation Chronic	Source
Mahoning River at Leavittsburg				
Flow (MGD)[A]	--	--	--	USGS
Cadmium (µg/L)	0.0	0.0	0.0	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	2.1	0.31	0.12	STORET
Lead (µg/L)	0.0	0.0	0.0	STORET
Nickel (µg/L)	2.8	0.18	0.07	STORET
Zinc (µg/L)	0.0	0.0	0.0	STORET
Mosquito Creek at mouth				
Flow (MGD)	80.9	1.44	0.54	USGS/SWIMS
Cadmium (µg/L)	0.25	2.7	1.0	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	2.4	0.7	0.27	STORET
Lead (µg/L)	0.0	0.0	0.0	STORET
Nickel (µg/L)	0.94	0.65	0.25	STORET
Zinc (µg/L)	11.3	1.3	0.47	STORET
Meander Creek at mouth				
Flow (MGD)	3.61	0.3	0.11	SWIMS
Cadmium (µg/L)	0.0	0.0	0.0	STORET
Chromium, total (µg/L)	1.3	0.97	0.37	STORET
Copper (µg/L)	6.0	0.92	0.35	STORET
Lead (µg/L)	0.0	0.0	0.0	STORET
Nickel (µg/L)	8.1	1.4	0.53	STORET
Zinc (µg/L)	40.	1.3	0.48	STORET
Little Squaw Creek at mouth				
Flow (MGD)	3.6	0.44	0.17	SWIMS
Cadmium (µg/L)	0.15	2.7	1.0	SWIMS
Chromium, total (µg/L)	3.2	0.35	0.13	SWIMS
Copper (µg/L)	12.	0.60	0.23	SWIMS
Lead (µg/L)	0.0	0.0	0.0	SWIMS
Nickel (µg/L)	9.8	0.87	0.33	SWIMS
Zinc (µg/L)	64.	0.80	0.30	SWIMS

Table 2. Monte Carlo Model Inputs (continued)

Parameter	Mean	Coefficient of Variation Acute	Coefficient of Variation Chronic	Source
Mill Creek at mouth				
Flow (MGD)	44.5	2.2	0.84	USGS
Cadmium (µg/L)	0.12	0.48	0.18	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	2.4	0.70	0.26	STORET
Lead (µg/L)	4.1	1.9	0.74	STORET
Nickel (µg/L)	28.1	0.30	0.11	STORET
Zinc (µg/L)	13.5	1.87	0.71	STORET
Discharger flows (MGD)				
Warren Steel Holdings (CSC)	0.76	0.94	0.35	SWIMS
Thomas Steel Strip	0.62	0.45	0.17	SWIMS
RG Steel				
003	0.086	0.98	0.37	SWIMS
006	0.013	1.56	0.59	SWIMS
007	2.48[C]	0.30	0.11	SWIMS
008	6.91	0.17	0.07	SWIMS
Intake[B]	--.--	--.--	--.--	---
013	34.3	0.11	0.04	SWIMS
010	0.24	0.72	0.27	SWIMS
011	1.47	0.60	0.23	SWIMS
012	0.14	0.47	0.18	SWIMS
ArcelorMittal 014	2.58	0.44	0.17	SWIMS
Warren WWTP	14.9	0.49	0.19	SWIMS
RMI - Niles	0.35	0.51	0.19	SWIMS
GenOn Power				
002	2.7	0.43	0.16	SWIMS
008	0.001	0.0	0.0	SWIMS
009	1.0	0.0	0.0	
Niles WWTP	4.99	0.52	0.20	SWIMS
McDonald Steel0.91	0.97	0.37	SWIMS	
Youngstown WWTP	34.6	0.39	0.15	SWIMS
Campbell WWTP	2.1	0.55	0.21	SWIMS
Struthers WWTP	4.7	0.31	0.12	SWIMS
Lowellville WWTP	0.43	0.72	0.27	SWIMS

[A] Each iteration of the model sequentially selects an upstream flow from the historical flow record at this gage.
[B] Intake flow was set equal to the sum of the RG Steel effluent flows plus the Mittal flow, multiplied by 0.871. (12.9% of the RG Steel / Mittal flow comes from sources other than the intake.)
[C] Long-term average value reported on the application.

The Conservative Substance Wasteload Allocation Model (CONSWLA)
The Conservative Substance Wasteload Allocation Model (CONSWLA) was used to allocate all parameters not included in the Monte Carlo model. CONSWLA is the model Ohio EPA typically uses in multiple discharger situations. Contrary to the Monte Carlo model, CONSWLA model inputs for flow are fixed at their critical low levels and inputs for effluent flow are fixed at their design or 50th percentile levels. Background concentrations are fixed at a representative value (generally a 50th percentile). A mass balancing method is then used to allocate effluent concentrations that maintain WQS under these conditions. This technique is appropriate when data bases are unavailable to generate statistical distributions for inputs (like those used in the Monte Carlo method) and if the parameters modeled are conservative.

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 Niles WWTP, the wasteload allocation values are 1.0 TU_a and 22.8 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.

<u>Reasonable Potential/ Effluent Limits/Hazard Management Decisions</u>

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 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 6, 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 10.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for Niles WWTP outfall 3PD00036001 and the basis for their recommendation.

Most of the effluent limits in the draft permit are the same as those in the current permit. The limits recommended for suspended solids and $CBOD_5$ are technology-based treatment standards included in 40 CFR Part 133, Secondary Treatment Regulation. Secondary treatment is defined by the Best Practicable Waste Treatment Technology criteria, which are required of all publicly owned treatment works discharging to effluent limited stream segments (with respect to conventional pollutants*)*. For a facility required to meet secondary treatment standards, monitoring of ammonia-N is appropriate and is proposed.

Limits proposed for dissolved oxygen, oil and grease, pH, and *E. coli*. are based on Water Quality Standards (OAC 3745-1-07). *E. coli* limits and monitoring are replacing fecal coliform limits and monitoring due to new water quality standards. WQS for bacteria are based on *E. coli*. rather than fecal coliform.

The Ohio EPA risk assessment (Table 10) places chlorine and mercury in group 5. This placement as well as the data in Tables 3, 4 and 6 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters PEQ is greater than 100 percent of the wasteload allocation. Pollutants that meet this requirement must have permit limits under OAC Rule 3745-33-07(A)(1).

Ohio EPA risk assessment (Table 10) places cadmium, chromium, hexavalent chromium, copper, cyanide, lead, nickel and zinc in groups 2/3. This placement as well as the data in Tables 3, 4 and 6 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 reduced frequency is proposed to document that these pollutants continue to remain at low levels.

The *2010 Ohio Integrated Water Quality Monitoring and Assessment Report* (Ohio EPA) lists the Mahoning River as impaired for aquatic life. Nutrients and organic enrichment/dissolved oxygen are listed as causes, and major municipal point sources are listed among the "high magnitude" sources. Considering this information and the fact that municipal wastewater treatment plants discharge a nutrient load to the river, monitoring for phosphorus, nitrate + nitrite and total Kjeldahl nitrogen is proposed based on best engineering judgment. Monitoring for phosphorus and nitrate + nitrite at the upstream and downstream stations also is proposed. The purpose of the monitoring is to maintain a nutrient data set for use in the future TMDL (total maximum daily loads) study.

Based on best engineering judgment, once every two weeks monitoring is proposed for total filterable residue (total dissolved solids).

Ohio EPA evaluated instream total dissolved solids (TDS) data collected in the Mahoning River at Lowellville, approximately one mile from the Ohio-Pennsylvania border (n = 128, range = 164 – 650 mg/l, period of record = January 1999 – January 2012). The Agency calculated summer and winter concentrations to characterize instream TDS levels. These concentrations are 95th percentiles of the monthly averages and daily values of the data. The calculated values are: monthly average – 364 mg/l (S), 456 mg/l (W); maximum – 423 mg/l (S), 587 mg/l (W).

These values are lower than the monthly average and maximum Pennsylvania TDS standards, 500 mg/l and 750 mg/l. This demonstrates that currently there is not reasonable potential for the instream TDS concentration to exceed the Pennsylvania standards at Lowellville, close to the state line. Based on this finding, water quality based effluent limits for TDS are not currently necessary for Ohio wastewater facilities discharging at their existing TDS loads.

Ohio EPA is pursuing a plan to begin regular TDS monitoring at a site in the lower part of the Mahoning River in Ohio. This monitoring would provide additional baseline data on ambient TDS concentrations with Ohio facilities discharging at their existing TDS loads. The Agency will consider options for reducing the TDS load to the Mahoning River if an upward trend in the ambient concentration is observed

Ohio EPA will evaluate proposals for new or increased TDS loadings to the Mahoning River from Ohio NPDES dischargers, which could be subject to provisions of Ohio's antidegradation rule (OAC 3745-1-05).

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

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

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the whole effluent toxicity data presented in Table 5 and other pertinent data under the provisions of OAC 3745-33-07(B), the Niles wastewater treatment plant is placed in Category 4 with respect to whole effluent toxicity. None of the four acute toxicity tests exceeded the WLA of 1.0 TUa; one test showed a slight toxic effect to fathead minnows that was less than the WLA.

Annual acute toxicity monitoring is proposed for the life of the permit. While test results indicate that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

<u>Other Requirements</u>

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

Sanitary Sewer Overflow Elimination Schedule
The draft permit contains two compliance schedules related to SSOs and bypasses. The first schedule requires elimination of all SSOs by December 31, 2012, and includes post-construction monitoring and reporting of potential overflow locations. The second schedule requires the elimination of the plant's headworks bypass by December 31, 2017. This second project will likely involve significant construction and therefore needs the longer schedule for planning, financing and construction.

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 Niles WWTP 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 which affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II, Item A of this NPDES permit represents language necessary to implement rule 3745-7-02 of the Ohio Administrative Code (OAC), and requires the permittee to designate one or more operator of record to oversee the technical operation of the sewerage system.

Storm Water Compliance
In order to comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on February 17, 2009. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than February 17, 2014, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations.

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

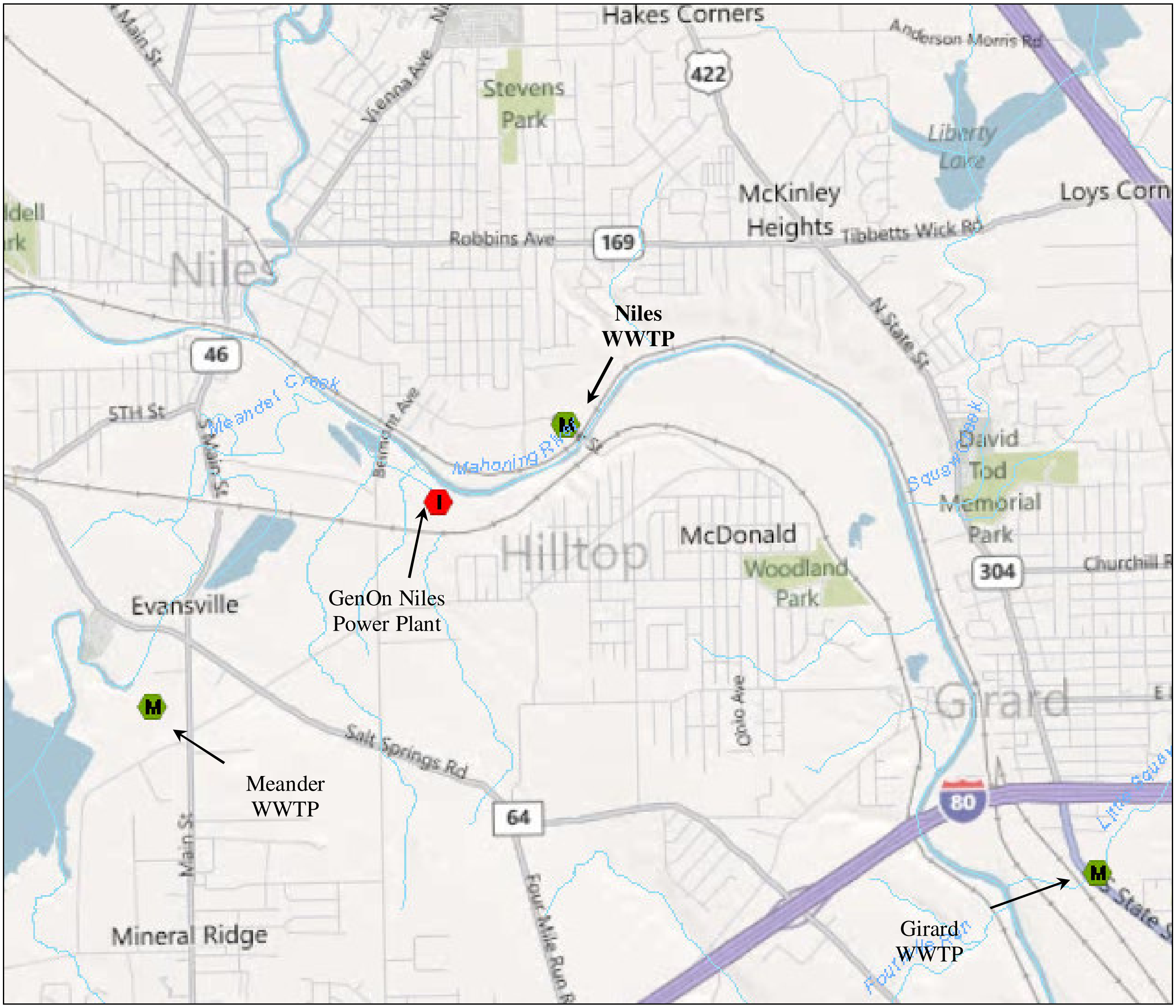
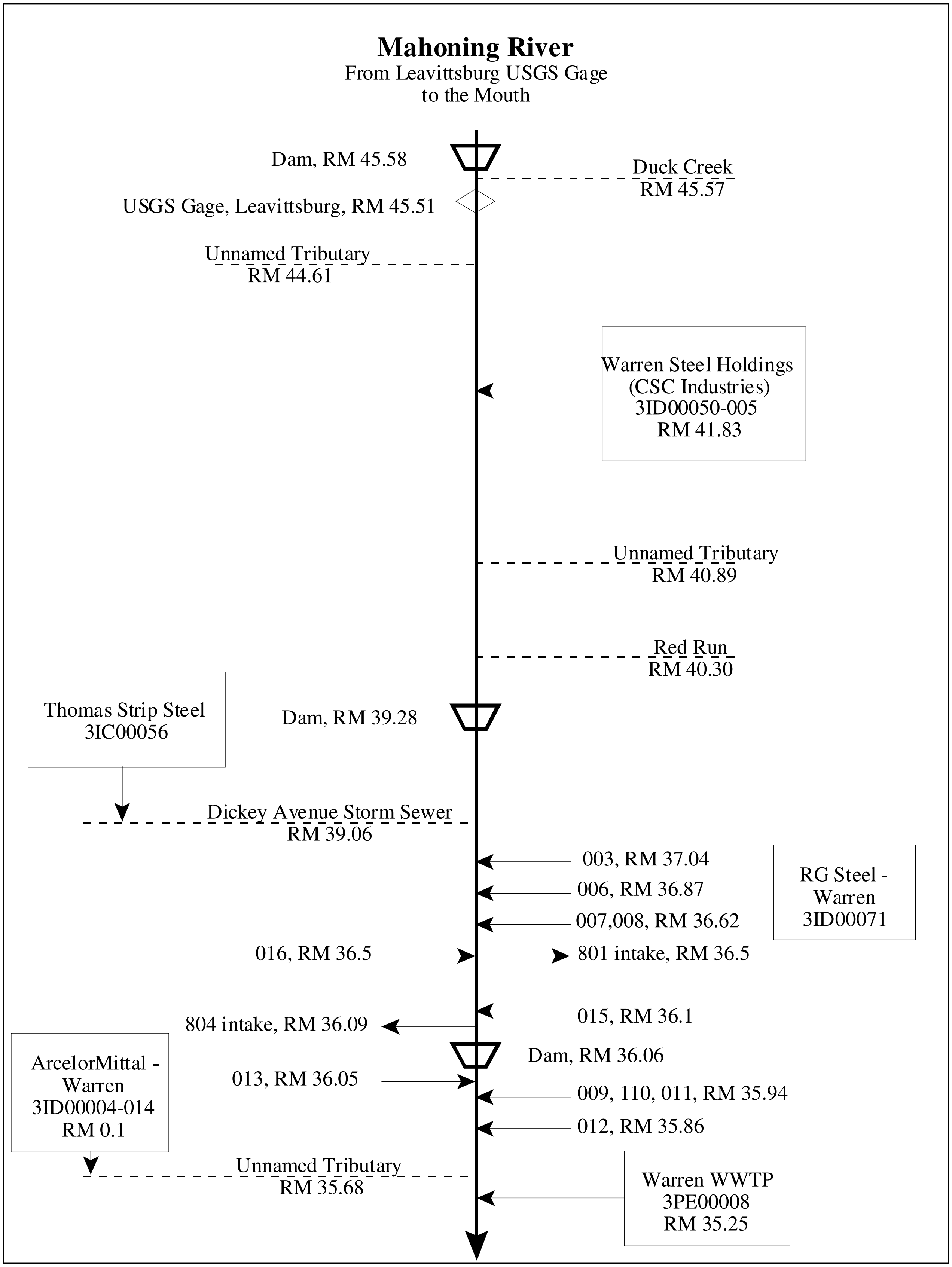
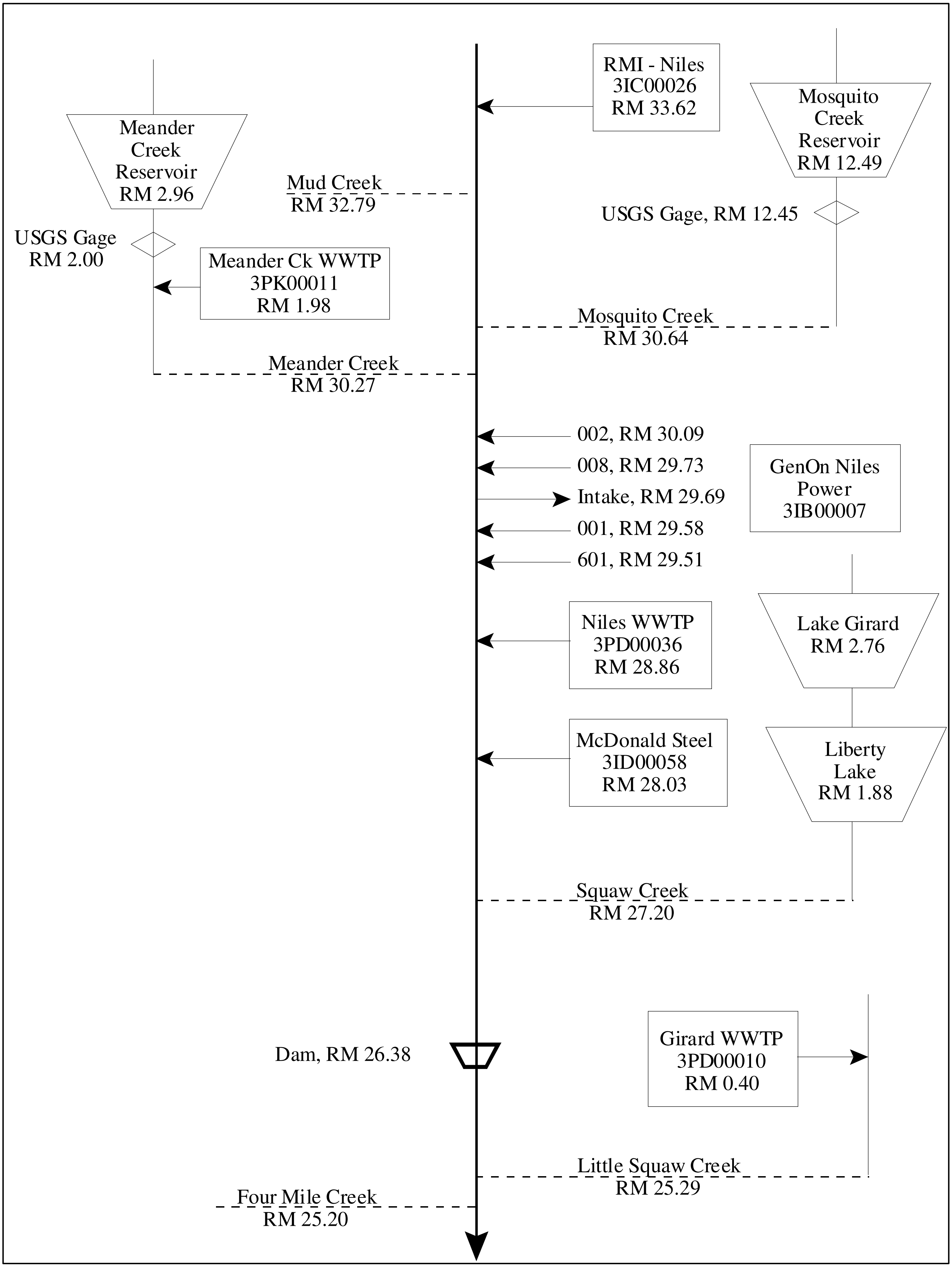
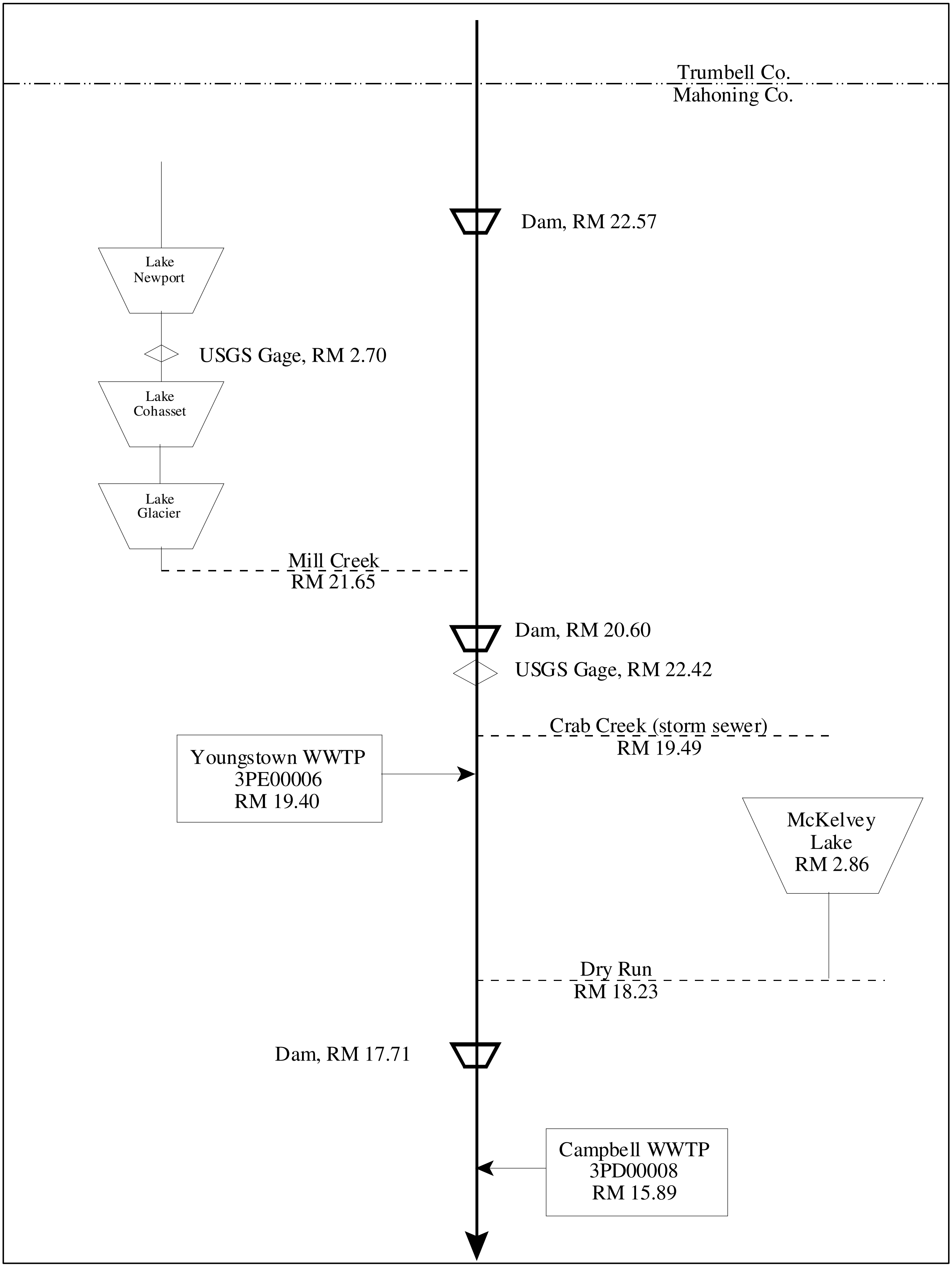


Figure 1. Approximate Location of Niles WWTP


Mahoning River
From Leavittsburg USGS Gage
to the Mouth
Dam, RM 45.58
Duck Creek
RM 45.57
USGS Gage, Leavittsburg, RM 45.51
Unnamed Tributary
RM 44.61
Warren Steel Holdings
(CSC Industries)
3ID00050-005
RM 41.83
Unnamed Tributary
RM 40.89
Red Run
RM 40.30
Thomas Strip Steel
3IC00056
Dam, RM 39.28
Dickey Avenue Storm Sewer
RM 39.06
003, RM 37.04
006, RM 36.87
007,008, RM 36.62
RG Steel -
Warren
3ID00071
016, RM 36.5
801 intake, RM 36.5
015, RM 36.1
804 intake, RM 36.09
Dam, RM 36.06
ArcelorMittal -
Warren
3ID00004-014
RM 0.1
013, RM 36.05
009, 110, 011, RM 35.94
012, RM 35.86
Unnamed Tributary
RM 35.68
Warren WWTP
3PE00008
RM 35.25


RMI - Niles
3IC00026
RM 33.62
Mosquito Creek Reservoir
RM 12.49
Meander Creek Reservoir
RM 2.96
Mud Creek
RM 32.79
USGS Gage, RM 12.45
USGS Gage
RM 2.00
Meander Ck WWTP
3PK00011
RM 1.98
Mosquito Creek
RM 30.64
Meander Creek
RM 30.27
002, RM 30.09
008, RM 29.73
Intake, RM 29.69
001, RM 29.58
601, RM 29.51
GenOn Niles Power
3IB00007
Niles WWTP
3PD00036
RM 28.86
Lake Girard
RM 2.76
McDonald Steel
3ID00058
RM 28.03
Liberty Lake
RM 1.88
Squaw Creek
RM 27.20
Girard WWTP
3PD00010
RM 0.40
Dam, RM 26.38
Little Squaw Creek
RM 25.29
Four Mile Creek
RM 25.20



Trumbell Co.
Mahoning Co.
Dam, RM 22.57
Lake Newport
USGS Gage, RM 2.70
Lake Cohasset
Lake Glacier
Mill Creek
RM 21.65
Dam, RM 20.60
USGS Gage, RM 22.42
Crab Creek (storm sewer)
RM 19.49
Youngstown WWTP
3PE00006
RM 19.40
McKelvey Lake
RM 2.86
Dry Run
RM 18.23
Dam, RM 17.71
Campbell WWTP
3PD00008
RM 15.89

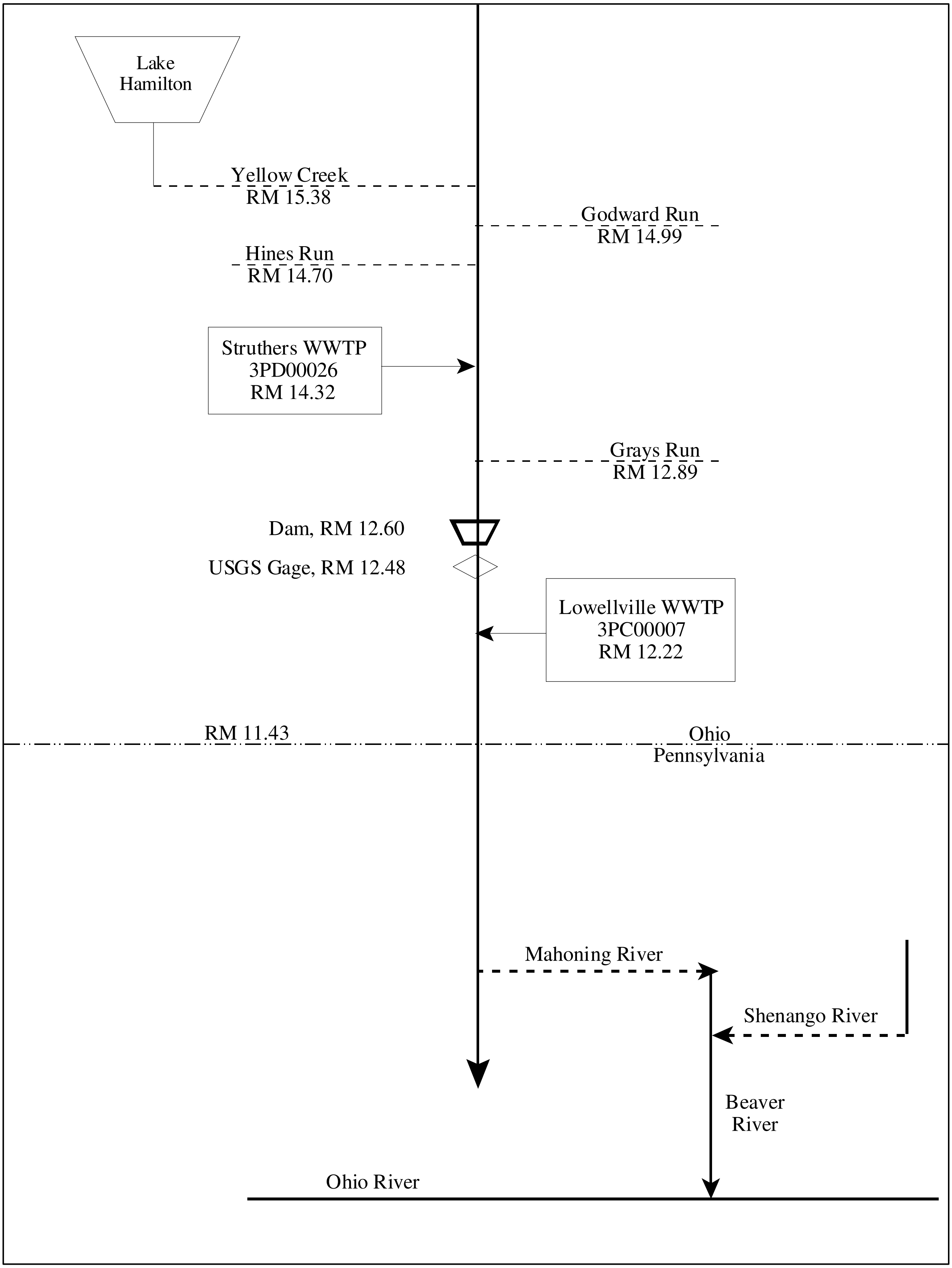


Figure 2. Lower Mahoning River Study Area

Table 3. Effluent Characterization Based on Pretreatment Data

Summary of analytical results for the Niles WWTP outfall 001. All values are in : g/l unless otherwise indicated. PT = data from, pretreatment program reports; 2C = Data from application form 2C; OEPA = data from analyses by Ohio EPA; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

PARAMETER	PT 09/16/10	PT 08/26/09	PT 09/24/08	PT 09/19/07	PT 09/06/06
Cadmium (ug/l)	ND(10)	ND(0.2)	0.36	ND(0.20)	ND(1.0)
Copper (ug/l)	ND(10)	13.5	ND(5)	ND(5)	ND(5.0)
Nickel (ug/l)	10	8.92	ND(5)	ND(5)	ND(10)
Zinc (ug/l)	49	37	29.4	35.3	31
Bromomethane (ug/l)	ND(10)	ND(5)	3.2	ND(2.0)	ND(5.0)
Chloroform (ug/l)	ND(5)	ND(5)	2.2	ND(2.0)	ND(5.0)

Table 4. Effluent Characterization Based on Self Monitoring Data

Summary of current permit limits and unaltered monthly operating report (MOR) data for the Niles WWTP outfall 3PD00036001_. All values are based on annual records unless otherwise indicated. N = Number of Analyses. * = For pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; A = 7 day average. Decision Criteria: PEQ_{avg} = monthly average; PEQ_{max} = daily maximum analytical results.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50th	95th		# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Water Temperature	Annual	C	Monitor		2191	15	20.8	5.7-44			
Dissolved Oxygen	Summer	mg/l	--	5.0 (min.)	788	7.9	8.9	5.71-10.3			
Dissolved Oxygen	Winter	mg/l	--	5.0 (min.)	776	8.89	10.1	6.2-11			
Total Suspended Solids	Annual	mg/l	30	45[A]	940	3	20.1	1-83			
Total Suspended Solids	Annual	kg/day	705	1057 [A]	940	53.1	493	9.11-3110			
Oil and Grease, Hexane Extr Method	Annual	mg/l	--	10	93	0	4.54	0-99.4			
Oil and Grease, Hexane Extr Method	Annual	kg/day	--	--	93	0	71.3	0-1010			
Oil and Grease, Freon Extr-Grav Meth	Annual	mg/l	--	--	50	0	9.66	0-14.7			
Oil and Grease, Freon Extr-Grav Meth	Annual	kg/day	--	--	50	0	160	0-966			
Nitrogen, Ammonia (NH3)	Summer	mg/l	Monitor		471	2	10.3	0-15.8	312	6.727	14.54
Nitrogen, Ammonia (NH3)	Winter	mg/l	Monitor		465	3.2	13.1	0.1-55.4	218	7.157	15.75
Nitrogen, Ammonia (NH3)	Summer	kg/day	--	--	471	32.1	151	0-358			
Nitrogen, Ammonia (NH3)	Winter	kg/day	--	--	465	65.9	300	2.31-1010			
Nitrogen Kjeldahl, Total	Annual	mg/l	Monitor		145	2.7	12.4	0-59			
Nitrogen Kjeldahl, Total	Annual	kg/day	--	--	145	41.3	237	0-976			
Nitrite Plus Nitrate, Total	Annual	mg/l	Monitor		145	10.5	24.3	0-58.9	135	28.73	43.91

Nitrite Plus Nitrate, Total	Annual	kg/day	--	--	145	177	360	0-796			
Phosphorus, Total (P)	Annual	mg/l	Monitor		312	2.12	3.43	0.3-6.02	299	3.049	4.035
Phosphorus, Total (P)	Annual	kg/day	--	--	312	34.4	76.2	3.91-175			
Cyanide, Free	Annual	mg/l	Monitor		71	0	0	0-0.01	67	0.0073	0.010
Cyanide, Free	Annual	kg/day	--	--	71	0	0	0-0.106			
Nickel, Total Recoverable	Annual	ug/l	Monitor		72	0	22.7	0-36	74	15.86	24.88
Nickel, Total Recoverable	Annual	kg/day	--	--	72	0	0.325	0-0.784			
Zinc, Total Recoverable	Annual	ug/l	Monitor		72	34.5	103	0-230	74	72.48	108.2
Zinc, Total Recoverable	Annual	kg/day	--	--	72	0.531	2.23	0-3.3			
Cadmium, Total Recoverable	Annual	ug/l	Monitor		72	0	0	0-0	46	0.402	0.550
Cadmium, Total Recoverable	Annual	kg/day	--	--	72	0	0	0-0			
Lead, Total Recoverable	Annual	ug/l	Monitor		72	0	0	0-3.2	26	3.037	4.16
Lead, Total Recoverable	Annual	kg/day	--	--	72	0	0	0-0.0557			
Chromium, Total Recoverable	Annual	ug/l	Monitor		72	0	0	0-5	69	3.65	5.0
Chromium, Total Recoverable	Annual	kg/day	--	--	72	0	0	0-0.273			
Copper, Total Recoverable	Annual	ug/l	Monitor		72	0	7.3	0-14	74	7.252	11.27
Copper, Total Recoverable	Annual	kg/day	--	--	72	0	0.166	0-0.36			
Chromium, Dissolved Hexavalent	Annual	ug/l	Monitor		73	0	0	0-0	70	0	0
Chromium, Dissolved Hexavalent	Annual	kg/day	--	--	73	0	0	0-0			
Fecal Coliform	Annual	#/100 ml	1000	2000[A]	460	38	1470	0-12000			
Flow Rate	Annual	MGD	Monitor		2191	4.36	10	2.18-23.1			
Chlorine, Total Residual	Annual	mg/l	--	0.019	1073	0.001	0.02	0-0.038	1042	0.015	0.032
Chlorine, Total Residual	Annual	kg/day	--	--	1073	0.0224	0.373	0-1.12			
Mercury, Total (Low Level)	Annual	ng/l	12	1700	75	3.79	18.9	0-67.8	72	22.58	33.81
Mercury, Total (Low Level)	Annual	kg/day	0.0003	0.04	75	0.00007	0.000328	0-0.000875			
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	Monitor		4	0	0	0-0			
Acute Toxicity, Pimephales promelas	Annual	TUa	Monitor		4	0	0.51	0-0.6			
pH, Maximum	Annual	S.U.	--	9.0	1564	7.2	7.5	6.7-7.7			
pH, Minimum	Annual	S.U.	--	6.5	1564	7.2	7.4	6.6-7.6			

CBOD 5 day	Summer	mg/l	25	40 [A]	471	5	12.5	1-24
CBOD 5 day	Winter	mg/l	25	40 [A]	464	6	15	1-39
CBOD 5 day	Summer	kg/day	587	939 [A]	471	72.5	230	8.92-1370
CBOD 5 day	Winter	kg/day	587	939 [A]	464	130	470	17.1-1580

Table 5. Summary of Acute Toxicity Test Results

Test Date(a)	*Ceriodaphnia dubia 48 hours*						*Fathead Minnows 96 hour*					
	UP[b]	C[c]	LC_{50}[d]	%M[g]	TUa[h]	NF[i]	UP[b]	C[c]	LC_{50}[d]	%M[g]	TUa[h]	NF[i]
12/3/2008 (E)	0	NR	>100	0	<1.0	NT	5	NR	>100	0	<1.0	NT
12/9/2009 (E)	0	NR	>100	0	<1.0	NT	30	NR	>100	30	<1.0	NT
12/31/2010 (E)	0	NR	>100	0	<1.0	NT	0	NR	>100	0	<1.0	NT
12/13/2011 (E)	0	NR	>100	0	<1.0	NT	0	NR	>100	0	<1.0	NT

[a] O = EPA test; E = entity test
[b] UP = upstream control water
[c] C = laboratory water control
[d] LC_{50} = median lethal concentration
NT = not tested
[f] %A = percent adversely affected in 100% effluent
[h] TUa = acute toxicity units
[i] NF = near field sample in the Mahoning River
ND = not determined
NR – not reported in OEPA database

Table 6. Effluent Data for Niles WWTP

Parameter	Units		# of Samples	# > MDL	Average PEQ	Maximum PEQ
Self-Monitoring (DMR) Data						
Ammonia	mg/L	S	312	311	6.727	14.54
Ammonia	mg/L	W	218	218	7.157	15.75
Nitrite+Nitrate	mg/L		135	135	28.73	43.91
Phosphorus	mg/L		299	299	3.049	4.035
Cyanide, free	µg/L		67	1	7.3	10.0
Nickel [B]	µg/L		74	26	15.86	24.88
Zinc [B]	µg/L		74	73	72.48	108.2
Cadmium [B]	µg/L		46	1	0.402	0.550
Lead	µg/L		26	2	3.037	4.16
Chromium, tot. rec.	µg/L		69	1	3.650	5.0
Copper [B]	µg/L		74	9	7.252	11.27
$Chromium^{+6}$, diss.	µg/L		70	0	--	--
Chlorine, tot. res.	µg/L		1042	757	15.46	32.34
Mercury	ng/L		72	67	22.58	33.81
OEPA and Pretreatment Data						
Bromomethane	µg/L		5	1	8.877	12.16
Chloroform [A]	µg/L		5	1	6.103	8.360

[A] Carcinogen
[B] Pretreatment data was combined with the DMR data.

Table 7. Water Quality Criteria for the CONSWLA Model

		Outside Mixing Zone Criteria				
			Inside			
		Average			Maximum	Mixing
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Ammonia - S	mg/L	--	--	1.3	--	--
Ammonia – W	mg/L	--	--	4.0	--	--
Antimony	µg/L	4300.	--	190.	900.	1800.
Arsenic	µg/L	--	100.	150.	340.	680.
Barium	µg/L	--	--	220.	2000.	4000.
Beryllium [H]	µg/L	280.	100.	25.	220.	480.
Bis(2-ethylhexyl)phthalate	µg/L	59.	--	8.4	1100.	2100.
Boron	µg/L	--	--	3900.	33000.	65000.
Bromodichloromethane	µg/L	460.	--	--	--	--
Bromoform	µg/L	3600.	--	230.	1100.	2200.
Bromomethane	µg/L	4000.	--	16.	38.	75.
Chlorine, tot. res.	µg/L	--	--	11.	19.	38.
Chloroform	µg/L	4700.	--	140.	1300.	2600.
Chromium $^{+6}$, diss.	µg/L	--	--	10. [C]	16.	31.
Cobalt	µg/L	--	--	24.	220.	440.
Cyanide, free	µg/L	220000.	--	12.	46.	92.
Dibromochloromethane	µg/L	340.	--	--	--	--
Fluoride	µg/L	--	2000.	--	--	--
Iron	µg/L	--	5000.	1500. [C]	--	--
Mercury [A]	ng/L	12.	10000.	910.	1700.	3400.
Methyl Bromide	µg/L	4000.	--	16.	38.	75.
Methylene Chloride	µg/L	16000.	--	1900.	11000.	22000.
Molybdenum	µg/L	--	--	20000.	190000.	370000.
Naphthalene	µg/L	--	--	21.	170.	340.
Nitrate+Nitrite	mg/L	--	100.	--	--	--
Phenol	µg/L	4600000.	--	400.	4700.	9400.
Selenium	µg/L	11000.	50.	4.6 [C]	--	--
Silver	µg/L	–	–	1.3	24. [D]	49. [D]
Strontium	µg/L	--	--	21000.	40000.	81000.
Tetrachloroethylene	µg/L	89.	--	53.	430.	850.
Thallium	µg/L	6.3	--	17.	79.	160.
Tin	µg/L	--	--	180.	1600.	3200.
Toluene	µg/L	200000.	--	62.	560.	1100.
Total Dissolved Solids	mg/L	--	--	1500.	--	--
Total Dissolved Solids	mg/L	--	--	500. [C]	--	--

[A] Bioaccumulative Chemical of Concern (BCC)
[C] Pennsylvania Water Quality Criteria.
[D] Effective Criteria Based on Application of Dissolved Metal Translator.
[H] Aquatic Life Criteria Based on hardness of 169.mg/l. IMZM based on hardness of 180. mg/l.

Table 8. Instream Conditions and Discharger Flows for the CONSWLA Model

Parameter	Units/Outfall		Value	Basis
Mahoning River Upstream				
7Q10	cfs	annual	136.	USGS gage #03094000, 1969-2010 data
1Q10	cfs	annual	129.	USGS gage #03094000, 1969-2010 data
30Q10	cfs	summer	186.	USGS gage #03094000, 1969-2010 data
	cfs	winter	192.	USGS gage #03094000, 1969-2010 data
HMQ	cfs	annual	383.	USGS gage #03094000, 1969-2010 data
Meander Creek at mouth				
7Q10	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
1Q10	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
30Q10	cfs	summer	6.19	USGS gage #03097500, 1929-51 data
	cfs	winter	6.19	USGS gage #03097500, 1929-51 data
HMQ	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
Mosquito Creek at mouth				
7Q10	cfs	annual	10.6	USGS gage #03095500, 1954-91 data
1Q10	cfs	annual	9.47	USGS gage #03095500, 1954-91 data
30Q10	cfs	summer	14.0	USGS gage #03095500, 1954-91 data
	cfs	winter	12.6	USGS gage #03095500, 1954-91 data
HMQ	cfs	annual	28.0	USGS gage #03095500, 1954-91 data
Mill Creek at mouth				
7Q10	cfs	annual	9.99	USGS gage #03098500, 1952-71 data
1Q10	cfs	annual	9.87	USGS gage #03098500, 1952-71 data
30Q10	cfs	summer	10.7	USGS gage #03098500, 1952-71 data
	cfs	winter	15.7	USGS gage #03098500, 1952-71 data
HMQ	cfs	annual	14.3	USGS gage #03098500, 1952-71 data
Discharger Flow (cfs)				
Warren Steel Holdings	005		2.01	DSW Permits Staff
Thomas Steel Strip	001		1.83	DSW Permits Staff
RG Steel Warren	003		0.34	DSW Permits Staff
	006		0.08	DSW Permits Staff
	007		3.84	DSW Permits Staff
	008		13.4	DSW Permits Staff
	010		0.77	DSW Permits Staff
	011		4.56	DSW Permits Staff
	012		0.38	DSW Permits Staff
	013		57.6	DSW Permits Staff
ArcelorMittal Warren	014		6.50	DSW Permits Staff
Warren WWTP	001		24.8	DSW Permits Staff
RMI-Niles	001		0.743	DSW Permits Staff
Niles WWTP	001		9.59	DSW Permits Staff
McDonald Steel	001		2.82	DSW Permits Staff

Table 8. Instream Conditions and Discharger Flows for the CONSWLA Model - Continued.

Parameter	Units/Outfall		Value	Basis
Discharger Flow	cfs			
Mosquito Creek WWTP	001		6.50	DSW Permits Staff
Meander Creek WWTP	001		6.19	DSW Permits Staff
Boardman WWTP	001		7.74	DSW Permits Staff
GenOn Niles Power	001		264.6	DSW Permits Staff
	002		6.92	DSW Permits Staff
	008		0.002	DSW Permits Staff
	009		3.09	DSW Permits Staff
Girard WWTP	001		7.74	DSW Permits Staff
Youngstown WWTP	001		54.2	DSW Permits Staff
Campbell WWTP	001		2.94	DSW Permits Staff
Struthers WWTP	001		9.28	DSW Permits Staff
Lowellville WWTP	001		0.792	DSW Permits Staff
Mixing Assumption	%	average	100	Stream-to-discharge ratio
	%	maximum	100	Stream-to-discharge ratio
Background Water Quality				
Ammonia	mg/L	summer	0.30	Niles 801: 24 values,0<MDL, 2006-11
Ammonia	mg/L	winter	0.40	Niles 801: 17 values,0<MDL, 2006-11
Arsenic	µg/L	annual	2.0	STORET [C]; 38 values, 17<MDL, 2006-2011
Beryllium	µg/L	annual	0.	No representative data available.
Bis-2EHP	µg/L	annual	0.	No representative data available.
Boron	µg/L	annual	0.	No representative data available.
Bromomethane	µg/L	annual	0.	No representative data available.
Cadmium	µg/L	annual	0.	STORET [C]; 38 values, 38<MDL, 2006-2011
Chlorine, total res	µg/L	annual	0.	No representative data available.
Chromium, tot.	µg/L	annual	1.	STORET [C]; 12 values, 11<MDL, 2006-2011
Chromium^{+6}, diss	µg/L	annual	0.	No representative data available.
Chloroform	µg/L	annual	0.	No representative data available.
Cobalt	µg/L	annual	0.	No representative data available.
Copper	µg/L	annual	5.	STORET [C]; 38 values, 30<MDL, 2006-2011
Cyanide free	µg/L	annual	0.	No representative data available
Fluoride	µg/L	annual	0.	No representative data available.
Iron	µg/L	annual	719.	STORET [C]; 38 values, 0<MDL, 2006-2011
Lead	µg/L	annual	1.	STORET [C]; 38 values, 35<MDL, 2006-2011
Molybdenum	µg/L	annual	0.	No representative data available.
Naphthalene	µg/L	annual	0.	No representative data available.
Nickel	µg/L	annual	2.75	STORET [C]; 12 values, 0<MDL, 2006-2011
Nitrate+Nitrate	mg/L	annual	0.61	STORET [C]; 38 values, 0<MDL, 2006-2011
Phenol	µg/L	annual	0.	No representative data available.
Selenium	µg/L	annual	0.	STORET [C]; 38 values, 38<MDL, 2006-2011
Silver	µg/L	annual	0.	No representative data available.
Strontium	µg/L	annual	127.	STORET [C]; 38 values, 0<MDL, 2006-2011
TDS	mg/L	annual	252.	STORET [C]; 38 values, 0<MDL, 2006-2011
Tetrachloroethylene	µg/L	annual	0.	No representative data available.
Thallium	µg/L	annual	0.	No representative data available.
Tin	µg/L	annual	0.	No representative data available.
Zinc	µg/L	annual	5	STORET [C]; 38 values, 33<MDL, 2006-2011

[C] STORET station # 602280 Mahoning River @ Leavittsburg - Leavitt Rd. RM 45.51

Table 9. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

		Average			Maximum	Inside
Parameter	Units	Human Health	Agri Supply	Aquatic Life	Aquatic Life	Mixing Zone Maximum
Ammonia - S	mg/L	--	--	16.	--	--
Ammonia - W	mg/L	--	--	--	--	--
Arsenic [B]	µg/L	–	473.	374.	830.[A]	680.
Bromomethane	µg/L	30140.[A]	–	66.	152.[A]	75.
Cadmium	µg/L	–	–	1.9 [E]	17.[A]	17.
Chlorine, tot. res.	µg/L	–	–	12.	19.	38.
Chromium, tot. [B]	µg/L	–	–	603.	5800.[A]	5800.
$Chromium^{+6}$, dissolved [B]	µg/L	–	–	25. [E]	39.[A]	31.
Copper	µg/L	–	–	48.[D]	48.[A D]	48.
Cyanide free [B]	µg/L	681400.[A]	–	20.	73.	92.
Lead	µg/L	–	–	23.[D, E]	510.[A D]	510.
Mercury [C]	ng/L	12.	10000.[A]	910.	1700.	3400.
Molybdenum [B]	µg/L	–	–	53730.	497500.[A]	370000.
Nickel	µg/L	–	–	353.	1500.[A]	1500.
Nitrate+Nitrite	mg/L	–	4734.	--	--	--
Selenium [B]	µg/L	52020.	236.	11.[E]	–	–
Silver [B]	µg/L	–	–	3.0	19.[D]	49.[D]
Zinc	µg/L	--	--	390.[A]	390.[A]	390.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.
[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested for use in pretreatment program.
[C] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, criteria must be met at end-of-pipe unless the requirements for an exception are met as listed in 3745-2-08.
[D] WLA based on applicable dissolved metal translator.
[E] Limits to meet Pennsylvania water quality criteria.

Table 10. Parameter Assessment

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

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

Arsenic	Chloroform	$Chromium^{+6}$,diss.
Chromium, tot.	Molybdenum	Nickel
Selenium	Silver	

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

Ammonia-S	Ammonia-W	Bromomethane
Cadmium	Copper	Cyanide, free
Lead	Nitrate+Nitrite	Zinc

Group 4: $PEQ_{max} \geq$ 50% but <100% of the maximum PEL or $PEQ_{avg} \geq$ 50% but < 100% of the average PEL. Monitoring is appropriate.
No parameters meet the criteria of this group.

Group 5: Maximum PEQ ≥ 100% of the maximum PEL or average PEQ ≥ 100% of the average PEL, or either the average or maximum PEQ is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits Average	Maximum
Chlorine, total res.	µg/L	summer only	12.	19.
Mercury	ng/L	annual	12.	1700.

Table 11. Final Effluent Limits and Monitoring Requirements for the Niles WWTP

Parameter	Units	Effluent Limits: Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day)[a] 30 Day Average	Loading (kg/day)[a] Daily Maximum	Basis[b]
Flow	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/l	--	5.0 (min.)	--	--	WQS
$CBOD_5$	mg/l	25	40[d]	587	939[d]	BPT
Suspended Solids	mg/l	30	45[d]	705	1057[d]	BPT
Dissolved Solids	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Ammonia-N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Kjeldahl N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Nitrate/Nitrite-N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Phosphorus	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Oil and Grease	mg/l	--	10	--	--	WQS
pH	S.U.	- - - - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - -				WQS
E. coli	#/100ml					
Summer		126	284[d]	--	--	WQS
Chlorine Residual	mg/l	--	0.019	--	--	WLA
Cyanide, Free	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Cadmium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Chromium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Hex. Chromium (Dissolved)	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Copper, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Lead, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Mercury, T.	ng/l	12	1700	0.00028	0.040	WLA
Nickel, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Zinc, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Whole Effluent Toxicity						
Acute	TUa	- - - - - - - - Monitor (w/o trigger) - - - - - - - - - -				WET

[a] Effluent loadings based on average design discharge flow of 6.2 MGD.

[b] Definitions:
ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l))
BPJ = Best Professional Judgment
BPT = Best Practicable Treatment Technology, 40 CFR Part 133, Secondary Treatment Rule
M = Monitoring
WET = Minimum Test Requirement, OAC 3745-33-07(B)(11)
WLA = Wasteload Allocation procedures (OAC 3745-2)
WQS = Ohio Water Quality Standards (OAC 3745-1).

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

[d] 7 day average limit.

Attachment – River Segment Summary from Ohio Integrated Report

Division of Surface Water Large River Assessment Unit Summary

Overview Information

Waterbody: Mahoning River
Segment: Eagle Creek to Pennsylvania border
Length: 37.00 miles
Priority Points: 6
Monitoring Scheduled: 2013
TMDL Scheduled: 2016

Aquatic Life Use Assessment

Reporting Category: 5x
Aquatic Life Uses: WWH
Sampling Years: 1997, 2002, 2003, 2006
Sites Monitored: 14
Total Miles Monitored: 16.00
Assessment Unit Score: 47.5
Miles in Full Attainment: 7.60 (47.50%)
Miles in Partial Attainment: 3.40 (21.30%)
Miles in Non Attainment: 5.00 (31.20%)

Most Recent Data

Year Assessed	Station Name	River Mile	Drainage Area	Aquatic Life Use	Attainment Status
2006	MAHONING R. AT WARREN @ 3RD ISLAND DST. SUMMIT ST.	39.08	594	WWH	Full
2006	MAHONING R. AT WARREN @ WEST MARKET ST.	38.26	594	WWH	Full
2006	MAHONING R. NEAR YOUNGSTOWN SHEET & TUBE, CAMPBELL	17	1018	WWH	Non
2006	MAHONING R. AT LTV STEEL CAMPBELL @ POLAND AVE.	16.46	1022	WWH	Non
2006	MAHONING R. DST. LTV 039, UPST. 041	16.1	1022	WWH	Non

Causes of Impairment

cause unknown
chlorine
direct habitat alterations
metals
nutrients
oil and grease
organic enrichment/DO
priority organics
thermal modifications

Sources of Impairment

combined sewer overflows
contaminated sediments
dam construction - development
flow regulation/modification - development
hazardous wastes
major municipal point source
minor industrial point source
source unknown
spills
urban runoff/storm sewers (NPS)

Comments: The WWH aquatic life use for the Mahoning River mainstem was listed as impaired based on historical data in the 2006 Integrated Report. For the 2008 report, aquatic life data from several small surveys conducted between 1997 and 2006 were included to update the mainstem assessment. Mainstem coverage was somewhat limited in that only 16 of 37 mainstem miles were considered assessed based on these small surveys. Aquatic life use status of the remaining 21 miles remains unknown. Identified causes and sources based on the intensive survey conducted in 1994 were carried over to this Integrated Report.

Recreation Use Assessment
Reporting Category: 3i
Assessment Unit Score: Not calculated

Public Drinking Water Supply Assessment
Reporting Category: 0
Cause of Impairment: None
Nitrate Watch List: No

Fish Tissue Assessment
Reporting Category: 5
Causes of Impairment: PCBs
PCB Concentration: 531 ppb